"I could only think about what i was doing, and that was a lot to think about": online self-regulation in dialogue interpreting

Herring, Rachel

"I Could Only Think About What I Was Doing, and That Was a Lot to Think About": Online Self-Regulation in Dialogue Interpreting

Thèse

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Rachel E. Herring

Jury :

- Prof. Barbara Moser-Mercer, Faculté de traduction et d'interprétation, Université de Genève (Directrice de thèse)
- Prof. Suzanne Ehrlich, Université de Floride du Norde (Co-directrice de thèse)
- Prof. Sonia Halimi, Faculté de traduction et d'interprétation, Université de Genève (Président du Jury)
- Prof. Birgitta Englund Dimitrova, Université de Stockholm (Jurée externe)
- Dr. Marta Arumí Ribas, Université Autonome de Barcelone (Jurée externe)
- Dr. Debra Russell, Université d'Alberta (Jurée externe)

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Abstract:

Although dialogue interpreting has been the focus of much scholarly interest in the past several decades, such research has primarily investigated its interactional, social, and communicative aspects. This dissertation approaches the study of this complex, dynamic task from a distinct perspective, placing the interpreter's experience of task performance at center stage. It employs a process-focused approach to exploring the features and variables of the interpreted interaction from the point of view of the task performer. The research study reported on herein explores dialogue interpreters' online self-regulation, defined as *online monitoring of affect, behavior, cognition, and context and the online employment of affectual, behavioral, or cognitive control mechanisms in order to maintain or increase alignment between the current state of the interactional system and the interpreter's performance goals.* Eight participants (5 'expert', 3 'novice') interpreted a simulated interaction and completed a retrospective process tracing session. The results of the study shed light on the aspects of the interactional system that interpreters monitor, the control mechanisms they employ during performance, and the goal states mediating their online self-regulation. In addition to reporting on the aforementioned research study, the author discusses and proposes models of dialogue interpreting.

Keywords: dialogue interpreting, community interpreting, public-service interpreting, self-regulation, online monitoring, online control, expertise studies, simulation of interpreted interactions, retrospective process tracing

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1. Introduction & Overview

> "Interpreters are not simply processing information and passively passing it back and forth. Their task requires knowledge of a discourse system that includes grammar, language use, organization, participant relationships, contextual knowledge, and sociocultural knowledge. Interpreters must also have the ability to adapt this knowledge quickly to size up a situation, anticipate problems, and decide on solutions within seconds which means they operate within an emergent system of adaptability" (Roy, 2000:103).

> "[*In dialogue interpreting*,] to the multi-tasking processes involved in all interpreting (simultaneous listening/watching, discourse processing, speaking, self-monitoring) is added constant (re-)negotiation of role, turn management, and general monitoring of the unfolding of the talk exchange, in which at least three parties are involved. Moreover, the interpreters are subject to conflicting pressures—from employers, clients and other participants, in the face of which it becomes very difficult to maintain impartiality and professional detachment" (Mason, 2001:i).

Dialogue interpreting involves the performance of complex cognitive and interactional processes under time constraints in dynamic and often high-stakes environments. As the preceding quotations illustrate, the task facing the interpreter is far from straightforward. The research reported on in this dissertation places the interpreter and his/her experience of task performance at center stage in order to better understand the features, parameters, and variables involved in dialogue interpreting. This chapter begins with a description of the object of study and a brief overview of major themes in the scholarly literature on dialogue interpreting. The second section describes the approach and focus of the research reported on herein, and the third section introduces the theoretical frameworks underlying the research and the rationale for their employment. The chapter ends with a section situating the research in relation to my personal and professional background and a summary of the methodology.

1.1 Dialogue Interpreting: Description & Major Research Foci

The type of interpreting described by Mason (2001) and Roy (2000) in the quotations that begin this dissertation is referred to by a number of names, including liaison interpreting, ad hoc interpreting, community interpreting, public service interpreting, medical/legal interpreting, and dialogue interpreting. The label employed by a given individual tends to reflect the type of interaction being described, geographical preferences, and the focus of the person doing the

labeling (see Mikkelson, 1999; Hale, 2007; and Tipton & Furmanek, 2016 for further discussion of labels). In this dissertation I employ the label 'dialogue interpreting' because it is broader, and thus more inclusive, than other possible labels, and because it emphasizes the interaction-coordinating aspects of dialogue interpreting, which are of central importance to task performance.

Dialogue interpreters are usually called upon to provide their services in situations in which a person with limited proficiency in a majority language and a fluent speaker[1] of the majority language need to communicate with each other. These interactions are typically goal-oriented and often, although not always, involve situations in which the individual with limited proficiency in the majority language is seeking something—for example, information, authorization for benefits, medical care, or a legal decision—from a person who has a higher status, whether real or perceived, or is in a position of authority. Such situations often deal with very sensitive subject matter, are characterized by inherent power imbalances between the parties, and are rife with potential for misunderstanding or conflict (Mason, 1999; Roy, 2000; Fontes, 2008; Mason and Ren, 2012). In addition to the need to communicate across language barriers, individuals involved in interpreted interactions must communicate across different ways of understanding and approaching the world, which, in many cases, may not be immediately mutually intelligible, or may even be in conflict (Wilcox & Shaffer, 2005; Rudvin, 2006). While in some cases all parties may be working toward the same end, divergent or conflicting goals are also typical features of this type of interaction (Mason, 1999; Fontes, 2008). Consider, for example, the tensions, power imbalances, and cultural differences that may come into play in settings such as courts, medical interactions, educational settings, social welfare agencies, and immigration proceedings.

Wadensjö (2011) provides a concise overview of several key features of dialogue interpreting, contrasting them with simultaneous conference interpreting:

- Dialogue is generally spontaneous and arises from the situation at hand, while conference presentations are generally pre-planned (and often written out in advance of delivery);
- Dialogue interpreters work in two directions, switching source and target languages (SL and TL, respectively) with every change of speaker, while conference interpreters generally work into only one language and are not generally required to switch back and forth between SL and TL frequently.[2]

[1] While I use terms such as 'speaking', 'hearing', and 'listening' throughout this dissertation, I do so advisedly, without intent to exclude signed languages or bimodal (i.e., between signed and spoken languages) interpreting.
[2] There are some notable exceptions to this trend; for example, retour (i.e., simul into the B, or second, language, rather than into the A, or first, language) is routinely provided by interpreters of some languages, such as Chinese or Arabic, and may be provided by interpreters of other languages as well. Wadensjö's (2011) point that simultaneous

- Dialogue interpreters are generally in close physical proximity to the parties for whom they are interpreting,[3] while conference interpreters are generally (although not always) in a separate booth at a remove from the proceedings;
- The dialogue interpreter is often the only person in the room who understands both languages.[4]

The influence of setting- and situation-specific factors on the interpreter's performance is central to understanding the complexities of the dialogue-interpreting task, as Mason (1999:148/149) stresses:

> "A glance at the issues listed below *[in Mason's article]*, as they emerge from studies carried out over the past two decades, shows quite conclusively the centrality of face-to-face dialogue in the interpreters' dilemmas, role-adopting, and decision-making processes" . . . "In general, wherever a particular outcome is of vital importance to one or both parties, pressures on the interpreter increase and go well beyond those experienced in routine conference simultaneous situations."

Dialogue interpreting performance thus requires not only a high level of proficiency in at least two languages and competence in the cognitive skills of interpreting, but also a broad array of auxiliary skills and knowledge, including the following:

- communication and interpersonal skills (including nonverbal/paralinguistic communication)
- discourse analysis skills
- turn-taking and interaction management skills
- knowledge & skill related to intercultural communication (e.g., awareness of potential differences in education/background/cultural assumptions between speakers and the effects of the same on communication)
- knowledge of professional codes of ethics and standards of practice, and the ability to put them into practice in a high-stakes, rapidly-changing environment
- understanding of concepts and knowledge of technical vocabulary related to specific settings

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conference involves less switching of target language and source language nevertheless holds, as simultaneous conference interpreting generally does not involve frequent changes of speaker of the sort that characterize dialogue interpreting.

[3] In some circumstances, the interlocutors are in a room together and the interpreter is present via telephone or videoconference.

[4] Wadensjö (2011) states that members of audiences for conference interpreting are often multi-lingual and are thus more likely to contain individuals who understand both the original and the interpretation.

- understanding of setting-specific differences in communication goals, expectations, and practices
- the ability to maintain professional composure and competent performance in situations that may cause personal distress

A great deal has been said in the Interpreting Studies literature about dialogue interpreting, its features, and its dynamic nature. Issues of interlingual/cultural communication, interaction management, role/positioning, and politeness/face have been widely explored (e.g. Wadensjö, 1998; Metzger, 1999; Roy, 2000; Mason, 1999, 2001). Analysis of interpreting in dialogue settings has repeatedly confirmed that, despite normative conceptualizations of interpreters as invisible and powerless, interpreters do have agency: besides being physically present in the interaction (and, thus, unavoidably visible), they are active co-participants and co-constructors of meaning whose decisions and behaviors undeniably influence the interpreted interaction (Wadensjö, 1998; Roy, 2000; Bélanger, 2004; Wilcox & Shaffer, 2005).

While an in-depth discussion of the abundant research on interpreted interactions is outside the scope of this dissertation, the reader unfamiliar with the literature is referred to works such as Wadensjö's (1998) volume on interpreting as interaction, Metzger's (1999) volume on neutrality in interpreting, the special edition of *The Translator* edited by Mason (1999), the edited volume on dialogue interpreting also edited by Mason (2001), Roy's (2000) volume on turn-taking; Angelelli's (2004) exploration of interpreters' views of their roles, Hale's (2007) overview of community interpreting, Valero Garcés & Martin's (2008) edited volume on community interpreting, Baraldi & Gavioli's (2012) edited volume focused on coordination of talk, and the multiple edited volumes arising from the Critical Link International conferences (Schäffner, Kredens, & Fowler, 2013; Hale, Ozolins, & Stern, 2009; Wadensjö, Englund Dimitrova, & Nilsson, 2007; Brunette, Bastin, Hemlin & Clarke, 2003; Roberts, Carr, Abraham & Dufour, 2000; and Carr, Roberts, Dufour, & Steyn, 1997), among many other books and articles that explore dialogue interpreting.

1.2 The Dialogue Interpreter as Task-Performer: A Process-Focused Approach

As discussed in the previous section, there is a large and growing body of research related to the interactional and communicative aspects of dialogue interpreting and the ramifications (whether purposeful or unintentional, positive or negative) of the interpreter's presence and performance for the interaction as a whole and the interlocutors involved in it. However, the dialogue interpreting literature generally does not take a process-focused approach to

understanding the task itself (Englund-Dimitrova & Tiselius, 2016); that is, the existing literature provides little information about the dialogue interpreter as task-performer.

Despite the paucity of process-focused research into dialogue interpreting, there is a long tradition of process-focused research into translation and interpreting. The cognitive processes involved in simultaneous conference interpreting have long been of interest to scholars in a number of fields, including language acquisition, bilingualism, cognition, neurocognition, psycholinguistics, communication, and pragmatics, as well to practitioners and educators (Gerver, 1976; Setton, 1999; Pöchhacker & Schlesinger, 2002; Pöchhacker, 2004; Gile, 2009; Hervais-Adelman, et al. 2011, 2014). Process research is one of the principal research paradigms within Interpreting Studies (Pöchhacker, 2004); indeed, a recent review of process-focused interpreting research identified more than 300 book chapters and journal publications dealing with translation or interpreting process research published between 2006 and 2013 (Muñoz Martín, 2014). Process-focused research into interpreting seeks to "understand the nature of the cognitive processes involved in translating [AN: and interpreting], *with a focus on the individual translator* [AN: or interpreter]" (Englund Dimitrova, 2010, quoted in Alvstad, et al., 2011:1; emphasis added).

The dearth of focused scholarly attention on the dialogue-interpreter-as-task-performer is not surprising, given that decontextualizing interpreting and the interpreter's processing—that is, separating interpreting and the interpreter from the communicative event being interpreted—is widely considered to be inadvisable, if not impossible. It is generally considered necessary to study the dialogue interpreter in the context of the interaction (Pöchhacker, 2005; Wadensjö, 2004; Englund Dimitrova & Tiselius, 2016). This foregrounding of the interaction has contributed to a situation in which "the (individual) interpreter tends in certain respects to be moved to the background" (Englund Dimitrova & Tiselius, 2016:199). While acknowledging the importance of the interaction and the communicative context to the task of dialogue interpreting, this study places the interpreter-as-task-performer at center stage. In doing so, I adopt a perspective similar to that outlined by Englund Dimitrova & Tiselius:

> "Some of the conclusions mentioned above, regarding the need to study the whole communicative situation in community interpreting, seem to contradict the possibility of studying cognition and the interpreting process only from the interpreter's perspective, or at least they indicate that such a study would disregard such important factors of the interpreting situation as to become uninteresting" .... "Despite such potential objections, *we believe that in view of the interpreter's central role in the complex social role of community interpreting, his or her cognition and problem solving merit further study*." (Englund Dimitrova & Tiselius, 2016:200, emphasis added).

The need to better understand the interpreter's experience of the dialogue interpreting task is further highlighted by the same authors, who call attention to the lack of "systematic study of what actually characterizes the "normal," "unproblematic" interpreting processes of the competent and experienced *[dialogue]* interpreter" (Englund Dimitrova & Tiselius, 2016:200). The research reported on in this dissertation contributes to filling in the gap in knowledge described by Englund Dimitrova & Tiselius (2016).

In taking a process-oriented approach to dialogue interpreting research and foregrounding the interpreter's perspective on the task, the research reported on in the following chapters takes an initial step toward modelling the dialogue-interpreting task. I adopt an exploratory approach, viewing the interpreted interaction as a complex system and seeking to better understand the features of the system, the variables affecting the system, and mechanisms available for achieving/maintaining equilibrium within the system from the point of view of the task performer. Rather than attempting to propose a comprehensive model on the basis of one study, I adopt a narrower focus, exploring the interpreter's monitoring of his or her performance and the control mechanisms s/he employs during performance, or, in other words, the interpreter's *online self-regulation*. In this context the term 'online' indicates that the focus is on the interpreter's self-regulation during the interpreted interaction, as opposed to before or after the interaction.[5]

My research thus takes a first step toward modelling dialogue interpreting from the perspective of the interpreter. The results of the study, presented and discussed in Chapter 9, describe variables that have the potential to influence performance (that is, potential targets for monitoring), control mechanisms that may be employed during performance, and the goal states mediating self-regulation of performance. In addition, they highlight the complexity of the task, suggest a number of avenues for future research, and provide a baseline of data for comparison. In a sense, this dissertation is an account of an exploratory journey. In addition to shedding light on the dialogue interpreter as task-performer, this research may also serve as an inspiration and point of reference for further process-focused research into dialogue interpreting.

1.3 Presentation of Theoretical Frameworks

The study presented in this dissertation is interdisciplinary in nature. As discussed in the previous section, it arises from the well-established paradigm of process-focused translation and

[5] In the Interpreting Studies literature, the term 'online' is commonly used to indicate that some thing or process occurs concomitantly with an interpretation—i.e., during performance, usually of simultaneous conference interpreting. In borrowing the term to describe dialogue interpreting, I use the term more broadly, applying it to the entirety of the performance phase, including moments when the interpreter is not speaking.

interpreting research (Pöchhacker, 2004; Muñoz Martín, 2014) and is informed by scholarly research into dialogue interpreting (e.g., Wadensjö, 1998; Metzger, 1999; Roy, 2000; Mason, 1999, 2001; see also the volumes mentioned in the concluding paragraph of Section 1.1). Inasmuch as process-focused research draws on the literature on expertise and skill acquisition (Ericsson, et al., 2006; Liu, 2008) and on working memory, attention, and executive control (Cowan, 2000/1, 2005; Timarová, 2008; Hofmann, et al., 2011; Baddeley, 2012), these bodies of knowledge are also highly relevant to the study. Another major strand of research and theory shaping this study is that involving the study of self-regulation and self-regulated learning (Pintrich, 2000; Zimmerman, 2000; Vohs & Baumeister, 2004; Dinsmore, et al., 2008; Carver & Scheier, 2011). See Figure 1, below, for a graphic representation of the theoretical influences on this study.

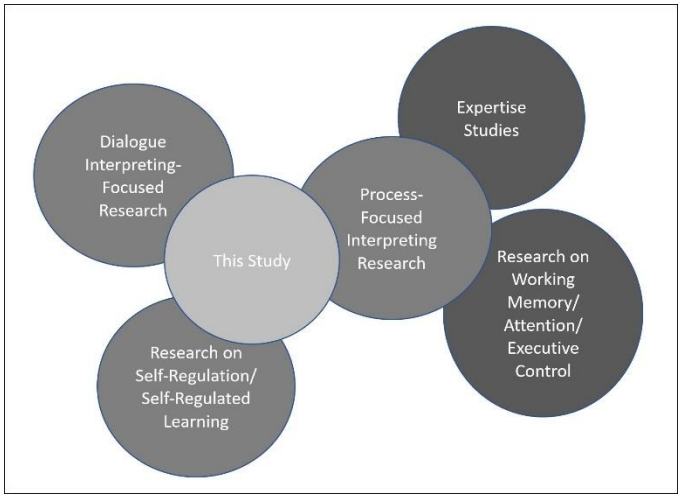

Figure 1 Situating this study within the field of Interpreting Studies

The theoretical portion of the dissertation thus begins with an overview of a number of relevant concepts related to memory, in Chapter 2. Chapter 3 discusses expertise studies and Chapter 4 discusses self-regulation. Chapter 5 discusses self-regulation in dialogue interpreting. In the immediately following sections, I briefly introduce expertise studies and self-regulation and the rationale for their use as the theoretical basis of the research study described and reported on in Chapters 6 through 9.

1.3.1 Expertise Studies: Describing the Trajectory of Skill Acquisition and the Characteristics of Competent Performance

The proposition that experts at a task or skill perform differently than novices is widely accepted (Ericsson, 2006a); indeed, research into expert performance has identified a number of cognitive and processing differences between novices and experts in many disciplines, including simultaneous conference interpreting (Hoffman, 1997; Ericsson, 2000; Liu, 2008; Moser-Mercer, 2007, 2010). Although intuition would suggest the existence of comparable differences in novice and expert dialogue interpreters, there is little research aimed at verifying the existence of such differences or describing them (see Englund Dimitrova & Tiselius, 2016, discussed above). This study is, therefore, novel in adopting an expertise-informed approached to studying dialogue interpreting.

Muñoz Martín (2014:55) describes expertise studies as seeking to identify "the potential range of cognitive, motivational and personal traits, habits and dispositions that will yield sustained outstanding performance." Although describing the characteristics of superior performance is one goal of expertise studies, it is not the only aim of such research. Describing differences in performance in more- and less-expert performers (i.e., in novices and in competent performers of a skill) provides insight into the developmental trajectory associated with skill acquisition (Chi, 2006), which, in turn, can lead to a better understanding of the demands of the skill and to improvements in training. As Liu (2008:160) puts it, "knowing how expert interpreters perform their craft differently from novice interpreters and how expertise progresses along a developmental course is crucial to the success and efficiency of interpretation training." Gaining insight into interpreters' performance at different points on the developmental trajectory is a fundamental step toward understanding the 'what' and 'how' of skill acquisition in dialogue interpreting. An expertise-studies approach is thus well suited to situating the interpreter-as-task-performer as the principal focus of inquiry. Expertise studies is further discussed in Chapter 3.

1.3.2 Self-Regulation: A Framework for Exploring Online Monitoring & Control

The high demands on cognitive processing involved in simultaneous conference interpreting are well-documented in the scholarly literature, which has explored issues such as simultaneity of listening and speaking, time constraints, and allocation of cognitive resources (e.g., working memory, parallel processing), all of which have been shown to potentially affect performance (Lambert and Moser-Mercer, 1994; Setton, 1999; Liu, 2008; Timarová, 2008; Gile, 2009, 2015; Moser-Mercer, 2010; Englund Dimitrova & Tiselius, 2016). In contrast, there has been little systematic inquiry into the variables influencing performance in dialogue interpreting.

The fundamental cognitive processes of comprehension, language transfer, and production are assumed to be involved in both simultaneous conference interpreting and dialogue interpreting (Hale, 2007; Englund Dimitrova & Tiselius, 2016). However, the many differences between conference interpreting and dialogue interpreting—especially with regard to simultaneity of listening and speaking in the case of the former[6] and interaction management in the case of the latter—suggest that while the variables influencing performance in the two subdomains of interpreting may overlap to some extent, they do not do so entirely.

For example, while the possibility of failures in performance due to cognitive overload exists in both types of interpreting, the existing literature, as well as intuition and experience, suggest differences in the factors that might lead to difficulties with allocation of cognitive resources. While dialogue interpreters do work under a time constraint (i.e., they are expected to produce a target language utterance immediately after hearing a source language utterance), that time constraint is qualitatively distinct from the time constraints experienced by simultaneous conference interpreters. In contrast to the situation faced by the conference interpreter in his/her booth, the dialogue interpreter does not usually face the need to speak and listen simultaneously, and, in most situations, has recourse to strategies or coping mechanisms not commonly available to simultaneous conference interpreters, such as modifying the pace of the interaction (by asking speakers to slow down or to pause for interpretation) or requesting a repetition or explanation of a portion of the source language utterance. At the same time, dialogue interpreting involves potential variables affecting performance that are generally not of central importance to conference interpreting, such as managing turn-taking and the flow of communication.

The research presented in this dissertation takes as its starting point the proposition that a systematic exploration of (1.) the variables influencing dialogue interpreters' performance and (2.) the control mechanisms employed by dialogue interpreters during performance is a necessary step toward formulating a process model of dialogue interpreting. This exploratory effort requires an analytical framework that is sensitive to the interactional, management, and affective factors that inevitably affect performance and to the range of control mechanisms that interpreters may employ.

The theoretical lens through which I approach this exploration is self-regulation, which focuses on "the many processes by which the human psyche exercises control over its functions, states, and inner processes" (Vohs & Baumeister, 2004:1). Inasmuch as the study of self-regulation is inherently focused on the individual and his/her achievement of performance goals

[6] Spoken-language dialogue interpreting is generally performed in the consecutive mode, although whispered simultaneous interpreting or simultaneous with remote equipment may be employed. Simultaneous interpreting is also frequently employed when the interpreter is working between a signed and a spoken language (i.e., bimodally).

(Pintrich, 2000; Dinsmore, et al., 2008; Carver & Scheier, 2000, 2011), it provides a productive theoretical and analytical framework for focusing attention on the interpreter-as-performer, and, more specifically, for exploring the parameters and features of the interpreting task that interpreters monitor during performance, as well as control mechanisms they employ. As Hild (2014:129) argues, "by integrating self-regulation and cognition within the purview of process research, one can move closer to gaining insights into how translators and interpreters operate in real-life situations." Self-regulation is further discussed in Chapter 4.

1.4 Researcher's Background and Statement of Purpose

Given that my object of study—dialogue interpreting—is also my field of professional practice, this dissertation can be seen as fundamentally emic (Headland, Pike, & Harris, 1990) in nature: the point of view is that of an insider, with considerable domain-specific expertise, whose approach to the object of study is inevitably influenced by her professional identity. Indeed, each step of the process that culminated in this dissertation—from the formulation of the research questions through the literature review, study design, data collection, data analysis, and write-up—has been informed by my experiences as an interpreter and educator (see also Mauthner & Doucet, 2003). In order to situate myself as a researcher and to contextualize the work presented in these pages, I briefly present some aspects of my background and experiences that are relevant to the development of my doctoral research.

I first encountered the academic discipline of Interpreting Studies as an MA student in Translation and Interpreting at the Monterey Institute of International Studies. After completing my studies there, I began to work as an interpreter, primarily in medical and educational settings. In 2010, I began coursework for the Master of Advanced Studies in Interpreter Training degree at the University of Geneva, during the course of which my interest in research—especially in skill acquisition, deliberate practice, and expertise—was rekindled.

In 2011, I began teaching interpreting at a community college in the state of Minnesota (USA). My proposal for doctoral research arose from my experience teaching in this program, which trains interpreters to work in a variety of settings. Due to Minnesota's long-standing tradition of welcoming immigrants, particularly refugees, there is a high demand for interpreters who speak a wide array of languages. For this reason, the translation and interpreting program in which I teach is language neutral—that is, classes are composed of students with different combinations of working languages, with English serving as the shared language of the group.

The benefits of a linguistically and culturally heterogeneous classroom include exposure to diverse points of view and a wide variety of individual experiences that may be drawn on in discussions of issues such as culture and ethics. Working with a linguistically diverse group of students is also challenging, especially with regard to the need to provide learners with adequate support and guidance during skill acquisition. Many of the difficulties encountered by student interpreters are cognitive in nature, and therefore not directly observable. While an instructor that is fluent in both the source and target languages may be able to infer something about the nature of a learner's processing by comparing input and output, identifying and troubleshooting problems in the learner's performance is more challenging when the instructor shares only one working language with the learner. In such cases, the instructor depends more heavily on the learner's own ability to observe, analyze, and report on his/her own cognitive processes. The learner's awareness of and ability to describe problems, attempted solutions, and outcomes is thus an integral factor in teaching and learning in a language-neutral environment.

The need to facilitate acquisition of interpreting skills in a setting where I do not always share the learners' working languages reinforced my interest in understanding the processes involved in interpreting—while I could not always offer feedback on linguistic aspects of my students' performance, I could help them to understand the skills and subskills involved in the task, and work to increase their metacognitive skills and ability to reflect on and troubleshoot their own task performance. I was aware, however, of the need to better understand—to have more empirical evidence of—the what and how of the complex and interrelated processes involved in dialogue interpreting performance. I was also aware of the need to better understand the developmental trajectory of interpreting skill acquisition—how processing and performance change as learners progress from novices to competent performers—in order to design effective curricula to facilitate skill acquisition. These considerations led me to place the interpreter, rather than the interaction or communication, at center stage in my research and informed the development of the research questions outlined in Chapter 6.

The pedagogical roots of my research align well with the oft-repeated call to strengthen synergies between research and training in the field of interpreting (Metzger, 1999; Hale, 2007; Angelelli, 2008; Pöchhacker, 2010; Wadensjö, 2011; Winston, 2013). A number of scholars, including those just cited, argue that researchers should make connections between their work and the practical realities of the classroom—that is, that research must both respond to and inform pedagogy. The research described in this dissertation was developed in response to identified pedagogical needs as described in the preceding paragraphs. Although the following chapters do not directly address pedagogy, my research has undoubtedly influenced my own teaching, and my hope is that it will inform the pedagogy of dialogue interpreting, whether on its own merits or through future research that draws on it.

1.5 Summary of Research Method

Interpreters with differing levels of training and experience (a 'novice' group and an 'expert' group) were recruited to interpret a simulated interaction and to complete a process-tracing retrospection immediately thereafter. In order to create as realistic an environment as possible, the simulation was planned and semi-structured, but not scripted. The process-tracing retrospection took place in three stages: uncued retrospection, minimally-cued retrospection, and verbal probes. The simulated interactions (the 'performances') were video- and audio-recorded, and the retrospective process tracing sessions (the 'retrospections') were audio-recorded.

The two data sets provide two perspectives on the same event. The performance data provides evidence of interpreters at work and allows for observation of overt control mechanisms employed during performance. The data from the retrospective process tracing provides insight into the foci of online monitoring and control. Triangulation between the two data sets strengthens the analysis in that it allows for comparison between the interpreter's performance and the interpreter's report on his/her performance.

The methodology and the data analysis process are discussed in detail in Chapter 7 and Chapter 8, respectively.

1.6 Conclusion

This chapter has provided an overview of dialogue interpreting as a field and as an object of scholarly inquiry, and has argued in favor of process-focused research into dialogue interpreting, placing the interpreter-as-task-performer at center stage. It has also argued for modelling dialogue interpreting, and positioned the research presented here within the context of dialogue interpreting research and process research in general. The chapter has also introduced the two primary theoretical frameworks that inform the research, described my background and motivation for undertaking this research, and briefly summarized the research method.

2. Memory

2.1 Introduction

Although memory is not the focus of study in this dissertation, many aspects of the work presented in the following chapters draw on and are informed by memory-related research. First, and fundamentally, interpreting and memory are closely (even, arguably, inextricably) linked: task performance—from source language comprehension to reformulation into the target language to production of the target language rendition—inevitably draws on the interpreter's memory. Second, the retrospective process tracing portion of the method is predicated on assumptions about memory and its accessibility for post-task retrieval that are based on empirical evidence from the literature. Third, the study participants' retrospective process tracing must be analyzed and understood within the context of research into memory, particularly with regard to attention, encoding, and retrieval. This chapter thus lays the groundwork for the rest of the dissertation by briefly introducing a number of relevant concepts and theories.

The literature on memory distinguishes between two principal types of memory, one long-lasting and durable and the other temporary and limited. This distinction is a long-standing one, dating back to the work of the philosophers John Locke in the late 17th century and William James in the late 19th century (Cowan, 2005, 2008, 2014). The former type—stable, long-lasting, and not limited in capacity—is known as *long-term memory* (LTM). The latter type, which is time- and capacity-limited, has been referred to as *short-term memory* or *working memory* (WM). There is a certain amount of confusion and imprecision in the common parlance—and also, on occasion, in the scholarly literature—with regard to usage of the terms short-term memory and working memory, as well as with regard to the distinction between them (Cowan, 2005). Baddeley (2012:5) prefers to use the term *short-term memory* to refer only to storage capacity, and the term *working memory* to the "combination of storage and manipulation" of information;[7] that is, working memory involves use of information, not only storage.

The following section provides an overview of models of working memory and describes one—Cowan's embedded processes model (1999, 2000/01, 2005)—in more detail. The final portion of the chapter discusses several aspects of long-term memory, including encoding, organization, and retrieval of information.

[7] In this context, and throughout this dissertation, "information" refers to any and all types of knowledge, including sensory information and procedural (how-to) knowledge, unless otherwise specified.

2.2 Working Memory

Working memory has been the subject of much attention and debate over the course of many decades (Baddeley, 2012). Gile (2009:167) points out that there are a number of ways of approaching and understanding working memory, but notes several points on which scholars tend to agree:

> "1. Working memory is a set of mechanisms or processes involved in the control, regulation, and active maintenance of task-relevant information in the service of complex cognition; it operates primarily on currently 'activated' information from long-term memory.
> 2. Working memory requires processing capacity.
> 3. Working memory has a small storage capacity."

Cowan, et al. (2005:42) define working memory as "the set of mental processes holding limited information in a temporarily accessible state in service of cognition." Key aspects of this definition are as follows:

- working memory is understood as processes, rather than a place or structure;
- working memory processes are limited (not inexhaustible);
- information in working memory is temporarily accessible (not permanently available);
- working memory makes information available for some end—that is, working memory processes are purposeful.

Models of working memory can be divided into two groups: those that conceptualize memory as a set of structures or stores (places, in a manner of speaking), and those that view it as a set of processes (Styles, 2005; Timarová, 2008). The classic structural account, in which the structures of working memory are identified and their properties explored, is Baddeley's (2012) model. Functional, or process, models, such as Cowan's (1999, 2000/01, 2005) embedded processes model and Ericsson & Kintsch's (1995) model of long-term working memory (LT-WM), view working memory not as a set of structures, but rather as "a set of *mechanisms* which enable short-term maintenance of task-relevant information to ensure successful task completion" (Timarová, 2008:9, emphasis added). Significantly, Baddeley considers both Cowan's and Ericsson & Kintsch's process models to be consistent with his structural model, although, as he puts it, they differ in terms of "emphasis and terminology" (Baddeley, 2012:20).

Cowan's (1999, 2000/01, 2005) and Ericsson & Kintsch's (1995) models integrate long-term memory, working memory, and attention, "emphasiz[ing] that working memory constitutes a subset of the representations of long-term memory, some of which are highlighted by (voluntary

and involuntary) attentional mechanisms and are thus particularly focused on" (Schweppe & Rummer, 2014:288). Process models of working memory and attention, especially Cowan's embedded processes model, have been proposed as particularly appropriate for the study of interpreting, especially in relation to the executive control/attention-focusing aspects of the task (Mizuno, 2005; Timarová, 2008). The following sections briefly present Baddeley's structural model, for context, and Ericsson & Kintsch's long-term working memory (LT-WM), in light of its focus on expert performance. Cowan's embedded processes model, which is that primarily drawn upon in this dissertation, is discussed in more depth.

2.2.1 Baddeley: A Structural Approach

One of the most influential models of working memory is that proposed by Baddeley & Hitch (1974, cited in Baddeley, 2012). The original version of the model posited the existence of two short-term input loops, one phonological and one visuo-spatial, mediated by a central executive in charge of "attentional focus, storage, and decision-making" (Baddeley, 2012:13-14). In the intervening decades, research findings have led to several revisions of the model. As of 2000, the model had been refined as shown in Figure 2.

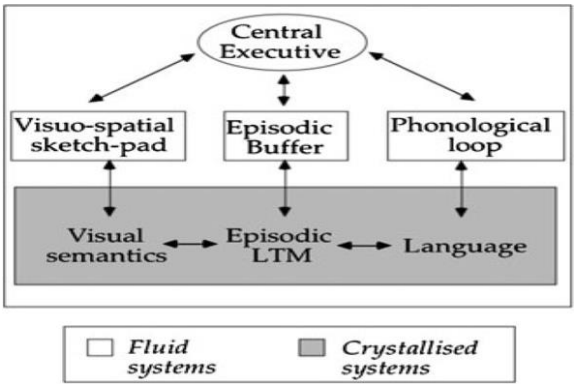

Figure 2. Baddeley's model of working memory, adapted from pg. 16 of Baddeley, A. (2012). Working memory: theories, models, and controversies. *Annual Review of Psychology 63*.

In this model, perceived information enters working memory through a phonological loop (i.e., aural input) and a visuo-spatial loop (i.e., things that are seen as well as haptic input). Both of these components as well as the episodic buffer interact with the fixed ("crystallised," Baddeley, 2012:11) contents of long-term memory.

Baddeley (2012:15) describes the episodic buffer as "episodic in that it is assumed to hold integrated episodes of chunks in a multidimensional code"—that is, it includes integrated

information from multiple perceptual channels— and as a limited-capacity buffer "not only between the components of working memory, but also linking working memory to perception and long term memory." The buffer is a space in which information from different sources can be combined and manipulated (presumably by the executive, per Baddeley, 2012:17). The central executive coordinates input from the three short-term sources (i.e., the visuo-spatial sketchpad, the phonological loop, and the episodic buffer). Baddeley suggests that the executive's tasks include focusing attention, dividing attention, task switching, and mediating between short-term and long-term memory.

2.2.2 Ericsson & Kintsch: Long-Term Working Memory

Ericsson & Kintsch (1995) and Ericsson & Delaney (1999) argue that the constructs of LTM (unlimited capacity, but slow and susceptible to failure) and WM (fast, but with limited capacity) are insufficient to account for skilled performance at complex tasks in which individuals access and manipulate large amounts of domain-specific information that has been acquired over time through training and/or experience. They therefore introduce the concept of long-term working memory (LT-WM) and argue for it as the mechanism whereby domain-specific information may be acquired and stored (through practice and training) and subsequently drawn upon efficiently and reliably as needed in the context of a domain-specific task. Guida, et al. (2012:223) describe LT-WM as relying on "meaningful encoding, structured retrieval, and acceleration of encoding and retrieval." LT-WM is understood to involve stable domain-specific knowledge structures that are easily accessible when called upon (i.e., activated) by working memory during task completion (Ericsson & Kintsch, 1995; Guida, et al., 2012). Put another way, LT-WM can be likened to "the use of computer memory that allows the computer to be turned off in hibernation mode and later returned to its former state when the memory is retrieved" (Cowan 2014:205).

Baddeley (2012:18) agrees with Ericsson & Kintsch's argument that expert performance "utilize[s] previously developed structures in long-term memory as a means of boosting working memory performance," but does not find explanatory value in the specific construct of LT-WM, preferring instead to see it "as a particularly clear example of the way in which working memory and long term memory interact." The value of the construct seems to rest primarily in its ability to explain the domain-specific working memory differences seen in expert and novice performers of a given task. Although scholars have sought to identify individual-level (innate) differences in specific areas or subskills of working memory between experts and novices, such differences have not been widely confirmed (Anderson, 2015; however, see also Macnamara, et al., 2011, who identified differences in cognitive abilities in ASL interpreters of differing skill

levels,[8] and Hervais-Adelman, et al., 2011, 2015, who discuss evidence of cognitive advantages identified in bilingual individuals). Thus, LT-WM provides one possible means of explaining why experts tend to show superior memory skills only for domain-specific tasks (Chi, 2006b; Feltovich, et al., 2006).

Although its focus on expert performance and its exploration of the relationship between long-term memory and short-term memory is indeed relevant to this research project, the LT-WM model does not include a discussion of executive control or attention, which I consider (along with Cowan, 2000/01 and Timarová, 2008) to be fundamental to understanding interpreting performance. For this reason, LT-WM is not employed as a primary framework for analysis in this dissertation.

2.2.3 Cowan: Embedded Processes

Cowan's (1999, 2000/01, 2001, 2005; Cowan, et al. 2005) embedded processes model posits the existence of a single, unified memory system which operates at different levels and is coordinated by a central executive. This model, illustrated in Figure 3, "conceptualizes working memory as an activated part of long-term memory" (Timarová, 2008:7), or as Baddeley (2012:20) describes it, sees working memory as "a limited-capacity attentional focus that operates across areas of activated LTM *[long-term memory]*."

[8] The interpreters in Macnamara, et al.'s (2011) study were divided into "more skilled" and "less skilled" groups based on characteristics of their performance; the groups were <u>not</u> differentiated by amount of formal training or of experience.

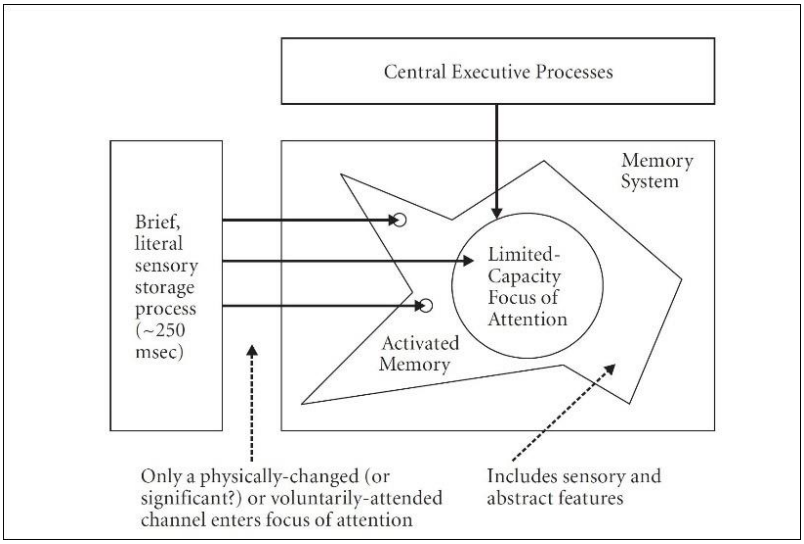

Figure 3. Cowan's embedded processes model, adapted from Cowan (2000/01) Processing limits of selective attention and working memory: Potential implications for interpreting. *Interpreting*, *5*, 20.

As indicated by Baddeley's description, this approach to understanding working memory centers on the role and limitations of attention. Specifically, it focuses on "the notion of an *adjustable attentional focus* and on measures of the storage capacity of attention or its *scope"* (Cowan, et al. 2005:43, emphasis in the original). Cowan, et al. (2005) argue that while all incoming information from any of the senses is cursorily processed, only some portion of the incoming stimuli is attended to and, thus, completely processed. Attention may be drawn to a stimulus either by an automatic ("orienting," Cowan, 2000/01:125) response to some aspect of the stimulus, or by volitional control exercised through the central executive.

The focus of attention is understood to be limited in capacity, with the ability to store approximately four chunks of information (each of which may contain a larger amount of 'bundled,' or integrated, information) for a very brief period of time. Separate chunks of information that are concomitantly the focus of attention can be combined into one, larger chunk; combining bits of information (stimulus plus information from long-term memory) allows attention to be brought to bear on more information at once (Cowan, 2000/01). Cowan (2001:92) highlights the fact that information can be bundled into chunks either in long-term or in short-term memory, stating that when a chunk is formed based on long-term memory, "there should be no limit to the number of stimulus elements that can make up a chunk," while chunks that are built from new information (i.e., information currently held in the focus of attention) would necessarily be constrained by focus of attention's capacity limits.

A second important component of Cowan's model is activated long-term memory, which is that portion of long-term memory, whether procedural or declarative, which is readily accessible

to the individual (in comparison to unactivated portions of LTM, which are less accessible). Cowan (2001:92) describes activated long-term memory as follows: "part of the long-term memory system that is not presently in the focus of attention but is temporarily more accessible to the focus than it ordinarily would be, and can easily be retrieved into that focus if it is needed for successful recall." Information in activated long-term memory is available to be drawn into the focus of the individual's attention, where it may be manipulated or otherwise used in the services of cognition. Information in activated long-term memory is described as limited by time but not by capacity; that is, no specific limit is suggested in terms of how much long-term memory may be active at a given moment. The time limit for activated long-term memory suggested by Cowan is 2 to 30 seconds. The construct of activated long-term memory appears to fulfill much the same purpose as Ericsson & Kintsch's (1995) long-term working memory in terms of explaining how experts organize and make use of domain-specific knowledge and experience; indeed, Cowan (2001:92) roughly equates 'activated long-term memory' with Ericsson & colleagues' 'long-term working memory.'

In sum, the embedded processes model views working memory as "a complex construct involving all information accessed for a task, including (a) memory in the focus of attention, (b) memory out of the focus but nevertheless temporarily activated, and (c) inactive elements of memory with sufficiently pertinent retrieval cues" (Cowan, 1999:67). The model has been described as well-suited to the study of simultaneous conference interpreting, particularly with regard to its integration of long-term memory and working memory into one model and the importance it places on attention and executive function (Mizuno, 2005; Timarová, 2008). I consider it to be equally well suited to the study of dialogue interpreting for the same reasons. While the dialogue interpreting task is distinct in many ways from that of simultaneous conference interpreting, both tasks place high demands on attention and executive function, as further discussed in Section 4.6.

2.2.3.1 Neural Evidence for the Focus of Attention and Activated Long-Term Memory

Although the work reported on in this dissertation does not involve neural imaging of any sort, there is a growing body of evidence describing neurophysiological features as they relate to memory and attention. This sub-section briefly describes neural evidence related to the constructs of focus of attention and activated long-term memory. Lewis-Peacock, et al. (2012) report on the results of a functional Magnetic Resonance Imaging (fMRI) study that presented participants with information and then drew their attention away from that information for a period of time before asking them to remember the information. The authors identify differences in neural activity associated with attention, on the one hand, and short-term memory, on the

other. They argue that previous findings suggesting active (neural) maintenance of information during delay periods might be better understood as evidence of active maintenance of information in the focus of attention (rather than in memory, per se). In discussing the results of their second experiment they state that "temporarily irrelevant items in STM were quickly removed from the focus of attention to a point at which their signature in ongoing brain activity vanished completely. However, these items could re-enter the focus and have their active neural signature restored, if they were cued as relevant for behavior a few seconds later" (Lewis-Peacock, et al., 2012:75). They note that episodic memories are formed when an attended-to item is linked to the current activated context, and that context can subsequently serve as a retrieval cue for the memory: "if a particular context representation is re-activated, it can then be used to revive the item representation(s) that co-occurred with that particular context state" (Lewis-Peacock, et al., 2012:75).

LaRocque, et al. (2014) also report on evidence which supports the embedded process model's (and other similar models') approach to working memory as "existing in various states of activation established by the allocation of attention" (p. 1). After reviewing a number of neuroimaging studies of attention and memory, they conclude that the literature strongly supports the idea that "active neural representations are present for items in the FoA [*focus of attention*], but not for items in aLTM [*activated long-term memory*]" (LaRocque, et al., 2014:9), which supports the distinctness of the two constructs as described in the various models, including Cowan's. They also note that the studies they review do not provide clear neurophysiological support for the notion that there is "a state in STM with intermediate levels of activation (i.e., aLTM) between the FoA and the massive network of latent LTM" (LaRocque, et al., 2014:9). The authors do not suggest that the distinction between the two constructs is artificial (in fact they go so far as to reject "isomorphism" (p. 9) between the two constructs), but rather argue for scholars to clarify the definition of 'activated' in their models. They note that the distinction between LTM and activated LTM arose from a desire to differentiate between readily-accessible bits of long-term memory and relatively-inaccessible bits of long-term memory. As the findings vis-à-vis neural activation do not correspond to the models' conceptualizations of LTM and activated LTM, they suggest referring to the portion of LTM that is available but not in the focus of attention as "accessible" rather than "activated" (LaRocque, et al., 2014:9).

2.3 Long-Term Memory

Long-term memory (LTM) plays a fundamental role in human experience and task performance. Differences in encoding, organization, and retrieval of information from LTM have also been identified as playing a role in expert performance (Ericsson & Kintsch, 1995; Kimball

& Holyoak, 2000; Brown & Craik, 2000; Ericsson, et al., 2006). The following sections define LTM and introduce key concepts related to encoding of information in LTM, representation of information in LTM, and retrieval of information from LTM.

2.3.1 What is Long-Term Memory?

LTM is generally understood as a repository for knowledge and experience that have, over the course of a person's life, been perceived, attended to, and stored (Styles, 2005; Anderson, 2015). LTM is described as having limitless capacity—as Cowan (2005:1) puts it, "the normal human brain never reaches a point at which new experiences can no longer be committed to memory; the brain cannot be full." Nevertheless, not all information stored in LTM is retained forever, nor is it all equally accessible to working memory (Anderson, 2015). Individuals have much more information "available in memory than is accessible at any moment" (Koriat, 2000:333), and the relative accessibility of the same bit of information varies over time (Anderson, 2015).

The principal constraint on LTM is not, therefore, one of size, but rather of access. This is a key point since, as Styles (2005) highlights, information stored in memory is only useful if it is available to the individual at the moment it is needed, for example, in the moment when the interpreter must reformulate an idea or term into the TL. A second key characteristic of LTM is that storage in and retrieval of information from LTM are (relatively) slow and prone to issues such as interference and decay (Koriat, 2000; Brown & Craik, 2000). These characteristics of LTM are significant to the object of study of this dissertation, inasmuch as interpreting, whether performed consecutively or simultaneously, inherently involves time pressure, which constrains the time available to the task performer (i.e., the interpreter) to process and store incoming information and to retrieve information needed for successful performance.

2.3.2 Encoding Information

Human beings' senses constantly perceive a large amount of information, some portion of which is encoded and stored in LTM (Styles, 2005; Anderson, 2015). While an in-depth discussion of how information is perceived, integrated, and stored in LTM is outside the scope of this dissertation, the following paragraphs briefly outline some key points related to how information is stored and organized in LTM.

The first step in getting information from the outside world into long-term memory is for it to

be perceived through one or more of the senses. In simple terms, information is perceived, some portion of it is attended to and enters working memory, and from working memory some part of it passes into LTM (Brown & Craik, 2000; Schweppe & Rummer, 2014; Anderson, 2015), although Styles (2005) notes that perceived but unattended (and un-recallable) stimuli may be processed and influence cognition downstream. Similarly, Cowan, et al. (2005) state that some information may enter memory via attention-free mechanisms.

In general, individuals tend to retain meaningful aspects of incoming information rather than the surface form of the stimulus: for example, people have been shown to have a better memory for the meaning of a sentence than for its exact wording, although they are able to retain wording when prompted to do so. A similar effect has also been demonstrated for visual information, such as images (Anderson, 2015). This process is not straightforward, however, as Ericsson & Kintsch (1995) point out: individuals may not know what portion of the information entering working memory will be needed for later processing, and thus potentially-necessary information may not be encoded and retained.

Although one might draw the intuitive conclusion that frequently encountered stimuli are more likely to be retained than rarely encountered or novel stimuli, this is not always the case. Styles (2005) illustrates this fact by pointing out the difficulty most people would have in precisely drawing (or describing) coins, which are, of course, very frequently encountered, but whose details do not require attention—it is easy to differentiate between a quarter and a dime without attending to details such as words, numbers, and engraving. Thus, while frequency of exposure does play a role in retaining information, in-depth processing—engaging meaningfully, drawing conclusions, elaborating on the information—is also key to retention (Brown & Craik, 2000; Styles, 2005; Anderson, 2015).

Along these same lines, Anderson (2015) stresses the importance of meaningfulness to the process of retaining information in the long term: one is more likely to retain information to which one can attribute meaning, while meaningless information is less likely to be retained. Koriat (2000) also emphasizes the connection between the way in which a piece of information is encoded and future ability to recall the information. Besides meaningfulness, factors that influence encoding of new information include the individual's motivation, use of memory strategies (such as organizing the material to be learned), prior knowledge, and context, as well as external factors such as the way the stimulus is presented (Brown & Craik, 2000).

2.3.3 Representation of Knowledge

In order to make use of the information that enters LTM, individuals must organize and represent it in ways that allow for future use (Anderson, 2015). This section introduces aspects of knowledge organization and representation relevant to expertise, self-regulation, and the research reported on below.

Styles (2005) and Anderson (2015) note that information can be represented verbally (linguistically), visually, or a combination of the two.[9] In some cases, the mind may form analogue representations of items, especially of physical objects that can be manipulated in the mind's eye. Knowledge may also be represented in the form of propositions, or truth statements, that classify or identify features of the thing or concept in question and allow for its classification as more- or less-typical within a category, such as 'mammal' or 'table.' Bits of knowledge are linked in a hierarchical fashion to form semantic networks in which lower-level items share the attributes of higher-level items within the same network (Styles, 2005; Anderson, 2015). Semantic networks represent knowledge in limited ways. They allow for categorizing things by their properties, but they cannot represent the totality of an individual's knowledge about a given item or situation (Anderson, 2015); on their own, they are not sufficiently complete and flexible to act in service of real-world cognitive tasks such as learning, understanding, and acting in the world around us (Styles, 2005).

Scholars have proposed a number of ways in which complex, interconnected information that transcends categories—or, as Feltovich, et al. (1997:126) put it, "abstractions from experiences that consolidate shared elements from these experiences"—may be organized and represented in LTM. These constructs, which include schemata, frames, prototypes, scripts, and mental models, overlap to some extent, and, indeed, are not always well-differentiated in the literature. For example, Klein, et al. (2007) characterize the "heritage and distinctions between" frames, scripts, and schemata as tangled. The following paragraphs focus on schemata and mental models because they are the constructs most commonly discussed in the literature drawn on for this research.

Schemata are understood to be abstract representations of information (whether of abstract concepts or concrete items) that allow the individual to make connections and draw inferences based on the totality of his/her knowledge about the item or concept in question (Bower, 2000; Styles, 2005; Anderson, 2015). Neisser (1976:54) describes schemata as "that portion of the entire perceptual cycle which is internal to the perceiver, modifiable by experience, and

[9] Information from other senses, such as haptic information, information about taste, and information about smell must also be represented in some form (Brown & Craik, 2000), but further discussion of this question is outside the scope of interest of this dissertation.

somehow specific to what is being perceived." Bower (2000:24) offers a succinct description of schemata as "clusters of organized expectations," while Howard (1987:32) states that they consist of "expectations about how part of the world is organized."

Schemata may contain both declarative and procedural knowledge (Winne, 2001). Although Anderson (2015:112-113) describes schemata as structures with 'slots' for various types of information about an item or concept, Styles (2005:299) argues that they are not static, pre-existing structures, but rather flexible and mutable, arising in the process of cognition: "schema emerge as they are needed from simpler elements in memory working together and are created by the environment that they are trying to interpret." By allowing multiple chunks of information or procedures to be worked with as a unitary whole (rather than as separate, scattered bits), schemata facilitate cognitive processing. They also play an important role in recognizing and understanding novel events, and in drawing inferences from pre-existing schemata (Winne, 2001).

Styles (2005) notes that schemata have variables that must be taken into account within real-world situations, and that schemata may be embedded in each other. To borrow Styles's example, an individual's schema for 'eating in a restaurant' will vary depending on whether the restaurant in question is a fast food restaurant or a sit-down restaurant with waiters. Within the 'eating in a restaurant' schema there are many embedded schemata, such as 'selecting an item from the menu and ordering it,' and 'asking for the check at the end of the meal.' To give example from the domain of interpreting, my schema of 'interpreting for a well-child visit,'[10] which is a situation I encounter frequently in my work, could be described as encompassing a number of possible component schemata, depending on whether the patient is an infant or teenager, whether the child is healthy or has a chronic medical condition, and so forth. In this scenario, the component schemata involved might include 'registering the patient,' 'general screening questions,' 'physical exam,' and 'vaccinations,' among others. Although both of these example involve concrete situations, information about abstract concepts may also be organized in schemata (Styles, 2005). In interpreting, for example, abstract knowledge about ethics and decision making could be schematically organized.

Another way of understanding organization and representation of knowledge is mental models, which Norman (1983:7) describes as a person's "naturally evolving" understanding of how a thing or system (whether concrete or abstract) works. Held, et al. (2006:19) describe mental models as consisting of abstract notions of "classes of situations as opposed to images

[10] 'Well child visit' is a term used in the US medical system to refer to routine appointments (generally yearly after 2 years of age, more frequently in infancy) with the primary doctor, at which a child's general health is discussed, recommendations about healthy living are given, and vaccines are administered.

representing single situations." They may contain emotional components as well as cognitive/relational information (Pauen, 2006). Burns (2005, following Craik, 1943) identifies three functions of mental models: describing, explaining, and predicting the world. Mental models are understood to be involved (i.e., drawn on) in processes such as inference, reasoning, decision-making, and learning (Johnson-Laird, 1980; Jones, et al., 2011). Inasmuch as they reflect an individual's personal understanding at a given moment in time, mental models are imperfect, partial, context-dependent, and may change with time or new information (Norman, 1983; Jones, et al, 2011).

While mental models may be constructed from physical experience (e.g., a mental model of something that the individual has used or encountered), actual experience of a phenomenon or system is not a prerequisite for forming a mental model. Held, et al. (2006) present evidence that hearing or reading about something is sufficient to induce construction of a mental model of the situation presented. Indeed, the ability to form mental models independently of individual experience is a key part of learning, as noted by Seel (2006:86, citing Mayer, et al., 1999): "learning occurs when people actively construct meaningful mental representations from information presented to them, such as coherent mental models that represent and communicate subjective experiences, ideas, thoughts, and feelings." Formation of mental models has also been identified as a factor in text/discourse comprehension (Hemforth & Konieczny, 2006; Hild, 2015); Hild (2015:69, following Graesser, et al., 1994) describes comprehension as a "process of constructing a coherent mental representation of the text, which is guided by the reader's goals and their attempts to establish coherence at both local and global level."

Mental models play a role in directing attention and in allowing individuals to think about possible outcomes and select the best solution (Mumford, et al., 2012). They facilitate the direction of attention to relevant factors or information, allow the situation of data or events within an appropriate context, and permit the problem-solver or decision-maker to consider what might happen in the future as a result of a given action (Endsley, 2006).

The existence of and privileged access to domain-related schemata within LTM has been identified as a mechanism underlying expert performance (Kimball & Holyoak, 2000), and has been implicated in expert inflexibility (Dane, 2010). Differences have also been identified in the content and structure of experts' and novices' mental models. Mental representation of knowledge and expert performance are discussed further in Section 3.3.2.

2.3.4 Retrieval from LTM

Retrieval[11] of information from LTM is a goal-oriented, cue-aided, problem-solving task involving two distinct types of processes:

> "a controlled, strategic process that guides retrieval, coordinating between different operations directed toward the recovery of the elusive memory target, and the automatic, involuntary emergence into consciousness of ideas and associations throughout the search" (Koriat, 2000:334).

Much information in LTM is routinely accessed automatically, without conscious awareness of retrieval processes. Automatic (unconscious) retrieval may take place as a result of habit or stimulus-response conditioning; it may also occur when a piece of information has been automatically activated through association (for example, if I am talking about a given subject, a related piece of information may be retrieved automatically) (Koriat, 2000). The relative accessibility of information in LTM is varied, and portions of LTM that are activated are more likely to be recalled automatically and to be recalled more quickly (Anderson, 2015; see also Cowan's embedded processes model, introduced in Section 2.2.3, and further discussed in Section 4.6; automation and attention are also discussed in Section 3.3).

When information is not rapidly accessible through unconscious processes, a conscious process of retrieval from LTM begins (Koriat, 2000). Conscious, or effortful, retrieval involves "complex regulatory processes of monitoring and control" (Koriat, 2000:338). It is common for individuals to have an idea of whether or not they know something, even if the needed bit of information is not immediately (automatically) retrieved. This phenomenon is known as *feeling of knowing*. The strength of one's feeling of knowing can lead to a response of "I don't know" or to an effortful search for the sought-after information. In this context it is important to note that the decision not to consciously search out an answer does not preclude the triggering of automatic associations that could lead to an answer: an individual might respond "I don't know" and subsequently recall the needed information through automatic processes. It is also possible for individuals to infer a response based on probability and other cues instead of engaging in an effortful search for a piece of information. A final point to make in this regard is that retrieval from memory is not a zero sum process—one may, for example, recall a portion of a piece of information or some characteristic of the required information, even if the entirety is not retrieved (Koriat, 2000).

[11] The term 'retrieval' indicates recall of an item of information from memory, rather than recognition (knowing that something is familiar: 'I've seen/heard that before').

Various factors influence retrieval of information, whether automatic or effortful, from LTM:

- **Recency:** More recently processed information is generally more accessible than information processed longer ago; for example, people will generally remember the last few words in a long list, presumably because a trace of them remains in working memory (Cowan, 2005).
- **Primacy:** Items at the beginning of a list are more likely to be recalled successfully than items in the middle, presumably because of greater opportunities to rehearse these items (Cowan, 2005).
- **Time since initial exposure:** Time elapsed since a memory was encoded can influence whether a given bit of information is retrieved and how completely it is retrieved (Koriat, 2000; Styles, 2005). Specifics usually fade from memory faster than generalities such as category attributes or the gist of a piece of information. Thus, "generic information is accessible long after the more detailed, item-specific information has ceased to be accessible" (Koriat 2000:339).
- **Priming:** Information associated with currently attended-to stimuli is more accessible—more likely to be activated, and to be activated faster—than unrelated or unassociated information. This phenomenon, known as activation or priming, is the reason that coherent or meaningful material is more quickly understood than incoherent or nonsense material, and is a key component of insight (Anderson, 2015).
- **Frequency of exposure:** Information that is well-practiced/rehearsed can often be accessed through automatic processes (Koriat, 2000). Effortful retrieval of information that is frequently encountered is generally faster than effortful retrieval of rarely-encountered information (Anderson, 2015).
- **Encoding specificity & retrieval cues/context:** Retrieval is also influenced by the conditions in which it takes place, and how well those conditions match the conditions in which the information was learned. Retrieval from memory is superior when the information is retrieved under conditions that match the conditions under which it was learned. This effect occurs insofar as the cue was encoded together with the initial stimulus; that is, a given condition is not expected to support retrieval unless the individual noted it (encoded it) at the time s/he was exposed to the stimulus. This effect encompasses cues related to the stimulus itself (e.g., whether the stimulus was read or heard, mnemonics or other strategies used by the leaner, etc.), the context in which the stimulus was presented, and the individual's emotional state at the time (Koriat, 2000; Styles, 2005). Cues and conditions at encoding/retrieval are especially important in real-world tasks, given that in such cases the need for retrieval is "generated spontaneously by

> the person himself, or triggered by accidental encounters or task demands" (Koriat, 2000:339). In such cases, cues and context are naturally present and may be drawn on automatically or be used consciously as part of a controlled process.

These factors must be considered in analyzing and drawing conclusions from the data collected for this study, inasmuch as retrospective process tracing necessarily draws on LTM, as discussed in Section 7.3. These factors were also taken into consideration in the design of the method for the retrospective portion of the study, described in Section 7.3.

2.4 Conclusion

This chapter has introduced a number of concepts and ideas related to memory, including the distinction between working memory and long-term memory, models of working memory, and overviews of how information enters, is organized in, and is retrieved from long-term memory. As mentioned in the introduction to this chapter, these concepts are important to this dissertation in three ways: first, in that memory is a fundamental part of interpreting; second, in the design and implementation of the retrospective process tracing portion of the methodology; and, third, in analyzing and understanding the data collected in the retrospective process tracing. The material presented in this chapter is thus drawn on, both implicitly and explicitly, throughout the remainder of this dissertation.

3. Expertise

3.1 Introduction

Although interest in the characteristics of experts in a field or at a task stretches back into antiquity (Ericsson, 2006a; Amirault & Branson, 2006; Alexander, et al., 2009), Degroot's (1946/1978, cited in Ericsson & Charness, 1997) classic studies of expertise in chess—in which chess masters were shown to perform better than novices at a laboratory task that required them to select the best next move in a given mid-game scenario—are often considered to be the beginning of the modern study of expert performance. Over the course of the intervening decades, expertise and expert performance have been the focus of a large and varied body of research (Ericsson, 2006a, Alexander et al., 2009). Scholars of simultaneous conference interpreting began to draw on expertise as a theoretical framework in the late 1990s (Tiselius & Jenset, 2011). One of the first interpreting-specific discussions of expertise comes from Hoffman (1997), who argues for studying interpreting as a separate and specific task rather than as an extension of linguistic or bilingual abilities:

> "The domain is not language translating, or even language interpreting. The domain is *language and gesture interpreting in a way that is sensitive to the audience and speaker and their relations and goals, sensitive to world knowledge and context as well as topic, and sensitive to status relations, loyalty shifting, and nuance as well as to literal meaning*. In other words, there is so much of a dependence on knowledge, purpose, and paralinguistic behavior that it would be misleading to define the domain of interpreting as just interpreting. It is, perhaps, too easy to see interpreting expertise as a mere outgrowth of bilingualism and/or bilingual ability. Even if it is, that does not mean that interpreting expertise does not involve its own sorts of special knowledge and mental models" (Hoffman, 1997:204-5, emphasis in original).

Indeed, the many expertise-focused studies of interpreting published in the wake of the introduction of expertise studies to interpreting studies have provided ample evidence of novice/expert differences in interpreting performance, as well as of the difficulty of defining expertise in the domain of interpreting.

The following sections present the approach to expertise studies adopted in this dissertation, discuss novice/expert differences described in the literature, and provide an overview of findings of expertise-related research on simultaneous conference interpreting.

3.2 Approaching Expertise Studies: Absolutism versus Relativism

The field of expertise studies encompasses a wide range of approaches, not all of which share the same assumptions and foci. Some scholars approach the study of expertise with the aim of identifying and studying "outstanding" individuals who "stand out" from others, whether in society or a given domain (Ericsson & Smith, 1991:2). This approach is characterized by an interest in capturing "reproducible, superior phenomena of expert performance" (Ericsson & Charness 1997:5) in order to analyze them and identify "representative real-time tasks that capture the essence of *{the domain}* and show a clearly superior performance" (Ericsson, 2000:207). Once the mechanisms involved in superior performance are identified, the focus shifts to "explaining the origin of these mechanisms and, if they are acquired, what kinds of practice activities led to their acquisition" (Ericsson, 2000:207). Chi (2006a, 2011) and Weiss & Shantaeu (2014) describe this as an absolutist approach. It requires a judgment—is the person whose performance is the object of study an expert, or is s/he not an expert?—and assumes that the object of study (i.e., the expert) is in some way special or out of the ordinary, even within the domain of interest. An absolutist approach also presupposes the existence of objective criteria against which to evaluate the extraordinary quality of the performance.

In contrast, other scholars take a relativist approach (Chi, 2006a, 2011; Alexander, et al., 2009) in which competent performers in a given field or of a given task are identified and studied in comparison to novices or less-skilled individuals. Research in this vein takes a developmental point of view, assuming that novices have the potential to become experts, in the sense of 'competent performers.' Rather than describing the performance of outliers within a domain, a relativist approach seeks to understand changes in cognitive structures and processes along the trajectory from beginner to accomplished performer. As Chi (2006a:23) puts it, "the goal of studying relative expertise is not merely to describe and identify the ways in which experts excel. Rather, the goal is to understand how experts became that way so that others can learn to become more skilled and knowledgeable." Similarly, Alexander, et al. (2009:492) point out that "it is not simply the sharp contrasts between those at the extremes of expertise that matter; it is also all the places in-between." Moser-Mercer (2000a), for her part, states that gaining insight into characteristics of performance at multiple stages of the developmental trajectory can inform pedagogy and provide insight into the sorts of difficulties that learners are likely to experience at various points along the way.

Given the pedagogical roots of my research and the difficulty of establishing objective criteria for identifying expert performance in interpreting (Liu, 2008; see also Section 3.4), a relativist approach to expertise was judged most appropriate for the present work. Thus, while the term 'expert' is used throughout the literature review and as an identifier for one of the

groups in the study (see Section 7.5.1 for a discussion of selection criteria), it should be understood in a relative sense, as a label facilitating differentiation between individuals with more experience and training and those with less experience and training in the context of a given study, rather than as an evaluative descriptor.

3.3 Characteristics of Novice & Expert Performance

Scholars of expertise have identified a number of areas of difference between novice and expert performers, including differences in how much they know and how that knowledge is organized, how they mentally represent and analyze problems, how they approach problem solving, the level of automation involved in their processing, and their ability to self-monitor. Three overviews of novice/expert characteristics are summarized in Table 1, Table 2, and Table 3, below. Of the novice/expert differences identified in the literature, automation of processing and (in)flexibility are of principal importance to the research discussed in this dissertation, and are therefore discussed in more detail below.

Experts' Skills and Shortcomings, from Chi (2006a)	
Experts excel at:	• Generating better solutions to problems and doing so more quickly and accurately • Detection/recognition of patterns and deep structures that novices do not see • Qualitative analysis of problems • Self-monitoring • Choosing appropriate strategies • Making use of all available resources • Doing all this with minimal cognitive effort, more automatically, and with increased cognitive control
Experts can fall short because:	• Expertise is generally domain-limited • Expertise can lead to over-confidence • Focus on deep structure can lead to passing over surface or less-relevant information • Reliance on context in order to exercise expertise (non-transference of abilities to similar situations outside of the domain) • Experts can be inflexible • Experts may not be able to make accurate predictions; they may be unable to take on non-expert viewpoints. • Experts may be biased towards their own area of expertise

Table 1. Experts' skills and shortcomings, from Chi (2006a).

Characteristics of Expertise from Feltovich, et al. (2006)		
Expertise is limited in scope	→	Experts rarely achieve extremely high levels of performance in more than one domain
Expertise is not transferable	→	Expert abilities rarely transfer from one domain to another
Domain-specific knowledge is a key aspect of expertise	→	Problem solving, reasoning, and other cognitive processes are affected by an individual's level of knowledge about a domain (cognitive processes cannot be effectively studied in a vacuum)
Experts process and store larger chunks of information	→	Experts are able to store and recall larger chunks of information than novices, and have recourse to long-term working memory for domain-specific information
Experts conceptualize information differently than novices	→	Experts develop functional understanding of problems at a deeper, more abstract level than novices
Expertise involves a certain level of automation of processes	→	Automation of lower-level processes enables higher-level processes; automation may also play a role in experts' increased access to knowledge.
Experts access relevant knowledge selectively	→	Experts are able to productively connect relevant past knowledge/experience to new problems; experts are better able to identify the relevant aspects of a problem
Reflection is integral to expert performance	→	Experts monitor and reflect on their own performance; experts have metacognitive abilities that aid in planning and control
Expertise involves adaptation of cognitive and physical structures and processes	→	Experts don't just have more knowledge and more experience; they have different ways of perceiving and doing that are relevant to their domain of expertise
Experience alone does not lead to the development of expertise	→	Not everyone who has spent a long time doing a task develops a superior level of performance--after a certain point, deliberate practice is needed in order to improve performance

Table 2. Characteristics of expertise from Feltovich, et al. (2006).

Aspects of Expertise Relevant to Decision-Making, from Ross, et al. (2006)	
Perceptual skills	Experts detect more (and different) things than novices do
Mental models	Experts have detailed mental representations of problems/situations in their domain of expertise
Sense of typicality and of associations	Experts know what is relevant (and what is not) in a given situation, and are able to recognize complex connections between things
Routines	Experts know how to accomplish things
Declarative knowledge	Experts have more knowledge than novices
Mental simulation	Experts can think through the possible consequences of a course of action before engaging in it, or understand how a situation might have developed into its present state
Assessing the situation	Experts spend more time assessing the situation at hand, while novices spend more time thinking about what to do about it
Finding leverage points	Experts are able to identify and make important changes with relatively low cost
Managing uncertainty	Experts can deal with lack of certainty
Understanding own strengths and weaknesses (metacognition)	Experts monitor their own performance better than novices

Table 3. Aspects of expertise relevant to decision-making, from Ross, et al. (2006).

3.3.1 Skill Acquisition & Automated Processing

The literature on cognitive processing and attention generally distinguishes between two types of processing: controlled processing, which requires active comparison of stimuli with stored responses, and automatic processing, which is associated with "well-practiced, consistent" (Hill & Schneider, 2006:659) tasks that do not require much cognitive effort (Miller & Cohen, 2001; Styles, 2005; Hill & Schneider, 2006; Anderson, 2015). Hill & Schneider (2006:659-660) contrast the two types of processing as follows:

> "Controlled processing has characteristics that allow rapid acquisition, easy alteration of process, and modification of memory, but it is a slow, serial, high-effort mode of processing that deteriorates under high workload and stressors [....] Automatic processing shows slow acquisition over hundreds of trials, is difficult to alter, does not modify memory, is fast and parallel, is low effort, and is robust to high workload and stressors."

Automated processes and behaviors are "determined largely by the nature of the sensory stimuli and well-established neural pathways that connect these with corresponding responses" (Miller & Cohen, 2001:168). Non-automated (i.e., controlled) processing is engaged when "the mappings between sensory inputs, thoughts, and actions either are weakly established relative to other existing ones or are rapidly changing," and is guided by "internal representations of goals and the means to achieve them" (Miller & Cohen, 2001:168). The distinction between automated and controlled processing is an important one in the context of expertise studies inasmuch as skill acquisition is generally understood as involving a gradual transition from less-automated to more-automated processing during performance; that is, automation of processes is generally associated with competence at a skill (Anderson, 2015; Miller & Cohen, 2001).

Anderson's (2015) account of skill acquisition describes it as a complex, cyclical process involving the acquisition of both declarative (factual) and procedural (how-to) knowledge and comprising three stages: cognitive, associative, and autonomous. In the first, cognitive, stage, the learner consciously learns what the steps are and how they are done. This stage is generally characterized by slow task performance, inasmuch as the learner must deliberately bring to mind each step in the process, as well as how each step should be performed, in order to complete the task. Ericsson (2006b:684) describes the cognitive stage as "try[ing] to understand the requirements of the activity and focus[ing] on generating actions while avoiding gross mistakes." During the second, associative, stage, the learner integrates new knowledge and abilities while beginning to identify and eliminate errors in performance. This stage is characterized by

increasing smoothness and speed of performance as procedural knowledge develops. Upon reaching the third stage of skill acquisition, autonomous performance, the learner is able to perform the task more- or less-automatically (i.e., without conscious consideration of each step). After a certain level of skill is reached, task performance is understood to become more automatic and rapid over time.

Automation of processing is seen as a major factor in expert performance. While novice performers must actively control cognition in order to complete a task, competent performers of the same skill are able to complete the same task, or at least many aspects of it, without conscious cognitive control. Automation of a process through practice also allows for parallel processing; that is, the automated (portion of the) task can be carried out at the same time as separate, attention-requiring processes (Anderson, 2015). Automation of sub-skills plays an important role in development of competent levels of performance at complex tasks inasmuch as automation of lower-level cognitive skills is necessary for the development of higher-level skills (Feltovich, et al., 2006). Dane (2013) argues that automation of lower level skills and the development of automated responses to stimuli ("automatic rule following," as Dane, 2013:60, puts it) can, in some cases, enhance the task performer's attentional breadth (i.e., the quantity of information/stimuli that the task-performer attends to) by freeing up attentional resources that would otherwise be occupied with lower-level tasks.

A classic example of automation of processes is provided by Styles (2005), Endsley (2006), and Anderson (2015), who highlight differences in driving for novices and experts. Styles (2005) notes that driving is not one single task for the novice—it is a collection of many tasks, and requires the novice driver to consciously direct attention to each separate task. In order to do so, the driver draws on his/her declarative (factual) knowledge of the components of each subtask. As the driver's skill increases, her declarative knowledge becomes proceduralized, with the various sub-tasks integrated and automated. She is thus able to operate the vehicle while doing other things (for example, changing the radio station or holding a conversation) or even without consciously remembering stretches of the experience (Endsley, 2006; Anderson, 2015).

Using chess as an example, Styles (2005:236) notes that a novice player's performance will be "slow and error-prone" because of the need to draw on declarative knowledge—"to retrieve specific facts and interpret them" (Anderson, 2015:212)—in order to make each move. Retrieving, holding, and interpreting bits of declarative knowledge in order to complete a task draws heavily on working memory (Styles, 2005). As knowledge is proceduralized, access to it becomes more automatic and thus places fewer demands on working memory (Styles, 2005). Automation of process is, therefore, "a means of restructuring some [cognitive] procedures so that working memory is largely circumvented, freeing resources for other cognitive chores"

(Feltovich, et al., 2006:58) such as monitoring and control of performance. Indeed, while many discussions of automation focus on physical tasks (such as riding a bicycle), cognitive tasks may also be automated (Endsley, 2006).

One might expect to find a similar pattern in the case of dialogue interpreting, which requires the task performer to carry out a number of subtasks, including the core cognitive process of interpreting (i.e., listening, analyzing, reformulating, producing a target language rendition, monitoring for accuracy), interaction management, and monitoring of performance (see Chapter 5 for further discussion of the subtasks involved in dialogue interpreting). The novice interpreter, drawing on controlled processing, would be expected to need to expend more conscious energy (attention) on the various subtasks competing for his/her attention and processing capacity, while the competent/expert interpreter would be expected to have more proceduralized knowledge and automated processes, and thus have less need to attend to some portions of performance. At the same time, the nature of the interpreting task precludes complete automation; indeed, the literature on expertise in interpreting suggests that effective management of cognitive resources (attention, in particular), rather than automation, is key to performance of simultaneous conference interpreting (Liu, 2008; see also Section 3.4 for further discussion of expertise in interpreting and Section 4.6 for further discussion of attention).

Although it is seen as a fundamental component of competent performance, automation has also been identified as a possible reason for failures in expert performance. For example, Ericsson (2006b) suggests a link between automation and eventual stagnation of performance improvement, pointing out that, while automation of processes is a natural and necessary stage of skill acquisition, it also goes hand in hand with loss of control over those selfsame processes, which may make it difficult for performers to modify or adjust them. Indeed, in some domains, over-automation of performance is considered negative (or even potentially dangerous, as in the case of pilots), and steps are taken to circumvent such possible ill effects (Endsley, 2006).

3.3.2 Representation of Knowledge

Differences in experts' and novices' mental representations of knowledge, systems, and problems—including schemata and mental models, both of which were introduced in Section 2.2.3—are well established in the literature: empirical evidence suggests that novices' and experts' mental representation of knowledge tend to differ in terms of the amount and type of knowledge represented; the features of a problem on which they focus in the process of representing it; and understanding of links, causation, and similar aspects (Ericsson, 2003; Chi, 2006b; Feltovich, et al., 2006; Chi, 2011).

Novices' mental representations generally focus on superficial features or elements of a problem, situation, or system (Chi, 2006b; Hogan & Rabinowitz, 2009) and may represent knowledge in an incomplete, fragmented fashion due to a lack of connections between related or relevant bits of knowledge (Hsu, 2006). In explaining complex phenomena, students tend to provide simple causal explanations and "to focus on the structure of systems rather than on the underlying function" (Hmelo-Silver and Pfeffer, 2004:129). Novices also tend to have more difficulty understanding and representing emergent processes[12] in which the connections between a cause and an effect are not clearly discernible (Hmelo-Silver, et al., 2007); indeed, individuals may form incomplete or incorrect mental models of such processes or systems (see, for example, Jee, et al., 2013, who report on a study of students', teachers', and virologists' mental models of viruses and vaccines).

Experts' mental representations tend to focus more on deep (structural) features (Chi, 2006b; Hogan & Rabinowitz, 2009), and their knowledge tends to be organized around principles. In modeling a complex system, experts tend to focus more than novices on the functions and behaviors of structures within a complex system (Hmelo-Silver & Pfeffer, 2004). Experts' mental models also tend to be better organized and integrated (Hsu, 2006). For example, Wolff, et al. (2015) report that expert teachers' mental representations of classroom scenes and events were more integrated and complete than those of novice teachers. This feature of experts' mental models—i.e., that they are more integrated and complex—is seen as beneficial for problem-solving in that "more integrated and elaborate mental models help the problem solver to draw inferences and predictions and to come up with efficient solution strategies" (Hsu, 2006:773). Wolff, et al. (2015:80) identify a number of characteristics of expert teachers' mental models:

> "Experts process new information differently than novices because they are able to assimilate new information in relation to prior experiences of similar events. Their richly developed awareness of what is happening is an awareness gained through experience. Experts have developed a sophisticated ability to make observations, recollect and link these to past experience, and phrase interpretations of their observations as predictions about what may arise."

Empirical evidence also suggests that an individual's goals may play a role in their mental representation of a system. For example, Hmelo-Silver & Pfeffer (2004) found that the mental representations of biologists and aquarium aficionados (both of which were considered experts in aquaria) tended to differ in focus. Similarly, Brulé & Labrell (2014) found that winegrowers' and biologists' representations of the structures, behaviors, and functions of vineyards differed from

[12] Emergent processes are processes in which "outcomes are not predetermined. The behavior of the system arises as a function of spatial and temporal interactions between its components" (Hmelo-Silver, et al., 2007:308).

each other's, as well as from those of laypeople. A growing body of research has found that training learners in the formation/use of mental models can have positive results (Hmelo-Silver and Pfeffer, 2004; Hogan & Rabinowitz, 2009; Mumford, et al., 2012); similarly Chi and VanLehn (2012) argue in favor of pedagogical approaches that focus on teaching students about deep structures and principles.

In the case of dialogue interpreting, the interpreter's mental representation of the task would presumably contain declarative and procedural knowledge related to the interpreter's working languages, the cognitive/language transfer portion of the task (i.e., 'interpreting,' per se), setting- or genre-specific expectations and constraints, and heuristics for problem solving and decision making. The interpreter's mental representation would also be expected to contain (i.e., have integrated within it) previous knowledge/experience of the setting and/or the specific parties involved in an interaction, whether general ('school conferences' as a type of interaction) or specific ('school conferences at X school/involving Y teacher'). The mental representation might also encompass such situation-specific features as the purpose/rationale for the interaction, genre-specific discourse features, and commonly encountered terminology or concepts.

Individual interpreters' mental representations would be expected to vary in terms of the amount of information they encompass. Such variation would be expected to occur not only in relation to the interpreter's level of expertise, but also in relation to the interpreter's prior experience and knowledge of the specific setting or type of situation (i.e., previous knowledge of jargon/terminology, genre-specific discourse features, the parties involved, etc.). In addition to differences in the amount and quality of information present in novices' and experts' mental representation, expertise theory suggests that there would also be differences in how the information is organized and drawn on during performance. For example, novices may not always effectively access knowledge during performance—they may have learned a term or been taught a strategy for resolving a problem, but fail to use the term or respond appropriately to a difficulty, whether because of a failure of monitoring, cognitive overload, or the fact that the information has not been fully integrated into the interpreter's mental representation or is not sufficiently accessible in LTM.

Although experts' ability to mentally represent or model problems, systems, or situations is generally seen as important to their superior level of performance, Zeitz (1997) argues that abstract representation is not necessarily always beneficial, inasmuch as reliance on abstract understandings of problems has been tied to findings suggesting that expert performance can be disrupted by deep-level changes to the underlying framework or rules of a domain. Their conceptual understanding of information may make it more difficult for experts to distinguish between prior experience and knowledge specific to the problem at hand; moreover, experts'

ability to process the gist of information may cause them to have more difficulty in retrieving detailed information about a problem or situation.

Feltovich, et al. (1997) also view mental representations as a double-edged sword: to be reductive is part of their nature and their value, but, as simplified versions of reality, they can also contribute to inflexibility in experts. Howard (1987) echoes this point (although his focus is on education rather than expertise), pointing out three problems that may arise when relying on schemata:

- first, one may disregard important aspects of the situation because they do not fit within the activated schema;
- second, once a schema for a specific problem or activity is established, it can be difficult to get rid of it and replace it with another (better, more accurate) schema; and
- third, it is possible to approach or try to understand a problem using a schema that is inappropriate to the situation (and may therefore lead to wrong conclusions).

Thus, while experts' mental representation of tasks or problems is generally seen as playing a key role in their superior performance, allowing them to "maintain access to relevant information and to support flexible reasoning about an encountered task or situation" (Ericsson, 2005:155), it also has the potential to negatively affect performance, as highlighted by Zeitz (1997) and Feltovich, et al. (1997). This duality is also seen in other characteristics of expertise, which are seen as having both the potential to aid and the potential to disturb or limit performance, as summarized in Table 1, above. One possible explanation of such contradictions is that there are two distinct types of expertise, one routine and one adaptive; this proposal, and the distinction between the two types of expertise, is discussed in the following subsection.

3.3.3 Routine & Adaptive Expertise

The expert's reliance on automated processes that may not be amenable to conscious control or modification (Feltovich, et al., 1997) has been proposed as a factor in one potential weakness of experts discussed in the literature—inflexibility (Chi, 2006b). Bilalić, et al. (2008:77) define flexibility as "the ability to adapt to problems where it is necessary either to use new methods, techniques, knowledge or information, or to modify the existing method of dealing with the problem." The question of whether—and to what extent—experts demonstrate the ability to adapt and modify their procedures has been a subject of debate in the literature (Feltovich, et al, 1997; Zeitz, 1997; Chi, 2006b; Bilalić, et al., 2008; Dane, 2010).

Feltovich, et al. (1997) review a number of other aspects of expert cognition (in addition

to automation) that can lead to inflexibility:

- functional fixedness (the tendency to view, approach, or use things in the manner to which one has been accustomed), which can lead to loss of creativity in problem solving.
- the reductive bias, which is "a tendency for people to treat and interpret complex circumstances and topics as simpler than they really are" (Feltovich et al., 1997*:*128)
- schematization of knowledge, which can potentially lead to mis-conceptualizing problems or ignoring real, complex data in favor of simplified abstractions

Bilalić, et al. (2008) note that literature on the subject of expert inflexibility often focuses on two main points: that a large amount of knowledge about a problem or domain can stifle creativity, and that skill development naturally leads to automation of processes. After discussing research findings both in favor of and against the notion of expert flexibility, they conclude that "the empirical evidence for either possibility *[that is, flexibility or inflexibility*] is sparse and unconvincing" (Bilalić, et al., 2008:77). The same authors report on a study investigating chess players' susceptibility to the Einstellung effect,[13] in which they found that the ability to resist the effect (that is, to reject possible-but-not-optimal solutions in favor of better ones) varied depending on the level of expertise of the player as well as the difficulty of the problem: more expert (more than 5 standard deviations above average, which the authors call "super-experts") chess players were more likely to resist the Einstellung effect than less expert (about 3 standard deviations above average, which the authors call "ordinary experts") players.

Feltovich, et al. (1997) report on research into medical decision-making that suggests that experts' flexibility may vary depending on the circumstances, and argue that the ability to recognize complexity and move beyond the reductive bias are key factors in expert flexibility in complex and dynamic environments characterized by ill-structured problems. In her review of the literature on expert flexibility, Zeitz (1997) draws a similar conclusion, arguing that experts demonstrate flexibility in tasks that capitalize on their ability to work with abstract representations of knowledge or systems, while tasks that require the expert to employ a more concrete level of mental representation or to reconceptualize the task are likely to reveal inflexibility. This distinction recalls Bilalić, et al.'s (2008) definition of flexibility, quoted above, in which flexibility is understood to be the ability to adapt or change methods as needed. The 'existing method' referred to in the definition may be understood as the mental model or schema

[13] The Einstellung, or set, effect is a phenomenon in which problem-solvers become fixated on a specific approach to solving a problem. Individuals who are primed with a certain manner of approaching a problem are likely to become stuck on that approach and continue to use it to solve other problems for which easier or better approaches are available.

that would usually apply in a situation; it could also be understood as the automated (i.e., not subject to conscious control) response to a given stimulus or problem. Thus, in order to successfully cope with the novel or unexpected, experts must be able to move away from existing mental models or schemata and exercise control over their cognitive processes.

A similar point is made by Dane (2010), who views cognitive entrenchment—"a high level of stability in one's domain schemas" (p. 579)—as the principal cause of expert inflexibility. He describes the possibility that experts' schemata can become highly stabilized and thus difficult to modify when circumstances call for it. This can lead to inflexibility in problem solving, including issues such as fixation, habituation, and failure to adapt. He argues that cognitive entrenchment does not always occur—that it is not a necessary sequela of expertise—and proposes two protective factors that reduce the likelihood that an expert will demonstrate entrenchment: first, the dynamism of the environment (i.e., the domain) in which the expert performs, and, second, engagement with dissimilar domains (tasks, activities). The author notes that dynamic domains discourage entrenchment because they are unpredictable, require adaptability, and require openness "to a wide range of possibilities, options, and information" (Dane, 2010:589), all of which make it less likely that an individual's schema will become highly stable and thus inflexible.

The fact that some individuals identified as experts in a domain demonstrate flexibility while others do not may appear, at first, paradoxical. It points, however, to the proposal that there are two types of expertise—one characterized by competent performance at routine tasks, the other characterized by the ability to adapt to dynamic and novel situations. For example, Holyoak (1991) argues for the existence of two "qualitatively different" (p. 310) types of expertise, based on evidence that experts do not always perform better than novices at complex, domain-relevant tasks, that experts can have more difficulty at certain tasks (such as writing) than novices, and that improved memory for stimuli and expertise do not always go hand in hand. Quoting Sloboda (1991), Holyoak (1991:310) contrasts two possible definitions of experts/expertise: first, expertise as "the reliable attainment of specific goals within a specific domain" and, second (which he prefers), the expert as "someone who can make an appropriate response to a situation that contains a degree of unpredictability."[14] These descriptions bring to mind the distinctions in expert flexibility mentioned by Feltovich, et al (1997) and by Bilalić, et al. (2008), as described in the previous section.

[14] Although Holyoak's (1991) discussion only encompasses the possible definitions quoted above, Sloboda (1991) goes on to reject both of these possible definitions, preferring to "abandon the idea that expertise is something special and rare (from a cognitive or biological point of view) and move toward the view that the human organism is in its essence expert" (Sloboda, 1991:155). While the quotation is contextualized in the interest of completeness, further discussion of this argument is outside the scope of this work.

The best known framework for describing and understanding different types of expertise is that of routine and adaptive expertise (Hatano & Inagaki, 1986). Routine expertise, in their account, is limited, inflexible, and dependent on automation of processes and well established patterns. Routine experts are described as unable to maintain expert level performance in the face of unusual or new problems (Hoffman, 1997). Paletz, et al. (2013) suggest that the routine expert's inability to respond to novel problems may arise from misapplication of problem-solving heuristics or strategies, or from a lack of heuristics or strategies applicable to a given problem, while Dane (2010) attributes expert inflexibility (he does not refer to routine expertise, but seems to be describing it) to cognitive entrenchment, as discussed in the previous section. Bohle Carbonell, et al. (2014:26) describe routine expertise as "limited by its lack of awareness of the context-specificity of its knowledge."

Adaptive expertise, meanwhile, is associated with deeper conceptual knowledge and greater flexibility (Hatano & Inagaki, 1986), and characterized by the ability to deal with uncertainty and to adapt to novel problems and situations (Moser-Mercer, 2007). Adaptive experts are described as more readily able to successfully confront novel situations and to continue to improve their performance over time (Hoffman, 1997). They also have "the knowledge of why and under which circumstances certain methods have to be used or new methods have to be devised" (Bohle Carbonell, et al., 2014:15).

The ability to successfully confront and react to unpredictability and novel situations—to adapt—is seen as important to task performance in many domains (Feltovich, et al., 1997; Bransford, et al., 2000; Moser-Mercer, 2007; Paletz, et al., 2013; Bohle Carbonell, et al., 2014), especially those characterized by ill-defined or ill-structured problems in which there is a "complex relationship between abstracted knowledge (e.g., principles and rules) and the situations or cases where this knowledge needs to be applied (e.g., in problem-solving)" (Feltovich, et al., 1997:138). Such domains are characterized by a lack of "intact, wide-scope abstractions that capture all of the goings-on of a case—no abstractions from which these particular happenings emerge as derivations. In addition, cases that may seem similar at some level of abstraction can be critically different in their particulars" (Feltovich, et al., 1997:138). These descriptors seem highly applicable to the task of interpreting (see the quotations from Roy, 2000, and Mason, 1999, at the beginning of Chapter 1, as well as that from Hoffman, 1997, in the first section of this chapter), which I would argue is an example of a domain characterized by ill-structured problems.

While, to my knowledge, no study has specifically explored routine and adaptive expertise in dialogue interpreting, Moser-Mercer (2007) makes a strong case for adopting approaches to interpreting pedagogy aimed at developing adaptive expertise in learners. Many characteristics of

the interpreting task—including high cognitive load/demands on attention and memory, the need for rapid decision making and problem solving, unpredictability, and, in general, the ill-structured nature of problems encountered by task performers—are such that it is highly plausible that adaptability would be a characteristic of high-level performers of the task.

3.4 Expertise in the Interpreting Studies Literature

In a review of expertise-focused research into simultaneous conference interpreting (SCI), Liu (2008:159-60) emphasizes that identifying objective hallmarks of expertise in interpreting is difficult, if not impossible, due to the parameters of the task:

> "the commonly mentioned goals of interpreting, e.g. to facilitate communication across languages and cultures, are too vague to guide research that can measure the achievement of such goals. Even the often-used criteria for judging the quality of interpreting, i.e. accuracy, completeness, appropriate language use, and smooth delivery, lack agreed-upon and reliable methods of measurement to produce consistent findings."

Despite this difficulty, Liu does not see studies of expertise in interpreting as a fruitless pursuit. Rather, she argues for adopting a relativist approach that focuses on improving understanding of the processes involved in the task, the factors influencing performance, and the development of skill over time—a perspective very much in line with that which informs this dissertation. Along similar lines, Tiselius & Jenset (2011:270) suggest that comparing the performances of novice and experienced interpreters may provide "clues to outstanding practice," even in the absence of objective criteria against which to judge expertise. This section presents a number of findings from the Interpreting Studies literature with regard to novice/expert differences in performance.

Moser-Mercer, et al. (2000) identify several developmental differences between novice and experienced interpreters:

- expert interpreters' knowledge bases are better organized than those of novices
- experts' interpretations rely more on context than those of novices
- experts work from a schematic understanding of the topic and context, whereas novices deal with utterances in isolation
- experts tend to plan and act more globally than novices, proceeding from "known to unknown," rather than vice versa, as is typical of novices (Moser-Mercer, et al., 200:109).

Ivanova (1999, 2000) reports that the novice interpreters in her study were more attentive to

and more influenced by the syntactic complexity of the source language input, while the experts attended more to meaning and were less affected by complex syntax. Novices were also noted to have a primarily low-level focus (i.e., on individual words rather than on larger units of meaning) in their translation efforts.

Liu (2001) presents evidence that SCI experts' working memory is not superior in general, but, rather is better only for domain tasks. She concludes that her study demonstrates evidence of three aspects that may be involved in expert SCI performance: ability to privilege important information over secondary information (i.e., better identification of highly-relevant vs less-relevant propositions), better self-monitoring skills, and greater efficiency in "allocating working memory resources" (Liu, 2001:76).

Hild (2011) finds that experts' performance is not greatly affected by the syntactic complexity of the source text, while novices' performance decreases when dealing with increasing syntactic complexity. She notes that the findings vis-à-vis the novice group are in line with previous findings about monolingual language processing, which have shown that syntactic complexity leads to decreased performance, but that the expert interpreters' performance supports the idea that "text processing in expert SI is qualitatively different from normal text comprehension;" that is, that expert/novice differences are not mediated by "innate WM *[working memory]* size, but by the availability of acquired skills and knowledge" (Hild, 2011::265).

Tiselius (2013; see also Tiselius & Jenset, 2011) reports mixed results in her investigation of conference interpreters' expertise. Her research compared the performances of more- and less-experienced interpreters, as well as performances by the same interpreters across a significant period of time (i.e., recordings of interpretations made 15 years previously by interpreting students compared with newly recorded interpretations of the same speech by the same interpreters, gathered for the purpose of the study). Cross-sectional comparison of novices' and experts' performances revealed differences in quality, as measured by validated rating scales, but comparison of the same individuals' performances over the long term did not reveal similar differences. The findings of the study also indicate that experienced interpreters "have more strategies at hand and encounter fewer processing problems than less experienced interpreters or laypersons" (Tiselius, 2013:97), which aligns well with the results reported by Ivanova (1999) and the literature discussed in Liu (2008).

Liu (2008) reviews several decades' worth of research comparing interpreters of differing skill levels[15] and highlights a number of skills and subskills that have been hypothesized or

[15] Despite the fact that the research Liu reviews involves comparisons of interpreters across levels of training/experience, much of the literature she discusses is not informed by expertise studies. For that reason, the

shown to vary in novice and professional/experienced interpreters (primarily in the setting of simultaneous conference interpreting). She notes that differences in performance at different skill levels have been demonstrated in the three principal processes involved in interpreting (i.e., "comprehension, translation {*i.e., language transfer*}, and production," Liu, 2008:161), as well as in attention and monitoring.

In terms of the first of these processes (i.e., comprehension), professional-level interpreters have been shown to process input more selectively and at a higher (semantic, contextual) level than novices, who tend to become overloaded by incoming content and are more likely to process incoming information at the syntactic level. Liu (2008:163) describes these differences as possibly related to "processing efficiency and different approaches to semantic processing."

The second of the three processes she discusses, language transfer, is not directly observable, but inferences about it can be drawn from the interpreter's output. Liu (2008) reviews evidence that indicates that experienced interpreters chunk and segment information differently (more efficiently) than novice interpreters, and that experienced interpreters are better able than novices to recognize linguistic patterns in one language and map them on to equivalents in the other language.

With regard to production, Liu (2008) mentions two developmental differences described in the literature: novices' output has been shown to be less logically coherent and to be more variable in terms of speed and pauses. Liu notes that these differences do not seem to be directly related to individual levels of verbal fluency, per se, but rather to "different approaches or strategies adopted in the production process or in the interaction of different processes during simultaneous interpreting" (Liu, 2008:166).

Attention and control processes are also strongly implicated in the simultaneous conference interpreter's ability to attend to an incoming speech, mentally translate the content, and produce target language output. Liu (2008:165) proposes that "one such strategy or control mechanism *{for overcoming interference between listening and speaking}* may be the interpreters' specific use and control of their attention by sharing or switching back and forth between the different tasks, manifested in the more frequent pauses and the reduction of their own speaking rate;" this view is also held by Cowan (2000/01), whose views on attention in interpreting are discussed in Section 4.6.

Liu (2008) argues that output monitoring may be one of the principal mechanisms responsible for expert interpreters' superior performance. She cites a number of studies that

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paragraphs discussing her review refer to "professional" or "more experienced" interpreters rather than "expert" interpreters.

demonstrate that experienced interpreters are less affected by delayed auditory feedback than are novices and non-interpreters. This finding supports the notion that experienced interpreters have "acquired *[the]* ability to pay less attention to their own output and thus more attention to comprehending the input" (Liu, 2008:167). The author notes that simultaneous conference interpreters cannot simply ignore (switch attention away from) their own output in order to focus primarily on the input; rather, they must attend to both input and output in order to process incoming information as well as to check their output for accuracy. Liu argues that the competent interpreter's tendency to process incoming speech at a semantic (rather than syntactic) level is at least partially responsible for the ability to monitor two streams at once; that is, the interpreter is not monitoring his/her output against a phonological (word for word) record of the input, but rather against a semantic conceptualization of already processed input. The quantity and quality of online monitoring taking place may vary depending on the processing capacity available to the interpreter at a given moment. Liu also argues that anticipation plays a role in this process. Semantic processing of the incoming speech may allow the competent interpreter to predict what is coming next, thus freeing up some processing power: comprehension of the next incoming speech segment "becomes a process of checking and confirming what was predicted, rather than the more effortful comprehension process" (Liu, 2008:168).

Based on the evidence she discusses, Liu (2008) concludes that, while experienced ('expert'/competent) interpreters make fewer errors, respond more quickly, and expend less effort than novices, these features are not the only things that distinguish expert performance from that of novices. She identifies semantic (rather than syntactic) processing of incoming speech and the ability to grasp higher level (discourse- and context-related) features of speech as key factors in competent performance, noting that they allow the expert to quickly grasp the structure of a piece of discourse, to make predictions, to chunk meaning into larger segments, and to expend less mental effort on comprehension, which in turn leaves processing power available for other things, such as monitoring. She argues that, while competent simultaneous conference interpreters have increased skill at all three of the core cognitive processes involved in the task (comprehension, translation, production), it is the interaction of their skills in each area through efficient management of cognitive resources that allows them to interpret competently.

3.4.1 Expertise and Interpreting in the Neuroimaging Literature

Although the research reported on in this dissertation does not involve neuroimaging, there is a growing body of work focused on better understanding the brain's structure and activity, both with regard to expertise and with regard to interpreting. To my knowledge, there are no available neuroimaging studies focused on dialogue interpreters; thus, this brief overview presents key

findings related to expertise in general and in simultaneous conference interpreting.

Neuroimaging studies have identified patterns of difference in novices' and experts' patterns of brain activation during WM tasks (Guida, et al., 2012). Guida, et al. (2012) argue that the patterns observed in such studies support theories that suggest that experts draw on LTM during performance (including, specifically, for Ericsson & Kintsch's theory of long-term working memory, discussed in Section 2.2.2). On the basis of a number of studies, they propose a two-stage framework of brain activation during skill acquisition. In their account, WM is drawn on heavily when novices begin to acquire a skill, which involves encoding and creating chunks of information in LTM. The high levels of WM-related brain activation decrease with practice as the advanced novice becomes able to retrieve and work with larger chunks of information:

> "when all these results are taken together, it is easy to understand that, as more LTM chunks become available (through chunk retrieval) during the process of acquiring expertise, the necessity and opportunity to create chunks by binding separate elements becomes quantitatively less important, and therefore the activity of the regions (prefrontal and parietal areas) that undergird the process of binding (and thus chunk creation) decreases" (Guida, et al., 2012:235).

The authors argue that with time and experience experts' brains undergo "cerebral functional reorganization" (Guida, et al., 2012:221); that is, with the acquisition of expertise, brain function is reorganized and LTM becomes more involved in expert task performance, allowing experts to draw quickly and easily on stable memory structures within LTM and to quickly and easily store incoming information in LTM by processing/embedding it within the context of pre-existing stable knowledge structures in LTM. Guida, et al. (2012:224) emphasize that their argument that experts' brains undergo functional reorganization does not mean that experts are using different areas of the brain to perform the same cognitive tasks as novices; rather, it means that "experts do the tasks differently; that is, they execute WM tasks using different mental operations based on LTM areas." At the same time, the authors acknowledge that while behavioral data seem to confirm this assertion, it is only partially confirmed by neuroimaging studies. Further evidence for brain reorganization in experts is discussed by Neumann, et al. (2016), who report on a meta-analysis of neuroimaging comparisons of novice and expert brain activation in the completion of non-motor tasks, and Chang (2014), who reviews a number of studies examining expertise-related plasticity. Neumann, et al. (2016:266) note that experts in cognitive domains "show larger activation magnitudes or activation in additional areas in contrast to the motor domain where brain activation patterns tend to be reduced and more focused in experts."

Evidence that the development of interpreting skill involves "significant changes in brain

activity (*functional changes* or *plasticity*) and brain structure (*structural plasticity*)" is discussed by Moser-Mercer (2010:265), who notes that the portions of the brain related to control are more engaged (active) in the early, effortful stages of skill acquisition, while activity in control-related portions of the brain is reduced in professional (i.e., 'expert') interpreters. As skills become automated, initially high demands on controlled cognitive processing begin to decrease. Hervais-Adelman, et al. (2011, 2014, 2015, 2017) report on a series of functional MRI (fMRI) studies of interpreters' brains that provide evidence of structural and functional plasticity in simultaneous conference interpreting trainees, including changes in areas related to executive function[16] and increased cortical thickness following training. They argue that "trained interpreters' expertise may enable them to carry out the task efficiently and effectively while recruiting fewer brain regions than naive participants, consistent with many studies showing decreased brain activation when a task is more rehearsed and automated compared to when it is more effortful and novel" (Hervais-Adelman, et al., 2014:4733).

Moser-Mercer (2010:274) describes two neurological mechanisms whereby relationships between objects or ideas may be analyzed and represented: "broadly tuned cells that selectively respond to certain features" and "a dynamic combination of these cells into functional units;" the second mechanism depends heavily on the relevance of the stimulus and the attention paid to it. Moser-Mercer notes that interpreting students are often asked to engage in pre-practice activities such as brainstorming in order to activate relevant long-term memory and connections between items of knowledge that tend to support this second mechanism. This idea coheres (as noted by Moser-Mercer, citing Hebb, 1949) with the idea that connections between neurons that are repeatedly activated at the same time will be stronger than connections between neurons that are not activated in concert. Moser-Mercer also highlights the relationship between WM and LTM in interpreting, noting that, in order to interpret, one must be able to quickly and effortlessly recall information from long-term memory and put it to use in order to complete the task (i.e., hold and manipulate it within working memory/keep it as the focus of attention). Moser-Mercer (2010:280) argues that "associative networks of information, purposefully built to subserve the simultaneous interpreting task, are the backbone of successful interpreting." These networks of information exist within long-term memory and can be called upon wholesale when needed in order to complete a task, thus facilitating the interpreting process.

3.5 Conclusion

The work presented in this dissertation seeks to shed light on the parameters and features of

[16] Executive function is further discussed in Section 4.6

the dialogue interpreting task, as well as on the developmental trajectory from novice to competent performer, from the perspective of the task performer. In doing so, it adopts a relative approach to expertise, and analyzes the performances and retrospections of interpreters with different levels of experience and training. As discussed in the previous sections, both the expertise studies literature and the literature on expertise in simultaneous conference interpreting suggest a number of differences in novice and expert performance. To my knowledge, the research reported on in this dissertation is among the first to employ an expertise-informed approach to the study of dialogue interpreting.

4. Self-Regulation

4.1 Introduction

In Section 1.3.2, I introduced self-regulation as a productive framework for considering the what of online monitoring and the how of online control in dialogue interpreting from the perspective of the task performer. In this chapter, I define self-regulation; introduce models of self-regulation and of monitoring and control; provide an overview of the development of self-regulatory skill and the connection between self-regulation and expertise; explore the relationship between self-regulation, executive function, and attention; and discuss the role of attention in self-regulation.

4.2 Defining Self-Regulation

Self-regulation is a complex construct that "at its core describes how individuals monitor and control their cognition, behavior, and motivation" (Alexander, et al., 2011:393). Self-regulation is closely related to a number of other constructs, many of which are poorly defined or overlap with each other (Zeidner, et al., 2000; Sperling, et al., 2004; Vohs & Baumeister, 2004, 2011; Dinsmore, et al., 2008). Some scholars define self-regulation narrowly, restricting their use of the term to conscious, volitional processes running counter to a preferred or instinctual response in service of a desired goal. For example, Bauer and Baumeister (2011:65) argue that "[*self-regulation*] is the capacity to alter the self's responses to achieve a desired state or outcome that otherwise would not arise naturally." From this point of view, self-regulation (which Bauer & Baumeister, 2011, use interchangeably with self-control) occurs only when an action is overridden in service of a competing objective. Other scholars prefer a broader conceptualization, and do not see self-regulation and self-control as interchangeable terms, as explained by Carver & Scheier (2011:3):

> "When we use the term self-regulation we intend to convey the sense of purposive processes, the sense that self-corrective adjustments are taking place as needed to stay on track for the purpose being served (whether this entails overriding another impulse or simply reacting to perturbations from other sources)."

In this view, which is that adopted in this dissertation, self-regulation does not necessarily involve overriding a preferred response. Rather, it is understood as a process whereby the individual exercises control in service of a goal. Although Carver & Scheier's (2011) definition,

quoted above, presents self-regulation as a conscious process, much self-regulation occurs without engaging the conscious mind. Indeed, nonconscious processes have been shown to play an important role in self-regulation of cognition, emotion, and behavior (Fitzsimons & Bargh, 2004:154).

4.3 Modelling Online Self-Regulation

Zimmerman (2002, 2006) views self-regulation as occurring in three phases: 1. forethought, which occurs in anticipation of an activity, 2. performance (of a given activity, e.g., interpreting), and 3. self-reflection, which occurs after completion of an activity. While the first and third of these phases (i.e., advance preparation and post hoc reflection) are certainly worthy of study, my focus is on the second phase: the interpreter's self-regulation while interpreting—that is, online[17] self-regulation.

Two closely connected, but distinct, processes are involved in online self-regulation: *monitoring*—that is, the process of observation—and *control*—that is, response to observation (Pintrich, 2000; Zimmerman, 2002, 2008). Online monitoring is the mechanism by which the need to adjust or modify some aspect(s) of performance is detected, while adjustments or modifications to performance are realized via online control mechanisms (Nelson & Narens, 1990; Pintrich, 2000; Winne, 2001).

A classic model of the relationship between monitoring and control is that proposed by Nelson & Narens (1990), which is illustrated in Figure 4. In this model, monitoring and control processes mediate between a current state of affairs (i.e., the activity that an individual is engaged in), called the *object-level*, and a dynamic mental representation reflecting the individual's understanding of the task, called the *meta-level*. Monitoring and control processes run in concert in order to achieve and/or maintain alignment between the object-level and the meta-level. Monitoring passes information from the object-level to the meta-level, allowing for comparison between the current and desired states of affairs. Control occurs "whenever the meta-level modifies the object-level—more specifically, when information from the meta-level acts to influence the ongoing activity at the object-level" (Dunlosky & Metcalf, 2009:5). Both halves of this mechanism are necessary for effective online self-regulation, as a system that only monitors does not allow for changes to be made (i.e., does not allow for control), while a system that only

[17] As discussed in Section 1.2 "online self-regulation" is used throughout this dissertation to refer to self-regulation that occurs during the course of the interpreted interaction, including the portions of the interaction when the interpreter is not speaking.

controls does not have information upon which to base its actions (Nelson & Narens, 1999).

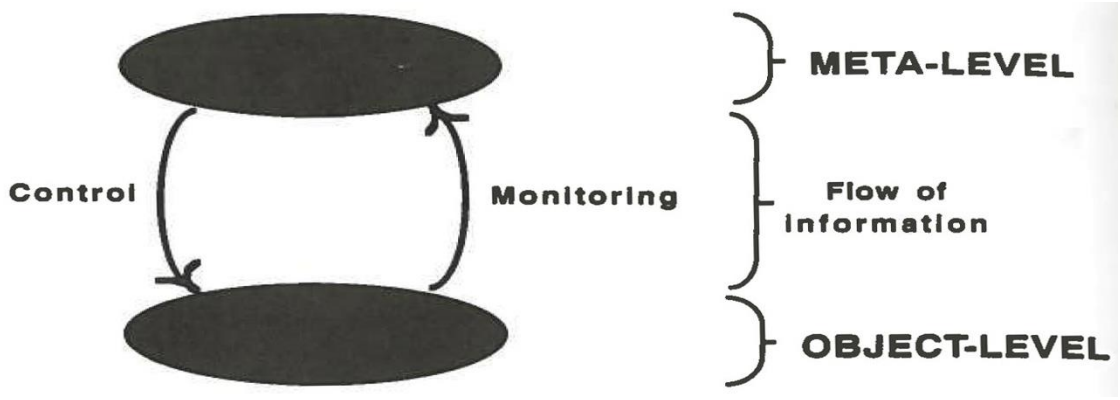

Figure 4. Model of monitoring and control processes, adapted from pg. 126 of Nelson, T. O. & Narens, L. (1990). Metamemory: a theoretical framework and new findings. In Bower, G. H. (Ed.) *The psychology of learning and motivation: Advances in research and theory*, Vol. 26 (125-173). San Diego: Academic Press.

Nelson & Narens's (1990) model of monitoring and control processes coheres with the model of self-regulation proposed by Carver (2004) and Carver & Scheier (2011) illustrated in Figure 5. This model conceptualizes self-regulation as a feedback loop that involves comparison of a *current state* of affairs with a standard or *goal state*. Online self-regulation thus involves modifying performance in order to create or maintain alignment between the current and goal states.[18] Self-regulation is not a single-iteration process. It is, rather, a cycle, in which progress toward the goal is repeatedly assessed, and performance is repeatedly adjusted over time (Carver & Scheier, 2000, 2011; Zimmerman, 2000). Control mechanisms employed in service of self-regulation may be internal (i.e., unobservable or covert) or external (i.e., observable or overt) (Zimmerman, 2000; Carver, 2004).

[18] Carver (2004) and Carver & Scheier (2011) also discuss the possibility that, in cases involving an avoidance feedback loop, self-regulation may be aimed at distancing the current reality from a reference state rather than creating/maintaining alignment.

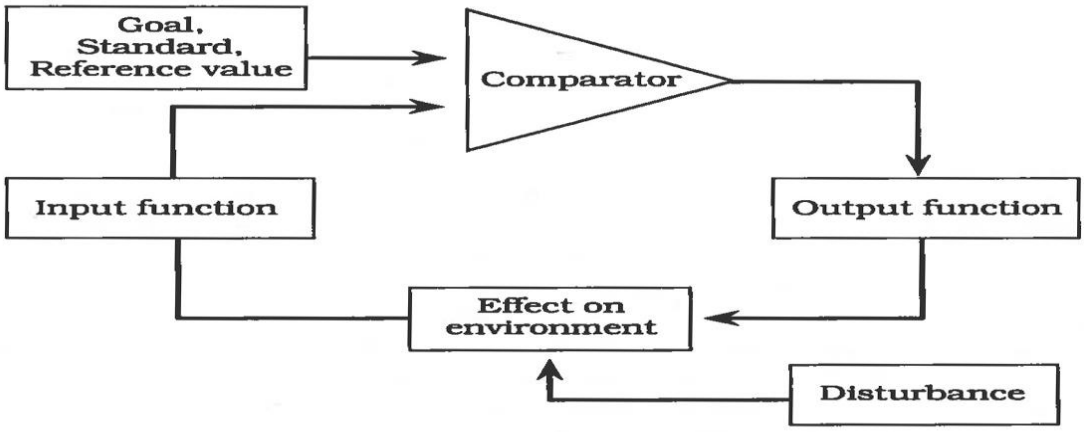

Figure 5. Feedback loop model of self-regulation, adapted from pg. 43 of Carver, C. S., & Scheier, M. F. (2000). On the structure of behavioral self-regulation. In Boekaerts, M., Pintrich, P. R. & Zeidner, M. (Eds.) *Handbook of self-regulation* (41-84). San Diego: Academic Press.

The models presented in the preceding paragraphs concur in conceptualizing online self-regulation as a recursive process in which a current state is compared with an ideal state. In both, a mismatch between the current and ideal states triggers actions intended to bring the current state closer to the ideal state. While both models inform the work presented here, in this dissertation I employ the terms *current state* and *goal state* rather than *meta-level* and *object-level*.

Discussions of monitoring within the literature on metacognition (that is, thinking about one's own mental processes) often refer specifically to monitoring of knowledge and of cognitive processes (Dinsmore, et. al. 2008; Hacker, 1998; Dunlosky & Metcalfe, 2009). Within the context of self-regulation, however, the potential foci of monitoring are generally understood more broadly. Online self-regulation may involve monitoring of a number of factors other than cognition, including motivation, personal actions (i.e., one's own behavior), the actions of other individuals, and the environment or context (Zimmerman, 2000, 2006; Pintrich & Zusho, 2002; Dinsmore, et al., 2008; Carver & Scheier, 2011). This dissertation adopts this broad approach to exploring the potential targets or foci of dialogue interpreters' online monitoring and of the online control mechanisms that dialogue interpreters may employ. Following Pintrich & Zusho's (2002) identification of four broad areas or foci of self-regulated learning, I consider interpreters' online monitoring of affect, behavior, cognition, and context, and their employment of affectual, behavioral, and cognitive control mechanisms.

4.4 Goal States

The notion of 'goal' in Carver (2004) and Carver & Scheier's (2011) model of self-regulation is flexible and broadly defined. A given person's goals are understood to be hierarchically organized, and individual goals within the hierarchy may be more or less concrete (Carver & Scheier, 2011). While some goals are very specific and/or concrete, others are abstract "mental representations of certain behaviors or outcomes that are desirable to pursue or to attain" (Papies & Aarts, 2011:127). More concrete goals may serve as mechanisms for the attainment of more abstract goals, and multiple concrete goals may be pursued concomitantly or in close succession in the service of attaining higher level goals (Carver & Scheier, 2000, 2011). Mental representations of goal states often include not only a representation of the goal itself, but also of the "*means by which* and the *circumstances under which* the goal can be attained" (Hofmann, et al., 2011, emphasis added).

Figure 6 illustrates a hierarchy of goals (note that the self-regulatory feedback loop is not included in the figure, but is understood to be active). The highest level of abstraction represents the individual's principles ('how do I want to be?'); the middle level includes the things the individual must do in order to realize the principles ("programs of action," Carver & Scheier, 2011:5); and the lower level subdivides actions even further.

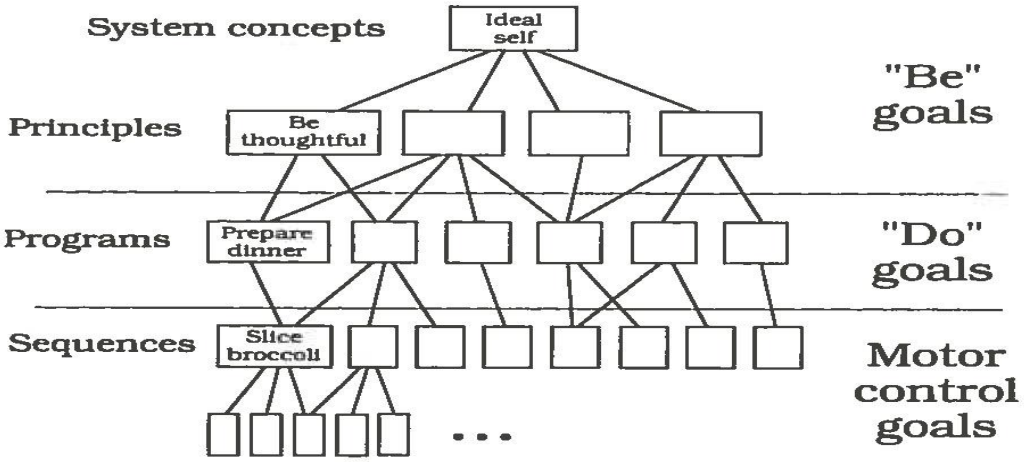

Figure 6. Hierarchy of goals, adapted from pg. 49 of Carver, C. S., & Scheier, M. F. (2000). On the structure of behavioral self-regulation. In Boekaerts, M., Pintrich, P. R. & Zeidner, M. (Eds.) *Handbook of self-regulation* (41-84). San Diego: Academic Press.

In this context, it is also important to note that goal states are not necessarily static or fixed: they may also be dynamic—that is, a goal may be "the process of *traversing the changing trajectory of the activity*, not just the arrival at the end point" (Carver & Scheier, 2011:4, emphasis added). Goal states, as well as the means employed to achieve them, may also be modified or abandoned in response to changes in circumstances or unexpected events (Hofmann, et al., 2011).

As mentioned in Section 3.3, cognitive control (i.e., non-automatic processing) may be required to maintain internal representations of goals active and to direct attention and neural activity toward "goals and the means to achieve them" (Miller & Cohen, 2001:168) when the links between goal representation and behavior are insufficiently well established or when a situation is dynamic or lacks clear cut 'right' and 'wrong' responses. It has also been suggested that widely observed capacity limits on cognitive control may be linked to limits on the number of goal representations that can be maintained active at one time (Miller & Cohen, 2001).

4.5 Skill Acquisition, Expertise, and Self-Regulation

While self-regulation may be viewed as a form of expertise in and of itself, in which self-regulatory ability is developed along the same trajectory that characterizes skill acquisition in general, the ability to self-regulate is not a guarantee of expertise in a particular domain (Zimmerman, 2000, 2006). As Zimmerman (2006:706) puts it, "self-regulatory processes can assist a person to acquire both knowledge and skill more effectively, but improvements in one's use of self-regulatory processes will not immediately produce high levels of expertise." Although well developed self-regulatory ability does not equate to domain expertise, the ability to self-regulate is considered important to expert performance. Monitoring and control mechanisms are among the "adaptations of mind and body" that occur as an individual develops expertise at a task (Feltovich, et al., 2006:57). Alexander, et al. (2011:394) make a similar point, stating that "one of the characteristics or hallmarks of developmental models of expertise is that experts *do* self-regulate" (emphasis in original).

The importance of metacognitive and self-regulatory abilities in learning has been discussed frequently in the scholarly literature on interpreting (see, for example, Choi, 2006; Moser-Mercer, 2007; Arumí Ribas, et al., 2006; Motta, 2011; Rodriguez Morell, 2011; Cañada and Arumí Ribas, 2012). Zimmerman (2002:86) notes that "there is growing evidence that people's use of self-regulatory processes to systematize their learning and performance play a greater role in developing expertise than their innate talent or ability." Evidence of the role of metacognitive

and self-regulatory ability in the development of interpreting skill informs Moser-Mercer's (2007) recommendation that interpreter educators should focus on creating learning environments and exercises that will tend to encourage the development of adaptive expertise in student (i.e., novice) interpreters, including pedagogical methods intended to support learners as they acquire metacognitive skills and self-regulatory mechanisms. The ability to self-regulate effectively does not spring into existence unaided, but may be developed over time, similarly to any other skill (Zimmerman, 2002, 2006; Pintrich & Zusho, 2002). Models of self-regulated learning assume that learners have the potential to develop self-regulatory skills, including online monitoring and control, but recognize that these skills may or may not become well-developed or be successfully implemented by all individuals at all times:

> "This assumption does not mean that individuals will or can monitor their cognition, motivation, or behavior at all times or in all contexts; rather, just that some monitoring, control, and regulation is possible" (Pintrich, 2000:452).

Monitoring of performance can be difficult for novices, as highlighted by Zimmerman (2000:19; also see Zimmerman, 2006): "the amount of information involved in complex performances can easily inundate naive self-observers and typically can lead to disorganized or cursory self-monitoring." Moser-Mercer (2010) indicates that self-monitoring skills are developed fairly late in the learning process. Moser-Mercer (2000a) cites evidence from self-reports and journals completed by students of simultaneous conference interpreting indicating that the students perceived their ability to self-monitor as dramatically improved over the course of six months of training and practice.

Arumí Ribas's (2012) comparison of the problems and strategies reported on by beginning and advanced students provides evidence of the development of monitoring abilities in students of consecutive interpreting. She reports that the beginning students in her study reported more problems related to technique, while the advanced students reported more problems with attention and concentration. The beginning students were also more likely than the advanced students to cite the quality of the audio recording of the source material as a problem, while the advanced students were more likely to identify lack of attention/concentration as a problem. She suggests that the contrast in the types of problems identified by beginners and advanced students may be related to the fact that novices are still learning note-taking technique and may be more likely to identify problems in their technique, rather than issues with other facets of the task, as the root of the difficulties they encounter. Advanced students' technique, meanwhile, may be more automated, leading them to focus less on technique as a source of difficulty. The author does not connect the beginners' issues with sound quality to a similar issue, but, to me, they are suggestive of a similar phenomenon, whereby the beginner, who has not yet developed the

ability to self-monitor, attributes difficulties to an external source rather than an internal source (e.g., insufficient attention/concentration).

Arumí Ribas (2012) also reports that the advanced students were less likely than the novices to feel that they had satisfactorily resolved the problems they encountered (she does not report on any comparison of this perception with the interpreters' output, so this is a question of the students' perception, rather than of their performance). She attributes advanced students' relative lack of confidence in their own problem solving to the fact that they have had more training and are more critical of their own performance. Viewed from the perspective of development of self-regulatory skill, the advanced students' relative dissatisfaction with the strategies they employ may be indicative of better-developed self-monitoring skills, rather than an indication that they lack confidence: in contrast with the beginner students, who are presumably still in the cognitive stage of skill acquisition, the advanced students may have reached a level of skill acquisition that allows them to monitor their performance more effectively and to evaluate the effectiveness of the strategies they employ.

In contrast with novices, experts' self-monitoring tends to be more selective and more accurate. Experts also tend to be able to detect and correct errors more readily, judge their own abilities more effectively, recall more about their performance after completion of a task, and recall more abstract information (Chi, 2006a, 2006b; Zimmerman, 2006). Expert self-monitoring is not infallible, however, as illustrated by the finding that expert interpreters' self-monitoring is among the first aspects of performance to suffer when the interpreter is faced with "an unexpected challenge, such as high input rates or convoluted semantic input" (Moser-Mercer, 2010:277).

In terms of control mechanisms, Tiselius & Jenset (2011:272) stress that effective control of performance requires that novice interpreters learn the range of strategies or tactics that may be employed (i.e., the responses at their disposal) and acquire "the skill to manage them during the task of simultaneous interpreting" (i.e., the ability to employ them effectively during performance). Vik-Tuovinen (2011) argues that a given interpreter's success at applying strategies (that is, online control) depends on the interpreter's level of competence with regard to three interrelated and interdependent factors: "situational factors, the interpreter's knowledge and mental potential, and norms" (p. 302). Vik-Tuovinen's argument coheres with the notion of variability in self-regulatory mechanisms and approaches described by Zimmerman (2002): a control mechanism successfully employed by a given performer in a given context may not be equally effective for all individuals, or for the same individual in different circumstances. Vik-Tuovinen (2011) highlights not only this variability, but also the fact that the responses available to an individual interpreter are rooted in the interpreter's own declarative and procedural

knowledge and abilities. One cannot usefully employ either procedural or declarative knowledge that one does not possess in service of self-regulation, and, in some cases, one may not be able to effectively access or employ the knowledge that one does have.

Indeed, self-regulatory ability is often described as context dependent. An individual's ability to regulate performance in one domain does not automatically transfer to other domains, and an individual's capacity to self-regulate in a given situation may be greater or lesser as a result of experience, training, and other factors (Schunk, 2001; Alexander, et al., 2011). Insofar as self-regulation is goal-oriented and domains vary in their approaches, problems, and solutions, it seems reasonable to suppose that context (i.e., domain or task) plays a role in determining how, to what extent, and by what means the individual self-regulates during learning (and by extension, during performance). Alexander, et al. (2011) review the literature on domain specificity of self-regulated learning abilities and conclude that, while the picture is not entirely clear, the evidence seems to support the notion of domain specificity of self-regulation. The argument for domain specificity in the acquisition of self-regulatory mechanisms is interesting in light of similar findings with regard to the domain specificity of expertise. As discussed above, the literature agrees that expertise is usually not transferable from one domain to another (see, for example, Chi, 2006a; Feltovich, et al., 2006).

4.6 Executive Function, Attention, and Self-Regulation

As discussed in Section 2.3, the senses constantly perceive a variety of stimuli, not all of which can be fully processed or responded to (Styles, 2005). As stimuli are perceived, attention-directing processes are responsible for "selecting a subset of information for further processing by another part of the information processing system" (Styles, 2005:5). Control of attention is closely associated with executive function, and has been proposed as an important factor in working memory, task performance, and self-regulation. The following paragraphs briefly describe the relationship between attention, executive function, and self-regulation, and then discuss the role of attention in online self-regulation.

Executive function is the set of "interrelated cognitive abilities that are required when one must intentionally or deliberately hold information in mind, manage and integrate information, and resolve conflict or competition between stimulus representations and response options" (Blair & Ursache, 2011:301). While self-regulation and executive function are closely linked, they are distinct constructs (Blair & Ursache, 2011; Hofmann, et al., 2011; Hofmann, et al., 2012). Blair & Ursache (2011) argue that the relationship between them is bidirectional with each informing and affecting the other: self-regulatory ability supports (or fails to support)

executive function, while executive function facilitates (or fails to facilitate) self-regulatory efforts.

The three primary executive functions identified in the literature are (a.) maintenance and updating of information (i.e., working memory), (b.) inhibition of impulses, and (c.) task-shifting (Hofmann, et al., 2011; Blair & Ursache, 2011; Hofmann, et al., 2012). These executive functions play a number of roles in self-regulation, including:

- "directing and re-directing attention to goal-relevant information" (Hofmann, et al., 2011:209);
- inhibiting irrelevant or possibly detrimental schema, thoughts, emotions, or impulses (i.e., disregarding irrelevant stimuli and maintaining focus on relevant stimuli); and
- updating and adjusting goal representations (i.e., "adjust[ing] plans flexibly to the changing circumstances," Hofmann, et al., 2011:210).

Miller & Cohen (2001:186, following Desimone & Duncan, 1995) view attention and inhibition as "two sides of the same coin: attention is the effect of biasing competition in favor of task-relevant information, and inhibition is the consequence that this has for irrelevant information." Thus, discussing attention necessarily implies a corresponding inhibitory process.

The first of the three self-regulatory roles that Hofmann and colleagues attribute to executive function—directing and re-directing attention—brings to mind Cowan's embedded processes model of working memory (Cowan, 1999, 2000/01; Cowan, et al., 2005; see Section 2.2.3), in which the central concept is the focus of attention. Within the literature on working memory and attention, there is some agreement that "executive control is largely synonymous with controlled attention" (Timarová, 2008:10). In fact, Cowan (2000/01) emphasizes the role played by attention in inhibition, maintaining focus, and working towards goals.

The role of attention focusing in effective self-regulation is a recurring theme in the literature on self-regulation and expertise (Rueda, et al., 2011; MacCoon, et al., 2004; Beilock, et al., 2002; Hofmann, et al., 2012; Timarová, 2008; Cowan, 2000/01). Executive control, generally, and attention, in particular, have been identified as major factors in simultaneous interpreting performance (Cowan, 2000/01; Timarová, 2008; Timarová, et al., 2014; Hervais-Adelman, et al., 2011, 2014), and it has been suggested that control of attention may be "the decisive element in the ability to interpret" (Timarová, 2008:21, citing Moser-Mercer, 2005).

Cowan, et al. (2005) argue for the existence of differences in individuals' scope of attention, while at the same time noting that a given person could have both more or less scope and more or less control of attention. They also propose that attention is adjustable, rather like a camera or

microscope:

> "When necessary, it *{i.e., attention}* might *zoom in* to hold on to a goal in the face of interference, and perhaps a minimum of related data that is required. However, when there is no interference with the goal and the task has been well-practiced, the focus of attention could afford to *zoom out* to apprehend multiple items at once (…..) We propose that a zoomed-out setting has more breadth or covers more objects, but has less intensity or precision of processing of each object, than a zoomed-in setting" (Cowan, et al., 2005:50, emphasis in the original).

While Cowan, et al.'s (2005) description suggests differences in the quantity of information to which an individual can attend in a given moment, Dane (2013) suggests distinguishing between two different aspects of attention: attentional breadth, defined as the number of things (stimuli, input) attended to during performance, and attentional integration, defined as the ability to make connections between events occurring in the environment and the individual's goals, and to act upon those connections. Dane's analysis of trial court proceedings and interviews with novice and expert trial lawyers suggests that both attentional breadth and attentional integration develop over time, with experts demonstrating more breadth of attention and more attentional integration than their novice counterparts. This finding coheres with research findings indicating that differences in experts' and novices' representations of knowledge play a role in performance, as discussed in Section 3.3.2.

As Dane's (2013) findings suggest, attention-related differences have been implicated in novice/expert differences in performance. Inasmuch as no clear evidence points to individual (innate) differences in working memory as an explanation for novice/expert differences in performance (Anderson, 2015),[19] it has been argued that acquired differences (i.e., developed through practice and experience) in executive function, and, more specifically, the ability to direct attention, are a significant factor in competent interpreting performance (Moser-Mercer, 2000b; Liu, 2008; Timarová, et al., 2014).

Indeed, Cowan (2000/01) suggests that competent performance of simultaneous conference interpreting—which, as he notes, is an attention-demanding task requiring training and practice—relies partly on efficient and strategic attention switching (i.e., rapidly switching attention back and forth between what is being heard and what is being said) and partly on automation of the cognitive processes involved in the task. Evidence for Cowan's assertion that

[19] Studies investigating working memory differences between non-interpreters and simultaneous conference interpreters, and between novice and expert simultaneous interpreters, have had contradictory results (Köpke & Nespoulous, 2006; Liu, 2008; Timarová, 2008; Köpke & Signorelli, 2012; Timarová, et al., 2014; Timarová, et al., 2015).

both mechanisms are involved in competent performance—that the ability to direct attention improves while the individual processes involved in the task become more automatic (thus requiring less mental 'effort')—is reviewed by Liu (2008), who describes a functional magnetic resonance imaging (fMRI) study in which an expert artist's and a non-artist's levels of brain activation were recorded as they drew. Liu states that "the level of activation appeared lower in the expert than in the novice, suggesting that a skilled artist may process facial information more efficiently and with less effort" (Liu, 2008:172, citing Solso, 2001). Liu (2008, citing Hill & Schneider, 2006) also notes that "studies involving the practice of cognitive tasks showed practice-related decreases in brain activation in the area involving working memory and attentional control." On the basis of this, she argues that gains in attention-related skill have a larger effect on performance than gains in efficiency in the processes involved in the task (such as, in the case of interpreting, comprehension, language transfer, or production).

Although dialogue interpreting is generally performed consecutively rather than simultaneously,[20] the absence of the challenge of simultaneous listening and speaking cannot be construed as an indication that dialogue interpreting places few demands on attention and memory. In fact, while many of the parameters of the task are distinct from those of simultaneous conference interpreting, dialogue interpreting involves a number of factors that are likely to draw on attention, working memory, and executive control. These include:

- switching between source language and target language regularly and frequently as speakers of different languages take turns at talk
- meaningfully relating individual utterances to prior utterances as the interaction proceeds; that is, understanding individual turns at talk within the context of the entire interaction, rather than as unitary, unrelated chunks of source text to be 'translated'
- continuous online problem-solving and decision-making (Corsellis, 2005; Leeson, 2005; Russell, 2005; Gile, 2009) related to linguistic, interactional, ethical/role-related, and other factors

The need to manage attention effectively is implicated in the difficulties with self-monitoring identified in novice performance discussed in Chapter 3 and in Section 4.6. For example, novices may be overwhelmed by the number of possible foci of attention, and be unable to effectively or consistently focus attention on relevant stimuli (Zimmerman, 2006). Competent performers, meanwhile, are expected to be able to draw on prior knowledge and experience in order to identify and direct attention to relevant aspects of the incoming stimuli. Experts' ability to judge a situation, identify patterns, and home in on relevant information could thus be understood as a

[20] See Footnote 6.

superior ability to manage the zooming-in and zooming-out functions of attention described by Cowan, et. al. (2005) that are quoted earlier in this section.

Although the discussion thus far has focused on volitional self-regulation mediated by attention, self-regulatory processes may also take place unconsciously via automated, unattended means. Just as information in LTM, including attention-directing or -inhibiting processes, may be automatically activated, independently of attention/awareness (Cowan, 1999, 2014), self-regulatory goals may be automatically activated by stimuli in the environment (Fitzsimons & Bargh, 2004; Papies & Aarts, 2011). Such automatic activation may also automatically trigger behaviors tending toward the achievement of the activated goal(s), and may extend to an entire "goal construct," encompassing a range of information related to behavior, motor actions, emotion, and social interaction (Papies & Aarts, 2011:128).

Gradual automation of processes during skill acquisition is well documented in the literature (see Section 3.3). As competency at a skill is acquired, attention-dependent processes become increasingly proceduralized and automatic, thus placing fewer demands on working memory and attention (Beilock, et al., 2002; Styles, 2005). Similarly, nonconscious cognitive associations between environmental or contextual cues, on the one hand, and specific behaviors or reactions, on the other, may be reinforced over time until they develop the force of habit—that is, a stimulus-response loop becomes automated (Papies & Aarts, 2011). Some automatic regulatory responses may be established by implementation intentions (e.g., if-then statements, such as 'if A happens, I will do B') rather than habituation through practice (Fitzsimons & Bargh, 2004). Indeed, interpreter training often includes explicit teaching of problem-strategy (i.e., possible solution) dyads (Arumí Ribas, 2012; González Montesino, 2016), which may, presumably, become automated with practice.

Automated performance, including self-regulation, can fail or be disrupted by changes or unexpected events. It is also not sufficient or appropriate to every occasion. Cowan (2014:203) highlights the fact that automatic and volitional attentive responses do not always operate in harmony, describing the control of attention as a "struggle between voluntary executive control and involuntary orienting responses." Styles (2005) makes a similar point, noting that attention plays an important role in overriding automatic responses in order to react appropriately and achieve goals in situations in which the automatic response is not the best or indicated one.

Beilock, et al. (2002) report on studies suggesting that conscious (attentive) monitoring of performance is beneficial when the process or aspect of performance being monitored is not proceduralized, but may be detrimental when attention is directed toward processes that would normally be carried out automatically (without attention). They also note that attended self-

regulatory processes may run in tandem with proceduralized (automated) aspects of performance such that "self-regulatory attention is metacognitive and aimed at the plans that precede skill acquisition and the products that follow skill acquisition, whereas skill-focused attention is cognitive and aimed at the component steps that constitute execution itself" (Beilock, et al. 2002:14). They also suggest that monitoring and control of proceduralized skills may occur as a part of metacognitive self-regulation: that is, "individuals may attend to specific components of their skill ... to alter control strategies and execution processes that, through self-regulatory actions, have been deemed unproductive or maladaptive to progress toward a desired goal state" (Beilock, et al. 2002:15).

4.7 Conclusion

This chapter has introduced self-regulation as a framework for exploring dialogue interpreting from the perspective of the interpreter-as-task-performer. It has presented two models describing self-regulatory processes and online monitoring and control, discussed the role of goal states in mediating online self-regulation, provided an overview of the relationship between self-regulation and expertise, and reviewed evidence of the role of attention in self-regulation.

5. Online Self-Regulation in Dialogue Interpreting

5.1 Introduction

In order to provide context and background, this chapter begins with an overview of the treatment of monitoring and control in two process models of simultaneous interpreting. Subsequently, I draw on the available literature to review evidence of interpreters' online[21] monitoring and control, and on the literature, experience, and intuition to suggest potential factors that may affect dialogue interpreting performance—that is, potential targets of online monitoring—and possible mechanisms for online control. The final section of the chapter discusses considerations for developing a process model of dialogue interpreting.

5.1.1 A Note on Terminology

In the Interpreting Studies literature, control mechanisms employed by interpreters during performance are often referred to as *strategies*; indeed, analysis of interpreting performance in terms of *problems* and *strategies* has been productively undertaken by many of the scholars whose work is discussed in this dissertation, including Ivanova (1999), Englund Dimitrova & Tiselius (2009), Gile (2009), Arumí Ribas (2012), and Arumí Ribas & Vargas-Urpi (2017). Other terms employed to describe control mechanisms include *tactics* (Gile, 2009) and *controls* (Dean & Pollard 2011, 2012, 2013). The use of these terms varies from publication to publication, depending on the theoretical approach employed by a given author: for example, scholars drawing on the Demand-Control Schema are likely to discuss *controls* while process-oriented scholars are more likely to discuss *strategies*. While the definitions of the terms in question overlap to some extent, they do not map onto each other entirely. *Controls*, for example, may include features of the interpreter's personal background, as well as behaviors, and are described as potentially available before, during, and after performance (Dean & Pollard 2011, 2012, 2013). Discussions of *strategie*s, however, generally—although not always—focus on the online (performance) phase of interpreting, as in Englund Dimitrova & Tiselius' (2009:8) description of strategies as "plans for solving problems in the process." Although *tactic* and *strategy* are used interchangeably by some authors, others differentiate between them, as does, for example, Gile:

> "I prefer to reserve *[the term strategies]* for planned action with specific objectives (for instance conference preparation strategies) and to opt for 'tactics' when referring to online decisions and actions. Also note that …. my use of the terms 'tactics' and

[21] Self-regulation is likely also a factor in pre-task preparation and post-task reflection (see, for example, Dean & Pollard, 2012 and 2011; Vik-Tuovinen, 2011; and Díaz-Galaz, Padilla, and Bajo, 2015). However, this dissertation is focused on online self-regulation, so the discussion of the literature focuses on performance rather than on pre-task preparation/post-task reflection.

> 'strategies' is restricted to *deliberate* decisions and actions aimed at preventing or solving problems, as opposed to spontaneous, perhaps unconscious actions" (Gile, 2009:201, emphasis in the original).

While Gile views strategies as conscious, purposeful actions, other scholars use the term more broadly, to refer to both conscious and unconscious (automated) actions (Englund Dimitrova & Tiselius, 2009; Arumí Ribas, 2012). As noted above, strategies are commonly studied in tandem with problems—that is, a strategy identified in an interpreter's performance is understood to be triggered by a problem. Research may aim to identify strategies employed by interpreters (see, for example, Ivanova, 1999; Englund Dimitrova & Tiselius, 2009), as well as to establish links or connections between a strategy and the problem that triggered its use (see, for example, Arumí Ribas & Vargas-Urpi, 2017). Some scholars also view at least a subset of an interpreter's strategies as artifacts of training—that is, students of interpreting are explicitly taught problem/strategy dyads ('in case of X, do Y'), which may become automated with time and practice; trainees' developing use of strategies has thus also been an object of study (Arumí Ribas, 2012; González Montesino, 2016).

In this work, I use the term 'control mechanisms,' to refer to the affectual, cognitive, and behavioral mechanisms employed by interpreters during performance, and use the term 'strategy' only where context warrants it, primarily in discussing publications that refer explicitly to interpreting strategies. The use of the term 'control mechanisms' reflects the models of online monitoring and control (Nelson & Narens, 1990) and online self-regulation (Carver, 2004; Carver & Scheier, 2011) that serve as a theoretical framework for the study (see Section 4.3). It also avoids any potential confusion between the use of the term 'strategy/strategic' to refer to planned/purposeful versus automated/unconscious actions or behaviors.

5.2 Monitoring & Control in Process Models of Simultaneous Conference Interpreting

A number of process models of simultaneous conference interpreting (SCI) were proposed in the last decades of the twentieth century, including those by Moser (1978) and Setton (1999). Although these models were not developed with dialogue interpreting in mind, they inform the research presented in this dissertation and serve as useful points of reference for the development of a process-focused model of dialogue interpreting. The following subsections provide a brief overview of two process models of SCI, with an emphasis on their treatment of monitoring and control.

5.2.1 Moser: An Information-Processing Model of SI

Moser's (1978) model of SCI processes is presented in a flow chart containing a series of structural components, decision points, and feedback loops, as illustrated in Figure 7, below. It breaks comprehension, language transfer, and production down into a number of steps and suggests constant interaction between the interpreter's long term memory and the online processes of interpreting at all points in the process, together with the possibility of rehearsing (repeating) a feedback loop regardless of the response at any given decision point—that is, neither a "yes" nor a "no" response obligatorily leads to a "stop" point. Moser-Mercer (1997/2002) points out that this facet of the model is based on the need to simultaneously monitor both incoming information (i.e., the source language speech) and outgoing information (i.e., the target language rendition) and make adjustments as necessary.

The decision points in Moser's (1978) model can be seen as opportunities for self-monitoring. They are phrased as questions directed at the self: is what has been heard thus far a word?; do the words I have heard thus far constitute a unit of meaning?; do I have a conceptual base within which I can process what I have heard?; do I understand what I heard?; do I have ready access to the target language version of these concepts?; can I predict what will come next?; is my target language version of the original meaning unit correct? Given the time constraints of simultaneous conference interpreting, these decision points must necessarily come and go too quickly for each one to be considered consciously. Many of them must be automated, nonconscious processes, just as self-monitoring of everyday language use is highly automated (Kormos, 2006).

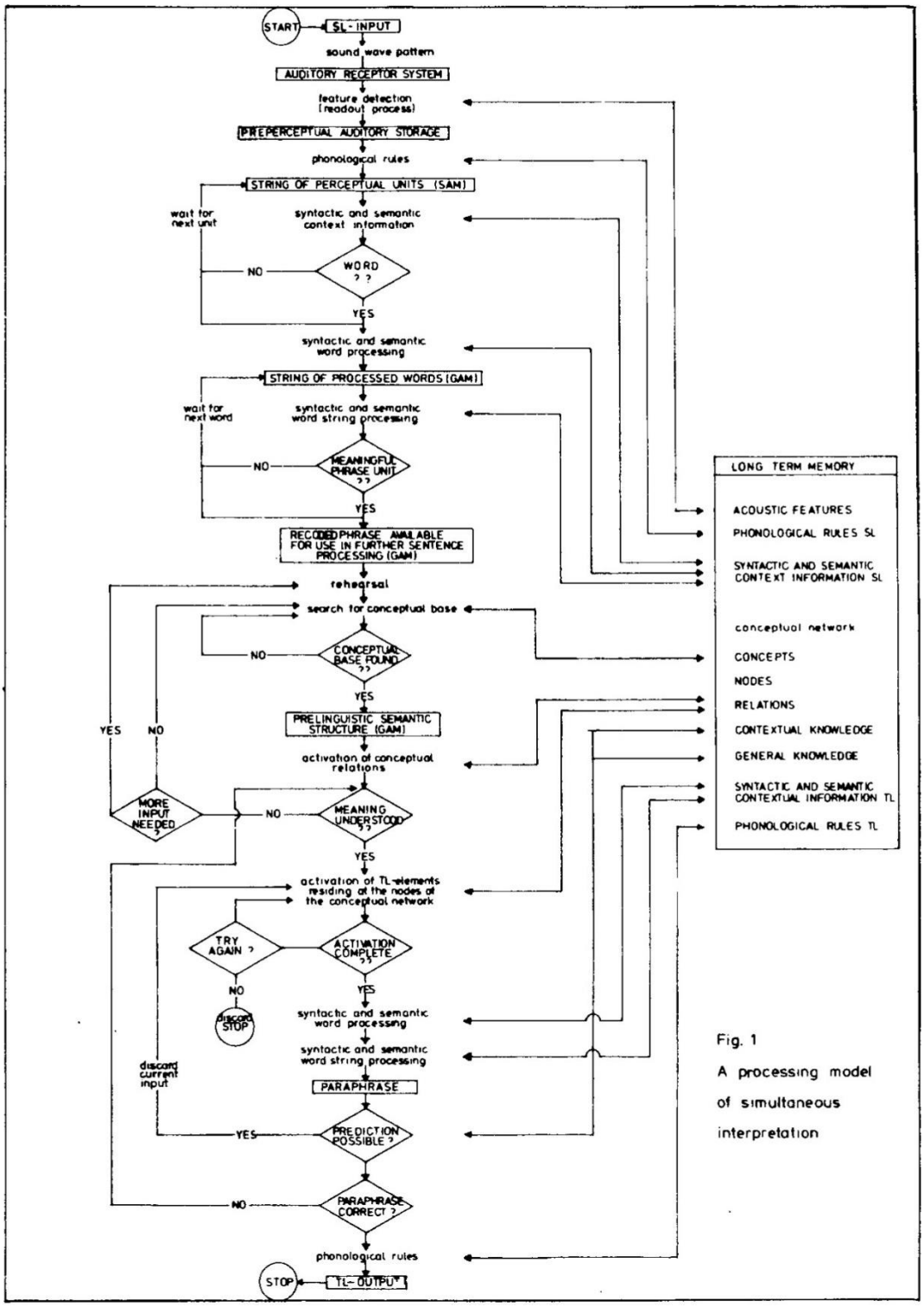

Fig. 1
A processing model of simultaneous interpretation

Figure 7. Moser's process model of simultaneous interpreting, adapted from pg. 355 of Moser, B. (1978). Simultaneous interpretation: A hypothetical model and its practical applications. In Gerver, D. & Sinaiko, W.H. (Eds.) *Language interpretation and communication. Proceedings of the NATO symposium on language interpretation and communication, Venice, 1977*, (353-368). New York: Plenum Press.

5.2.2 Setton: Pragmatics & Meaning Assembly

For Setton (1998, 1999), models such as that proposed by Moser (1978) do not take into account the full complexity of language as used in communication. He argues that a complete model of SCI processes must consider, on the one hand, the goal-oriented nature of the task and, on the other, the role that context, pragmatics, and inference play in construction of meaning, successful communication, and, perforce, interpreting.

Setton's (1999) model, depicted in Figure 8, takes the form of a flow chart in which input (from the speaker's voice, the interpreter's voice, and the environment) is acted upon by processes—including word recognition; comprehension of input, whether linguistic, pragmatic, or inferred; organization of incoming and outgoing segments; formulation of segments to be produced; and articulation—that are mediated by working memory and coordinated by an Executive.[22] Knowledge stores (i.e., information stored in LTM; Setton's model refers to situational knowledge and world knowledge) are available and drawn on as needed throughout the process. Opportunities for self-monitoring of output (i.e., the reformulation into the target language) are posited as being available both before and after production.

Setton's conceptualization of working memory includes a "task-oriented mental model" (p. 67) that, he argues, facilitates comprehension by "maintaining an updated record of the entities, relations, and propositions most salient and relevant to the discourse" (p. 85). The mental model is, thus, an abstract representation of the situation at hand, but it does not contain only information from the currently-received input—it draws on the interpreter's world knowledge and prior experience, as well as on the situation and the incoming input.

The model also includes an Executive, which has access to all of the information coming from the various stores and processes of the model, and is responsible for coordination and control, including monitoring of the match[23] between source and target versions with respect to linguistic, pragmatic, and paralinguistic aspects of communication; adjusting output in accordance with the context and audience; and controlling production (Setton, 1999). This Executive is not meant to be understood as 'executive function' or 'working memory' as they are used in cognitive psychology—Setton (1999:90) himself states as much—but it does perform some similar functions. I do not attempt an in-depth comparison of Setton's Executive with the executive function and/or working memory here; such a comparison would be difficult, and perhaps unproductive, given the widely divergent paradigms from which Setton's model, on the

[22] Setton capitalizes this term, and this convention is followed here in order to distinguish Setton's Executive from executive function as employed in the field of cognitive psychology; executive function is discussed in Section 4.6.
[23] With regard to the use of words such as 'match' and 'accuracy,' the reader is referred to Footnote 30, in Section 5.3.3.

one hand, and models of working memory and executive function, on the other, have emerged. For the purposes of this dissertation, it is sufficient to note Setton's Executive as another instance in which scholars of SCI have argued the importance of online monitoring and control to task performance.[24]

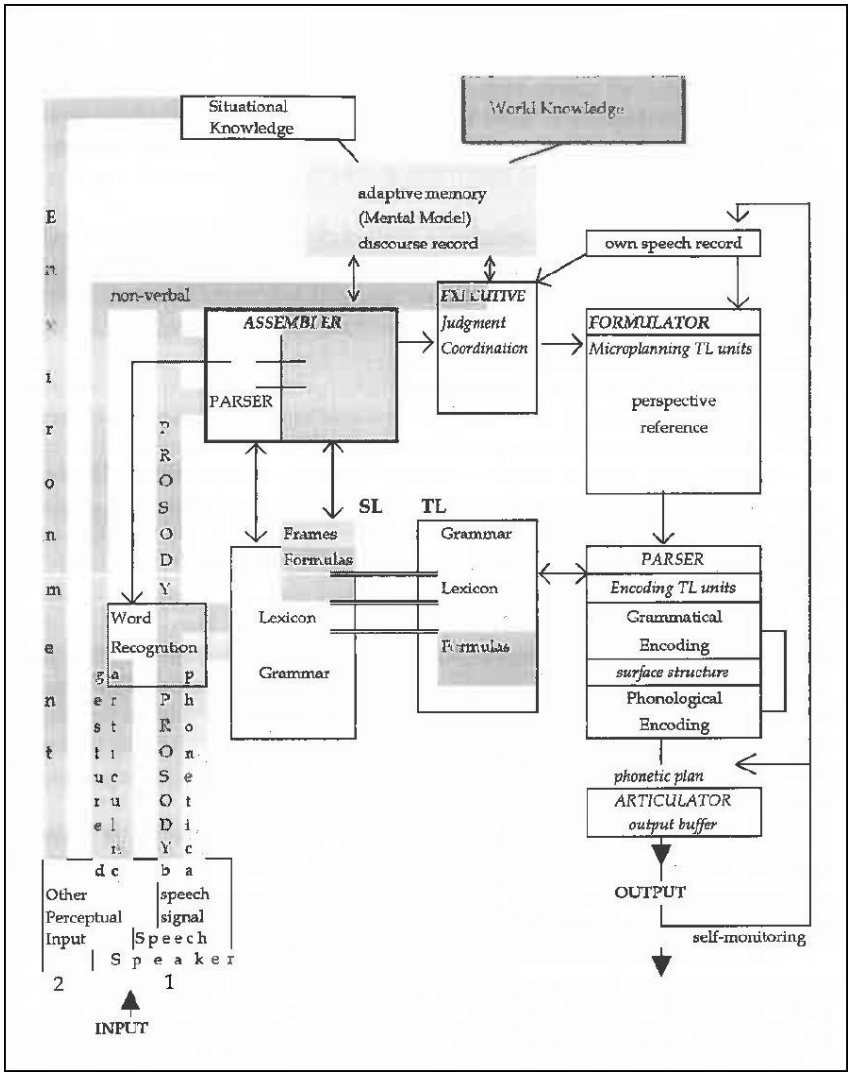

Figure 8. Setton's model of simultaneous interpreting, adapted from pg. 65 of Setton, R. (1999). *Simultaneous interpretation: a cognitive-pragmatic analysis*. Amsterdam: John Benjamins.

[24] I am grateful to Kilian Seeber for his input in the formulation of the ideas discussed in this paragraph.

5.3 Online Self-Regulation in Dialogue Interpreting: The What of Monitoring and the How of Control

The following sections explore the what of monitoring and the how of control in dialogue interpreting: that is, they discuss targets for online monitoring and online control mechanisms available to interpreters. The first subsection reviews several studies of simultaneous conference interpreting that employ a retrospective methodology. While the differences in the tasks suggest the probability of significant differences in the what and how of online self-regulation in simultaneous conference and dialogue interpreting, the literature on simultaneous conference interpreting is the principal source of available evidence and is therefore drawn on as a point of departure and comparison. The second and third subsections draw on the literature, experience, and intuition to discuss first the what of online monitoring and then the how of online control in dialogue interpreting.

5.3.1 Evidence of Online Self-Regulation via Retrospective Process Tracing

While some information about interpreters' online self-regulation may be obtained through observation of performance (e.g., overt control mechanisms such as speech disfluencies, self-correction, or control of turn-taking), observation alone does not provide insight into the aspects of performance being monitored, nor of the interpreters' use of covert (unobservable) control mechanisms. Additional insight into interpreters' online self-regulation may be gained by asking interpreters to report retrospectively on their performance (Shlesinger, 2000; Ivanova, 2000). The literature discussed below provides a substantial amount of evidence that interpreters' online self-regulation is, at least to some extent, attended (i.e., not automated), and that the interpreter is subsequently able to recall and report on some portion of it. As demonstrated by the studies discussed in this section, retrospective reports provide valuable insight into the interpreter-as-task-performer, including evidence of (a.) aspects of the interaction and of his/her performance that the interpreter attended to during performance and (b.) the interpreter's employment of control mechanisms. This section reviews evidence of online self-regulation, including novice/expert differences, from studies involving retrospective reports; retrospective process tracing as a research method is discussed in detail in Chapter 7.

Ivanova (1999, 2000) classifies the retrospective reports provided by the interpreters in her study as containing evidence of:

- problems, which she defines as "breakdowns in automatic processing" (1999:170, quoting Færch & Kasper, 1987), or, in other words, things that were attended to, and thus

available for post-task recall, due to the need to consciously engage non-automatic processes;

- monitoring observations, which she defines as things that were mentioned by the interpreters but not in connection with a corresponding control mechanism; and
- strategies, which she defines as conscious control mechanisms brought to bear in order to resolve difficulties.

The expert group in her study reported fewer than half as many problems as novices in their retrospections, while at the same time reporting twice as many instances of monitoring. Many of the experts' comments were related to high-level processing and translation. They were also noted to make fewer retrospective comments about "L2 lexical access and syntactic processing" (2000:41), both of which are thought to be automatic processes. This finding is consistent with the supposition that automated processes may not be accessible for retrospection.

Ivanova (1999) also reports that the expert interpreters in her study were more likely than the novices to recall a problem-strategy dyad as a whole (rather than recalling either the problem OR the solution). She argues that this provides evidence for holistic representation and processing of problems and solutions in expert performers. Her novices also preferred one strategy—omission—while experts employed a wider range of strategies: 78% of novices' reported strategies fell into the category 'deletion,' while only 19% of experts' reported strategies fell into that category. The experts' reports demonstrated evidence of global processing and flexibility of strategy use, as well as exploitation of contextual knowledge such as knowledge of the speaker, the domain, and the genre.

The novices in Ivanova's (1999) study mentioned more problems, in general, and the types of problems they reported were distinct from those of the experts. Processing problems were mentioned more frequently, with difficulty of comprehension being the most commonly reported cognitive issue. The novices also frequently commented that they could not hear portions of the source text. As the sound system was working properly and no one complained about acoustic issues during the debriefing, it seems likely that these reports do not represent an issue with the signal (i.e., 'hearing' in the strict sense), but are rather the result of incomplete processing or comprehension of the incoming text. Evidence for monitoring of affective states was also found in this research. Once again, there were clear differences between novices and experts: both groups commented on their mood with roughly the same frequency, [25] but experts' comments tended to be more positively focused, while novices encountered difficulty with managing stress

[25] Self-directed meta comments ("internal commentary" in Ivanova's words, 1999:176) were more common from expert interpreters.

and negative affect.

Ivanova (1999:192) summarizes the findings of the retrospective portion of the study as follows:

> "the experts were found to have more elaborate problem representations, i.e. they were more cognisant of the nature of the breakdowns occurring during performance. The elicited translation-related comments revealed an interesting aspect of the experts' deliberate practice during task performance: they engage in active monitoring of translating and thus form persistent representations of translation problems and their solutions. Furthermore, metacognitive constraints related to the effect of situational factors (the speaker in this case) and the nature of the object of the task (the text) are an indispensable aspect of the experts' approach to the task."

Tiselius & Jenset (2011; see also Tiselius, 2013) report on a study that replicated Ivanova's methodology and coding scheme. Their findings with regard to processing problems were in line with those reported by Ivanova, while their findings with regard to monitoring showed some differences—Tiselius & Jenset found more instances of internal commentary and fewer instances of monitoring of time and inner speech than did Ivanova— but were still largely compatible. The authors state that their results support the findings of Vik-Tuovinen (2006, cited in Tiselius & Jenset, 2011), who concluded that beginners focus more on "source text and linguistic expression" while experts focus more on "situational factors" (Tiselius & Jenset, 2011:290). The authors also suggest that differences in monitoring may be an important mediating factor in expert performance of simultaneous conference interpreting.

Vik-Tuovinen (2000) recorded offline (i.e., while not interpreting) conversations between two interpreters during breaks in their work. Their comments about problems encountered during the interpretation and the quality of their own performance touch on issues such as comprehension, language transfer, and production. Vik-Tuovinen (2002) reports on a study involving novices, advanced students, and professionals. She coded the retrospections collected in her study into comments regarding knowledge, understanding, transfer, and product. She found that students and professionals commented most frequently on similar issues—specifically, transfer and production. Vik-Tuovinen (2002:67) notes a qualitative difference between the groups' comments about transfer: "the *[advanced]* students and the professionals have a more nuanced way of commenting on it *[transfer]*, while most of the novices' comments concern interpreting technique." Overall, novices made fewer comments than the advanced students and experts.

Vik-Tuovinen's (2002) findings with regard to the number of comments made by novices and

experts are the opposite of Ivanova's (1999). As discussed previously, Ivanova found that experts reported fewer problems than novices. The disparate results may not be as problematic as they seem at first glance, however, given that the methodologies employed and the foci of analysis were different.[26] Vik-Tuovinen mentions two possible reasons why novices made fewer comments than the other groups in her study: lack of experience at self-analysis, and inability to successfully monitor all the different aspects of the interpreting process. Vik-Tuovinen's conclusion seems to go contrary to the idea that novices monitor too much—that is, that novices are not able to focus their self-monitoring where it is needed, but rather become overwhelmed by the amount of potential targets for monitoring. While it is likely that the novices did self-monitor less effectively, in my view it is also likely that the issue was related to unrefined or inefficient self-monitoring rather than a lack of attention to one or more phases (processes) of interpreting. It also may be that novices' metacognitive skills were less developed or that they lacked meta-language to use in retrospective reports on processing.

Mead (2002) also worked with three groups of participants with differing levels of experience—beginners, advanced students, and professionals—in his study of the reasons behind interpreters' pauses. The participants were asked to report retrospectively on the rationale for long pauses and hesitations in their output. Their responses were coded and categorized as follows: difficulties of formulation, difficulty with notes, logical doubts, no apparent reason, and other (2002:77). Analysis involved calculating what percentage of each individual's reasons was attributed to each category. The professional interpreters reported hesitating because of formulation difficulties significantly less often than the student groups, and had more pauses for which they reported no rationale. Mead attributes the difference in (reported) difficulties with formulation to the professionals' greater facility with "extralinguistic skills and strategies" (Mead, 2002:79); that is, because of experience and well-developed strategies, the professional group had more cognitive resources available to expend on linguistic issues, which resulted in fewer hesitations related to such issues. As for the professional groups' greater inability to comment on the rationale for pauses and hesitations, the author attributes this to automation of processes: experienced interpreters would be expected to have automated more processes than students and thus the fact that professionals were more likely to be unable to comment on the reasons for hesitations may be evidence of automated processes at work in their performance. It is also possible that training differences with regard to reflection/self-assessment of performance

[26] Ivanova's participants provided their retrospections on the basis of a transcript, and had no access to their performance. The analysis focused on problems encountered while interpreting. Vik-Tuovinen's participants commented on a recording of their interpreting performance (with a transcript available), and the analysis was more generally focused (rather than specifically focused on problems as in Ivanova's study). The time between a given interpreter's performance and his/her retrospection varied considerably (from the same day to several days later) in Vik-Tuovinen's study, while Ivanova's participants completed their retrospection immediately post task.

might have played a role in students' ability to comment on their rationale for pauses—that is, if students were accustomed to routinely reflecting on their performance as part of their studies, that might have influenced their retrospective reporting. Although the author does not provide information on this point, it is worth considering.

Despite differences in frequency of reporting, all of the groups in Mead's (2002) study were able to comment on the rationale for at least a portion of their pauses (over 2,000 comments/reasons were collected from the 45 subjects), further supporting the argument that not all interpreting-related processes are automated and thus unavailable for retrospection; at the same time, it is important to receive these findings with some caution, given that the interpreters were asked to explain the rationale for their decision-making rather than report on their thoughts during performance—this is an important methodological distinction, which is discussed in detail in Section 7.3.

There is empirical evidence suggesting that interpreters are not always aware of monitoring failures. For instance, Moser (1978) reports on an informal observational study in which she listened (live) to interpretations, identified instances of self-correction, and then asked interpreters about errors made during their interpretation. She heard only 5 self-corrections in 45 minutes of interpreting, and found that the interpreters were largely unaware of their uncorrected errors, which seems to indicate a failure of output monitoring. Another example is provided by Gile (2009), who conducted an experiment in which an experienced interpreter was found to produce a number of incorrect and/or awkward utterances while interpreting a simple speech given at a slow pace. The fact that an experienced interpreter made errors and produced awkward output in conditions that cannot be described as cognitively taxing may be understood as evidence of failure of monitoring. In another experiment, Gile (2009) had a group of interpreters interpret the same speech twice. He found that not only did all the interpreters make errors in both renditions, but the errors they made in the second rendition were different than those they had made in the first rendition.

As discussed in the previous chapter, monitoring and control are separate, although interdependent, processes. While control mechanisms are presumed to be employed in response to monitoring, it is important to avoid making assumptions about the cause or reason for employing a given control mechanism. As illustrated by Ivanova (2000:30), a given control mechanism may be employed in response to any of a number of factors or problems: "an omission of a SL segment might be a consequence of comprehension, translation or production problems or an outcome of strategic choices the interpreter has made in order to avoid processing overload." Shlesinger (2000) makes a similar point, describing a situation in which a large percentage of research participants (13/16) omitted a specific word in an interpretation—the

author proposes no fewer than eight reasonable explanations of why the word might have been omitted. Interpreters' retrospections may link a control mechanism to an issue or factor, but such reports may be faulty, as the interpreter may misremember, or the account may be colored by post hoc analysis or rationalization. Despite the possibility that an interpreter's retrospection may be incomplete or faulty, retrospections are nevertheless valuable, as they provide important insight into the process from the interpreter's perspective, focusing attention on aspects of the task that the task-performer finds particularly significant. In the case of retrospective reports of overt control mechanisms, it is also possible to compare the interpreter's retrospection to the performance in order to gain further insight into processing and recall.

5.3.2 Targets for Online Monitoring

As previously noted in this chapter, there has been little systematic enquiry into the factors potentially affecting dialogue interpreting task performance (i.e., of the aspects of performance that interpreters may monitor). This section draws on the available literature, experience, and intuition to discuss the aspects of the interaction and of their performance that dialogue interpreters may monitor.

Gile (2009) proposes a list of potential problem triggers for simultaneous conference interpreters primarily related to language and cognitive load, including:

- density of the source text
- the interpreter's (in)ability to anticipate upcoming information
- language-specific features such as syntactical differences between the two languages
- information that may be easily lost due to lapses of attention such as numbers or proper names
- culture-specific issues
- external factors such as sound problems or speed.

Ivanova's (1999, 2000) study of simultaneous conference interpreters, discussed in the immediately preceding section, also identifies a number of problems reported on by interpreters, which she divides into three broad categories: problems related to comprehension, problems related to translation, and problems related to simultaneity of tasks. Her findings correspond, to a large degree, with Gile's suggestions; for example, the subcategories of problems identified by Ivanova include things such as difficulty with perception, syntax, retrieval of target language forms, and the speaker's speed.

Arumí Ribas (2012) discusses problems retrospectively reported on (via written

questionnaire) by beginning and advanced students of long-form (i.e., non-dialogue) consecutive interpreting. Students in this study reported problems in all the phases of the interpreting task, as summarized in Table 4, quoted from Arumí Ribas (2012:821):

Listening and Understanding[27]	**Note-taking**	**Decoding Notes**	**Expressing and Reformulating**
• lack of understanding of the source speech • numbers • lack of common sense • speed of delivery of the source speech • unfamiliarity with the topic • sound problems • length of the source speech • information density • lack of practice • lack of attention / concentration	• lack of understanding of the source speech • speed of delivery of the source speech • information density • lack of practice • numbers	• unable to understand their own notes • lack of restitution speed • lack of connectors • unclear notes • memory problems	• lack of understanding of the source speech • feeling nervous • lack of confidence • unclear notes • overuse of connectors • problems expressing themselves

Table 4. Problems reported by students of consecutive interpreting, from Arumí Ribas (2012).

Ivanova's and Gile's lists of potential problems are specific to simultaneous conference interpreting, and thus are not likely to fully represent the range of potential targets of monitoring in dialogue interpreting. While the list presented by Arumí Ribas is related to consecutive interpreting, the participants in the study were performing long consecutive (i.e., of a speech) with notes, which is distinct from dialogue interpreting in a number of ways, especially in terms of the length of source language utterances, the lack of frequent turn-taking among interlocutors,[28] and the probable setting and goals of the interpreted event. Arumí Ribas's list is also derived from the reports of students at two levels of training, and thus may not reflect the same targets of monitoring that would be found in experts' reports.

[27] Note that the order of the items in the lists does not imply anything about the relative frequency with which each problem was reported: I reproduce the list order provided by the author.

[28] Long consecutive of speeches/longer utterances may be employed in situations that involve turn-taking (e.g., in a negotiation session or the Q&A portion of a presentation), but such situations are generally qualitatively distinct from the dialogue interpreting settings that are the focus of interest of this dissertation (see Section 1.1; also see Fontes, 2008, on the features of service provider/client interviews).

For their part, Englund Dimitrova & Tiselius (2016) argue for the existence of two phases of monitoring in (consecutive) dialogue interpreting: one that occurs when the interpreter is listening, and another that occurs when the interpreter is speaking. They propose the following foci of monitoring during the two phases (Englund Dimitrova & Tiselius, 2016:204, emphasis in original):

> "When a *primary party speaks*, the interpreter
> 1. monitors his or her comprehension of the primary party's utterance
> 2. monitors the relation of the primary party's utterance to the interpreter's previous interpreted utterance (i.e., does it seem to have been understood by the primary party as intended?), and
> 3. monitors his or her memory and processing capacity, in order to interrupt and take the turn, if necessary.
>
> When *the interpreter speaks*, he or she
> 1. monitors his or her own utterance, as an utterance in the given language
> 2. monitors, when relevant, the relation of his or her own utterance to the primary party's previous utterance, and
> 3. monitors the verbal and non-verbal reactions of the primary parties."

The last of these foci of monitoring is a significant one in that it points to the need for interpreters to monitor not only their own processing (e.g., comprehension, production, source language/target language match), but also the other parties' understanding of and reactions to each other's utterances. While the authors' discussion of monitoring does not mention affect and behavior, per se, it seems reasonable to infer that monitoring of discourse features such as the parties' verbal/nonverbal reactions to utterances involves monitoring of those parties' behavior and/or affect. The need to monitor the audience's reception of the target language utterance is mentioned by Napier (2004:128), who notes that sign language interpreters participating in research involving interpreting benefit from having an audience or "receiver" (i.e., a deaf person, in the case of her experiment) to whom they can direct their interpretation and from whom they can receive "feedback" (i.e., backchanneling, paralinguistic reactions) during performance. While her comment is specifically related to signed language interpreting, it seems reasonable to assume it would also apply to spoken language interpreting given the importance of paralinguistic information to communication regardless of the modality (i.e., signed or spoken). Research on remote interpreting (Moser-Mercer, 2003, 2005; Mouzourakis, 2003; Braun, 2007, 2013) also suggests that performance may be affected by the ability to see (or not, as the case may be) the speaker's and/or listeners' paralinguistic actions/reactions and turn-taking/ceding moves, as well as other cues present in the environment. Findings such as these, considered

together with experience and anecdotal evidence from professionals in the field, strongly suggest that interpreters' online self-regulation encompasses affect, behavior, and context in addition to the core cognitive processes of interpreting (i.e., comprehension, language transfer, production).

Drawing on the existing scholarly literature and on naturally-occurring Chinese-Catalan interactions that took place in an educational setting (cf. Vargas-Urpi & Arumí Ribas, 2014), Arumí Ribas & Vargas-Urpi (2017) suggest a number of classes of problems that may face dialogue interpreters, including:

- lexical
- pragmatic
- cultural
- related to management of conversation
- related to the impromptu nature of speech in such interactions
- pronunciation or expression
- ethical dilemmas

While there is little available research into online monitoring in dialogue interpreting, Dean & Pollard's (2011, 2012, 2013) well known Demand-Control Schema (D-CS) identifies four categories of demands that may arise during an interpreting assignment: environmental, interpersonal, paralinguistic, and intrapersonal. These categories encompass issues such as the work environment, management of situational and interactional features of discourse, interpersonal interactions, cultural/extralinguistic facets of communication, and management of individual feelings and reactions (i.e., affect) as summarized in Table 5. In the D-CS, demands are defined as "any factor in the assignment that rises to a level of significance where it impacts interpreting work" (Dean & Pollard, 2011:162), i.e., anything that might influence the interpreter's performance. Inasmuch as these factors may affect performance—and, therefore, threaten to distance the current state from the goal state—they may be potential foci of online monitoring.

Potential Demands on Performance, from Dean & Pollard (2011 2012, 2013)	
Environmental	Paralinguistic features of speaker
• goal/purpose of setting • setting-specific terminology • characteristics of the personnel/clients in the setting • physical environment (temperature, lighting,	• style • volume • pace • accent • clarity

smells, noise, space)	
Interpersonal • dynamics between all parties (including interpreter) • power/authority • emotions • role/cultural differences • turn-taking • differing background experiences, assumptions, ways of approaching and understanding the world	Intrapersonal The interpreter's own feelings/thoughts about: • personal safety • performance (am I doing well?) • liability • the people and the dynamics in the room • the environment • physiological distractions • psychological response

Table 5. Demands that may affect the dialogue interpreting task (Dean & Pollard, 2011, 2012, 2013).

In sum, while the literature does not provide a great deal of information about online monitoring in dialogue interpreting, the work discussed in the preceding paragraphs, taken together with experience and intuition, suggests that a wide range of factors may place demands on an interpreter's attention and processing—that is, may be monitored—during performance. Some of these factors are related to comprehension, language transfer, and production, while others are related to external factors, such as others' behaviors, environmental factors, or the interpreter's reaction to the situation or content (Dean & Pollard, 2011, 2012, 2013; Hale, 2004, 2007; Corsellis, 2005; Tipton & Furmanek, 2016; Englund Dimitrova & Tiselius, 2016). These potential targets for monitoring are summarized in Figure 9.

Potential Sources of Demands on Performance in Dialogue Interpreting

- **Internal factors**—emotional reactions, judgments, personal issues, internal distractions
- **The interpreter's physical presence**—where to be, where to look, people's reaction/attention to the interpreter, fatigue, illness
- **External factors**—speed, accent, pauses, overlapping speakers, other peoples' behavior, noise
- **Communication**—are the parties communicating effectively?; if not, whether and when and how to intervene
- **Interpreting**—listening, analysis, retention, language transfer, production

Figure 9. Potential sources of demands on performance in dialogue interpreting.

5.3.3 Online Control Mechanisms

The feedback loop model of self-regulation presented in Section 4.3 postulates that control mechanisms (whether overt or covert, automated or purposeful/attended) are brought to bear when online monitoring processes indicate a need to (re)act in order to increase or maintain alignment between the current state of affairs and a goal state or states. Thus, online control mechanisms are tools available to interpreters in order to sustain task performance. This section reviews a number of discussions of online control mechanisms from the literature and discusses online control mechanisms available to the dialogue interpreter.

Both Ivanova (1999) and Gile (2009) discuss online coping strategies that may be employed by simultaneous conference interpreters. The strategies mentioned by Ivanova, outlined in Table 6, are drawn from the retrospective interviews she carried out with her research participants.[29] Gile proposes his list, outlined in Table 7, on the basis of a review of the Interpreting Studies literature, discussions with fellow practitioners, and pedagogical experience.

[29] Ivanova (1999) is discussed in detail in Section 3.4.

Strategies from Ivanova (1999)	
Strategy	**Description**
Selection:	Focusing on a specific source language chunk due to informational or pragmatic salience
Summarization:	Giving the gist of a source language chunk
Restructuring:	Reworking syntax due to anticipation of a problem or in order to improve target language expression
Creative Interpretation:	Guessing or filling in on the basis of prior knowledge/context
Overgeneralization:	Using a more abstract or general term in the target language than was used in the source language
Deletion:	Omission
Explication:	Including (making explicit) information that was implied in the source language
Compromise:	Producing a less-than-ideal rendition of one segment in order not to get into further trouble (e.g., make a mistake, miss the next segment)

Table 6. Strategies from Ivanova's (1999) retrospective interviews.

Online coping strategies from Gile (2009)	
Type of difficulty	**Possible response**
In case of difficulty with comprehension:	• Delay the response (i.e., wait before interpreting the problematic segment) • Reconstruct the meaning from context (i.e., use contextual clues to infer meaning) • Get assistance from one's boothmate • Use available resources (i.e., glossary, conference program, etc.) in the booth
In case of anticipating upcoming difficulties (for example, due to dense or fast incoming speech, or due to lack of knowledge, etc.):	• Write down information (for example, numbers, names) • Lengthen or shorten the ear-voice span • Chunk the incoming speech so as to lessen the load on short-term memory • Reorder elements within a list or segment

In case of difficulty with target language reformulation:	• Delay the response • Get assistance from one's boothmate • Use resources in the booth (documents, glossary, etc.) • Go general (for example, "my colleague" or "the company" instead of a person's name) • Circumlocute or paraphrase (explain the idea or term) • Reproduce the sound that was heard (for example, in the case of foreign words or proprietary names) • "Naturalize" the term (i.e., 'make up' a term in the target language that is lexically similar but fits target language phonology and morphology) • Transcode (translate word for word) • Let the listeners know there is a problem • Refer the delegates to another source of information (for example, a PowerPoint or handout) • Omit the speech segment • Invent something plausible (Gile recommends use of this only in extreme circumstances and after consideration of the ethical implications) • Turn off the microphone (Gile recommends doing so only in extreme cases)

Table 7. Online Coping Strategies in Simultaneous Interpreting, from Gile (2009).

While many aspects of Gile's and Ivanova's lists are similar, even identical, there are differences worth noting. Gile includes both linguistic and behavioral strategies, generally describes the control strategies very specifically, and makes causal links between problems and strategies, which is not surprising, given the pedagogical focus of the volume in which the coping strategies appear. Ivanova's strategies are described in broader strokes, a fact which perhaps reflects their source (i.e., categories of comments from retrospective interviews). Also, all of Ivanova's strategies are linguistic in nature, which may be due to the fact that she is reporting on the results of an experiment (e.g., the participants had no boothmate to call on for support, and the source language input was audio-only in a controlled environment).

The students in Arumí Ribas's (2012) study (described in Section 4.5) reported on an array of strategies employed during consecutive interpreting:

- generalizing
- omitting
- summarizing
- paraphrasing
- leaving words/terms in the source language
- speeding up the reformulation
- changing the order of items

- repeating
- using common sense
- resorting to memory
- paying greater attention to the source-language speech
- paying greater attention to output
- ignoring
- adding wrong information *(AN: presumably not purposefully; the author is not clear on this point)*
- trying to calm down
- trying to avoid calques
- choosing the right vocabulary

The control mechanisms described by Gile and Ivanova, and discussed above, are specific to simultaneous conference interpreting, while those discussed by Arumí Ribas are related to long consecutive with notes performed by students. Although a number of them might plausibly be employed as control mechanisms in a dialogue interpreting setting, others are less likely to be employed by dialogue interpreters. Some are rather obviously not applicable—for example, dialogue interpreters do not, by definition, work in a booth. Although the situation is often different for signed language interpreters, who more frequently work in teams, spoken language interpreters usually work alone and thus have no colleague to consult with during the interaction (although, in the present day, most have access to online dictionaries and other such resources on their smartphones). In addition, some of the control mechanisms discussed by Ivanova and Gile are obviated when the mode of interpreting is consecutive (although they may still be called upon during simultaneous dialogue interpreting), which allows the interpreter to pause the interaction and ask the original speaker to repeat missed or unclear segments.

Arumí Ribas & Vargas-Urpi (2017) describe a number of strategies observed in data they collected on the basis of role-play interactions in an educational settings. Drawing on Wadensjö (1998), they classify strategies as being related to linguistic problems (Wadensjö's *'talk as text'*) or to management of the interaction (Wadensjö's *'talk as activity'*). In the former category ('talk as translation') they note that their data contains evidence of interpreters' using an exact target language equivalents for source language terms or phrases, using a dynamic (functional) equivalents, explaining terms/concepts, using calques, and using loanwords. They also note the presence of omissions of source language segments and the use of deictics (e.g., where possible, saying "this" or "here" rather than providing a 'translation' of an unfamiliar term; Arumí Ribas & Vargas-Urpi, 2017:128). In terms of interactional coordination ('talk as activity'), they note that the interpreters in their study interrupt to take a turn at talk, ask for pauses via verbal and non-verbal means, take notes, explain or summarize the source-language turn, split original turns into multiple parts in the rendition, and restructure the source-language information.

Hale (2007) highlights a number of differences in the strategies considered appropriate in dialogue settings and simultaneous conference interpreting. She notes that the use of text condensation strategies, which "involves the omission of non-content features, such as hesitations, discourse markers, repetitions and backtrackings," (Hale, 2007:10) is considered acceptable—and even encouraged—in conference settings, and that the use of such strategies saves time (thus, in theory, reducing cognitive load) and produces a smooth, easily-followed 'text' for those listening to the target language rendition. Hale argues that while this is an appropriate approach for a conference setting, it is not generally acceptable in dialogue settings where interpreters are expected to maintain/re-produce non-content features of discourse such as those she mentions. Given the nature of the interactions that dialogue interpreters generally interpret, the re-production[30] of such non-content features is commonly seen as an ethical issue: research has shown both the course and outcome of an interaction, as well as the parties' reactions to/participation in the interaction, can be influenced by the interpreter's (non)rendition of features such as discourse style (e.g., direct vs indirect), affect, tone, hedges, and politeness markers (Wadensjö, 1998; Cambridge, 1999; Davidson, 2000; Mason & Stewart, 2001; Hale, 2001, 2004, 2007; Pöllabauer, 2006).

Table 8 proposes a number of control mechanisms—both covert and overt— that the literature, experience, and intuition suggest may be employed by dialogue interpreters. In considering the control mechanisms proposed here, it is important to note that the highly-situated nature of dialogue interpreting means that the range of control mechanisms available to an interpreter at a given moment may be constrained by setting-specific expectations or other considerations arising from the communicative context (Dean & Pollard, 2011, 2013; Hale, 2007). The possible control mechanisms listed below are intended as a generic, comprehensive list, not specific to a particular setting. The list below focuses on the mechanism of control, and does not imply anything in terms of the target of monitoring that triggered the control mechanism (that is, the control mechanism is considered independently of the issue identified by monitoring processes prior to the attempt at control).

[30] There are, of course, problematic assumptions inherent in stating that an interpreter can 'reproduce' anything so that it is 'equivalent' to the original speaker's communicative intent, style, and so forth, but they are outside the scope of this work. Throughout this dissertation, I use terms such as 'reproduce,' 'match,' and 'accuracy' advisedly, aware of the importance of lexical choices and the assumptions inherent in them.

Online Control Mechanisms Potentially Available to Dialogue Interpreters	
Affectual Control Mechanisms:	• compartmentalize/redirect emotional response • employ positive self-talk • become frustrated/upset *(negative response)*
Behavioral Control Mechanisms:	• request pause / repetition / clarification • request a break • take notes • switch interpreting mode (consecutive/simultaneous) • consult dictionary/other online or print resource • request behavior change from others (e.g., speak one at a time, speak more slowly, speak more loudly) • initiate or request change in environment (e.g., turn off TV, rearrange seating) • change approach (e.g., try a new position, a different intervention, or a different control mechanism)
Cognitive Control Mechanisms:	• employ circumlocution • draw on knowledge of context • draw on knowledge of discourse practices/schema • draw on cultural/linguistic knowledge • increase focus • shift attention • increase effort

Table 8. Online control mechanisms potentially available to dialogue interpreters.

5.4 Towards a Model of Dialogue Interpreting

Early models of interpreting—process-focused and otherwise—often conceptualized interpreting as a mechanistic process in which interpreters were (ideally) a passive and invisible medium through which information passed (Wadensjö, 1998; Roy, 1993, 2000; Wilcox & Shaffer, 2005). The view of the interpreter as conduit is reflected in common metaphors for interpreters/interpreting, such as those listed by Roy (2000:101): “a machine, a window, a bridge, and a telephone line.” Wadensjö (1998:7) refers to this as a “transfer model of communication,” in which meaning is understood to arise solely from the speaker, and the successful 'receipt' of that meaning by the message recipient is seen as a simple, straightforward fact.

This view is based on a number of epistemological assumptions about language and communication: that communication is an uncomplicated, straightforward process; that meaning is 'in' language (that is, the meaning encoded in language is transparent and objective); and that messages are 'sent' by a speaker directly 'to' the intended 'receiver' (listener) (Mason, 1999; Wilcox & Shaffer, 2005). This understanding of communication has been widely questioned in the literature (Wadensjö, 1998; Roy, 2000; Wilcox & Shaffer, 2005; Shaffer, 2013). Mason (1999:150) notes that such "mistaken assumptions" about language and communication are problematic for interpreters in that they lead to a simplistic understanding of interpreting as well as to unreasonable expectations on the part of clients, such as requests for 'verbatim' or 'literal' translation. Wilcox & Shaffer (2005) argue persuasively that these assumptions about language and communication run counter to current scholarly consensus around the fundamentally dialogic nature of communication.

A dialogic understanding of communication views sense-making as a process requiring active involvement of both the speaker and the hearer of a piece of discourse (Wilcox & Shaffer, 2005; Janzen & Shaffer, 2008; Shaffer, 2013). Meaning is not produced or sent, but rather constructed by the recipient on the basis of the speaker's verbal and nonverbal output in concert with context, or, as Wilcox & Shaffer (2005:27) express it, "communication, and therefore interpreting, is an active process of constructing meaning based on evidence provided by speakers." Wadensjö (1998:8) also insists on the co-constructedness of meaning as developed in talk: "communication, as well as mis-communication, presupposes a certain reciprocity between the people involved." That is, meaning cannot be understood as being wholly present in an utterance, such that each utterance is meaningful independent of its context. Rather, sense-making involves both the speaker and the listener and is influenced by context both at the level of the individual speaker and of the unfolding interaction (Kohn & Kalina, 1996; Diriker, 2004; Janzen & Shaffer, 2008).

The process of sense-making becomes even more complex when interlocutors communicate across linguistic and cultural barriers with the aid of an interpreter (Kohn & Kalina, 1996; Pöchhacker, 2005; Janzen & Shaffer, 2008). As Wilcox (1986:5) puts it, interpreting is

> "the creative process of 'making sense' out of what is happening and expressing this sense to the speaker of another language. The interpreter's skill and effectiveness depend on the extent to which these constructed worlds of sense map on to the worlds of sense which speakers are also constructing and expressing in their language. The creation of sense requires the active working of people's minds."

It is this communication-related complexity that Rudvin (2006:173) is referring to when she states that "texts are not simply terminological systems, but systems of knowledge and belief."

In this research I take an emic (Headland, Pike, & Harris, 1990) approach to the object of study, foregrounding the interpreter as task-performer and conceptualizing the task from the interpreter's perspective. I do so advisedly, however, acknowledging the impossibility of separating the interpreter and his/her processing from the interpreted interaction as a whole. Indeed, formulating a model of dialogue interpreting that considers the interpreter and his/her processing in isolation from the communicative situation and the parties involved in it would be narrow and reductive (see Englund Dimitrova & Tiselius, 2016, discussed in Section 1.2). Both the interaction itself and the interpreter's task performance are inevitably influenced not only by the interpreter's own background, worldview, abilities, and decisions, but also by various characteristics and behaviors of the parties to the interaction and the interplay between them throughout the course of the interaction. A process model of dialogue interpreting must, therefore, take into consideration the presence, influence, and interaction of all of the parties involved.

The quotation from Roy (2000:103) that appears at the beginning of this dissertation describes the interpreter as "operat[ing] within an emergent system of adaptability." This view of the interpreted interaction as a system provides a useful point of departure for conceptualizing the entirety of the task. The study of complex systems, as an academic discipline, seeks to better understand systems that are characterized by a number of specific features, including the following: they tend to feature a number of highly interconnected components that interact with each other in a non-linear fashion; causal links between inputs and outputs are generally not clear-cut; and small differences in starting points or inputs may give rise to quite distinct outcomes (Byrne, 1998; Arrow, et al., 2000). I do not explore complex systems theory in this dissertation, nor do I argue that 'the interpreted interaction' meets all of the criteria (or, rather, one of the multiple possible sets of criteria; Ladyman, et al., 2013) to be designated a complex system in the technical sense used in the literature of that discipline. I do propose, however, that conceptualizing the interpreted interaction as a complex system provides a productive springboard for thinking about the components and features of the interpreted interaction, the interplay between them, the variables influencing the interaction, and the interpreter's online self-regulation. Such an approach facilitates an integrated approach to understanding dialogue interpreting by situating the interpreter's processing and task performance firmly within the context in which the interpreted interaction takes place and taking into account the social/interactional features of the task.

The interpreted-interaction-as-system comes into existence when a minimum of two participants come together to interact with each other in service of some purpose. Since the parties do not share a language in common, they rely on the services of a third person, who speaks both languages and is thus charged with facilitating communication between the parties. The communicative actions and reactions of each interlocutor are inevitably influenced by a number of personal characteristics such as linguistic/social/cultural background & worldview, personality, communication goals, knowledge of the setting/context, and so forth. The interpreter also brings to the table his/her own prior experience (background, worldview, personality, ideas of professional practice/behavior, etc.), which inevitably influence his/her actions and reactions during performance. The interactional system is also influenced (and, potentially, constrained) by features of the communicative or institutional context in which it takes place, such as a court of law, where communication is stylized and follows largely predetermined patterns (Berk-Seligson, 2002; Hale, 2004; Pöchhacker, 2005), or a medical setting, which also has genre-specific characteristics and patterns of discourse (Tebble, 1999, 2009; Davidson, 2000; Meyer, 2002). As the system operates—that is, as the interaction progresses—it is further influenced by the ongoing interplay between the interlocutors, as well as between the interpreter and each of the interlocutors. The system of the interpreted interaction thus encompasses and is influenced by a number of factors and variables, some of which are intrinsic to the individuals involved, and others of which arise from the context and the interplay among the parties as the interaction unfolds.

Many of the factors potentially influencing the system as a whole, as well as the interpreter's performance—such as the interpreter's background, prior experience, and training; the interlocutors' communication goals; and context- or setting-specific constraints—do not lend themselves easily to observation or quantification. Their potential to influence task performance may also be difficult for those unfamiliar with interpreting (including students) to conceptualize. For these reasons, it may be helpful to draw an analogy between the situation of the interpreter and that of another class of task performers: operators of motor vehicles. While these tasks are superficially dissimilar, they share a number of characteristics, and the variables influencing driving performance are more likely to be observable and/or quantifiable than those that may influence interpreting performance. This point, taken together with the fact that most people are more familiar with the parameters of the driving task and to have direct experience of task performance than is the case with dialogue interpreting, suggests that drawing an analogy between the two tasks may prove helpful in describing the aims and contribution of this research.

Like interpreters, drivers are faced with a complex, dynamic, and goal-oriented performance task that is influenced by an array of factors. For drivers, these factors include the physical characteristics of the vehicle, potential roadway hazards, weather, and internal and external

distractors. The driver must take all of these factors into account during task performance, and must monitor the current status of and the potential for changes in factors such as the vehicle's performance (e.g., mechanical difficulties), weather and road conditions (e.g., debris, snow, stopped vehicles), the route s/he is following (e.g., whether it is a known or unfamiliar route) and the state or requirements of the passengers or cargo (e.g., children fighting in the back seat or hazardous chemicals in a tanker), as well as other potential disruptions or distractions (e.g., sleepiness, a ringing cell phone). The driver has recourse to multiple control mechanisms when online monitoring processes indicate they are needed. The range of control mechanisms available and a given driver's choice from among them are influenced by numerous internal and external factors. Internal factors might include the driver's level of comfort with the vehicle or road conditions, knowledge of the surrounding area, skill or confidence level with regard to driving in adverse weather conditions; external factors might include the type of vehicle and its cargo (e.g., a family car vs a semi-tractor trailer), current weather conditions, and the goals of the task (e.g., getting a sick person to the hospital vs a pleasure outing).

Like the driver, the interpreter performs a complicated task, monitors a range of variables that may affect performance, and draws on a variety of control mechanisms to respond to problems or avert potential problems. The research undertaken for this dissertation helps to explicate the interpreter's experience of the interaction-as-system. It provides empirical evidence of the aspects of the interaction-as-system that influence interpreters' performance in a manner similar to that in which factors such as the weather, the type of vehicle, and the characteristics of the cargo/passengers influence driving performance. It also provides empirical evidence of the range of control mechanisms available to interpreters when monitoring indicates a need to maintain/increase alignment between the current state of the system and their mental representations of the ideal or goal state(s) of the system.

Given the complexity of the system that comprises the interpreted interaction, and the high likelihood that its various components, variables, and processes do affect the interpreter's performance, describing the system is a necessary precursor to proposing a model (or models) of the task. The research reported on in this dissertation is an important first step toward modelling the system: it sheds light on salient features and characteristics, variables that may influence interpreters' performance (and, thus, the system as a whole, inasmuch as the interpreter's performance is fundamental to the continued functioning of the system), and tools interpreters may employ to achieve/maintain the system's operations.

5.5 Conclusion

This final chapter of the theoretical portion of the dissertation began and ended with process models of interpreting. The first part of the chapter reviewed the treatment of online monitoring in two process models of simultaneous conference interpreting (Moser 1978, Setton 1999), while the last section discussed the need for a model of dialogue interpreting to reflect (a.) contemporary understandings of communication, and (b.) the full complexity of the 'system' that is the interpreted interaction. The final section also further explicated the goals of the research reported on in this dissertation. The middle sections of the chapter reviewed a number of studies that provide evidence of (simultaneous conference) interpreters' online self-regulation (Moser, 1978; Ivanova, 1999, 2000; Shlesinger, 2000; Vik-Tuovinen, 2000, 2002; Mead, 2002; Gile, 2009; Tiselius & Jenset, 2011), and drew on the Interpreting Studies literature (Ivanova, 1999, 2000; Hale, 2007; Gile, 2009; Dean & Pollard, 2011, 2012, 2013; Arumí Ribas, 2012; Englund Dimitrova & Tiselius, 2016), experience, and intuition to suggest a range of potential targets for online monitoring and potential online control mechanisms that are specific to dialogue interpreting.

6. Summary of Theoretical Chapters & Research Questions

In preceding chapters I have reviewed evidence indicating that:

- Interpreters can and do self-regulate during performance. Online self-regulation involves monitoring of internal and external factors including affect, behavior, cognition, and context. When monitoring processes indicate a need, control mechanisms (either overt or covert) may be brought to bear in order to create or maintain alignment between a goal state and the current state.
- Although many aspects of performance, including aspects of self-regulation, may be automated and thus may not be attended to during performance, interpreters do attend to, and are able to report retrospectively on, some aspects of their online self-regulation.
- Expert and novice performance differs in several ways; among these differences is the fact that expert performance may be more automated and experts may have more self-regulatory ability. Aspects of online self-regulation that are attended to (and thus potentially reported on retrospectively) may be different in novices and experts.

As discussed in Chapter 1, the research reported on in this dissertation is a first step toward developing a process model of dialogue interpreting, from the perspective of the interpreter-as-task-performer. In order to gain insight into the variables influencing performance and the control mechanisms available to interpreters, the following research questions were posed:

RQ 1. What evidence is there for online self-regulation in dialogue interpreting?

RQ 1.1 What evidence is there of online monitoring of affect, behavior, cognition, and context?

RQ 1.2 What online control mechanisms do dialogue interpreters employ?

RQ 2. What aspects of online self-regulation do dialogue interpreters report on retrospectively?

RQ 3. Are there differences between novices' and experts' online self-regulation?

RQ 4. Are there differences between novices' and experts' retrospective reports of online self-regulation?

In the remainder of the dissertation, I describe the research method (Chapter 7) and data analysis process (Chapter 8), report on and discuss the findings (Chapter 9), present conclusions and implications for future research (Chapter 10), and propose models of the interpreted interaction (Chapter 10).

7. Methodology

7.1 Introduction

This chapter describes the method employed in the research study. The second section discusses the rationale for the use of simulated interactions and the process employed to develop the simulation. The third discusses verbal process tracing methods in general, and retrospective process tracing in particular, provides an overview of a number of important methodological considerations for retrospective process tracing, and discusses the rationale for the method employed in this study. Subsequent sections discuss the pilot testing of the method, recruitment and demographics of the study participants, and the procedure employed during data collection.

7.2 Simulated Interactions

7.2.1 Background & Rationale

The importance of using realistic, contextualized source material, tasks, and field conditions in interpreting research is highlighted by Gile (1994), who bases this recommendation on practitioners' intuition and the lack of scientific evidence with regard to the effects—or lack thereof—that these features of experimental design may have on interpreting performance. He concludes that "when no evidence in favour or against *{realistic vs decontextualized or unusual materials, tasks, or conditions}* is available, the best policy seems to take as a starting point the hypothesis that the general feeling of I/T practitioners *{that unrealistic material or situations may affect performance}* may be right" (Gile, 1994:46). Shlesinger (2000:6) concurs with Gile, noting that a number of factors, including "the text-in-situation, the setting, the circumstances, and the interpreter's knowledge of the situation as a whole," influence the interpreting process and must therefore be taken into account in research design. In considering the possibility of designing experiments to focus on one or another portion of the interpreting task, Shlesinger (2000:6) concludes that "decomposition of the task is problematic, notwithstanding the importance of conducting a controlled examination of each of the large number of variables involved." A similar point is made by Ericsson (2006c:231), who recommends studying expert performance during "naturally occurring activities," rather than in contrived situations.

The use of naturally occurring interpreted interactions as a source of data is a common approach to studying dialogue interpreting. Hale (2007:230) points out that many interpreter-mediated interactions (such as court proceedings) are routinely recorded and thus a good source of authentic data. Permission can also be sought to record interactions in other types of settings,

such as medical, educational, or social services institutions. Nevertheless, gaining access to naturally occurring interpreter-mediated interactions is far from a straightforward process, as illustrated by accounts of the ethical and logistical considerations involved in research studies involving video-taped medical interactions, such as those provided by Metzger & Roy (2011) and Major (2013), and by Turner & Harrington (2000), who discuss issues of ethics and power in Interpreting Studies research methodology.

Due to logistical and ethical considerations such as those described by the authors cited in the previous sentence, simulation of interpreted interactions is sometimes employed as an alternative to gathering data from naturally-occurring interactions. Hale (2007:231) defines simulations as interactions in which "all the variables, such as pre-written questions and answers, the setting, length of time allowed and the chosen subjects are controlled." However, simulation methodologies described in the Interpreting Studies literature do not always correspond to Hale's definition. Anazawa, et al.'s (2012:7) simulation of a medical interaction did employ a script developed by a registered nurse and reviewed by a doctor, and the individuals playing the doctor and mother were "instructed to follow the script." Arumí Ribas & Vargas-Urpi (2017) report using scripted roleplays developed on the basis of naturally-occurring interactions; although the interactions were scripted, the parties (i.e., teacher and parent) were allowed some freedom to ad-lib "so that the interaction was consistent with the renditions of the interpreters" (p. 126). A different approach is described by Major (2013, 2014), whose unscripted simulation was developed collaboratively between the physician and the deaf person who were to interact with each other in the simulated interaction. Prior to developing the scenario, the parties were briefed on the interpreting challenges to be included. Major reports that the doctor's and patient's performance was consistent across 10 repetitions of the scenario. Another example of structured but unscripted simulation is that described by Russell (2002), who used materials developed and tested by the Law Courts Education Society of British Columbia to conduct mock trials. The simulation participants were given necessary materials in advance and were prepared for their parts, but the speakers' lines and behavior were not scripted or constrained beyond the expectation of realistic participation in a mock trial. Similarly, Cambridge's (1999) simulations of medical interactions were completely unscripted.

Thus, despite Hale's (2007) narrow definition, simulated interactions come in a variety of guises ranging from more controlled, in which participants deliver highly-scripted material (which may be read or memorized), to less controlled, in which participants act spontaneously on the basis of a background story or set of parameters. Given the strong preference for realistic, contextualized material in Interpreting Studies research, simulated interactions can be seen as a mid-point between a relatively decontextualized laboratory approach and naturally occurring data.

There are a number of arguments against simulated interpreted interactions: the interaction may be stilted; the communicative situation may be artificial; and the interpreter's performance may be affected both by the knowledge that s/he is in a 'fake' situation in which the parties may understand each other's languages perfectly well and have no real need to communicate (thus lowering the stakes for all parties, including the interpreter); the interpreter's performance may be affected by the knowledge that s/he is being observed and, at least in some sense, evaluated. Many of these issues can be mitigated by a well-designed and well-carried out simulation. In the case of the latter argument vis-à-vis the effects of being observed, it is important to note that the interlocutors' and the interpreter's behavior is expected to be influenced by the knowledge that they are being observed or recorded even in a naturally occurring situation; Metzger (1999) for example, comments on these issues in the context of video recording interpreted interactions. Although the interpreters who participated in Major's (2013) unscripted simulations reported being aware of the fact that the scenario was simulated and that some aspect of their performance was going to be analyzed by the researcher, 80% of the participants found the interaction realistic, and the author concludes that use of simulated data can be a useful complement to naturally occurring data. The validity of simulated interactions for eliciting realistic performances is attested in the literature on their use in evaluation and training of teachers, medical and mental health service providers, and other professionals (see, for example, Gallagher & Hargie, 1989; Smit & van der Molen, 1996; Oh & Solomon, 2014; Gerich & Schmitz, 2016).

There are several benefits to simulating interactions when studying dialogue interpreting within an expertise framework. First, in order to gain insight into differences between the performance of novices and competent performers, it is necessary to identify participants based on clear criteria for training and experience rather than observing whichever interpreter happens to be present at the time one is able to record a naturally occurring interaction. Additionally, observations of naturally occurring interactions do not allow for repetition, which reduces the opportunity to compare subjects and groups with regard to specific challenges or aspects of performance. The unpredictable nature of naturally occurring interactions also means that the level of difficulty and the specific challenges that arise in a given interaction may not be such that they present a challenge for the interpreter. This is an important point, given Ericsson's (2000:208) assertion that "many experts frequently do not show their superiority with typical and routine situations." The need for balancing careful planning with realism is reinforced by Woods (1993:246), who urges field researchers using process tracing methodologies to design their method so that it will elicit data that will answer their research questions and also provide insight into the study participants' "problem representation."

Thus, in the case of this study, the benefits of controlling for participant training and experience, of being able to compare performance with regard to similar challenges across groups, and of being able to 'seed' the scenario with specific challenges were viewed as outweighing the counterarguments outlined in the preceding paragraphs.[31]

In developing the simulation for this study, I sought to mitigate the potential issues and to create as realistic an interaction as possible. Some control of the content and the interactional features of each scenario was considered necessary in order to create a "tricky case" (Moser-Mercer, 1997), which is more likely to produce behaviors or responses characteristic of expert performance.[32] A fully scripted interaction was not considered ideal, however, as it would lead to a more static (thus less realistic) interaction and allow less freedom for the parties in the interaction to respond to the interpreter's performance in real time, in line with Gallagher & Hargie (1989:157)'s recommendation that role-plays (as they call their simulated interactions) be "as similar as possible to the target situation" in order to increase validity. The simulation developed for the present study therefore sought to establish a balance between, on the one hand, having some control of the content and interactional features of the interaction and, on the other, creating a realistic, dynamic interaction sensitive to the interpreter's actions and behaviors.

7.2.2 Development of the Simulations for this Study

The initial study design included two simulations to be interpreted by each participant in order to allow for intra-subject analysis as well as inter-group analysis. In the interest of fully exploiting the opportunity to compare two performances and two retrospections by the same interpreter, the scenarios were designed to present both similarities and differences in the types of challenges interpreters would encounter during the interaction (see Appendix A for a description of each scenario).

During the initial planning stage, a distinction was made between potential interpreting challenges that occur during a single moment in time, and, once dealt with, do not recur, and challenges that recur during or influence an entire interaction. For the purposes of this study, the former were termed *utterance-level difficulties* and the latter were termed *discourse-level difficulties*. In light of findings from the expertise literature related to novices' and experts'

[31] With regard to this point, see also Major (2013:117), who, while arguing that simulated data cannot replace naturally occurring data, lists ease of collection, the ability to control for "topic and structure," and the ability to compare performance across interpreters as benefits of simulations.

[32] With regard to this point, see also Arumí Ribas & Vargas-Urpi (2017), who discuss seeding simulated interactions with "rich points," which they describe as specific features or items that are expected to cause difficulty for the interpreter and/or are of special interest to the research questions being investigated. Their study was not published in time for their approach to inform my method and analysis, but is highly relevant in connection with this point.

differences in noticing patterns and drawing on the 'big picture' rather than focusing on details; dealing with uncertainty; accessing relevant background knowledge and experience; problem solving; and self-monitoring ability (Chi, 2006a; Feltovich, et al., 2006; Ross, et al., 2006), I expected that novice and expert interpreters' approaches to dealing with utterance-level difficulties and discourse-level difficulties might differ.

To enable differentiation between the two scenarios on the basis of utterance-level and discourse-level difficulties, I developed a list of difficulties that could arise during interpreted interactions. Each difficulty was classed as utterance-level, discourse-level, or potentially either depending on the frequency or type of occurrence. The list and the classifications were developed based on my experience as an interpreter and educator, and were reviewed for relevance by practicing interpreters and the co-supervisor of my doctoral work. Table 9 lists illustrative sample items and their classifications; see Appendix A for a complete list of the difficulties planned for each scenario.

Description of difficulty	**Classification**
Confusing/contradictory story; latter parts may contradict or change information from previous parts	Discourse
Highly charged/emotional content; conflicting goals/emotional states among parties	Discourse
Speakers expect interpreter to resolve misunderstandings/communication difficulties	Discourse
Technical jargon	Utterance *(may become a discourse-level challenge if used constantly throughout interaction)*
Idiomatic expressions	Utterance *(may become a discourse-level challenge if used constantly throughout interaction)*
Speed	Utterance *(may become a discourse-level challenge if occurs constantly throughout interaction)*
Overlapping speakers	Utterance *(may become a discourse-level challenge if occurs constantly throughout interaction)*
Interruptions (e.g., speaker answers phone)	Utterance *(may become a discourse-level challenge if occurs constantly throughout interaction)*

Table 9. Sample categories from simulation design and their classifications.

Based on the classification of difficulties, I developed two scenarios: one included more utterance-level difficulties and the other included more discourse-level difficulties.

Scenario 1: Genetic counseling with possible carrier of cystic fibrosis gene—utterance-level difficulties

- Semi-technical topic—requires detailed family history, explanation of complicated genetic information
- Potential for some emotionally-charged content (i.e., discussion of carrier status—possibility of having future children affected by cystic fibrosis), but muted; not the focus of the interaction
- Parties in alignment—no fundamental conflict of goals/assumptions

Scenario 2: Employee dispute—discourse-level difficulties

- Chaotic environment—administrator interacting with two employees who were arguing loudly in the hall; context and details unclear; administrator does not control flow of interaction
- Emotionally charged—speakers in conflict; emotional and openly contradicting each other's story
- Management challenges—speakers overlap, interrupt each other frequently; both understand a little of the other's language

A prolonged search for a qualified individual to play the genetic counselor in the first scenario was unsuccessful due primarily to a lack of funding and logistical issues. Consequently, the first scenario was abandoned; it is described, however, in Appendix A.[33] The preceding discussion reports on the development of both scenarios in the interest of completeness and of providing as much detail as possible for others seeking to replicate the methodology.

The search for individuals to play parts in the second scenario was successful. During the development stage and the pilot, the administrator ('Theresa'[34]) was played by a person with a background in human resources who understood some Spanish. This person was unable to continue after the pilot testing, so another actor,[35] who understood no Spanish, played the role of the administrator during the data collection process. The Spanish-speaking and English-speaking employees ('Mariela' and 'Andrew') were played by native speakers of Spanish and English, respectively. Both work as interpreters and are fluent in both languages. This may have influenced their participation in the simulation, as each had linguistic access to the other's utterances independent of the interpreter; however, their experience at role-playing in the context

[33] More detailed summaries than those included in Appendix A will be made available upon request to individualss interested in replicating the scenarios for research purposes.
[34] Each actor used a pseudonym during the scenario; these pseudonyms are used throughout the dissertation.
[35] None of the participants were professional actors; this term is used here for convenience and clarity.

of their interpreting studies, and their real-life experience with the types of difficulties planned for inclusion in the role play, were seen as outweighing the fact of their fluency in both languages. Additionally, one of the difficulties planned for the simulation took advantage of the possibilities afforded by having speakers who (partially) understand each other: Mariela and Andrew's brief for the simulation stipulated that each understood some of the other's language, and, at one point during the simulation, one of them was tasked with reacting to something the other said in the other language (e.g., "Did he just say _____?"), but misunderstanding the other party in doing so.

All of the actors were personally known to me before being recruited to participate in the study, and all agreed to participate after completing an informed consent process as approved by the ethics review committee of the study site[36] and the Translation and Interpreting Faculty at the University of Geneva. At the end of the data collection process, each actor received a monetary gift in appreciation of their participation.[37]

Mariela and Andrew met with me via videoconference in order to flesh out the details of the scenario. I explained the general outline of the scenario (as described above) and the list of difficulties to be included in the interaction. With the list of difficulties in mind, we worked together to decide on the details of the situation. This allowed the situation and story to be developed organically, and avoided requiring actors to memorize a pre-planned backstory, list of grievances, and so forth. At this stage, the first actor playing the administrative role (Theresa) joined in the planning, and was briefed on the scenario.

To ensure that the simulation would be dynamic and realistic, and that the expected challenges would be included, I set a target for a minimum number of occurrences of each difficulty during the role play. For example, the actors were told to use at least three idiomatic expressions during the interaction, which enabled them to monitor their own and each other's use of idiomatic expressions and adjust their performance as needed to ensure the target number was reached or exceeded. They were also asked to limit the interaction to approximately 20-25 minutes to ensure that the simulations were relatively consistent in length. During data collection, Theresa was charged with monitoring the (approximate) time elapsed and bringing the interaction to a natural close.[38]

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[36] The study site was also my place of employment.

[37] I received grants from the Upper Midwest Translators and Interpreters Association and the Interpreting Stakeholder Group, which funded the thank you gifts of $150 to each of the actors and $20 to each of the interpreters, as well as the transcription of the retrospections. I am grateful to both of these organizations for this financial support.

[38] When the simulations were developed, I was unaware of Major's (2013) dissertation, which involved both naturally occurring and simulated data. Many aspects of Major's approach to developing her simulation—

The interaction was practiced in English via videoconference, and I gave feedback and suggestions with regard to the actors' inclusion and realization of the various difficulties. Several months passed between the pilots and the data collection and, as noted above, the actor playing the administrator changed, so before data collection began the story was reviewed once more in English via videoconference so that the new administrator (whose part was the smallest of the three) could become acquainted with the story. As a last step, the actors practiced the interaction in person, with me in the role of interpreter, immediately before the first data collection session.

7.2.3 Summary of the Employee Dispute Simulation

The simulation involved three parties—two custodial employees at a college who had been arguing loudly in the hallway and creating a disturbance for faculty and students, and an administrator who had been asked to step in to help calm the employees down in the absence of someone from Human Resources (Human Resources personnel were unavailable due to it being an evening/weekend). The characters were:

- Theresa, the administrator. She did not understand Spanish, did not have experience working with interpreters, and took a relaxed/non-directive approach to interaction management.
- Andrew, a lead (i.e., in a supervisory position) custodial employee. He was a native speaker of English, but understood some Spanish.
- Mariela, a custodial employee. She was a native speaker of Spanish, but understood some English.

Andrew and Mariela's hallway argument was about the fact that Mariela had been asked to come to work early and to clean the men's bathrooms. During the interaction, Mariela accused Andrew of treating her unfairly and engaging in retaliatory behavior. It became clear that Mariela and Andrew had once had a romantic relationship, prior to him being placed in a supervisory position over her. Andrew maintained that the change in shift and duties was due to people being out on vacation, people being sick, etc. Mariela insisted it was retaliation. Mariela was highly emotive, dramatic, and occasionally on the verge of tears. Andrew was defensive and occasionally angry or sarcastic. They interrupted each other and made side comments (i.e., under their breath). The storytelling did not proceed in a structured fashion; rather, it was chaotic and non-linear. The interaction was brought to a close by an agreement that Andrew and Mariela

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developing an unscripted scenario in conjunction with the actors, giving the actors target behaviors/challenges to include in the scenario, and putting one actor in charge of closing the interaction within the desired time frame—correspond to those used in this study.

would work in separate areas for the remainder of the shift, and that they would have an opportunity to speak to Human Resources the following day.

7.3 Process Tracing

The following subsections provide an overview of the use of process tracing methodology in general and in Interpreting Studies, describe a number of important methodological considerations related to retrospective process tracing, and discuss the use of cues in retrospective process tracing. They also describe in detail the retrospective process tracing method employed in this study, and explain the rationale for a number of aspects of the design and procedure.

7.3.1 Verbal Process Tracing: Definitions & Overview of the Method in the IS Literature

The issue of how best to gain access to interpreters' cognitive processes in order to better understand them is an important methodological question within process focused research (Shlesinger, 2000; Alvstad, et al., 2011). The family of research methods used to gain insight into online thought processes "are all oriented towards *externalizing internal processes or producing external signs that support inference about internal workings*" (Woods, 1993:233, emphasis in the original). Process-tracing methodologies have been productively used to explore online cognitive processing and aspects of expert performance in many domains, including interpreting (Hoffman, 1997; Ivanova, 1999; Ericsson, 2000; Jääskeläinen, 2000; Monacelli, 2000; Ericsson, 2006c; Englund Dimitrova & Tiselius, 2009, 2014). Process tracing is considered especially suitable for exploratory studies aimed at forming hypotheses and identifying areas of focus for more controlled research (Ivanova, 1999, following Ericsson & Simon, 1980; Moser-Mercer, 2000a), as is the case with the research reported on in this dissertation.

The Interpreting Studies literature involving verbal[39] process tracing reflects a variety of approaches and inconsistency in definition of terms. In the interests of precise definitions and methodological rigor (see Jääskeläinen, 2000, who calls for increased rigor in the use of think-aloud methods in translation studies), this section explores approaches and methodological

[39] Nonverbal process tracing methods such as gaze tracking, keystroke tracking, and pupillometry are in frequent use in many disciplines, including Translation Studies and Interpreting Studies. This discussion of process tracing methodologies focuses on verbal process tracing, as that is the method used in the research reported on here.

considerations related to verbal process tracing and provides a brief overview of its use in interpreting research.

The classic method for accessing an individual's thought processes during completion of a task is the Think Aloud Protocol (TAP), or concurrent process tracing (Ericsson & Simon, 1993). To carry out a TAP, the subject is asked to complete a task while verbalizing the thoughts that pass through his or her mind. The TAP is often preceded by a pre-task training or practice focused on training the participant in the method. From a methodological perspective, verbalizing thoughts is the central point of the definition. Ericsson (2006c) stresses that the validity of protocol analysis is threatened when researchers begin to ask "why" or other questions that require the subject to make inferences rather than simply verbalizing their thoughts—a point further discussed in Section 7.3.2.

Although Ericsson & Simon (1993) integrate discussion of concurrent and retrospective (i.e., post-task-completion) verbal process tracing into one account (i.e., the two methods are discussed together), other scholars distinguish between process tracing that occurs during performance (the TAP, strictly defined) and process tracing that occurs after task completion (retrospection). Moreover, the literature generally identifies two separate types of retrospective process tracing—cued, in which a stimulus, such as text or audio/video, is provided to the research participant in order to trigger or facilitate process tracing, and uncued, in which no stimulus is provided. These approaches are referred to by various terms within the literature. In the interests of clarity and precision, Table 10 presents a brief typology of approaches to verbal process tracing, a selection of terms used in the literature to refer to them, and a brief definition of each one. The terms used in this dissertation appear in bold in the table.

Typology of Approaches to Verbal Process Tracing		
	Term(s) used in the literature (term in **bold** is used in this dissertation)	**Definition**
Concurrent process tracing	• **Think-aloud protocol** (TAP); (Ericsson & Simon, 1993; Woods, 1993; Henderson & Tallman, 2006)	Verbal process tracing that occurs during task performance
Retrospective process tracing without a cue or stimulus	• Retrospective TAP (Ericsson & Simon, 1993) • Self-observation (Henderson & Tallman, 2006) • **Uncued retrospection** (Woods, 1993)	Verbal process tracing that occurs after task performance; the research participant is not presented with a visual or audio stimulus for retrospection
Retrospective process tracing with a cue or stimulus[40]	• Prompted interviews (Henderson & Tallman, 2006) • Stimulated recall (Lyle, 2003) • **Cued retrospection** (Woods, 1993)	Verbal process tracing that occurs after task performance; the research participant is presented with a stimulus to trigger retrospection

Table 10. Typology of approaches to verbal process tracing.

As indicated in the preceding table, I use the terms *uncued retrospection* and *cued retrospection* to refer to the two types of retrospective process tracing; I restrict the use of the term *think-aloud protocol (TAP)* to concurrent process tracing. In referring to retrospective process tracing where differentiation or specification as to cued/uncued is not possible or relevant, I use the term *retrospective approaches.*

Although verbal process tracing was first employed in the study of domains with well-defined problems, it has also been productively used in domains where problems are ill-defined, including translation (Jääskeläinen, 2000; Ericsson, 2006c). Retrospective process tracing is considered particularly appropriate in situations in which concurrent verbal reporting is inadvisable or impossible due to the nature of the task under study, including 1. tasks that require speaking in order to do them; 2. "real-life problem-solving circumstances;" and 3. the presence of factors such as "high levels of interaction, time constraints, emotive contexts and dynamic actions" (Lyle, 2003:862). Interpreting is generally considered unsuitable for concurrent reporting (i.e., TAP), inasmuch as one cannot reasonably expect interpreters to verbalize thoughts while interpreting (Monacelli, 2000; Englund Dimitrova & Tiselius, 2014). Lyle's

[40] Ericsson & Simon's (1993) discussion of retrospective process tracing does not comment on the use of cues other than verbal probes.

second and third points, vis-à-vis real-life problem-solving and high levels of interaction, are also highly applicable to interpreting.

Retrospective approaches are relatively popular in process research into interpreting. At least 13 studies employing retrospection were published in the Interpreting Studies literature between 1999 and 2017; several of these publications also present detailed arguments in favor of the validity of retrospection as a research methodology. Table 11 summarizes the research questions and retrospection-related aspects of the method of a number of studies. The majority of the studies involve simultaneous conference interpreting or long consecutive; only two involve dialogue interpreting.[41] The authors of the studies described in Table 11 employ a variety of terms to describe their methodologies; however, analysis of the methodologies described in their publications indicates that all of the approaches they employ correspond to cued retrospection as defined above. As illustrated in the table, the specifics of the methodology, including the elapsed time between performance and retrospection, the cue(s) used to elicit retrospection, and the method employed for the retrospection, differ notably from study to study.

This wide variation in methodological approaches to retrospective process tracing makes it difficult to reliably compare the findings of the studies, inasmuch as it is difficult to determine how the method may have influenced the results. This methodological inconsistency clearly increases the difficulty of comparing results across studies, especially when combined with other common challenges to generalizability found in Interpreting Studies research—such as small sample sizes; differences in research participants' levels of training/experience; differences in stimuli, conditions, and analytical approaches; and the need to take into account language- and culture-specific phenomena. Although retrospective process tracing is firmly established as a method for process research in interpreting, there appears to be no strong consensus within the field as to the most appropriate approach to employing the method. Given retrospective process tracing's increasing popularity as a research method, the inconsistency with which it is carried out, and the need to reliably compare results across studies, I believe that the time has come to work toward determining methodological best practices in retrospective process tracing in Interpreting Studies research. In order to contribute to such an effort, I discuss my approach to retrospective process tracing and the rationale for that approach in detail in the following section. Chapter 8 also includes a post hoc critique of the method I employed, in the hope of sparking ongoing discussion and methodological refinement.

[41] Although a portion of its findings are presented in Sections 4.5 and 5.3.2, Arumí Ribas (2012) is not included in the summary table because the retrospections were elicited in writing, in response to a questionnaire, rather than orally.

Summary of Use of Retrospection in the Interpreting Studies Literature, 1999-2017					
Author(s)/ Year of Publication	**Research Question (in brief)**	**Pre-retrospection Interpreting Task**	**Time Elapsed between Interpretation and Retrospection**	**Cue for Retrospection**	**Method for Retrospection (in brief)**
Ivanova, 1999, 2000	Comparison of expert and novice performance at SCI; comparison of expert and novice processing during SCI	Simultaneous interpretation of two speeches, approximately 600 words each	After completion of interpreting task and subsequent recall-of-content task	Transcript of original	Read transcript and recall everything possible about thoughts during interpreting Minimal researcher cueing Debriefing interview after retrospection
Mead, 2002	"... interpreters' perception of why they pause in consecutive interpretation" (Mead, 2002:73), including comparison of novice/expert and of A/B language performance	Consecutive interpretation of two taped speeches, English<>Italian	Immediately after each interpretation	Recording of interpretation	Participants were asked to comment on 1. longer pauses and 2. series of brief pauses in their rendition Participants were informed that analysis would not judge quality
Vik-Tuovinen, 2002	"... what kind of information quantitative and qualitative oral retrospective data can give about the informants and the process of interpreting" (Vik-Tuovinen, 2002:63)	Simultaneous interpretation of 7-minute speech	Varied—from same day to several days after	Audio of original Audio of interpretation *(It is not clear whether both were presented on the same audio recording, or whether they were listened to in succession).* Transcript of original *(mentioned as being available)*	Listen to audio and pause to comment or share recollections of thoughts; researcher also stopped audio to ask for comments

Summary of Use of Retrospection in the Interpreting Studies Literature, 1999-2017					
Author(s)/ Year of Publication	**Research Question (in brief)**	**Pre-retrospection Interpreting Task**	**Time Elapsed between Interpretation and Retrospection**	**Cue for Retrospection**	**Method for Retrospection (in brief)**
Napier, 2004; Napier & Barker, 2004	Explores omission as a linguistic coping strategy	20 minute simultaneous interpretation of videotaped university lecture (after viewing 10 minutes of video for context)	Immediate (up to 5 minute break allowed if needed)	Video of interpretation Transcript of original with omissions noted by researcher during interpreting task	Watch video and pause to comment on omissions (process tracing) Subsequent interview focused on reaction to interpreting task
Bartlomiejczyk, 2006	"(1) identifying, classifying, and determining the frequency of strategies used in simultaneous interpreting (SI) from English into Polish and from Polish into English, and (2) investigating the effect of directionality on strategy use" (Bartlomiejczyk, 2006:149)	Simultaneous interpretation of 2 short speeches, one B>A, one A>B (3 sets of 2 speeches were used; each was interpreted by 1/3 of the subjects)	Immediately after each interpretation	Dual-track audio of original and interpretation	In the booth, listen to audio and pause it to record comments about thoughts during the interpretation process Participants were told that the focus was on decision-making rather than quality of output Participants were told to comment on everything they could remember, but not to invent anything

Summary of Use of Retrospection in the Interpreting Studies Literature, 1999-2017					
Author(s)/ Year of Publication	**Research Question (in brief)**	**Pre-retrospection Interpreting Task**	**Time Elapsed between Interpretation and Retrospection**	**Cue for Retrospection**	**Method for Retrospection (in brief)**
Chang & Schallert, 2007	Compare strategies used when working into the A language and into the B language, and explore cognitive/metacognitive processes	Simultaneous interpretation of four speeches of approx. 600 words: two English>Mandarin, two Mandarin>English	Immediately after each interpretation	Script of source speech Dual-track audio recording of original + interpretation	Retrospection training prior to beginning interpreting task Script of recording and dual-track audio with original and interpretation Instructions to recall everything that was on their mind as they interpreted Researcher prompted as necessary based on notes from observation Final debriefing interview after completion of all four interpreting/retrospection tasks
Takimoto, 2009; Takimoto & Koshiba, 2009	Examining the interpreter's work in multi-party talk *(Takimoto reports on shifts in footing; Takimoto & Koshiba report on non-rendition of utterances)*	A business meeting *(naturally-occurring interaction; case study)*	A few hours later	Audio recording of interaction	Researcher asked questions of interpreter Interpreter volunteered explanations of what was going on

Summary of Use of Retrospection in the Interpreting Studies Literature, 1999-2017					
Author(s)/ Year of Publication	**Research Question (in brief)**	**Pre-retrospection Interpreting Task**	**Time Elapsed between Interpretation and Retrospection**	**Cue for Retrospection**	**Method for Retrospection (in brief)**
Englund Dimitrova & Tiselius, 2009; Englund Dimitrova & Tiselius, 2014	Comparison of retrospections in translators and interpreters; exploring the validity of retrospection as a method	Simultaneous interpretation (by some subjects) and translation (by others) of a 9.5 minute speech	Immediate	Transcript of source text	Participants were asked to go through the source text transcript "sentence by sentence, trying to recall their thoughts and actions while they interpreted or translated it and describe these in their own words" (2009:118) Subsequent debriefing interview (not recorded or analyzed)
Tiselius & Jenset, 2011	Comparison of process and product in novice and expert interpreters	Simultaneous interpretation of 9-minute speech	Immediate	Transcript of original	Replicated Ivanova, 1999, 2000 *(see above)*
Major, 2013, 2014	Explore clarification in an interpreted medical interaction	Simulated interaction between deaf pt. and general practitioner (MD)	3-6 weeks after the simulation (to allow for initial data analysis)	Video recording of interaction *(i.e., all participants, including interpreter)*; interview focused on moments involving clarification	Began with debriefing questions Participants viewed the video and were asked to reflect on and explain their interpreting choices during moments involving clarification

Summary of Use of Retrospection in the Interpreting Studies Literature, 1999-2017					
Author(s)/ Year of Publication	**Research Question (in brief)**	**Pre-retrospection Interpreting Task**	**Time Elapsed between Interpretation and Retrospection**	**Cue for Retrospection**	**Method for Retrospection (in brief)**
Russell & Winston, 2014	Explore classroom interpreters' cognitive strategies and decisions, and explore the effect of preparation on the quality of the interpretation	20 minute simultaneous interpretation of videotaped authentic classroom interactions *(after viewing 20 minutes of prior activity in same classroom and providing a TAP of preparation)*	Immediate—8 interpreters Within 48 hours after interpreting—2 interpreters More than 48 hours after interpreting—2 interpreters	Video recording of interpretation	Interpreters viewed the video and paused ad lib to comment on the interpretation and on their thought processes while interpreting Researcher also asked questions
Hild, 2015	Explore novice/expert differences in discourse comprehension	Simultaneous interpretation of two speeches, similar in content, but manipulated to have different levels of redundancy	Immediate	Transcript of source language text *(retrospection appears to have occurred only after interpreting one of the texts)*	Interpreters read the transcript and provided ad lib process tracing Researcher only intervened to ask about specific areas of interest noted during interpreting OR to keep participant on -task

Summary of Use of Retrospection in the Interpreting Studies Literature, 1999-2017					
Author(s)/ Year of Publication	**Research Question (in brief)**	**Pre-retrospection Interpreting Task**	**Time Elapsed between Interpretation and Retrospection**	**Cue for Retrospection**	**Method for Retrospection (in brief)**
Shamy & de Pedro Racoy, 2017	Exploration of simultaneous conference interpreters' (recent graduates or nearing graduation) approach to dealing with language-pair-specific challenges between English and Arabic; compared process tracing with product to gain pedagogical insight	Simultaneous interpretation of a 10-minute formal speech and of a 3-minute impromptu speech	Not specified	Video recording of the original speeches	Participants were given oral instructions on how to approach the retrospection Participants completed process tracing in the language(s) they preferred Researcher intervened only to answer direct questions, to clarify use of regionalisms, or to clarify ambiguity

Table 11. Summary of use of retrospection in the Interpreting Studies literature, 1999-2017.

7.3.2 Methodological Considerations for Retrospective Process Tracing

Critical discussions of retrospective process tracing are offered by Calderhead (1981), Yinger (1986), Gass & Mackey (2000), Lyle (2003), and Henderson & Tallman (2006). An important question discussed by these authors is the extent to which data collected during retrospection accurately reflects online cognitive processes as opposed to inferences or explanations (Lyle, 2003; Ericsson, 2006c). The centrality of this question is emphasized by Gass & Mackey (2000:89), albeit with a focus on research in second language learning and use. The point remains valid when substituting the word 'interpreters' for 'learners':

> "Given that the goal of stimulated recall is to tap learners' thought processes while they were performing a particular task, the method itself will have no validity unless one can be reasonably sure that accurate recall is in fact taking place."

The authors cited in the preceding paragraph identify a number of design elements that can, if carefully planned and executed, increase the likelihood that retrospective process tracing will elicit reliable information about online cognition. In light of the "considerable variety in implementation" (Lyle, 2003:863) of retrospective process tracing, and of the need for greater rigor in the use of retrospective methods in Interpreting Studies, the following sections highlight methodological considerations regarding the validity of retrospective process tracing and discuss their influence on the design of the method employed in the research reported on in this dissertation.

7.3.2.1 Preparing Participants for Retrospection

While Ericsson & Simon (1993) recommend providing participants in TAPs the opportunity to practice the method with sample tasks before beginning the TAP itself, Gass & Mackey (2000:52) argue against the use of pre-task practice for cued retrospection, due to its potential to affect outcomes or prime the subjects to perform and respond in ways that may confound the cued retrospection process. Gass & Mackey (2000) note a lack of empirical research into the effects of completing practice recalls before the experimental recall. They conclude "that participants should be trained if pilot studies have shown that they need such training in order to provide recalls and that the minimum training necessary should be provided to avoid influencing or affecting the subsequently recalled data." There is a difference, however, between training participants in the method and preparing participants for the recall task. There is consensus in the literature with regard to the need to appropriately prepare participants for cued retrospection (Calderhead, 1981; Gass & Mackey, 2000; Lyle, 2003; Henderson & Tallman, 2006).

Calderhead (1981) points out that the content and completeness of a participant's recall may easily be influenced by the individual's level of anxiety vis-à-vis reviewing his or her own performance, as well as by the individual's level of confidence in that performance. In my research study, participants were not presented with a trace (i.e., video or audio recording) of their own performance (as discussed below), but the lack of a cue for retrospection does not obviate the possibility that anxiety or lack of confidence might influence what participants recall or how they recall it. It is therefore important to set participants at ease and explain the retrospection process clearly and precisely. Henderson & Tallman (2006:83) recommend encouraging participants to "report any thought even if it is not related to {*the task being recalled*}" in order to minimize the possibility that the participant will filter out thoughts that they consider irrelevant or inappropriate. It is also important to stress that the researcher is interested in cognitive processes (thoughts) and not in judging the quality of the performance. As Russell & Winston (2014:106) put it, "above all, the subject should not feel as if his or her actions are being recorded for the purpose of later criticism; the fact that it is the process of thinking, and not the end result, [*that is of interest*] should be emphasized." At the same time, it is important to avoid sharing specifics of the items of interest or research goals with the participants, as this may confound the data by priming them to focus on specific areas of performance or to provide data (i.e., recollections) that meet the researcher's stated goals (Calderhead, 1981; Henderson & Tallman, 2006; see also Major, 2013, who notes that some of the interpreters in her simulations reported that they had been trying to figure out what behaviors or features of performance the researcher was looking for).

In the case of this study, I discussed the retrospection briefly with the participants during the informed consent process: I told the interpreters that I would interview them after the interaction. Participants were assured that the goal of the study was not to make judgments about the quality of their interpreting, but rather to "better understand characteristics of performance in novice and competent interpreters" (Informed Consent for Participants, page 1). No further information was given, as I did not want to focus the interpreters' attention on the retrospection rather than on the performance—that is, I wanted to avoid signaling that the retrospective portion of the study was a primary focus of interest. During the course of the retrospection, interpreters were asked to recall anything and everything they remembered thinking. On the few occasions when an interpreter made a comment that indicated s/he was thinking about what I might be looking for, I assured the interpreter that I was interested in hearing about anything and everything s/he remembered having thought during the interaction. All of the participants in the study were aware of my status as an instructor of interpreting, which may have influenced their responses to

me. Half of them had slight previous professional acquaintance with me,[42] which also may have influenced their level of comfort or anxiety.

7.3.2.2 Timing of Retrospective Process Tracing & (In)completeness of Recall

Inasmuch as retrospective process tracing occurs after task performance, it necessarily draws on long-term memory. This does not mean, however, that the length of time that passes between task performance and retrospection is unimportant or irrelevant (Færch & Kasper, 1987). As noted in Section 2.3.4, recency (i.e., the time elapsed between encoding a memory and retrieving it) is known to be a factor in retrieval from LTM. Gass & Mackey (2000:51) state that "longer periods of time *{between action and retrospection}*, even when the recall support is very strong, often lead to controversy in terms of what is being accessed and what claims are being made by the researcher," while Henderson & Tallman (2006:75) note that "recall accuracy diminishes as a function of the intervening time between the event and the recall."

Immediacy of retrospection does not guarantee completeness of recall (Englund Dimitrova & Tiselius, 2009, 2014; Hansen, 2005). Some aspects of performance may not have been attended to (i.e., been automated), or may have been attended to but not encoded in LTM, while others may not be accessible for retrieval during retrospection or may have been forgotten. Individuals' recall & responses to questions may also be influenced by a number of other social/pragmatic factors (Goldsmith, Pansky, & Koriat, 2014; Calderhead, 1981; see also the discussion below of procedures for eliciting retrospection), which might include willingness/mood, desire to present oneself in a positive light, and/or reactions to the researcher or the task.

In light of the scholarly consensus regarding the advisability of performing process tracing directly after task completion, the interpreters in this study completed the retrospection immediately after the interpreted interaction ended. Nevertheless, both the likelihood that the participants' retrospective process tracing represents only a portion of their online processing and the possibility of distortion or self-editing must be considered when analyzing and drawing conclusions based on the content of retrospections (Vik-Tuovinen, 2002; Englund Dimitrova & Tiselius, 2009, 2014). Despite these considerations, interpreters' post-task retrospections—both in terms of their content and their gaps (Englund Dimitrova & Tiselius, 2014)—are valuable and informative inasmuch as they place the interpreter-as-task-performer at center stage and provide a window into the interpreter's processing and experience during task performance. As Kiraly (1995:41, quoted in Hansen, 2005:516) puts it, "even if verbal reports are necessarily incomplete

[42] My current/former students and fellow staff interpreters at the hospital where I worked were excluded from the study on the grounds that the nature of the pre-existing relationship might unduly influence their performance and their process tracing.

and do not reveal everything, what they do reveal is important." Triangulation between a given interpreter's performance and retrospection provides additional insight inasmuch as it allows for comparison between the observed reality of the performance and the experience as reported on retrospectively (Ivanova, 1999; Englund Dimitrova & Tiselius, 2009).

7.3.2.3 Procedures for Eliciting Retrospection

Gass & Mackey (2000:89) describe the possibility that the researcher's questions and reactions during a cued retrospection session may compromise the accuracy of the retrospection as "the most serious of difficulties." A similar point is made by Ericsson (2006c), who cautions against asking participants to provide more information than the thoughts they recall—such as asking "why" questions or asking for explanations—noting that this type of probe may lead participants to make inferences about what they must have thought, rather than report their recollection of what they did think during task completion. Based on their review of the literature, Henderson & Tallman (2006:78-79) make a number of concrete suggestions for researchers conducting cued retrospection sessions. Many of their suggestions correspond to recommendations found elsewhere in the literature; the list below cites those authors, as well.

- **Non-directive questions:** Verbal prompts and probes must avoid directing the participant toward a response; they must also avoid asking for explanations. Besides the risk of leading participants to make inferences (as noted in the preceding paragraph), directive questions are more likely to (subconsciously) direct the participant toward aligning his/her response with the research goals instead of providing a true account of what s/he remembers thinking. Careful design of the verbal probes employed during the cued retrospection session helps to avoid crossing the line between recall and reflection/inference. Lyle (2003:873) recommends a "stop and remember" approach to cued retrospection rather than one in which the participant is asked to talk the researcher through the process.
- **Who initiates responses:** While the researcher does have responsibility for initiating the cued retrospection session and probing for responses (especially if the participant does not initiate recall), Henderson & Tallman (2006) highlight the importance of allowing the participant him/herself to initiate recall on whatever aspects of the task s/he chooses; given their primacy within the participant's recall, such items were presumably significant to the participant during task completion. Lyle (2003) prefers unstructured approaches to recall, given the risk that over-structuring the recall session may lead participants to provide a more structured account of their thoughts than they otherwise would. A similar point is made by Calderhead (1981:214), who notes that "the questions

of preparing teachers for stimulated recall interviews and of structuring the interview itself clearly have to be weighed against the possibilities of imposing, or encouraging teachers to impose, unreal interpretations upon their behaviour."

- **Interviewer training:** Interviewers must learn to establish rapport, trust, and respect while adhering to other aspects of the protocol. Calderhead (1981) underscores this point, noting that anxiety about reviewing one's own work or lack of confidence about one's abilities may affect the amount and types of thoughts reported in cued retrospection. Interviewers must also be sensitive to the timing of questions. Lyle (2003) also cautions that researchers who are very familiar with the setting they are researching must be aware of the tension between the benefits of being able to watch, listen, and probe from a place of real understanding, on the one hand, and the possibility of introducing bias because of that same understanding, on the other.
- **Keeping participants focused on the "there and then":** Retrospection protocols seek insight into an individual's cognition during a recently completed task (e.g., interpreting, teaching)—but the nature of retrospection is such that participants are engaged in a new task (that of recalling thoughts) and, thus, new cognitive processes during recall (Englund Dimitrova & Tiselius, 2009). As noted above, researchers must be aware of the possibility that participants' focus during the recall session may easily switch from strict recall of thoughts during (previous) task completion (the "there and then," as Henderson & Tallman, 2006:80, phrase it) to reflections that occur during review of the stimulus (i.e., in hindsight). Henderson & Tallman (2006) stress the importance of avoiding a negative reaction to participants' reflections based on hindsight, but, at the same time, recommend that researchers redirect participants to focus on recalling what they were actually thinking at the moment in question.

7.3.3 Cues for Retrospective Process Tracing

7.3.3.1 Selecting Cues for Retrospection

The Interpreting Studies literature summarized in Table 11 reports on the use of a variety of cues for retrospection, including source language speech transcripts, audio recordings of source language speeches and target language renditions, videos of source language originals, and verbal probes (i.e., questions). This section highlights a number of considerations related to choosing cues for retrospection.

One well-established approach to cued retrospection is to have the participant review a video of his/her performance (see, for example, Gass & Mackey, 2000; Lyle, 2003; Henderson &

Tallman, 2006; as well as the relevant studies described in Table 11). One advantage of video as a cue for retrospection is that it allows the participant access to aural and visual triggers for memory. It is not, however, without potential pitfalls. Calderhead (1981, following Bloom, 1953) notes that the features perceived by a participant in real time are not necessarily those captured by a recording; that is, the video cue may draw the individual's notice to things that were not perceived at the time of the original performance. Wilcox & Trudel (1998) concur, highlighting the possibility that viewing a video of one's performance may compromise the validity of the data obtained through cued retrospection by presenting the participant with new information (for example, aspects that went unheeded during the original performance, or which did not pass into LTM). Further to this point, Lyle (2003, following Yinger, 1986) stresses that viewing a video of an event may create a new set of memories—a new experience—for the participant, rather than prompting the individual to access real memories of his/her thought processes during task completion.

In the case of interpreting, presenting the participant with a transcript of the original text and/or an audio recording of the interpretation has been a popular approach, especially in studies of simultaneous conference interpreting of spoken languages.[43] Reporting on a pilot study comparing the use of a transcript of the original vs a transcript plus a recording of the target language output, Ivanova (1999) states that the transcript alone was more effective than the transcript plus the target language output. She notes that 1. the transcript provided sufficient information to verify participant reports, 2. presenting participants their output increases the likelihood they will make inferences about their thinking rather than strictly recall it, and 3. not having access to their performance data reduces the possibility that participants might react negatively to problematic areas of performance. Shamy and de Pedro Ricoy (2017:59) point out additional arguments against presenting participants with a recording of their own performance as a cue for retrospection: "not providing the participants with the target text reduces the risk of inferring, spares them any embarrassments and allows for verification of protocols by comparing them to the interpreted output."

Another possibility is to use a multi-step approach such as that employed by Henderson & Tallman (2006) to study teacher-librarian's mental models and interactions with students. In their study, the teacher-librarian subjects first completed a retrospection cued by a video recording of their teaching session. Directly after the cued retrospection with video they completed an uncued follow-up interview. The authors (2006:66) argue that completing the tasks in this order provided "access to a more reliable prompt—the video and the cued retrospection of the teaching-learning session—than the participant's memory;" however, they also viewed the second portion of the

[43] Audio-only recordings are not feasible for performances involving signed languages; video recordings are generally employed for studies of bimodal interpreting.

retrospective process as an opportunity for the participants to "elaborate, justify, and explain their actions and strategies," rather than to engage exclusively in process tracing.

7.3.3.2 Rationale for the Approach Used in this Study

The retrospective process tracing completed for this study comprised three stages that were experienced as one 'interview' by the participants. The first stage was uncued retrospection, followed by minimally-cued retrospection, and then by verbal probes. This section discusses the rationale for the design; the procedure is described in detail in Section 7.6.

Given the nature of the interpreting task employed for this study (i.e., planned but unscripted simulated interactions), it was not feasible to present participants with a transcript of the original. To do so would have necessitated delaying the cued retrospection until a transcript could be prepared. This delay between the task and retrospection would have decreased the reliability of the retrospections, as described above. Another possibility would have been to present a video or audio recording of the interpreted interaction. In dialogue interpreting, the source and target language utterances are inevitably intertwined and cannot be quickly or easily separated (if at all, given the probability of overlapping speech produced by multiple parties, including the interpreter); thus, use of a video or audio recording as a cue for retrospection would entail having the interpreter view both the original and his/her performance. Although this approach might be well suited to cases where the researcher wishes to explore specific phenomena and/or discuss the interpreter's reasoning or decision-making (as in, for example, Major, 2013), it was judged inappropriate for this study given the desire to lessen the chance that participants would engage in post hoc evaluation and reflection rather than process tracing.

Uncued retrospection was thus identified as the best option for gaining more direct, unfiltered insight into the interpreter's thought processes, thereby capturing the thoughts at the forefront of the interpreter's mind with as few distractions or interventions as possible after task completion. This approach also mitigates interference between the online processes of the first task and the new processes that occur while viewing or listening to a cue. Uncued retrospection also increases the utility of triangulating the interpreters' retrospections with their performances, given that the content of the retrospection is not influenced by a reexperiencing of the original text or of the interpreter's performance.

These considerations are especially important in a study focused on self-regulation and expertise. The literature on expertise leads us to expect novices and experts to heed different aspects of performance (Moser-Mercer, 2000a, 2010; Zimmerman, 2000; Chi, 2006a). In addition, monitoring and control processes can be automated or effortful, and it is the latter that

are expected to be stored in memory and potentially accessible for retrieval during process tracing. Therefore, allowing participants to structure their own recall by commenting on things in the order in which they occur to them, rather than the temporal order imposed by viewing and pausing a video or scanning a transcript, provides insight into which aspects of the process were most salient to the interpreter. That is, not only what is mentioned, but when and how, gives valuable information about the interpreter's online processes.

Verbal cues (i.e., questions) were considered an important follow-up to the uncued retrospection, as they would provide an opportunity to direct the interpreter's attention to specific aspects of the interaction and to enquire about specific points of interest arising from observation of the interaction. Care was taken to word the verbal cues in a neutral way so as to elicit further process tracing from the participants without asking them to evaluate or explain their performance. In addition to enquiries with regard to aspects of the interaction that were easy or difficult, the verbal cues included several questions about emotional reactions, identification with the parties, and reactions to the situation at hand. It was expected that the responses to these questions might offer insight into the effects of emotional and situational factors on interpreters' experience of the task. In order to facilitate the portion of the retrospective process tracing focused on specific points of interest observed during the interpreter's performance (i.e., the simulation), I developed an observation sheet that I employed as I observed the simulated interactions and referred to during the verbal probes section of the retrospections. The text of the verbal cues employed in the retrospections and the observation sheet employed during observation of the simulations are included in Appendix B.

After piloting the methodology (see Section 7.4), another stage was added to the combination of uncued retrospection followed by verbal probes. The new stage, which occurred between the other two, was minimally-cued. The interpreter was presented with a brief written outline of the main topics discussed in the interaction just interpreted. It was thought that the presentation of a minimal written cue after the uncued retrospection might trigger further retrospection from the interpreters. The minimally-cued portion of the retrospective process tracing proved problematic as is discussed in the evaluation of the method in Section 8.8.

7.4 Pilot Testing the Methodology

Pilot testing of the methodology involved having four interpreters complete the simulation and retrospection. This was completed in two sessions, the second three weeks after the first. In order to preserve the pool of prospective participants for the study, the participants recruited to participate in the pilot were interpreters who did not meet the eligibility criteria for the study.

Two of the pilot participants were individuals who spoke both languages, had a small amount of ad hoc interpreting experience, and had received no training in interpreting. The other two were practicing interpreters who had received training; they were ineligible for the study because of preexisting professional relationships with me. No technical assistant was on hand for the pilot. Participants in the pilot completed the informed consent process and the demographic survey, then proceeded to interpret the simulated interaction and complete the retrospective process tracing.

A number of changes were made after piloting the study. The seating arrangement was adjusted so that all the parties could be seen on the video recording. As noted in the previous section, a new, minimally-cued stage was added to the protocol for the retrospection. The written text that was given to the interpreters at the beginning of the retrospection was also drafted after the pilot, as was a finalized list of verbal probes for the last part of the retrospection. The observation sheet proved unwieldy and was therefore completely overhauled. A summary of the simulation was made for the actors in order to increase consistency across participants. The final version of the observation sheet and the documents used during the retrospection are included in Appendix B.

7.5 Participants

7.5.1 Identifying Experts & Establishing Inclusion Criteria

'Expert' is a term frequently used but infrequently operationalized in everyday life. For example, it is fairly common to encounter and act upon the advice of experts without enquiring deeply into the basis for the expert's designation as such. The need to identify experts or competent performers in a domain is, however, of central importance to researchers working within an expertise framework (Jääskeläinen, 2010), even when the research adopts a relativist approach.

In many domains, the identification of expert performers via objective criteria is far from straightforward—consider, for example, the complexities of aviation, medicine, and music, just three of the performance domains discussed in Ericsson, et. al. (2006). Indeed, Ericsson & Charness (1997:7) recognize that "in most domains it is easier to identify individuals who are socially recognized as experts." Identifying experts solely on the basis of social criteria (i.e., status, peer recognition) is problematic, however. Not all individuals identified as experts in a given domain will necessarily perform better than novices, and experience (time on task) and knowledge are not always reliable predictors of performance (Ericsson & Charness, 1997:7; Ericsson, 2006a, 2006b; Jääskeläinen, 2010). Yates (2001:24) echoes this theme, calling

attention to the notion of "experienced incompetence" and warning scholars to be wary of seeing experience as equivalent to expertise. Similarly, Jääskeläinen (2010, citing Sirén & Hakkarainen, 2002) points to studies in which novices outperformed supposed experts at translation tasks, and advocates for differentiating between expertise and professionalism in translation studies, noting that "while all experts are professionals, not all professionals are experts" (p. 215). She also cautions against confounding the notions of specialization (e.g., in a specific type of translation/interpreting, such as medical or legal) and expertise.

Approaching expertise research from a relativist stance does not obviate the need to operationalize the definition of 'expert' or 'competent performer' for a given research project or domain. When the criteria for designating 'expert' and 'novice' groups vary greatly from study to study it becomes difficult, if not impossible, to make valid comparisons across studies (Köpke & Signorelli, 2012). This is also true when the inclusion and exclusion criteria are not clearly described by the researcher. Despite the many expertise-related studies in the Interpreting Studies literature, there are no widely agreed upon criteria for inclusion in 'expert' or 'novice' groups. The studies discussed in Section 3.4 employ a wide range of criteria that are not always clearly defined or explicated. The following examples are illustrative of the diverse inclusion criteria for expertise-related studies of interpreting; note that the referenced publications are not always clear as to whether the author is describing preestablished criteria that were used for inclusion/exclusion in the study or providing a post hoc report on the participants' demographic information:

- Ivanova (1999, 2000): The expert group had an average of 9 years of experience. The novice group was composed of students who had three months of simultaneous conference interpreting study/training.
- Moser-Mercer, et al. (2000): The group of professional interpreters had 5-10 years of experience. The novice group was composed of students beginning their first year of (postgraduate) study of conference interpreting.
- Liu (2001): The professional group had at least one year of formal training and at least two years of experience with at least 40 working days per year. The advanced novice group had 1.5 years of training in simultaneous conference interpreting. The novice group had just begun training in simultaneous conference interpreting.

The research described in this dissertation involved two groups (termed 'novices' and 'experts' in the results and discussion; see Section 3.2 for further discussion of the approach to expertise studies taken in this dissertation; see also Section 9.3.1 for a further note on the groups) with differing levels of training and experience in order to gain insight into performance at multiple points on the developmental trajectory. Following Chi's (2006a) recommendation of

academic training, years on the job, and recommendation by peers in the domain as criteria for identification of competent performers, I established educational and experience criteria for inclusion in the study (peer recommendation was not used as an inclusion criterion, given the need to preserve confidentiality; however, peer networks were draw on to identify potential participants).

Liu (2001) recommends consideration of formal training in interpreting as a criterion for inclusion in expertise-related studies of interpreting, noting that individuals (in general, not necessarily interpreters) with both experience and training in a given domain have been shown to outperform those who have experience but no training. Köpke & Signorelli (2012) also stress that the type of training and the quality of professional experience are important factors to consider in identifying participants for research due to the possibility that differences in these factors may influence performance (and, thus, research findings). This consideration is especially relevant to this study, given the realities of the professional landscape of dialogue interpreting in the geographical area in which it was conducted: there are working interpreters with many years of experience who have little formal training. There are also recent graduates of academic programs that have considerable training but little experience. For this reason, separate criteria were established for training and experience for each group. The criteria and rationale for each one are listed below.

For the novice group, the inclusion criteria were as follows:

- Maximum of 40-60 hours of formal training.
    - Some level of training was considered necessary, as the study was focused on trained interpreters rather than ad hoc interpreters or untrained bilinguals.
    - The majority of private training programs that prepare interpreters to work in the field are 40 or 60 hours long, so this was established as the training cutoff for novices.
- Less than 200 hours of interpreting experience.
    - Hours of work was considered a better measure than days, weeks, or months, given that many interpreters work as freelancers: a ‘day’ might include anywhere from an hour of work to eight or more hours. The quantity of hours was chosen arbitrarily but was thought to be sufficiently low (the equivalent of 5 weeks of full-time work; although novices are not likely to work full time as interpreters) to avoid automation of processing and development of well-established schema.

For the expert (‘competent performers’) group, the inclusion criteria were as follows:

- Graduate of college-level training program.[44]
    - Completion of a college-level training program ensures a distinct contrast in level of training in the two groups.
- At least 5 years of interpreting experience.
    - Performance improvement is rapid at first, but generally slows dramatically after a certain level of skill is reached (Anderson, 2015). Five years of experience seemed sufficient time for participants to have developed fairly stable schema and automated processing, as well as to have settled into patterns with regard to their use of control mechanisms, etc.

7.5.2 Participant Recruitment and Demographic Information

In order to recruit participants, an informational email and flyer were distributed through personal and institutional networks, including professional organizations, educational institutions, hospital interpreting services departments, and interpreting agencies. Recruiting participants proved to be difficult. A number of practicing professionals were interested in participating but did not fit the inclusion criteria for the expert group due to insufficient formal training (e.g., having sufficient experience, but only 40 hours of formal training). Despite sustained outreach to trainees currently enrolled in 40-hour programs, it was also difficult to recruit novice interpreters to participate in the study.

In the end, eight interpreters participated in the study. Five were classed as expert and three as novice interpreters. In order to collect demographic data on the participants, each interpreter was asked to complete a brief questionnaire (full text of the questionnaire may be found in Appendix C) after completing the informed consent process at the study site. In order to avoid dehumanizing the participants, each interpreter was assigned a pseudonym, which is used throughout the results and discussion.

Given the small sample size and the small pool of eligible participants from which the participants were recruited, there is a risk that detailed reporting of demographic information could allow the participating interpreters to be identified. To minimize this risk, the demographic information is reported in an aggregated fashion in Table 12. The sample can be described both as heterogeneous, in terms of training, experience, and language skills, and homogeneous, in that all the participants have the same language combination and live/work in the same geographic area.

[44] Graduates of the institution at which I teach were excluded from the study.

Demographic Information of Study Participants (N=8)		
Gender:	Female.....	6
	Male.....	2
Age:	20-29.....	1
	30-39.....	3
	40-49.....	1
	50-59.....	3
Education level *(not necessarily interpreting-specific)*:	Some college.....	1
	Bachelor's degree.....	4
	Graduate degree.....	3
Formal training in interpreting:	40-hour program.....	3
	College-level certificate program.....	3
	BA in Translation & Interpreting.....	1
	MA in Translation and Interpreting.....	1
Language profile[45]:	Roughly balanced.....	4
	Stronger English.....	3
	Stronger Spanish.....	1
Interpreting experience *(length)***:**	< 6 months.....	2
	1-2 years.....	2
	5-10 years.....	2
	10-20 years.....	1
	20+ years.....	1
Interpreting experience by setting *(total is greater than 8 as some interpreters identified multiple sectors)***:**	Medical settings.....	8
	Legal settings.....	3
	Educational settings.....	1

Table 12. Study participants' demographic information.

[45] Assessment of the relative strength of the participants' languages is subjective based on their demographic reports and on observation of their performance during the simulation. No formal assessment was completed. See narrative discussion in the section following the table.

Gender was heavily skewed toward female participants, which is consistent with trends in the Interpreting Studies literature and with the United States' Department of Labor's 2011 statistics, which indicate that 68% of interpreters and translators in the US are female.[46] Both male participants in this study were in the novice group. Age was fairly evenly distributed across the expert and novice groups; that is, not all the novices were younger nor all the experts older. All but one of the participants had completed a Bachelor's degree or higher in some subject (not necessarily interpreting). Three interpreters had completed a 40-hour interpreting training program; three had completed a college-level certificate program in interpreting; and two had completed a BA- or MA-level translation and interpreting program. The interpreters had experience primarily in medical settings, although three mentioned legal and one educational settings.

To check on their fit with the inclusion criteria for experience, the demographic questionnaire asked the interpreters to indicate how long they had worked as interpreters and approximately how many days a week they worked as interpreters. Due to a misunderstanding, one of the interpreters in the expert group met the criteria for amount of training but did not meet the requirements with regard to length of experience. Additionally, while all three novices fit the stated criteria for length of experience, one had more experience than the other two (one year of occasional freelance work vs less than six months of occasional freelance work).[47]

The language profile of the participants was varied. Half of the participants were born in the United States, and half were born in a Spanish-speaking country. They had varying lengths and contexts of exposure to both languages (e.g., learning both languages from a young age; immigrating to the United States at a young age). Observation of their language use during performance led to a subjective assessment that 4 of the 8 participants had roughly balanced skills in both languages, while three had much stronger English skills and one had somewhat stronger Spanish skills. While the interpreters' level of fluency in their working languages was not a focus of the research, a subjective assessment of language proficiency is included in the

[46] US Department of Labor statistics accessed 27 April, 2017 at https://www.dol.gov/wb/stats/occ_gender_share_em_1020_txt.htm

[47] Although the inclusion criteria for novices was 200 hours, it proved difficult for interpreters to estimate the number of hours they had worked. During the informed consent process, I engaged in conversation with each interpreter about how many hours per week, on average, they worked, in order to get a sense of whether they met the criteria or not. In this context, it is important to note that an interpreter working only 5 hours a week would take 40 weeks to reach the 200 hour mark, as well as the fact that dialogue interpreting work involves a large amount of waiting/non-interpreting time—an interpreter may be booked for an hour-long appointment that involves only 20-30 minutes of interpreting. The proportion of time-on-task may be even less in some situations, such as an emergency room visit or a surgery.

demographic information given that language proficiency appears to have played a role in some aspects of some of the interpreters' performances (and, thus, in some aspects of the findings).

7.6 Procedure

The data was collected at the college at which I teach, during times when no classes were in session, and after having gained approval for use of the space. Two classrooms and a quiet study area between them were used. The quiet study area was used to greet interpreters and complete the informed consent process. The simulation took place in one classroom, in which desks had been arranged in advance to accommodate the parties. The video recording device was a small webcam which was part of the teaching installation present in the classroom; it was situated directly in front of the interpreter at a distance of approximately 15 feet. I observed the interaction from the second classroom, which also served as the location for the retrospective process tracing.

During the course of the simulated interaction, I observed via a secure videoconference link and used the observation sheet described in Sections 7.3.3.2 and 7.4 to make efficient use of the limited time to note items of interest during the interaction. The observation sheet provided a structure for noting several aspects of moments of interests, including who the original speaker was, the type of difficulty(ies) observed, the interpreter's response, the approximate time at which the moment of interest occurred, and notes about the occurrence. The notes taken on the observation sheet served as the basis for verbal probes during the corresponding stage of the retrospection. The observation sheet is included in Appendix B, and its usefulness is discussed in Section 8.8.

7.6.1 Simulation

Upon arrival at the study site, interpreters were greeted, completed the informed consent process and the demographic survey, and were given $20 in thanks for their participation. With the exception of the informed consent, all of these steps were carried out by the study's technical assistant. When all of the parties were ready to start, I went into a classroom and started the videoconference link and video recording that would allow me to observe the interaction while the technical assistant escorted the interpreter to the classroom where the actors were waiting, announced "the interpreter is here," and started the backup audio recording equipment. The technical assistant then left the room as the interaction began.

Theresa (the actor playing the administrator) greeted the interpreter and briefly explained the situation: that two employees had been arguing loudly in the hallway, that the administrator had been asked to come up with a temporary solution given that no one from Human Resources was currently available, and that one of the employees didn't speak English. From the time the interpreter walked into the room until the time the administrator was done explaining the situation, Mariela (the Spanish speaker) was walking around the room having a (one-sided, pretend) conversation on her phone. The interaction then began, and proceeded until it was brought to a close. Figure 10 is a screen capture of one of the simulations in progress with the participants[48] labeled. Immediately after the interaction ended, the technical assistant or I escorted the interpreter to the other classroom to complete the retrospective process tracing.

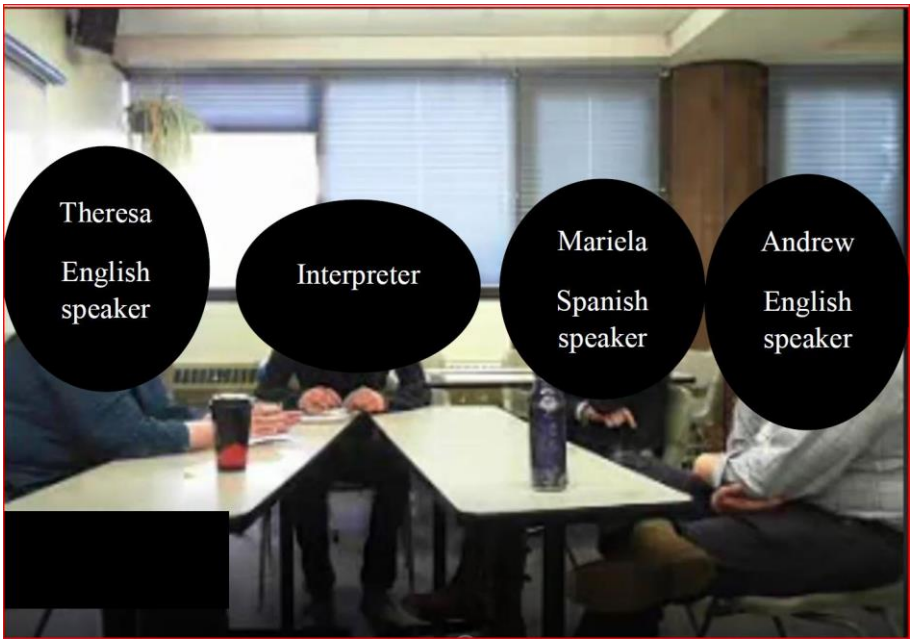

Figure 10. Screenshot of a simulation.

7.6.2 Retrospective Process Tracing

As mentioned above, the retrospective process tracing comprised three stages: uncued retrospection (stage 1), minimally-cued retrospection (stage 2), and verbally-cued retrospection (stage 3). All three stages occurred in one continuous whole; that is, the participants did not complete three discrete tasks, but rather participated in one 'interview' immediately after interpreting. Throughout this dissertation 'retrospection' refers to the entirety of the process

[48] The names that appear in the picture are the pseudonyms used during the simulation, not the actors' real names.

tracing completed by a given interpreter; the three stages of the retrospection are referenced by name where applicable.

The process tracing began with uncued retrospection. Immediately upon entering the room and turning on the audio recorder, I handed the interpreter a piece of paper reading as follows:

> *I would like to hear anything you remember thinking during the encounter. The goal of retrospection is to reconstruct your thought processes as you interpreted, NOT to evaluate your work or explain your decisions. Please begin by sharing anything and everything that went through your mind as you interpreted.*

Following the recommendations discussed in Section 7.3.2., the wording of the sentences above was chosen carefully to focus the interpreter on his/her own thought processes during the interpretation and to mitigate anxiety about the evaluation/judgement of the performance. I allowed the interpreter to speak for as long as s/he was inclined to do so. If the interpreter paused or seemed unsure of what to do, I encouraged the interpreter to keep going, or explained out loud the information that was written on the sheet.

After the interpreter finished providing uncued retrospection, I handed him/her a sheet of paper (see Appendix B) outlining the main points of the interaction (e.g., explaining the problem, accusation of retaliation, closing) and containing a request for the interpreter to continue process tracing. I only intervened in this portion of the retrospection to clarify the directions or to redirect the participant toward process tracing. In this portion of the retrospection, many of the participants began describing the interaction rather than using the list of topics to trigger further process tracing. This may have been due to the indications at the top of the paper being unclear, or to some other reason. This point is discussed further in Section 8.8.

When the interpreter had nothing more to say in response to the cue, I informed the participant that I would ask some questions. The questions were carefully phrased to keep the interpreter's focus on the 'there-and-then' (Henderson & Tallman, 2006) of the interpreting process rather than on evaluation of performance or explanation of their decision-making (see also Englund Dimitrova & Tiselius, 2009), and to avoid suggesting responses or asking for explanations as discussed in Section 7.3.2. Apart from the list of preplanned questions (see Appendix B), additional questions were asked to follow up on items from the observation sheet and on things the interpreter had brought up during the course of the retrospection. After concluding the questions, I asked the interpreter if there was anything else s/he could remember thinking. When the interpreter had no more to say, the retrospection came to a close.

7.7 Conclusion

This chapter has presented the rationale for the method employed in the study, described the development of both the simulation and retrospection portions of the study, discussed the process of participant recruitment and the demographics of the study participants, and provided an overview of the piloting process and the procedure employed for data collection. Although both simulation and retrospective process tracing have been employed in interpreting research, the specific method used in this study is, to the best of my knowledge, a novel one. For this reason, and in the hope that other researchers may find it a productive method, I offer a critical evaluation of the method in Section 8.8.

8. Data Analysis

8.1 Introduction

In this chapter, I report on the analysis of both the performance and the retrospection data. As further described in the following sections, a mixed, recursive approach (Blair, 2015) was employed in coding the data: initial lists of categories were developed for both the performance and retrospective data, and were updated and revised throughout the analysis process. The data analysis process is described in some detail[49] in light of the need for precision and thoroughness in reporting on research involving retrospective process tracing (Englund Dimitrova & Tiselius, 2014) and in the hope of providing sufficient information to allow for informed analysis/comparison of the results of this research with those of future studies using similar methods or investigating similar questions.

8.2 Overview of the Data Analysis Process

As noted above, the interpreted interactions (hereafter, 'performances') were video- and audio-recorded, and the retrospective process tracing sessions (hereafter, 'retrospections') were audio-recorded. A table listing the lengths of the performances and retrospections is included in Appendix D. Coding was carried out in the qualitative analysis software NVivo. Videos of the performances were imported into the software, and coding was performed directly on the videos. For the retrospections, both the audio recording of the retrospection and a transcript were imported into the software. While the coding of the retrospections was done on the transcripts, the audio versions of the retrospections were available for consultation as needed (for example, to check the pragmatic features of utterances).

I began the coding process by developing two lists of categories—one for the performance data and another for the retrospection data. The category list for the performance data consisted of possible indicators of online monitoring and control (or failures thereof). The category list for the retrospection data consisted of possible indicators of online monitoring and control (or failures thereof) as well as some thematic categories. The lists of categories were developed based on the potential targets for monitoring and potentially available control mechanisms discussed in Chapter 5 (Ivanova, 1999, 2000; Gile, 2009; Dean & Pollard, 2011, 2012, 2013;

[49] The description of the coding categories in this chapter contains a number of examples, all of which are illustrative in nature (i.e., they are not direct quotes from the retrospection data).

Arumí Ribas, 2012; Englund Dimitrova & Tiselius, 2016), as well as on experience[50] and intuition. During the coding process, the lists of categories were modified and refined in response to the phenomena identified in the data—some new categories were added, others were combined, and still others were discarded. Category descriptions were also refined. This process, as well as the final lists of categories and their descriptors, is discussed in the following sections.

Although the category lists and the coding were informed by relevant theoretical frameworks and scholarly literature discussed in the theoretical portion of this dissertation, I approached both creating/refining the category lists and coding the data with an open mind rather than a fixed hypothesis or aim. In this, I followed the recommendation of Ivanova (1999:165, following Crotjahn, 1987, and Ericsson & Simon, 1996), who notes the potential threat to validity posed by the researcher serving as the interpreter (in the general sense, rather than in the sense of translation) of retrospective data, and advises approaching analysis of retrospective protocols with "weak and uncontroversial theoretical assumptions" and "with an open mind which allows the researcher to discover structures inherent in the protocols."

I completed the initial round of coding on my own. Shortly after the end of that process, I recoded one retrospection transcript as a quality control measure. Comparison of the recoded retrospection with the initial coding revealed some inconsistencies in the descriptions of the categories and in their application during coding. As a result of this finding, I decided, in conjunction with my supervisor, that a second coder should be recruited, and that a second round of coding should take place. A second coder with appropriate background and skills was identified.[51] After signing a confidentiality agreement, the second coder worked with me to recode the data. I reviewed the categories and their descriptions with the second coder and provided examples.

The second round of coding of the performance data was carried out simultaneously by me and the second coder. We sat together in front of the same computer screen, viewed the video of each performance together, and agreed on all coding decisions. For the second round of coding of the retrospection data, the second coder independently coded the transcript of one retrospection as a trial run. The second coder and I then discussed the coding of that transcript in order to further clarify category descriptions and answer questions. The second coder then coded all of the retrospection transcripts independently, using the Microsoft Word comment feature.

[50] 'Experience' refers here to professional experience and to the experience of having observed the performances as they occurred and heard the retrospections as they were provided, as the category lists were developed in the same time period in which the data collection process took place.

[51] The second coder's qualifications include: native speaker of Spanish (I am a native speaker of English); BA in Translation and Interpreting; many years of experience working as a community/medical interpreter and translator; and good analytical and critical thinking skills.

When the second coder had completed coding the retrospection data, I transferred the coding from Word into a new NVivo project file. I then compared the second coder's coding with my first-round coding and produced a final, consolidated version reflecting both coders' work.

A notable amount of time passed between the first and second rounds of coding of the data—between two and three months in the case of the performances, and approximately four months in the case of the retrospections. The lapse of time between the first and second rounds of coding is significant in that it allowed me to approach the data and the original coding from a fresh perspective. Given that the coding scheme used for this study is a novel one (i.e., developed for this study, rather than being a preexisting one taken from the literature), reapproaching the coding after a lapse of several months provided an important opportunity to sharpen the category descriptions and to ensure the coherence and consistency of the coding.

Approximately one month after the recoding was completed, a final round of thematic analysis was carried out on the retrospection data, focusing on a more detailed examination of foci of monitoring and of control mechanisms. For this round of analysis, I read hard copy transcripts of the retrospections and identified segments that contributed to answering the research questions. The comments were written down on index cards, identified as to group (i.e., novice vs expert) and stage of process tracing (uncued, minimally-cued, verbal probes), organized thematically, and analyzed for patterns and commonalities. This second round of thematic analysis is further discussed in Section 8.4.3.

A final round of qualitative analysis was also carried out on the performance data approximately one month later. This round of analysis focused on triangulating the performance data and the retrospections, contextualizing the quantitative data obtained through coding, and developing a profile of each interpreter that incorporated both the performance and the retrospection data.

8.3 Analysis of the Performance Data

Three groups of indicators of online self-regulation, comprising thirty-five categories, were coded for in the performance data:

- Speech indicators—for example, disfluencies or pauses
- Management indicators—overt control mechanisms, principally related to turn-taking and management of the flow of the interaction
- Other indicators of interest—for example, speaking the wrong language at the wrong time or self-commentary

A complete list of the categories and their descriptions appears in Table 13. The following sections briefly present the rationale for the use of these categories as indicators of online self-regulation.

8.3.1 Speech Disfluencies

Speech disfluencies, which are common in both native- and non-native speakers of any language (Pillai, 2006; Kovač, 2014) and vary widely across speakers (Rose, 2013), occur as a part of control of speech output (Gile, 2009). Their occurrence implies output monitoring, inasmuch as monitoring is a necessary precursor to control. They include phenomena such as "hesitations, silent and filled pauses, false starts, repetitions, vowel prolongations, speech errors, and self-repairs" (Kovač, 2014:114). Rose (2013:992) defines a number of types of disfluencies:

- "Silent pauses – long silent pauses, not including the short pauses associated with breathing, articulation, or junctures
- Filled pauses – non-verbal vocalized pauses (*uh/uhm* in English, *ano/e-to* in Japanese, and *este* in Spanish)
- Repairs – a sequence of speech which is intended to be understood as a replacement of an immediately preceding sequence of speech (*look at the blue the red one over there*)
- Repeats – immediate repetition of a sequence of one or more words (*I I I think that's a good idea*)
- False starts – a sequence of speech which begins an utterance but which is then abandoned (*do you I disagree with that*)
- Lengthenings – the prolongation of one or more segments of a word (*I'll take the blue a- and the- red ones*)."

Disfluencies provide insight into the speaker's cognitive processes (Pillai, 2006; Kovač, 2014). They offer evidence of what Postma (2000:102) describes as "errors [*that*] violate the desired progress of an utterance, ... [*whose*] correction typically causes some form of disruption (e.g,. the restart of planning and execution)." Engelhardt, et al. (2013) note that self-repairs, repetitions, and unfilled pauses are generally understood as indicators of difficulties arising from cognitive processing, while other disfluencies, such as filled pauses, are sometimes understood as arising from cognitive difficulties (e.g., in planning upcoming speech segments) or, alternately, as having communicative or pragmatic functions (see de Leeuw, 2007). Self-repairs, in particular, are understood to provide evidence of active (i.e., attention-demanding) control; as Pillai (2006:115) puts it: "in order for self-repairs to take place, there must be an awareness that

an error is about to be or has been produced by the speaker. Hence, the concept of self-repair is consistent with the idea that self-monitoring occurs in the process of speech production."

Chen, et al. (2012:8) note that "acoustic, prosodic or linguistic" features of speech can reveal information about an individual's cognitive load during task performance. They report that frequency of pauses and changes in pitch were "good potential indicators" (Chen, et al., 2012:9) of cognitive load in their data set, which involved speech corpuses collected in laboratory settings with controlled variations in the amount of cognitive load. In another data set, gathered from both lab-based and real life corpuses, the data reported on by the same authors supported the idea that pauses are indicators of cognitive processing—that is, that as cognitive load increases, individuals pause more often and for longer periods. They also found that lexical variety decreases and syntax becomes more complicated (i.e., convoluted) and harder to understand as cognitive load increases.

Given that dialogue interpreters produce speech in their native as well as their non-native languages during performance, it is also worthwhile to consider the effect that speaking in one's non-native language may have on speech disfluency. Use of a non-native language in communication increases cognitive load and requires more cognitive control (Kovač, 2014), which may lead to increased disfluency as a result of cognitive overload. However, not all speech disfluencies that occur in the non-native language are necessarily artifacts of cognitive overload due to use or of level of fluency in the non-native language. Although disfluencies in the speech of non-native speakers may be related to the speaker's language proficiency, such disfluencies may also be related to the speaker's individual style and disfluency patterns in the native language (Rose, 2013).

Analysis of disfluencies occurring in interpreters' output is further complicated by three additional factors. First, disfluencies may be related to monitoring of the match between source language and target language utterances, rather than to monitoring of speech production processes, per se; that is, disfluencies may arise from the ongoing process of monitoring for accuracy in addition to regular speech monitoring processes. Second, interpreters' speech production may be influenced by the fact that they are reproducing thoughts previously formulated by another speaker rather than formulating their own thoughts in response to a stimulus: as Gile (2009:163) states, "people who speak on their own behalf are free to speak their own mind and bypass possible production difficulties ... in contrast, interpreters find themselves forced to follow rather closely the path chosen by another speaker" (a similar point is made by Kohn & Kalina, 1996). Production disfluencies related to this issue might be expected to occur more frequently when the interpreter is speaking the non-native language, in which s/he presumably has less grammatical, lexical, and syntactical fluency and flexibility. Third,

interpreters may produce intentional disfluencies mirroring those of the source language speaker. While they do not enjoin interpreters to reproduce disfluencies in a literal fashion, both scholarly literature and training materials on dialogue interpreting highlight the importance of reproducing non-linguistic features of speech (e.g., style, tone) in order to achieve as accurate a rendition as possible (Berk-Seligson, 2002; Hale, 2004; Hale, 2007). It is, therefore, entirely plausible that some of an interpreter's disfluencies are not idiosyncratic artifacts, but are purposeful, produced as an intentional reflection of the original speaker's style or speech patterns.

In recognition of the considerations described above, and in light of the focus of the research questions explored in this study, coding and analysis of speech disfluencies in the performance data did not distinguish between L1 and L2 disfluencies, nor seek to link disfluencies to other factors such as cognitive load or mirroring of the source language text. Rather, disfluencies were noted as one piece of evidence for online monitoring and control of performance. Future researchers might wish to compare occurrence of speech disfluencies in dialogue interpreters' L1 and L2, or to explore disfluencies as indicators of cognitive load, but those aims are outside the scope of this study.

8.3.2 Management Indicators

Among the principal observable evidence of interpreters' online self-regulation is the use of overt control mechanisms to manage turn-taking and the flow of communication. The 'how' of online control is discussed in some detail in Section 5.3.3. Beyond that discussion, two additional observations are offered with regard to the analysis of the performance data:

- The analysis of the performance data counted all attempts at management, regardless of the result of the attempt. This coding decision was based on two considerations:
    - First, the research is primarily aimed at understanding the interpreter's cognitive processes. In this light, an attempt to employ a management-related control mechanism, whether successful or otherwise, provides clear evidence of (attempted) online self-regulation.
    - Second, it is difficult to define a 'successful' outcome to the employment of a management-related control mechanism. The simulations were designed to be as realistic as possible, and the actors playing the various roles acted and reacted freely. Thus, the 'success' or 'failure' of a management-related control mechanism did not depend solely on the interpreter—it also depended on other parties' reactions to the attempt, which could and did vary (for example, an

interpreter might ask a party to pause more frequently, but the individual might or might not do so).

- It is not possible to identify causal relationships between an observed control mechanism and a corresponding target of monitoring on the basis of the performance data alone; that is, observation of performance does not provide an explanation as to why an interpreter employed a given control mechanism at a given moment. In some instances, however, interpreters themselves made causal connections between specific difficulties and resultant management choices during the course of their process tracing. Some of these connections are discussed in the sections reporting on the qualitative analysis of the retrospections.

8.3.3 Other Indicators

Several phenomena in the performance data that did not fit within the two previously mentioned subgroups (i.e., speech indicators and management indicators) were also identified as indicators of online self-regulation:

- Speaking the wrong language at the wrong time, or to the wrong person — When unperceived/uncorrected, this is understood as a failure of monitoring, in that the speaker is producing output in a language that is the same as the source language, and/or is addressing an individual in a language that the individual does not understand. When the interpreter perceives and corrects the issue, it is classified as an instance of online monitoring.[52]
- Commenting on own performance / Self-correction — The fact that an interpreter comments on her/his own performance during the performance itself and/or initiates correction of an error in a target language utterance indicates that s/he was actively engaged in monitoring the performance.
- Paralinguistic indicators of online monitoring — Moments when the interpreter's facial expression, body language, and/or tone of voice indicate that the interpreter is reacting to his/her own performance.
- Significant issues with syntax, grammar, or lexical choice in target language utterances — Uncorrected production of a mangled or incomprehensible target language utterance indicates a failure of output monitoring.

[52] The target of monitoring in question may be the interpreter's own output, the addressee's (verbal or nonverbal) response to hearing input that is incomprehensible, or a combination thereof.

- Major semantic error — Indicates a failure of monitoring at some stage (whether of comprehension, retention, match between input and output, or production). Inasmuch as the goal of the study was to better understand self-regulation of performance, and not to assess fidelity, the data analysis did not include an in-depth evaluation of the interpreters' accuracy/completeness. This coding category was included in order to gain insight into (failures of) online monitoring, and was used only in cases where both coders agreed that a very significant error had been made and been left uncorrected.

PERFORMANCE DATA—Indicators of Online Self-Regulation	
Speech Disfluency Indicators	
silent initial pause	Silent pause at the beginning of an utterance
silent midstream pause	Silent pause mid-utterance
silent final pause	Silent pause at end of utterance/meaning unit
filled initial pause	Filled pause at the beginning of an utterance
filled midstream pause	Filled pause/hesitation in the middle of an utterance (e.g. “um” “uh” “pues” “este”)
filled final pause	Filled pause at the end of an utterance (i.e., interpreter trails off and doesn’t finish utterance/turn)
drawing out word	Word elongated (e.g. “coouuulld”)
word repair	Restating/restarting word: (e.g. “in the ca- bus”)
word repetition	Repetition of 1-2 words (not a full meaning unit) (e.g. “He he told me”, “It was it was in the morning”)
restart	Interpreter begins, abandons, and restarts an utterance or meaning unit (i.e., interpreter does not complete meaning unit/utterance before abandoning the utterance and restarting) (e.g., “When I saw ... When I got here this morning I saw”)
rephrase	Interpreter completes interpretation of a meaning unit/phrase and then immediately rephrases it
garbled speech	Unintelligible speech
Management Indicators	
requests pause—gesture	Interpreter uses a gesture to request a pause
requests pause—verbal	Interpreter verbally requests a pause
interrupts	Interpreter interrupts speaker’s ongoing utterance in order to take the turn at talk
jumps in	Interpreter starts interpreting during speaker's natural pause (this occurs mid-turn, not at the clear end of a turn)
attempts interruption	Interpreter tries to take the turn at talk by interrupting or jumping in, but abandons the attempt because the original speaker does not cede the turn
renders overlap	Interpreter renders overlapping talk
omits overlap	Interpreter does not render overlapping talk
requests one at a time	Interpreter asks speakers to speak one at a time and allow for interpreting between speakers
requests repeat	Interpreter requests repetition or clarification
requests shorter segments	Interpreter requests speaker to pause more frequently
requests slow down	Interpreter asks speaker to speak more slowly
refers turn decision	Interpreter refers decision as to which of multiple overlapping turns to interpret first to authority figure
clarifies confusion	Interpreter intervenes to clarify something causing confusion
starts taking notes	Interpreter begins taking notes—with paralinguistic evidence that starting to take notes is a strategy/reaction to current speaker/situation
switches modes	Interpreter switches to simultaneous interpreting (chuchotage)
Other Indicators	
wrong language	Interpreter speaks wrong language to wrong person/at wrong time
comments on own performance	Interpreter comments on own performance
self-correction	Interpreter self-corrects, overtly or covertly (this involves correction of content, not speech repair)
paralinguistic indicators	Interpreter’s body language/tone of voice indicate a reaction to own performance
major linguistic error	Significant issues with syntax, grammar, or lexical choice in target language utterance
major semantic error	Target language utterance contains a very significant semantic error that goes uncorrected

Table 13. Indicators of online self-regulation coded in performance data.

8.4 Analysis of the Retrospection Data

The following subsections report on the analysis of the data from the retrospective process tracing sessions (referred to hereafter as 'retrospection data' and 'retrospections' for ease of reference). This analysis involved coding from three distinct perspectives: by stage of the retrospection (that is, uncued, minimally-cued, or verbal probes), by indicators of online monitoring, and by theme. Each of these perspectives is discussed in turn below.

8.4.1 Coding by Stage of Retrospection

In order to facilitate comparison of comments at different stages of the retrospection, each retrospection was coded by stage.[53] Responses to verbal probes in stage 3 were also coded to the corresponding verbal probe (i.e., all responses to "what was difficult?" were tagged as responses to that question) for ease of analysis. The categories coded were as follows:

- *stage 1*—uncued retrospection
- *stage 2*—minimally-cued retrospection
- *stage 3*—verbal probes

8.4.2 Coding for Indicators of Online Monitoring and Control

The retrospections were coded for evidence of online monitoring and control using the following categories:

- *monitoring only*—portions of the retrospections providing evidence of online monitoring but not of an associated control mechanism (e.g., "She was talking very fast.") (*NB: This does not necessarily indicate a lack of online control, but that the interpreter's retrospection does not mention online control.*)
- *monitoring with online control*—portions of the retrospections providing evidence of online monitoring with an associated control mechanism (e.g., "She was talking very fast so I asked her to slow down.)
- *monitoring failure*— portions of the retrospections that, either alone or in conjunction with the performance data, provide evidence of a failure of monitoring

[53] As discussed in the methodology chapter, each interpreter participated in one process tracing session encompassing all three stages.

- *post hoc control*—portions of the retrospections providing evidence of online monitoring together with post hoc mention of a possible control mechanism (e.g., "She was talking very fast, and I should have asked her to slow down.")
- *introspection*—portions of the retrospections containing general introspective comments about performance, but not referring to this specific interaction (e.g., "In my experience, when people talk very fast....")
- *retelling the story*—portions of the retrospections in which the interpreter retells the story of the interaction rather than engaging in process tracing or retrospection (e.g., "She was really mad because of what happened last week."). This category is limited to instances in which the interpreter retold the story without reference/connection to his/her own processing. Instances in which the interpreter's retelling of a portion of the story was linked to or part of a clear instance of process tracing (e.g., "so-and-so was complaining about what happened last week, and that part was difficult to understand") were not coded to this category.

The final category, *retelling the story*, is included as an indicator of monitoring because the ability to recount the content of the interaction indicates the interpreter attended to the events as they unfolded sufficiently to create an episodic memory that s/he subsequently recalls.

8.4.3 Thematic Coding & Qualitative Analysis

The categories employed for the initial thematic analysis were developed on the basis of the literature reviewed in Section 5.3 and revised throughout the coding process. To develop the initial list of categories, I drew on Dean & Pollard's (2011, 2012, 2013) Demand-Control Schema, which was introduced in Section 5.3. Portions of the retrospections were identified as referencing *demands*—factors (potentially) affecting performance—and/or *responses/reactions* to demands, and further sub-categorized to reflect the focus of the comment. Four additional thematic categories were also identified and coded. The complete list, with category descriptors, appears below:

- *demand*—comments on factors (potentially) affecting performance
    - *affect*—comments related to other parties' affect
    - *behavior toward interpreter*—comments related to others' behaviors toward the interpreter
    - *discourse*—comments related to aspects of the discourse in general, or aspects of other parties' speech (e.g., style, speed)
    - *interpreting (process or technique)*—comments related to the cognitive processes of interpreting and/or to interpreting technique (NOT management)

    - *lexicon*—comments related to other parties' use of specific words
    - *management*—comments related to others' behaviors/aspects requiring management of interaction
- *reaction/response*—interpreter's comments on own process/behavior during performance
    - *affect*—comments related to affect/emotional state/emotional reaction
    - *interpreting (process or technique)*—comments related to interpreting process/technique (NOT management)
    - *lexicon*—interpreter's comments related to own use or understanding of specific words
    - *management*—interpreter comments related to management of interaction with reference to own behaviors/strategies
- *context/background*—comments related to background/context of scenario
- *role/boundaries*—comments related to professional role/boundaries
- *evaluation of performance*—evaluative comments on own performance
- *external focus*—comments focused on other parties/the situation (i.e., not introspection/process tracing)

The categories developed on the basis of the D-CS served as a useful framework for the initial analysis, which confirmed that the participants' retrospections touched on similar themes. However, analysis of the coded retrospections suggested the analytical framework needed to be revised in order to facilitate further qualitative analysis that was sensitive to all of the nuances contained in the data. In order to more fully explore the range of targets for monitoring and of control mechanisms mentioned in the retrospections, I carried out a second round of qualitative analysis rooted in a framework drawn from the literature on self-regulation. The second round focused on identifying evidence of online monitoring of affect, behavior, cognition, and context in the retrospections, and on classifying the control mechanisms mentioned in the retrospections as to the means by which control was exerted (affectual, behavioral, cognitive). The shift in analytical framework led to a more fine-grained and focused analysis of the targets of monitoring and the control mechanisms mentioned in the retrospection data. For example, the category list above includes two categories related to affect: one for demands, which was specifically focused on the parties to the interaction, and one for responses, which was focused on the interpreter; the second round of qualitative analysis, from a self-regulatory perspective, led to a more nuanced analysis that differentiated between interpreters' monitoring of their own affect and their monitoring of the other parties' affect, as well as the interpreter's use of affectual control mechanisms.

In reporting on and discussing the results of the qualitative analysis of the retrospections, I focus on, and structure the presentation and discussion of the findings around, the second round of qualitative analysis. The results of the first round of thematic coding are briefly presented in Section 9.6.

8.5 Modifications to Coding Scheme During the Coding Process

As mentioned above, the categories and category descriptors were refined during coding and recoding of the data. This section briefly presents several examples of these modifications in order to provide insight into the coding process.

In analyzing the performance data, an effort was made to document the phenomena observed in the data rather than limit the coding to the list of categories produced beforehand. This desire to be comprehensive led to the addition of some categories of management indicators, such as *clarifies confusion*, *refers turn decision*, and *starts taking notes*, that were needed to capture control mechanisms employed by interpreters in the study. Additional categories, including *filled final pause* and *garbled speech*, were added to the speech disfluency indicators in response to observed phenomena.

Other categories were combined or discarded. For example, the initial round of coding distinguished between *pause for self-correction* (i.e., the interpreter stopping and indicating verbally to the parties that s/he was self-correcting) and *self-correction without pause* (i.e., the interpreter self-correcting without commenting on the self-correction). In the second round of coding, this distinction was identified as not contributing substantively to the analysis, especially given the fact that a separate category existed for *commenting on own performance*, and the two self-correction categories were therefore combined into one. An example of a category that was discarded is that of *error of comprehension*—although the original list of categories had included both errors of comprehension and errors of commission (i.e., mistakes), analysis of the performance data revealed that it was impossible to identify the cause of errors; moreover, accuracy/fidelity was not the primary focus of the study. The category *error of comprehension* was thus discarded, and the *errors of commission* category was renamed *major semantic error*. The category descriptor was also modified to make clear that the rationale for coding instances of very significant, uncorrected semantic errors was to capture indications of monitoring failure, rather than to make judgments vis-à-vis accuracy.

In the case of the retrospection data, modifications were primarily focused on refining category descriptors to ensure clarity and consistency in coding, rather than on adding,

combining, or discarding categories. For example, review of the initial round of coding and conversation with the second coder revealed the need to more clearly differentiate between the thematic categories of *demand—interpreting* and *demand—management*, as well as between *response—interpreting* and *response—management*. In both cases, *interpreting* was clarified as referring to cognitive processes and strategies (e.g., increasing/redirecting focus, monitoring retention) and to specific interpreting techniques (e.g., switching modes, taking notes, summarizing), while *management* referred to overt control of the flow of the interaction (e.g., managing turn-taking, asking for repetition).

Where monitoring indicators in the retrospections were concerned, the second round of coding involved clarification of the criteria for coding an utterance as *post hoc control* or *introspection*, as well as changes in the application of the category *retelling the story.* In the former case, it was important to distinguish between an interpreter's general introspection about similar situations s/he had experienced in the past or how s/he generally handled a given situation (i.e., *introspection*), and instances of process tracing with post hoc control specific to the just-interpreted interaction (i.e., *post hoc control*); that is, to distinguish between "When this kind of thing happens, I usually do X" and "This happened during this interaction, and I should have done X at that time."

In the case of *retelling the story*, the category had been broadly applied during the first round of coding. In discussing this category with the second coder, a consensus was reached that instances of retelling the story in the context of process tracing should **not** be coded to this category; rather, only instances of retelling the story without associated process tracing were coded to the category, as described in the preceding section. The rationale for this change was rooted in the goals of the study—the category *retelling the story* was established as a way to identify moments when an interpreter relayed episodic memory rather than engaging in process tracing; therefore, the category's purpose was best served by only coding instances that did not contain process tracing.

While this is not an exhaustive discussion of all the modifications made during coding, the examples presented here are illustrative of the process undertaken to ensure, to the extent possible, that the category lists were comprehensive, that the descriptors were clear, and that the coding was coherent.

8.6 Analysis and Presentation of Quantitative Findings

The bulk of the findings reported on and discussed in Chapter 9 comes from the qualitative analysis of the data. While the quantitative findings are limited by the size of the sample, they

serve as an important point of comparison—a baseline, in a sense—for future research on similar topics. In order to streamline the text of the dissertation and to focus the reader's attention primarily on the qualitative analysis, the text generally reports on quantitative data in summary fashion and refers the reader to tables in the appendices for more detail.

For some categories—especially those related to management-related control mechanisms in the performance data—it was considered important to employ a method of analysis that would allow for drawing conclusions vis-à-vis the relative frequency or infrequency of occurrence of a given feature of interest in an individual interpreter's performance in comparison with its occurrence in other performances: that is, to have a basis for identifying a given feature of interest (such as requesting pauses via gestures, or asking speakers for repetition or clarification) as occurring frequently or infrequently within a given performance in comparison to its occurrence in the other performances in the data set.

In order to identify outliers within specific categories of interest, the median and the median absolute deviation (MAD) of each of the selected categories were calculated in Excel. Leys, et al., (2013) describe the MAD as a reliable method for identifying outliers in a data set, noting that the median is a "measure of central tendency *{that}* offers the advantage of being very insensitive to the presence of outliers" (Leys, et al. 2013*:*765), thus permitting better detection of outliers in a sample. In order to identify outliers within each category of interest, cutoffs were established at one MAD below the median of the category, at one MAD above the median of the category, and at two MADs above the median. Performances with values more than one MAD below the median of a given category were classified as having *infrequent* occurrence of the feature of interest, performances with values more than one MAD above the median were classified as *frequent*, and performances with values more than two MADs above the median were classified as *very frequent*.

8.7 Labelling & Transcription Conventions

Throughout the results and discussion, interpreters' pseudonyms are followed by (N) or (E) to indicate whether the interpreter is part of the expert or novice group. In the interests of ease of reading, the label is not repeated when a pseudonym is repeated within a paragraph.

The stages of the retrospection are referred to by number (stage 1, stage 2, stage 3). The first reference to a given stage number in a section is followed in parentheses by a descriptor (i.e., uncued, minimal cues, verbal probes). Subsequent mentions in the same section use only the number, in the interests of readability.

In quoting from the retrospections, I sought to strike a balance between retaining the oral nature of the originals and producing an accessible text for the reader (see Lapadat, 2000; Niemants, 2012; and Skukauskaite, 2012, on theoretical and practical considerations related to transcription). Decisions vis-à-vis transcription of the retrospections were informed by the analytical focus on the interpreter's recall of online processes (rather than on, for example, co-construction of meaning between interlocutors, as may be the focus in discourse-analysis-informed research). The quoted extracts do not include precise indications of pause length or reflect intonation, although paralinguistic indicators (primarily of laughter) are included. I did not insert punctuation (e.g., commas, periods), nor did I elide speech disfluencies (i.e., hedges) or repeated words. In order to increase readability, I adopted several formatting conventions, detailed in Table 14, to indicate repetition/rephrasing, semantic/phrasal boundaries, quoted/internal speech, and pauses.

Transcription Conventions Employed in Extracts from Retrospections

Notation/Formatting	**Example(s)**	**Significance**
Single dash immediately following word	• I wanted- I tried • She- she	Indicates abandoning an utterance in progress and rephrasing or starting over OR signals word repetition
Double dashes separated from words by spaces	• They were fast -- that made it hard	Indicates short pause, breath, or clear indication of a new semantic chunk *(generally used where a comma or period might be used in writing)*
Four dashes separated from words by spaces	• Let me see ---- I don't remember	Indicates a longer pause
Single quotation marks	• I was thinking 'what should I do'	Indicates internal/self-directed talk
Ellipses	• I asked him to slow down .... but he didn't do it	Indicates that words have been omitted from the quotation
Bold typeface	• I wanted to **make sure that I had it right** and didn't guess	Indicates a portion of an extract that is of specific interest (i.e., to which the reader's attention is particularly drawn)

Word(s) in all capital letters	• I guess LAUGHTER I guess I wanted to	Indicates relevant paralinguistic information

Table 14. Transcription conventions employed in extracts from retrospections.

As noted in the table, some portions of the extracts appear in **bold**. This formatting decision was made in light of the fact that many of the extracts are quoted at length in order to avoid decontextualizing the interpreter's remarks. Bolding the portion(s) of a given extract that are of specific interest thus strikes a balance between preserving the original context of the interpreter's remarks and drawing the reader's attention to features of interest.

8.8 Evaluation of the Method

While the methodology employed for this study shares characteristics with other studies that have employed retrospection (e.g., Ivanova, 1999) or simulation (e.g., Major, 2013; Arumí Ribas & Vargas-Urpi, 2017) of interpreted interactions, the specific combination of simulated interpreted interactions and retrospective process tracing employed in this study is, to the best of my knowledge, novel. In this section I discuss the effectiveness of the method and suggest possibilities for refining it.

8.8.1 Simulated Interaction

Although the interpreters who participated in the study were not asked about their perception of the simulated encounter (i.e., whether it seemed 'real' or 'natural' to them) during the retrospective process tracing, a number of comments in the retrospections provide insight into how the interpreters experienced the simulation. Some interpreters made comments that revealed their awareness of the simulated nature of the interaction; however, the majority of these comments signaled that the interpreters found the simulation realistic:

> *"I was also sort of laughing as I was thinking '**boy if this is acting then they are doing it really good**'"* –Ana (E), stage 1 (uncued)

> *"well one of the things that I remember ---- was that it was **very similar to what I encounter** LAUGHTER when uh someone needs an interpreter but actually everybody understands what the other- other person is saying pretty much -- and they are answering uh before I have said anything -- or they are reacting before I have said anything so so that was- **I thought that was pretty similar**"* –Erica (E), stage 1

> *"Oh well I- I- I um – well* ***I didn't know if it was fake or for real*** *-- after a while I says maybe this is real -- I didn't know if you guys were -- if this was playing- they were acting or if it was real -- so I- I- I couldn't tell the difference --* ***I go 'well they are really good actors or is this a real scenario you put me into' so I wasn't sure*** *-- they did so well I wasn't sure -- mm"*—Carla (N), stage 3 (verbal probes)

Some interpreters also made comments indicating that the fact that it was a simulated interaction influenced their performance, as in the extracts below:

> *"um well I was thinking about it* [AN: her approach to managing turn-taking] *because well --* ***'cause it's like a simulation I wanted to be like very- as correct as I could****"* –Sara (E), stage 3

> *"But LAUGHTER* ***maybe because this is not like a real thing*** *you know for --* ***it's a real thing but it's not like I mean a real you know encounter*** *you know what I mean --* ***I know that this is for a study LAUGHTER like I don't know -- so maybe like I was relaxed like if this is in a real like situation and I see that this is going on maybe ---- I would be more nervous****"*—Naomi (E), stage 3

In contrast, several of the interpreters also made comments suggesting that they were deeply immersed in the world of the simulation:

> *"****I definitely saw some um you know issues with um Mariela having you know- with having a male interpreter um in the room*** *um because she didn't -- she felt like she wasn't getting a fair service --* ***like she almost sensed that I was taking sides of some sort 'cause at one point she requested um that on a future meeting with HR that they would um have a female interpreter*** *she did you know make clear that it wasn't something personal but you know -- I didn't take it personal -- but that's the message she tried to get across"* –Benjamin (N), stage 2 (minimally-cued)

> *"um I feel like ---- I feel like um -- hopefully Andrew's explanation that they were short staffed um um was resolved or fully explained --* ***Mariela seemed like she understood that part of it um -- but after that it just also seemed like she didn't want anything more to do with the encounter*** *and um that was difficult to reconcile with the other two parties"* –Jonathan (N), stage 3

> *"yeah ---- I mean the thing is I was not ----* ***th- thinking that much about interpreting about the interpreting process -- I was more like thinking ---- yeah about that- about their relationship*** *how was-* ***how it was po- possible that they were dating*** *in the very*

> *beginning and then **later like um they didn't understand each other** -- that is what is confusing me"* –Naomi (E), stage 2

The design of the simulated interaction prioritized spontaneity and flexibility to allow for a natural flow of interpreted talk and to allow the interlocutors to react naturally (i.e., in the moment) to the interpreters' performances rather than being bound by a script. The simulations were judged a success in that they elicited natural-seeming behaviors and reactions from the interpreters as well as from the interlocutors. This impression is supported by the extracts quoted above.

Although this portion of the method proved successful, there were notable variations between the eight versions of the simulated interaction. Despite the fact that the story, general content, and some specific interpreting-related difficulties were planned and practiced in advance in order to provide some structure, the interactions were not as consistent as would have been desirable. For example, the number of instances of overlapping speech in the interaction varied widely, ranging from 6 to 25 instances, with a median of 11 (see Section 9.4.3). Other aspects of the interaction, including portions of the content, varied as well. Additionally, the length of the interaction varied from interpreter to interpreter (see Appendix D). These differences may be due partly to the fact that the data was collected over the course of several months—approximately 3.5 months passed between the first and last of the 8 simulations, during which time the actors' recollection of the practiced content and structure may have changed.

Whatever the reason for the variations, the fact that the interaction differed to such a degree from one incarnation to the next indicates a need to find a better balance between spontaneity/flexibility and structure. Creation of a more structured simulation protocol, more training in simulation for the actors, and collection of the data across a shorter time span might lead to more consistency across simulations while still allowing the parties to react freely to each other and to the situation as it unfolds.

Overall, the simulations appear to have been an effective approach to striking a balance between, on the one hand, achieving a realistic interaction with a natural flow of communication while controlling certain aspects of the content and structure of the interaction. While there is room for improvement in the consistency with which the planned aspects of the simulation were carried out, the retrospections suggest that the interaction was indeed realistic and experienced as such by the participating interpreters.

8.8.2 Retrospective Process Tracing

In this section, I assess the validity of the retrospective process tracing as evidenced by indications that interpreters' retrospections focused on their processing during task performance rather than on post hoc reactions to the task and/or their own performance. As discussed in Section 7.3.2, keeping the focus on the "there and then" rather than the "here and now" (Henderson & Tallman, 2006:80) is an important methodological consideration in process tracing. The analysis of the retrospections carried out for this study indicates this goal was largely achieved. as evidenced by the indications discussed in the following paragraphs, which draw on the analysis of the retrospection data to evaluate the effectiveness of the method in terms of eliciting process tracing and introspection from the interpreters.

In stage 1 (uncued) of the retrospections, there are no instances of *post hoc control*, one instance of *retelling the story*, and three instances of general *introspection*. This indicates that during this stage of the retrospections participants were primarily focused on recall of their performance during the just-completed interpreting task rather than on revisiting their decisions (i.e., engaging in *post hoc control*), reviewing the incidents of the interaction (i.e., *retelling the story*), or engaging in general *introspection* rather than focusing on the just completed task.

Data from stage 2 (minimally-cued) and stage 3 (verbal probes) of the retrospections paints a more mixed picture. For example, stage 2 contains more instances of *post hoc control* and of *retelling the story* than stage 1. This finding may be due in part to the nature of the minimal cue provided to the participant, which was a list of the main segments/themes ('beats,' to borrow a term from the theater) of the interaction, such as 'unhappiness with work assignment,' 'rationale for current work assignment,' and 'accusation of retaliation' (see Appendix B for the full text of the cue). Although an explanation of the minimal cue's purpose and instructions to use it to trigger memory appeared at the top of the page, the desired effect was not achieved in most cases: rather than triggering further process tracing, the cue prompted several of the participants to start retelling the story.

Stage 3 (verbal probes) of the retrospections elicited a large number of instances of reports of online monitoring and/or control. The larger number during this stage is not surprising given that I was probing for reactions or answers to specific questions or for recollections of specific moments from the interpreted interactions. This stage had more instances of *post hoc control* and *introspection* than the previous two stages, but the numbers are still fairly low, especially in comparison with the number of instances of online monitoring/control. Stage 3 did not contain any instances of *retelling the story*, which may be due to the fact that the retrospections in this stage were produced in response to specific questions (as noted above, instances in which a

portion of the story was retold as part of process tracing were not categorized as retelling the story).

In addition to instances of *retelling the story*, more than half of the retrospections contained one or more *externally focused* (as opposed to introspective/retrospective) comments. Although instances of *retelling the story* and of *external focus* cannot be understood as process tracing, the interpreters' ability to retell the story of the interaction and/or make externally focused comments arising from the events of the interaction is still significant in that it implies that the interpreters attended to (i.e., monitored) the events of the interaction sufficiently to create episodic memory(ies) of the interaction.

On the whole, the approach to retrospective process tracing employed for this study proved productive and produced valuable results as illustrated throughout Chapter 9. Nevertheless, several aspects of the design and procedure of the retrospection might be improved upon in future research using a similar method.

First, the data analysis highlighted the need for researchers to develop and pilot a detailed protocol for conducting retrospective process tracing and to follow it consistently, especially with regard to prompting and following up with participants. For example, in reviewing the retrospections, I found that some interpreters spoke very little in stage 1 or stage 2, and I was inconsistent in prompting them to continue (e.g., "is there anything else you can remember thinking?") versus continuing immediately to the next stage. In some cases, I moved on to the next stage immediately, while in others I prompted the interpreter for more before I moved on. Another issue I identified is that I directly asked some interpreters about a specific feature of their performance, but did not ask all of the interpreters who displayed that feature about it (e.g., some interpreters were asked directly about use of the third person, while one interpreter, who used third person consistently throughout the interaction, was not asked about it). Some of this inconsistency may have been due to the long period of time over which the data was collected (3.5 months). My lack of hands-on experience as an interviewer also may have contributed. In any case, consistency is important to ensure comparability of the resulting process tracing. Future researchers employing a similar methodology would be well advised not only to pilot and revise their process tracing protocol, but to complete and analyze one or more practice sessions in order to minimize inconsistencies.

Second, the minimally-cued stage of the retrospection (stage 2) did not work as planned in all cases. While some interpreters used the minimal cue to trigger more retrospection, others began to retell the story of the interaction (i.e., what had happened). While a solution to this problem is not immediately clear, it may be helpful to give verbal rather than written instructions or to

provide a combination of the two. Depending on the research questions being investigated, a different type of cue might also be productive (for example, watching the video of the interaction with no sound, or providing a more detailed cue than that provided for this study).

Third, the observation sheet that I used to take notes during the simulations was not as helpful as I expected. While I was able to take note of a number of interesting phenomena and follow up on them in stage 3 (verbal probes) of the retrospections, many things I identified as of interest during the subsequent data analysis had not been noted on the observation sheet during the actual performance, so were not asked about during the retrospection. A relevant factor here is the exploratory nature of the study, which required me as observer/researcher to cast a wide net rather than focus on a few specific features of interest. While this was a valuable approach to the research questions, the broad focus made it difficult to note all features of interest in real time (i.e., as the interaction occurred). Additionally, the analysis identified features of interest that I had not contemplated in advance of the study, and to which, therefore, my attention was not specifically directed during my observation of the simulations.

While I believe the observation sheet is a potentially productive tool to use in real-time observation of interpreted interactions, its usefulness would be increased by narrowing its focus to well-defined aspects of performance. For example, the observation sheet could focus on one of the features of interest identified in the qualitative analysis of the performance data (see Section 9.3), such as the interpreter's handling of self-authored turns, or of maintaining the consistency of addressee in multi-party interactions. It could also be revised to focus on use of overt control mechanisms, such as requesting pauses or interrupting to take a turn. In addition to revising the observation sheet to fit the research questions being explored in a given study, it may be helpful to train researchers on the use of observation sheets, both in terms of filling them out during observation and drawing from them during retrospective process tracing.

8.9 Conclusion

This chapter has described the quantitative and qualitative data analysis process in detail, discussed the transcription and labelling conventions used throughout the results and discussion, and evaluated the methodology. The information provided in the preceding sections informs the analysis and discussion in Chapter 9, and should prove helpful to future researchers employing similar research methods.

9. Results & Discussion

9.1 Introduction & Plan of Chapter

In Chapter 5, I proposed conceptualizing the interpreted interaction as a complex system and described this research's focus on the interpreter-as-task-performer, and, more specifically, on the interpreter's online self-regulation. The research questions, initially stated in Chapter 6 and repeated below, were broadly focused, as befits an exploratory study:

RQ 1. What evidence is there for online self-regulation in dialogue interpreting?

RQ 1.1. What evidence is there of online monitoring of affect, behavior, cognition, and context?

RQ 1.2. What online control mechanisms do dialogue interpreters employ?

RQ 2. What aspects of online self-regulation do dialogue interpreters report on retrospectively?

RQ 3. Are there differences between novices' and experts' online self-regulation?

RQ 4. Are there differences between novices' and experts' retrospective reports of online self-regulation?

The data analysis (see Chapter 8) cast a wide net, seeking to describe as broad a range of targets of online monitoring and of online control mechanisms as possible. This approach led to a bountiful catch in the form of substantial evidence contributing to answering the research questions. The first section of the chapter briefly presents summary findings supporting two assumptions that are foundational to the research questions and the methodology. I then report on the quantitative and qualitative analyses of the performance and retrospection data, focusing on evidence of targets of online monitoring and of online control mechanisms employed by interpreters. The chapter concludes with a discussion of the goal states mediating the participants' online self-regulation, as evidenced in the retrospections.

9.2 Summary Findings Supporting Underlying Assumptions

The research reported on in this dissertation rests on two assumptions: first, that interpreters self-regulate during performance and, second, that they can report retrospectively on some portion of their self-regulation. In this section, I present summary findings supporting these two assumptions.

Evidence that dialogue interpreters do self-regulate during performance is provided by a number of overt indicators of online control (and thus, by implication, of online monitoring) identified in the performance data. These findings are summarized in Table 15, which indicates the number of performances (N=8) in which each was identified (the reader is referred to Chapter 8 for a discussion of the process of identifying categories of indicators and coding the data, as well as for descriptions of the various categories mentioned throughout this chapter).

Summary Findings—Evidence of Online Self-Regulation in Performance Data
Indicators of online self-regulation identified in performance data & number of performances in which each indicator was identified (N=8)
• Speech disfluencies—8
• Overt control mechanisms employed to manage turn-taking (e.g., requesting pauses, interrupting)—8
• Self-correction or comments on own performance—7
• Evidence of failure of online self-regulation (e.g., using wrong language at wrong time, errors in grammar/syntax/lexicon, garbled speech)[54]—8

Table 15. Summary findings—Evidence of online self-regulation in performance data.

The retrospection data provides further support for the assumption that interpreters self-regulate during performance, as illustrated by the findings below, which also support the assumption that interpreters attend to and are able to report retrospectively on some portion of their online self-regulation:

- All of the retrospections contain multiple indications of online monitoring (hereafter, *monitoring only*) and of monitoring with associated online control (hereafter, *monitoring with online control*). Instances of both *monitoring only* and *monitoring with online control* are found in all three stages (uncued, minimally-cued, verbal probes) of the retrospections.
- More than half of the retrospections contain instances of online monitoring with *post hoc control*, general *introspection*, or *retelling the story* of the interaction.
- Three of the retrospections provide evidence of a *failure of monitoring*.

[54] While failures of online monitoring or control are not evidence of self-regulation in and of themselves, they do provide evidence that online self-regulation is not a straightforward, uncomplicated process: it can and does fail.

Thus, both the performance and retrospection data confirm the assumption that dialogue interpreters self-regulate during performance. The retrospection data also indicates that some portion of the interpreter's online self-regulation is attended (i.e., not automated) and is accessible for retrospective process tracing. Although these findings are not surprising, they support the assumptions on which the study is built and lay the foundation for the remainder of the analysis and discussion.

9.3 Qualitative Analysis of the Performance Data

Although the bulk of this chapter focuses on the data collected in the retrospective process tracing, the recordings of the interpreters' performances are also a valuable data source. This section presents qualitative analysis of the interpreters' performances, particularly with regard to their patterns of use of overt management-related control mechanisms and interpreting techniques, and identifies a number of commonalities and differences in the interpreters' performances. The section's placement at the beginning of the chapter also provides an opportunity for the reader to get a sense of the study participants as individuals at the outset, before moving on to the quantitative analyses and the qualitative analysis of their retrospections.

Patterns of difference in the novices' and experts' performances are apparent in several areas, as detailed in Table 16, including management of turn-taking, characteristics of self-authored turns, pronoun shifts when dealing with multiple speakers, note-taking, and use of the simultaneous mode. Analysis of these findings reveals a number of similarities in the performances of the novice interpreters (Benjamin, Carla, and Jonathan),[55] including:

- a less active management style
- longer and more labored self-authored turns
- shifting pronouns such that the addressee of an utterance is changed
- more restless body language

The performances of the three most-experienced interpreters (Ana, Erica, and Sara) also display a number of commonalities, including:

- a more active management style
- shorter and often monolingual self-authored turns
- use of chuchotage (whispered simultaneous)

[55] The names used to refer to the interpreters who participated in the study are pseudonyms, as described in Section 7.5.2.

- more contained body language

The performances of the other two interpreters (Laura and Naomi), who were recruited as part of the expert group, are characterized by a mixed combination of features that are not consistent with either of the other groups nor with each other. The fact that these two interpreters' performances display distinct mixtures (i.e., not similar to each other) of features that were observed in the performances of the three novices and the three most experienced interpreters suggests the possibility of a developmental change in management approach. It also might reflect a distinction between routine and adaptive expertise (note, for example, that one of the novices began to engage in more active management toward the end of the interaction, which suggests an emerging capacity to adapt to novel/unfamiliar task constraints).

9.3.1 Three Groups or Two?: A Brief Note

In light of the results of the qualitative analysis of the performance data, which revealed patterns of similarity in the performances of the three most experienced interpreters and of the three novice interpreters, as well as mixed patterns in the performances of the two other interpreters, I undertook a re-analysis of the quantitative data, dividing the participants into three groups (i.e., most experienced/middle/novice), rather than two (i.e., expert/novice). This re-analysis of the data did not provide any additional indications of novice/expert difference. Thus, the original distinction between a 'novice' and an 'expert' group was maintained. Mentions of the 'expert' group in the analysis and discussion refer to all five participants designated as such at the beginning of the study. The 'three most experienced' interpreters are specifically referred to as such on occasion, where relevant.

Summary of Qualitative Analysis of Novice/Expert Patterns in Performance Data			
Aspect of Performance	**Novice Group (Benjamin, Carla, Jonathan)**	**Expert Group (Ana, Sara, Erica)**	**Mixed Group (Laura, Naomi)**
General	• Their body language tends to be more restless or fidgety than that of the other interpreters. • Their speech tends to be more disfluent. • They omit or summarize much more information, and make more significant meaning errors, especially with regard to Mariela's accusation of retaliation.	• Their body language tends to be more contained; gestures appear to be more purposeful (i.e., not restless/fidgeting).	• Both have some features similar to the novice group and some features similar to the expert group. • Their performances are not similar to each other. • One has more contained body language; the other has more restless body language.
Management of turn-taking	• Their management style is less active than that of the expert interpreters. They let speakers take longer turns without stopping them, and they wait longer in the interaction to begin to engage in more active management of turn-taking among the multiple speakers. • Two of them never ask the speakers to take turns; two of them never ask for repetitions from the speakers. The only one of the three to shift into a more active management style is the one whose	• All three of these interpreters have an active style of managing turn-taking, including either high incidence of requests for pauses or high incidence of interruptions.[56] They are quick to initiate management, beginning to take a more active management role early in the interaction. Two of them actively use gestures to manage turn-taking; the third uses her gaze to manage turn-taking. • Their renditions of side comments/overlapping speech often appear at the end of their turn	• One of them does not engage in active management: she is an infrequent requestor of pauses and an infrequent interrupter. Both of them make very frequent requests for the speakers to take turns (speak one at a time). One makes very frequent requests for repetition, but is an infrequent interrupter.

[56] See Section 8.6 for a discussion of the method whereby performances were classified as having frequent or infrequent incidences of specific control mechanisms. The findings of this analysis are discussed in Section 9.4.

Summary of Qualitative Analysis of Novice/Expert Patterns in Performance Data			
Aspect of Performance	**Novice Group (Benjamin, Carla, Jonathan)**	**Expert Group (Ana, Sara, Erica)**	**Mixed Group (Laura, Naomi)**
	language skills were roughly balanced, but this does not occur until near the end of the interaction.	at talk; that is, they are able to process and remember overlapping speech that occurs while they are interpreting, and are able to render the content of the overlapping speech after rendering the first speaker's utterance into the TL.	
Self-authored turns *(e.g., requests for clarification, repetition, other self-initiated interventions)*	• One of them always makes requests for clarification/repetition in the third person ("the interpreter...") and in both languages; they are generally fairly slow and long. Another uses both languages in these situations, but does not have many moments at which he initiates self-authored turns. The third usually requests pauses/clarifications in one language only, and does so in an informal style.	• They tend to make requests for clarification or repetition quickly and smoothly, often in only one language, or deferring the explanation in the other language to the end of the turn.	• One's self-authored turns are long and in both languages. The other's self-authored turns seem to be focused on avoiding having speakers address her directly, rather than on management of turn-taking, per se; she sometimes produces these turns in only one language.

Summary of Qualitative Analysis of Novice/Expert Patterns in Performance Data			
Aspect of Performance	**Novice Group (Benjamin, Carla, Jonathan)**	**Expert Group (Ana, Sara, Erica)**	**Mixed Group (Laura, Naomi)**
Note-taking[57]	• Two of them do not have notepads and do not mention the lack of them in their retrospection. One has a notepad, but does not seem comfortable using it (additionally, he discusses his difficulty with note-taking at length in the retrospection).	• Two of them have notepads; they take notes for longer utterances, and deliver from their notes smoothly. The third does not have a notepad, and mentions in her retrospection that she wishes she had brought one.	• Both have notepads and take notes. One's delivery from notes is generally slow and tonally flat. The other fidgets with her notepad, moving it about, cradling it, etc.
Pronoun shift	• In their renditions, pronouns are sometimes changed such that the addressee of the original utterance is changed (that is, the speaker's 'you' becomes a general remark, or is addressed to a different 'you').	• They tend to maintain consistency of pronouns so that the person addressed by the original speaker is maintained as the addressee in the interpretation.	• In their renditions, pronouns are sometimes changed such that the addressee of the original utterance is changed (that is, the speaker's 'you' becomes a general remark, or is addressed to a different 'you').

[57] The possibility of taking notes during the interpreting session is an important control mechanism available to dialogue interpreters. The interpreter's readiness and ability to employ note-taking as a control mechanism is of interest in comparing expert and novice interpreters' online control.

Summary of Qualitative Analysis of Novice/Expert Patterns in Performance Data			
Aspect of Performance	**Novice Group (Benjamin, Carla, Jonathan)**	**Expert Group (Ana, Sara, Erica)**	**Mixed Group (Laura, Naomi)**
Chuchotage (whispered simul)	• Two of them do not make sustained attempts at chuchotage; one makes brief attempts.	• Their use of chuchotage is smooth and natural, beginning immediately, rather than waiting for a pause and subsequently resorting to chuchotage when the speaker does not pause. All three of them trigger a request from Theresa to use only consecutive interpreting.[58]	• One does not attempt chuchotage. The other attempts chuchotage, but only a small amount (not sufficient to trigger Theresa's request not to do so).

Table 16. Summary of qualitative analysis of novice/expert patterns in performance data.

[58] I had asked the actor playing Theresa to stop interpreters if they began to interpret simultaneously. This was accomplished by asking the interpreter not to interpret at the same time someone else was talking. The rationale for this decision was twofold: first, to allow for better analysis of the performance data (i.e., making all the interpreter's turns clearly audible on the recording) and, second, to create an additional challenge for the expert interpreters to contend with.

9.4 Quantitative Analysis of the Performance Data

In contrast to the qualitative analysis of the performance data reported on in the preceding section, the quantitative analysis of the performance data does not reveal clear patterns of novice/expert differences. There is substantial variation in the frequency with which individual interpreters employ specific control mechanisms; however, there is no clear cut pattern of control mechanisms preferred or dispreferred—that is, more- or less-frequently employed—by novice or by expert interpreters. Although the quantitative analysis is limited by the sample size, the results prove useful in several ways:

- Confirming that dialogue interpreters commonly employ a broad range of overt control mechanisms.
- Suggesting that individual interpreters may have 'styles'—that is, individual interpreters, independent of their level of experience/training, may prefer or disprefer certain types of overt control mechanisms.
- Providing a baseline of empirical evidence as a point of comparison for future research.

The following sections present the quantitative analysis of several indicators of interest; specifically, they touch on *speech disfluencies*, *major linguistic errors*, *rendering/omission of overlapping speech*, and control mechanisms related to *management of turn-taking*. Because the quantitative analysis did not suggest clear novice/expert differences in the frequency of instances of overt control in the performance data (with the exception of speech disfluencies, as discussed below), details of the analysis by group are provided in Appendix E rather than in the body of the text. Information regarding the lengths of the performances (i.e., the duration of each simulation) is included in Appendix D. The reader is referred to Section 8.6 for a discussion of the criteria used to analyze the relative frequency of occurrence of indicators of interest in each interpreter's performance.

9.4.1 Speech Disfluencies

Speech disfluencies, which naturally occur as part of output monitoring (see Section 8.3.1), were coded as indicators of online monitoring in the performance data. In this data set, three of the expert interpreters—the same three identified as having similar performance characteristics in the previous section—were classified as having *infrequent* incidence of speech disfluencies, and one interpreter—a novice—was classified as having *frequent* incidence. Interestingly, the one interpreter classified as having *frequent* incidence of speech disfluency was not one who had

one working language clearly weaker than the other. All four interpreters identified as having one stronger language and one weaker language fell in the middle of the range.

Name	**Number of Speech Disfluencies**	**Classification**
Ana (E)	68	Infrequent
Laura (E)	122	Middle
Sara (E)	81	Infrequent
Naomi (E)	105	Middle
Erica (E)	29	Infrequent
Jonathan (N)	114	Middle
Benjamin (N)	138	Frequent
Carla (N)	130	Middle
Median = 109.5 Median Absolute Deviation (MAD) = 24.5	Below 85 =Infrequent Above 134 = Frequent	

Table 17. Frequency of speech disfluencies, by interpreter.

In considering the incidence of speech disfluencies in the data, it is important to note that the coding and analysis did not differentiate between speech disfluencies produced in one language versus the other.[59] (That is, the number of speech disfluencies coded in a single performance reflects all the disfluencies produced, regardless of the language being spoken.) Thus, it is not possible to compare the disfluencies produced by a given interpreter in his/her L1 versus L2. The fact that all three of the interpreters with roughly balanced languages who had *infrequent* occurrence of speech disfluencies are also experts is suggestive, but that finding is counterbalanced by the fact that the fourth interpreter with roughly balanced languages (a novice) had *frequent* incidences of disfluency.

The data do not, therefore, paint a clear picture of a connection between experience and speech disfluencies nor between language skill and speech disfluencies, but they do suggest that output monitoring may be related to expertise—note that the three interpreters who had *infrequent* speech disfluencies are the three most experienced interpreters, whose performances were described in the previous section as having a number of similarities. Further study of this relationship might productively compare incidence of speech disfluency in L1 vs L2. It could also potentially involve a more fine-grained analysis of the types of speech disfluency (i.e., filled vs unfilled pauses, rephrasing, word repetition) produced by interpreters.

[59] See Section 8.3.1 for a discussion of the rationale for this approach.

9.4.2 Major Linguistic Errors

The incidence of major linguistic errors also suggests a complex relationship between self-regulation, expertise, and language skills. All three novices—including the one whose languages were roughly balanced—were classified as having *very frequent* incidence of major linguistic errors.

Name	**Number of Major Linguistic Errors**	**Classification**
Ana (E)	3	Middle
Laura (E)	1	Middle
Sara (E)	2	Middle
Naomi (E)	2	Middle
Erica (E)	1	Middle
Jonathan (N)	8	Very Frequent
Benjamin (N)	10	Very Frequent
Carla (N)	20	Very Frequent
Median = 2.5 Median Absolute Deviation (MAD) = 1.5	Below 1 = Infrequent Above 4 = Frequent Above 6.5 = Very Frequent	

Table 18. Frequency of major linguistic errors, by interpreter.

9.4.3 Overlapping Speech

The simulated interactions were designed to contain multiple instances of overlapping speech (i.e., moments when the parties spoke over each other and/or the interpreter). Because of the spontaneous nature of the interaction, incidences of overlapping speech varied greatly in each interaction (range: 6-25, median 11).[60] Interpreters' rendering of overlapping speech varied greatly, as well. The percentage of instances of overlapping speech rendered by interpreters ranged from 8% to 67%, with a median of 33% rendered. Neither instances nor percentage rendered of overlapping speech seems strongly linked to the interpreter's status as a novice or expert.

[60] For further discussion of variability in the simulations, see Section 8.8.1.

Name	Number of Instances of Overlapping Speech	Classification
Ana (E)	21	Frequent
Laura (E)	6	Infrequent
Sara (E)	7	Middle
Naomi (E)	19	Frequent
Erica (E)	7	Middle
Jonathan (N)	25	Very Frequent
Benjamin (N)	12	Middle
Carla (N)	10	Middle
Median = 11 Median Absolute Deviation (MAD) = 4.5	Below 6.5 = Infrequent Above 15.5 = Frequent Above 20 = Very Frequent	

Table 19. Instances of overlapping speech, by interpreter.

Name	Percent of incidences of overlapping speech rendered	Classification
Ana (E)	33%	Middle
Laura (E)	67%	Very Frequent
Sara (E)	43%	Middle
Naomi (E)	19%	Middle
Erica (E)	47%	Middle
Jonathan (N)	8%	Infrequent
Benjamin (N)	33%	Middle
Carla (N)	10%	Infrequent
Median = 33% Median Absolute Deviation (MAD) = 14%	Below 19% = Infrequent Above 47% = Frequent Above 61% = Very Frequent	

Table 20. Percent of instances of overlapping speech rendered, by interpreter.

The only interaction classified as having *infrequent* instances of overlapping speech was that interpreted by Laura (E). The interaction interpreted by Naomi (E) was classified as having *frequent* instances of overlapping speech, and those interpreted by Ana (E) and Jonathan (N) were identified as having *very frequent* instances of overlapping speech. It is possible that the high number of instances of overlapping speech in the interactions interpreted by Ana and Jonathan was influenced in some way by the fact that they were the first two study participants

(for example, the actors may have been more attuned to or focused on producing instances of overlapping speech). The high number of instances of overlapping speech in the interaction interpreted by Naomi may have been influenced by the fact that Naomi and the actress playing Mariela had a preexisting personal acquaintance.

In terms of the percentage of instances of overlapping speech rendered by the interpreter, two of the interpreters were classified as *infrequent* renderers of overlapping speech—Jonathan and Carla (N)—and one was classified as a *very frequent* renderer of overlapping speech—Laura (E). Interestingly, there is no readily apparent relationship between the frequency of incidence of overlapping speech and the number of instances of overlapping speech rendered by the interpreter—that is, while one might expect those who experienced more instances of overlapping speech to have rendered relatively fewer instances, and vice versa, this does not prove to be the case.

9.4.4 Management of Turn-Taking & Other Overt Control Mechanisms

The interpreters who participated in this study employed a range of control mechanisms to manage turn-taking and information flow. The following tables present the data for several of the most commonly observed control mechanisms—*use of a gesture to request a pause*, *verbal requests for a pause*, *requests for clarification/repetition*, *requests for the speakers to take turns speaking* (rather than overlapping), and *interrupting* to take a turn at talk.

Name	**Pause request via gesture**	**Classification**
Ana (E)	17	Very Frequent
Laura (E)	1	Infrequent
Sara (E)	12	Very Frequent
Naomi (E)	4	Middle
Erica (E)	2	Middle
Jonathan (N)	4	Middle
Benjamin (N)	1	Infrequent
Carla (N)	2	Middle
Median = 3 Median Absolute Deviation (MAD) = 1.5	Below 1.5 = Infrequent Above 4.5 = Frequent Above 6 = Very frequent	

Table 21. Pause request via gesture, by interpreter.

Name	**Pause request, verbal**	**Classification**
Ana (E)	4	Middle
Laura (E)	5	Middle
Sara (E)	4	Middle
Naomi (E)	4	Middle
Erica (E)	2	Infrequent
Jonathan (N)	3	Middle
Benjamin (N)	8	Very Frequent
Carla (N)	2	Infrequent
Median = 4 Median Absolute Deviation (MAD) = 1	Below 3 = Infrequent Above 5 = Frequent Above 6 = Very Frequent	

Table 22. Pause request, verbal, by interpreter.

Name	**Request repetition / clarification from speaker**	**Classification**
Ana (E)	5	Middle
Laura (E)	13	Very Frequent
Sara (E)	4	Middle
Naomi (E)	6	Middle
Erica (E)	4	Middle
Jonathan (N)	6	Middle
Benjamin (N)	1	Infrequent
Carla (N)	0	Infrequent
Median = 4.5 Median Absolute Deviation (MAD) = 1.5	Below 3 = Infrequent Above 6 = Frequent Above 7.5 = Very Frequent	

Table 23. Requests for repetition/clarification, by interpreter.

Name	Request speakers to take turns speaking	Classification
Ana (E)	1	Middle
Laura (E)	4	Very Frequent
Sara (E)	1	Middle
Naomi (E)	7	Very Frequent
Erica (E)	1	Middle
Jonathan (N)	0	Middle
Benjamin (N)	2	Middle
Carla (N)	0	Middle
Median = 1 Median Absolute Deviation (MAD) = 1	N/A = Infrequent Above 2 = Frequent Above 3 = Very Frequent	

Table 24. Requests for speakers to take turns speaking, by interpreter.

Interrupting a speaker to (attempt to)[61] take a turn at talk was also frequently observed in the data. The distribution of the instances of interruptions is such that the method of frequency analysis used for other categories is not helpful. Applying the analytical method used for the other categories leads to a classification of one *frequent* and three *infrequent* interrupters. However, looking at the raw data for this category leads to a different impression. The totals by individual interpreter for the category are 1, 1, 3, 7, 13, 13, 14, and 15. The distribution is bimodal and clearly indicates that some interpreters interrupt less frequently, others more frequently, and one falls in the middle of the range. Thus, it seems most appropriate to classify the interpreters with 1 and 3 interruptions—Laura (E), Sara (E), and Naomi (E)—as *infrequent* interrupters and to classify the interpreters with 13, 14, and 15 interruptions—Ana (E), Erica (E), Benjamin (N), and Carla (N)—as *frequent* interrupters.

Other control mechanisms observed in the performance data include *asking parties to slow down*, *asking parties to pause more frequently*, and *stopping the interaction in order to explain a misunderstanding or confusion*. Each of these control mechanisms was observed in fewer than half of the interactions, and is thus not reported on in detail. *Self-correction* and *interpreter comments on own performance* also did not occur with sufficient frequency in the performance data to allow for detailed analysis.

The quantitative analysis of interpreters' use of overt control mechanisms does not suggest any pattern of novice/expert difference. In this sample, the frequency of use of these control mechanisms varies widely from individual to individual, and no clear patterns of preferred or

[61] The count of interruptions includes both successful and unsuccessful attempts to interrupt speakers. Because the success or failure of the attempted interruption depends on factors other than the interpreter (such as the speaker's willingness to cede the turn), interpreters' relative rates of success/failure at interrupting are not reported on.

dispreferred control mechanisms emerge. There is clearly a need for further research with a larger sample of interpreters, and in a variety of settings, in order to better understand the range of overt online control mechanisms employed by dialogue interpreters, and to gain insight into the influence of the interpreter's personal background and preferences, setting/situation, and other factors on the use of these overt control mechanisms.

9.4.5 Conclusions vis-à-vis the Quantitative Analysis of the Performance Data

The quantitative analysis described in this section does not point to well-delineated 'expert' and 'novice' profiles. Interpreters in this data set generally have recourse to a similar range of control mechanisms, but there is no indication that specific mechanisms are more or less frequently employed by either novices or experts within the sample. The results reported above do contain indications that individual interpreters may have a preferred style (e.g., being more likely to interrupt, or less likely to request a pause via gesture). In general, these findings suggest that future researchers might expect to see a range of commonly employed overt control mechanisms being employed by dialogue interpreters, as well as indications that individual interpreters have a 'style'—individual preferences that may be more related to personality or specific aspects of their training (e.g., being trained to behave/react to certain difficulties in a certain manner) than to their level of expertise per se. Analysis of a larger sample, different types of interactions (with different constraints and variables), or of different pairs of working languages might confirm the findings of this study, reveal additional possibilities in terms of control mechanisms, or identify patterns of novice/expert difference in the use of control mechanisms that were not present in this data set.

9.5 Quantitative Analysis of the Retrospections

As with the performance data, quantitative analysis of the retrospections is limited by the small sample size and thus does not lend itself to robust quantitative analysis. The quantitative analysis also revealed few patterns of novice/expert difference. The results presented below are thus provided principally in the interests of completeness and to serve as a point of reference and inspiration for future research.

9.5.1 Length of Retrospections

The word counts of the retrospections as a whole and of the three stages of the retrospections (uncued, minimally-cued, verbal probes) were compared to check for patterns of difference

between novice and expert interpreters. Graphic representation of these comparisons appears below; raw data appears in Appendix D. Figure 11 shows the number of words per stage in each retrospection for each interpreter. Each bar in the graph shows the number of words per stage for each interpreter. Figure 12 allows for comparison of length per stage by showing the percentage of each interpreter's retrospection that each stage comprises. While Figure 11 clearly indicates a substantial amount of individual variation in the word counts of the various retrospections, Figure 12 suggests that the proportion of the total retrospection in each stage generally follows a similar pattern: with two exceptions, stage 1 (uncued) has more words than stage 2 (minimally-cued), and in all cases stage 3 (verbal probes) has more words than either stage 1 or stage 2. The fact that the minimally-cued portion of the retrospection generally elicited shorter responses than the uncued portion may be related to methodological issues with the minimally-cued portion of the retrospection; this point is further addressed in Section 8.8.2.

In conclusion, there are clearly individual differences in the length of the retrospections and the length of each stage of the retrospection, but there are no evident patterns that suggest differences between novices and experts in terms of the number of words in their retrospections or the percentage of the total retrospection produced in the different stages. It seems, therefore, that, in this set of interpreters, level of expertise (as judged by the criteria for inclusion/exclusion used in this study) and length of retrospection as a whole, and in the various stages, are not strongly connected. While this finding is not generalizable, it serves as a point of reference for future studies of dialogue interpreting involving retrospective process tracing.

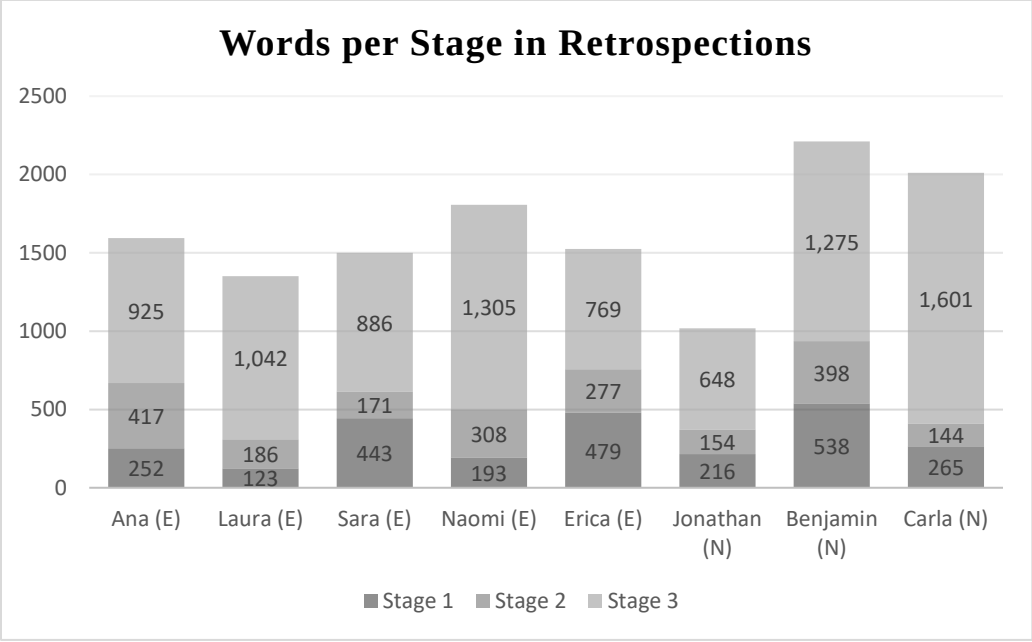

Figure 11. Words per stage in retrospections.

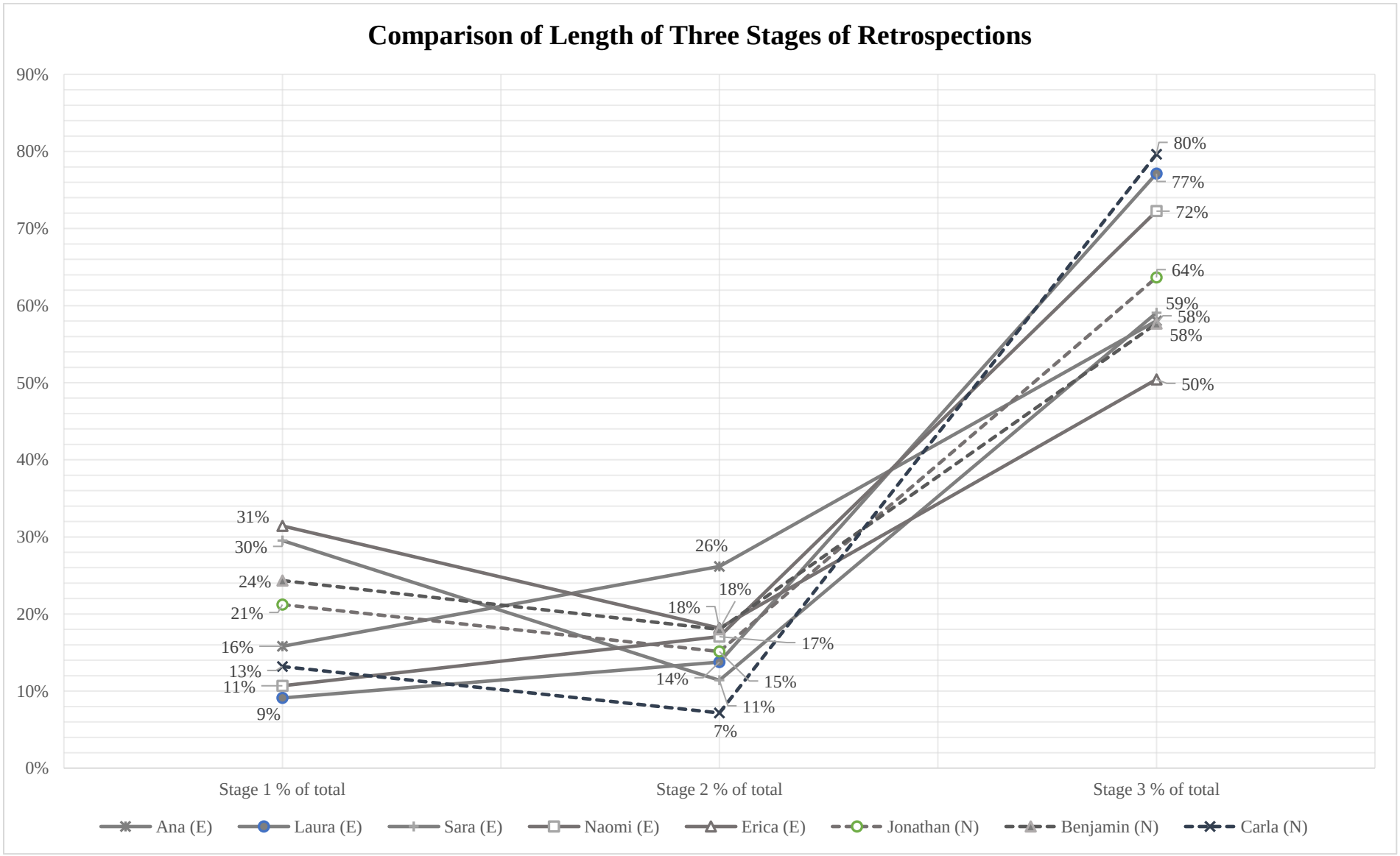

Figure 12. Percentage of retrospection length by stage.

9.5.2 Monitoring Indicators

The analysis of the occurrence of monitoring indicators in the retrospections suggests the possibility of quantitative differences in novices' and experts' reports of online monitoring. The mean instances of *total monitoring indicators* and the mean instances of the two principal monitoring indicators, *monitoring only* and *monitoring with online control*, appear to differ in novices and experts, as illustrated in Tables 25 and 26. (Individual totals by category and by interpreter are included in Appendix E.) Although the sample size is small, the trend observed in this data is suggestive. In a similar study involving more interpreters (that is, a larger data set) one might find statistically significant differences in the number of total monitoring indicators that appear in novices' and experts' retrospective process tracing, as well as in the number of indicators of *monitoring only* and *monitoring with online control*.

Total & Mean Monitoring Indicators by Group		
Group	**Total**	**Mean**
Experts (N=5)	108	21.6
Novices (N=3)	44	14.7

Table 25. Total and mean instances of monitoring indicators, novice/expert comparison.

Total & Mean Indicators of *Monitoring Only* AND *Monitoring with Online Control* by Group		
Group	**Total**	**Mean**
Experts (N=5)	88	17.6
Novices (N=3)	34	11.3

Table 26. Total and mean instances of the two most frequent monitoring indicators, novice/expert comparison.

Further analysis focused on the two principal monitoring indicators coded in the retrospection data, *monitoring only* and *monitoring with online control*. Figure 12 shows the instances of each of these indicators in each interpreter's retrospection. This analysis reveals considerable individual variability but no clear pattern of novice/expert difference.

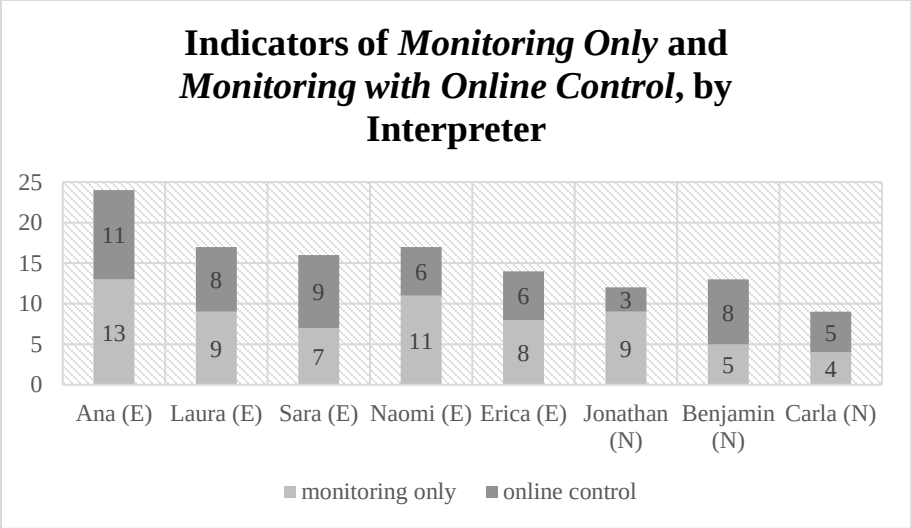

Figure 13. Quantitative analysis of indicators of monitoring only and monitoring with online control, by interpreter.

The number of instances of *monitoring only* and *monitoring with online control* in each stage of the retrospection was also analyzed. Figure 13 shows the mean number of instances of the two indicators (i.e., *monitoring only* and *monitoring with online control*) in each stage of the retrospection. (Data for all monitoring indicators by stage of retrospection appears in Appendix F.)

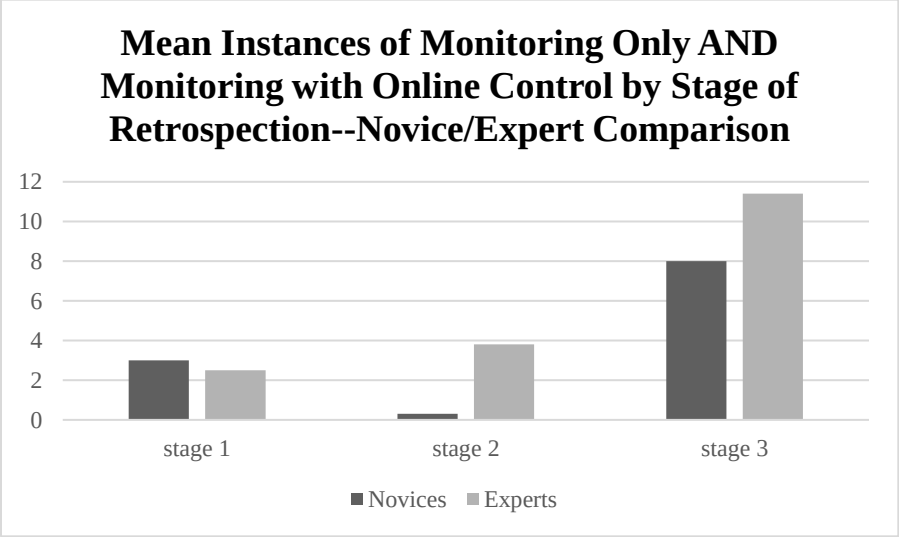

Figure 14. Mean instances of monitoring only and monitoring with online control by group and stage of retrospection.

While the mean instances of *monitoring only* and *monitoring with online control* are roughly equal for both groups in stage 1 (in fact, the mean number of instances in novices' retrospections

is slightly higher than that of experts), the mean number of instances in experts' retrospections is higher in both stage 2 and stage 3. While the numbers in this sample are small, this finding may suggest a difference in novices' and experts' ability to report on their own online self-regulation. The fact that the experts' retrospections contain more instances of *monitoring only* and *monitoring with online control* in the third stage of the retrospection may be indicative of differences in novice and expert processing: it suggests that experts' responses to verbal probes (including questions about specific moments or aspects of the interaction) contain evidence of online self-regulation more frequently than novices' responses to such verbal probes. The fact that experts are generally more able than novices to report on their own self-regulation in response to specific probes aligns with findings suggesting that experts process more deeply, whether because of differences in attention (such as those suggested by Dane, 2013; see Section 4.6) or because they have more cognitive resources available for monitoring due to automation of lower-level processes as discussed in Section 3.3.1. Thus, while these findings are based on a small sample, they seem to align with what one would expect based on the literature on expertise and self-monitoring reviewed in previous chapters (e.g., Zimmerman, 2000, 2006; Pintrich & Zusho, 2002; Moser-Mercer, 2000a, 2010; Chi, 2006a, 2006b; Tiselius & Jenset, 2011).

9.6 Qualitative Analysis of the Retrospections

This section reports on the qualitative analysis of the retrospections. As it is the longest portion of the chapter, I begin it with a high-level summary of the targets for monitoring and the online control mechanisms identified in the interpreters' retrospective process tracing.

Each of the thematic categories coded for in the initial round of qualitative analysis[62] appeared in all or almost all of the interpreters' retrospections, with one exception, as indicated in Table 27. The fact that these themes are encountered throughout the data rather than in only a few cases, and that mentions of these themes were found in both novice and expert interpreters' retrospections, is indicative of their pertinence to the interpreter's experience of task performance. Table 27 indicates the number of retrospections (of 8 total) in which each category was identified.[63]

[62] See Section 8.4.3 for a discussion of the two approaches to thematic analysis employed.
[63] Quantitative results of this round of coding are included in Appendix G.

Summary of Initial Thematic Analysis of the Retrospection Data	
Thematic Categories and Number of Retrospections in Which They Were Identified (N=8)	
Demands on Performance (Targets for Monitoring):	• others' affect/emotions—8 • others' behavior toward the interpreter—7 • aspects of the parties' discourse/talk—7 • cognitive demands of the interpreting process/interpreting technique—7 • linguistic features of the parties' talk—8 • management of turn-taking/ flow of interaction—8
Responses/Reactions (Control Mechanisms):	• affect/emotional response—8 • response related to interpreting process or technique—8 • response in the form of management of turn-taking/flow of interaction—8 • linguistic response —5
Indicators of Monitoring of Other Aspects of the Interaction:	• comments related to background/context of interaction—8 • comments involving self-evaluation of performance—8 • comments related to the interpreter's role/professional boundaries—8

Table 27. Initial thematic analysis of the retrospections--Themes and number of retrospections in which they were identified.

The results of the second round of qualitative analysis paint a more nuanced picture of the aspects of their own and others' affect, behavior, cognition, and context that interpreters monitored during performance, as well as of the control mechanisms they mentioned in their retrospections. These findings are summarized in Tables 28 and 29.

Evidence from Retrospections—Targets for Online Monitoring	
Affect/Intrapersonal:	• Interpreter's own emotional state • Interpreter's level of confidence/performance evaluation • Interlocutors' emotional state

Behavior:	• Interpreter's own behavior
	  ○ Management of interpreting process (in terms of cognitive processes of interpreting)
	  ○ Management of turn-taking
	  ○ Behavior related to establishing/maintaining role boundaries/professional identity
	• Interlocutors' behavior
	  ○ Interruptions/overlaps
	  ○ Reactions to interpreter's behavior/management
	  ○ Potential threats to interpreter's role boundaries/professional identity

Cognition:	• Cognitive processes of interpreting
	  ○ Comprehension
	  ○ Retention
	  ○ Language transfer
	  ○ Production
	  ○ Checking for match between source language and target language utterances (accuracy)

Context:	• Situational context (e.g., the setting, the purpose of the interaction, the identities of the parties and relationships between them, the background/history leading up to the interaction)

Table 28. Targets for online monitoring—Summary evidence from retrospections.

Evidence from Retrospections—Online Control Mechanisms *(NB: Refers to mechanisms **by which** control is exerted)*	
Affect/Intrapersonal:	• Focus on neutrality / professional identity • Control/redirect emotional reaction (including positive self-talk)
Behavior:	• Keep input manageable / manage turn-taking / manage overlapping speakers • Establish and/or maintain role boundaries/professional identity • Use different interpreting modality (simultaneous, take notes)
Cognition:	• Increase/direct focus • Mental search for solution • Linguistic/interpreting strategies (e.g., summarizing, circumlocution)

Table 29. Online control mechanisms--Summary evidence from retrospections.

The remainder of this section is organized as follows: the first part (Section 9.6.1 and subsections) reports on evidence of monitoring of affect, behavior, cognition, and context found in the retrospections. The second part (Section 9.6.2 and subsections) reports on evidence of control mechanisms found in the retrospections. Both sections contain a number of illustrative extracts from the retrospections; the reader is referred to Section 8.7 for information about transcription and labelling conventions.

9.6.1 Online Monitoring

The retrospections provide a wealth of information about the aspects of the interaction and of their own performance that interpreters monitor. The following subsections report in detail on evidence from the retrospections with regard to interpreters' online monitoring of affect, behavior, cognition, and context.

9.6.1.1 Monitoring Affect

9.6.1.1.1 Monitoring the Interlocutors' Affect

The retrospections provide evidence that dialogue interpreters monitor the emotional state(s) of the interlocutors, that the interlocutors' affect can influence interpreting performance, and that interpreters may also monitor the effects of others' emotional state on their own performance. All eight of the retrospections mention the heightened level of emotion in the simulated interaction. The salience of the interlocutors' affect to task performance is highlighted by the fact that it is referenced in stage 1 (uncued) of the retrospection by seven of the eight interpreters, and in stage 2 (minimally-cued) and/or stage 3 (verbal probes) by seven of the eight interpreters.

The interlocutors' emotional state is mentioned both in isolation and in connection with specific difficulties and/or control mechanisms, by both novices and experts. For example, several interpreters connect the speakers' emotional state with increased speed:

> *"everyone was speaking too fast 'cept for the employer -- one of the employers was you know- was speaking calmly but um* ***Andrew and Mariela were very furious about the situation um so- so they were just -- you know talking -- so fast****"*—Benjamin (N), stage 1[64]

> *"it- it's harder to* ***interpret for someone who is very upset and passionate about something because they tend to speak a lot faster*** *and their um thoughts aren't as um structured"*—Sara (E), stage 1

> *"well I think uh the difficulty of the situation – that* ***when you have people that are annoyed or angry*** *then the job of the interpreter probably becomes more difficult 'cause* ***if you ask people to slow down they may- uh may not do it****"* –Erica (E), stage 1

Other interpreters connect the speakers' heightened emotional state with difficulties in taking turns at talk:

> *"and that* ***was- a little hard to ---- to interrupt her*** *when she um when she started explaining her case -- uh you know and* ***getting more and more emotional****"*—Jonathan (N), stage 1

> *"I mean it was difficult because ---- because* ***she was really upset and uh so it was a little bit difficult for me to say 'hey can you stop'*** *like um and -- let's just like -- respect the*

[64] Transcription conventions are described in Section 8.7.

> *turns -- which I did once or twice -- but yeah it's difficult when someone is so upset"*—Naomi (E), stage 1

The interlocutors' emotional states were also referenced as a reason for switching to simultaneous interpreting:

> *"and especially with* ***heightened level of excitement it would have been best to do it in simultaneous****"* —Ana (E), stage 1

The indications in this data that the interpreter's performance may be influenced by the interlocutors' emotional state add to a growing body of empirical evidence about the potential effects of the emotional content of their work on dialogue interpreters. Previous research in this area has primarily focused on the sequelae interpreters may experience as a result of working in emotionally charged or traumatic situations, including the risk of suffering vicarious trauma or burnout (see, for example, Bontempo & Malcolm, 2012; Lai, et al., 2015; Crezee, et al., 2015; Harvey, 2015).

To the best of my knowledge, this study is the first in the field of interpreting to describe evidence that the emotional content of the interaction may affect performance during the interaction in progress—that is, in addition to the potential for post hoc effects, high levels of emotion may affect the interpreter's performance during the interaction and thus, potentially, the course or outcomes of the interaction. Although the interaction interpreted by the interpreters in this study did not include traumatic content, it did contain a heightened level of emotion.[65] As illustrated by the extracts above, the interpreters in this study reported that the interlocutors' emotional state influenced aspects of their performance including their ability to interpret effectively (which implies a threat to accuracy) and their approach to managing turn-taking.

The findings from this study suggest that the effect of heightened emotional content on interpreters' performance is a topic worthy of further investigation by researchers and of consideration by practicing professionals and educators. Further research in this area might explore the effects of heightened emotion on specific aspects of performance, such as interaction management and accuracy. Such research might also identify effective methods for teaching interpreters to be aware of the potential effects of others' emotional state on their performance

[65] As described in Section 7.2, the interaction centered on a conflict between coworkers and an accusation of workplace retaliation subsequent to the ending of a romantic relationship. Although the content did not touch on traumatic or violent incidents, it is possible that some aspect of the interaction could have been triggering to individuals who had previously experienced similar situations. The emotionally charged content of the interaction was considered to be fairly typical of the types of situations dialogue interpreters regularly encounter; nevertheless, the interpreters were told during the informed consent process that they could stop the interaction at any time if they became uncomfortable with the situation. None exercised that option.

and strategies that interpreters could employ in situations involving heightened emotion or potentially traumatic content.

9.6.1.1.2 Monitoring the Interpreter's Affect

The retrospection data indicate that interpreters monitor their own emotional state during performance, a finding that aligns with the work of other scholars such as Ivanova (1999) & Tiselius & Jenset (2011). All of the retrospections contained at least one reference to the interpreter's mood or state of mind during performance, because one of the verbal probes in stage 3 directly asked them about it. Some interpreters also mentioned their own emotional state spontaneously (i.e., without being prompted to do so) in stage 1 (uncued) or stage 2 (minimally-cued) of the retrospection. Unprompted references to the interpreter's affect suggest that monitoring of their emotional state was especially salient to these particular interpreters. Ana (E), Sara (E), and Erica (E) all mentioned their emotional state or reaction to the interaction during stage 1 of the retrospection, while Sara (E), Laura (E), and Benjamin (N) did so in stage 2.

Overall, the experts in this study commented on their own emotional state more frequently than novices, and were more likely to do so spontaneously (as opposed to in response to a direct question). This finding contrasts with mentions of the other interlocutors' emotional state, discussed in the previous subsection, which seven of the eight interpreters commented on spontaneously (i.e., during stage 1 or stage 2). Taken together, these findings point to a possible difference in novices' and experts' monitoring of affect, suggesting that the ability to monitor and report on others' emotional state may develop before the ability to monitor and report on one's own emotional state, or that monitoring of others' affect may be more salient (i.e., more likely to influence task performance), and thus more likely to be attended to and/or reported on retrospectively.

Experts' spontaneous comments regarding their own emotional state or reactions were often made in the context of comments related to insufficient understanding of the situational context; this point is discussed further in Section 9.6.1.4, which includes a number of illustrative extracts. The novice group tended to mention their own emotional state in the context of performance evaluation (i.e., feelings of doubt related to their own abilities), while the three most experienced interpreters did not make connections between their emotional state and their self-evaluations of performance. While the parameters and sample size of the current study do not allow for speculation as to the roots of this phenomenon, it is an interesting finding, and it would be

worthwhile to take note of whether a similar trend is identified in future studies modeled on this one.

The valence of the emotional states mentioned by the interpreters varied fairly widely as illustrated by the words they used to describe them, which appear in Table 30.

Affect Descriptors with Positive/Neutral Valence	Affect Descriptors with Negative Valence
amusement	panic
natural high	nervous
relaxed	thrown off
comfortable	anxious
happy	overwhelmed
humor	frustration
	lack of confidence
	not mentally prepared
	hurried
	upset
	overloaded

Table 30. Descriptors of interpreters' emotions during performance, from the retrospection data.

While some of the descriptors are positive or neutral, the majority have a negative emotional valence. It is not possible to say whether the tendency toward negative emotional states reported on in the retrospections reflects the full reality of the interpreters' affectual state during the interaction. It may be, for example, that interpreters attended to negative emotional states more closely than positive or neutral emotional states, and were thus more likely to recall them. This hypothesis seems plausible when considered from the perspective of the self-regulation feedback loop: a negative emotional state may be more likely to occur in the context of a misalignment between the current state and the goal state, a situation that may trigger a control response and is, therefore, more likely to be attended to. Monitoring—and recall—of the negative emotional states may thus be linked to an attendant need for active control. Neutral or positive emotional states may not be as likely to be attended to or to trigger a control mechanism, and thus may not be recalled during process tracing. Alternately, the interpreters in this study may actually have felt more negative emotion than neutral/positive emotion while interpreting: that is certainly plausible inasmuch as the simulation was developed with an eye toward creating a dynamic and challenging interpreting task.

9.6.1.2 Monitoring Behavior

9.6.1.2.1 Monitoring the Interlocutors' Behavior

The retrospections provide ample evidence of interpreters' monitoring of the other parties' behavior, particularly with regard to the following:

- the interlocutors' turn-taking behavior (e.g., interruptions/overlapping speech)
- behaviors that are perceived by the interpreter as out of the ordinary or as (potential) threats to the interpreter's professional role boundaries

The following extracts illustrate interpreters' monitoring of the interlocutors' turn-taking behavior. The extract from Ana's retrospection also indicates metacognitive awareness of the need to decide whether or not to respond in some way to the situation at hand:

> *"um ---- yes* ***it was difficult to explain what one person was saying*** *to Theresa um* ***when the other person would interrupt****"* –Jonathan (N), stage 3

> *"and then with the man I could see he didn't LAUGHTER get five minutes in you know he couldn't -- and* ***she didn't give him a word really but -- he didn't have much to say anyway -- he couldn't s- -- but she didn't give him a chance to say anything*** *you know um so --"* –Carla (N), stage 3

> *"yeah challenges yeah like it was very -- the flow of the conversation -- it was very difficult because* ***nobody was respecting their turns -- especially the woman*** *and ----"*—Naomi (E), stage 3

> *"um hm -- I see --* ***I remember thinking 'what should I do when they were interrupting each other' -- some of the things that Mariela said under her breath, should I deal with them -- or just let them slip****"* —Ana (E), stage 1

The following extracts are illustrative of monitoring others' behaviors that are unusual or may pose a threat to the interpreter's professional role boundaries:

> ***"Mariela asking to use me as an interpreter was OK*** *in the sense that I have had to deal with the situation before --* ***it probably would have been nicer if we had been- had more eye contact and the session had been a little more appropriate*** *with her discussing actually with the others and not using me"* —Ana (E), stage 2

"um ---- well there was the- the- and I didn't really deal with it specifically -- um this wasn't really a challenge- but as far as the interaction went -- ***Mariela kept saying 'well we'll talk' 'cause she wanted me to interpret for her tomorrow*** *and so I didn't really deal with it because I didn't really know how much I was supposed to get into the role playing or not --* ***but she was like 'we'll talk' like 'telephone give me your card' kind of thing*** *and I just interpreted everything that she said -- so that's a challenge as far as ethics go but I don't know if that's what you're referring to"* –Sara (E), stage 3

*"****trying to decide whether or not I should ask Mariela to not use her telephone*** *-- because I wasn't sure if that's really my place as the interpreter -- I felt like that might have been more of Theresa's role since she was the one that was facilitating the meeting between the two"*—Laura (E), stage 3

"I mean at the end it was ***difficult for me because she was like talking to me*** *uh and* ***she was like 'can you come and interpreter so- and interpret for me'*** *so I just asked the HR person like 'can the interpreter come and the same interpreter' -- so that was a little bit confusing because she was talking to me and I had to talk to the HR but the question was through me"* –Naomi (E), stage 2

"um ---- yes ***there were a couple times that Mariela addressed me directly personally*** *like when she was leaving or after she requested a female interpreter but then said 'you can if you're available' -- I could interpret"*—Jonathan (N), stage 3

"well for example the first thing I asked them to do was to please uh speak in first person -- uh speak among each other not to me uh -- that was not really the case -- ***people were still staring at me talking in like a- not in third person but they were definitely trying to keep an eyesight to me*** *um even though I tried to keep my head down -- to not make eye contact so I can you know have them look upon each other and not me um -- not sure if that was really effective"* –Benjamin (N), stage 1

The interpreters in this study primarily reported on monitoring of two aspects of the interlocutors' behavior as illustrated in the extracts quoted above. However, the wide range of settings in which interpreters work, differences in communicative goals, and differences in interpersonal behavior suggest that the specific behaviors monitored by interpreters are likely to be situationally determined. Behaviors displayed by interlocutors during an interaction are specific to the communicative situation and the individual parties that participate in it; for example, the simulated interaction interpreted by the study participants was characterized by behaviors such as interruptions/overlapping speech and Mariela's comments directed to the interpreter. One might reasonably expect behaviors to vary, or for different behaviors to be

salient, requiring attention and potentially a response, from interaction to interaction. The specific aspects of the interlocutors' behavior monitored by the interpreter would be expected to vary as well. Thus, while the findings of this study revealed two major foci of monitoring of interlocutors' behavior, these foci must be understood as specific to this study. Analysis of other interactions might reveal evidence of monitoring of other behaviors in addition to (or instead of) those identified by this study. The principal conclusion to be drawn from the findings reported on above is thus that the interlocutors' behavior is indeed salient to interpreters' performance and is actively monitored as part of online self-regulation.

9.6.1.2.2 Monitoring the Interpreter's Behavior

The retrospections provide evidence of interpreters monitoring not only their own behavior but also the effectiveness or appropriateness of the behavioral control mechanisms they employ. For example, Benjamin describes his often-unsuccessful attempts to control the flow of the interaction, especially with regard to overlapping speech, and concludes that this aspect of the interaction was beyond his skill level:

> *"it was a lot of chaos with trying to find uh you know um organization there was uh overlapping of conversations a lot* -- ***even though I tried to get you know control of it- it was very hard to regain you know the respect as far as you know allowing me my time to interpret*** -- *so I think the level of the you know the assignment was kind of in the difficult level to my experience"* –Benjamin (N), stage 3

Similarly, Jonathan makes an evaluative comment about his use of behavioral control mechanisms, describing one mechanism (asking for repetition) as undesirable and one (taking effective notes) as more desirable, but outside his skill set:

> *"LAUGHTER I- I guess just- uh just* ***the desire to have taken better like shorthand notes so that I could stop having to ask them to repeat themselves*** -- *um yeah that was frustrating for me"* –Jonathan (N), stage 3

Although she does not directly evaluate the effectiveness of the behavioral control mechanism she employed, Carla's retrospection also indicates that she was monitoring both her own behaviors and their results:

> *"um ---- I think that um ---- probably 'cause sh-* ***I had to tell her to slow down -- and then she was speaking very fa- and I had to say 'oh can you just you know stop for a minute so I can interpret what you said'*** *and then- so I had to kind of get that- 'cause sh-*

> ***she was like speed of lightning and then I had to like slow her down -- uh so I did like kinda take control and say you know 'stop here'*** *you know 'so I can explain' and she's 'oh ok ok' you know and* ***then she'd go off on a rampage and- and then I'd have to say 'ok slow down' so I can you know ex- explain what's going on****"* –Carla (N), stage 3

Portions of the retrospections also indicate monitoring of the use of behavioral control mechanisms that the interpreters considered out-of-the-ordinary, given the circumstances in which they were employed, as illustrated by Sara's comments vis-à-vis interpreting in the third person and Ana's comments about the management style she adopted:

> *"yes and* ***I was very aware of that*** {AN: interpreting in third person rather than first person} ***because I don't usually do that -- but it was like a situation where um they were talking over each other and so I had to say uh 'she's saying'*** *-- um it was when Theresa was saying something -- usually when Theresa spoke – um and I don't know --* ***I was definitely- I was very aware*** *but now I can't really remember what she was talking about or um"* —Sara (E), stage 3

> *"sometimes I felt like* ***I was doing more of the role of the managing the discussion which should have actually been in the hands of the person in charge*** *and not in my hand -- uh* ***telling people to stop or to giving turns speaking -- that was probably a bit more than I wa- should have been doing ---- but the person in charge wasn't doing it****"*—Ana (E), stage 1

In general, the retrospections confirm that interpreters monitored the behavioral control mechanisms that they employed during performance, particularly with respect to the control mechanisms they employed in support of the cognitive processes of interpreting such as requesting speakers to slow down, requesting pauses to allow for interpretation, and requesting clarification or repetition. Their retrospections also suggest that the interpreters in this study monitored not only their behavior—<u>what</u> they did—but also the <u>effectiveness</u> or <u>appropriateness</u> of the behavioral control mechanisms they employed. For these interpreters, monitoring of their own behavior thus encompassed not only awareness of their behavior, but also checking or assuring that the behavior was having the desired effect or was sufficient to meet the end for which it was employed: that is, it involved monitoring not only 'what am I doing?' but also 'is what I'm doing accomplishing what I want it to accomplish?'

9.6.1.3 Monitoring Cognition

The lack of process-focused research into dialogue interpreting has given rise to a situation in which the available process models are primarily those developed in the context of simultaneous conference interpreting. Although it seems reasonable to assume that the basic cognitive processes involved in interpreting are to some extent similar in simultaneous conference and dialogue interpreting, there is little empirical evidence to support such an assumption. While this study did not set out to find evidence of the core cognitive processes described in the Interpreting Studies literature (i.e., listening/comprehension of source language input, language transfer, production of target language output, and monitoring of accuracy) in dialogue interpreting, qualitative analysis of the retrospections provides evidence of interpreters' online monitoring of each of these processes, thus indicating that they are indeed involved in dialogue interpreting. Although not surprising, this finding is a key contribution in that it supports inclusion of these processes in dialogue-interpreting-specific process models. The following subsections describe evidence from the retrospections of interpreters' monitoring of comprehension, retention, language transfer, production, and accuracy.

9.6.1.3.1 Monitoring (Own) Comprehension[66]

All eight of the retrospections contain comments indicative of online monitoring of the interpreter's comprehension of the source language input. These comments indicate that interpreters monitored their comprehension of aspects of the source language input such as the speaker's accent, style, speed, and lexicon. The former two (accent, style) were less frequently mentioned than the latter two (speed, lexicon).

All eight of the interpreters commented on the speed at which the parties (principally Mariela, the Spanish speaker) spoke; however, speed appears to have been a more salient issue for novices than for experts. All three of the novices mention the speakers' speed in stage 1 (uncued) of the retrospection, while only two of the experts mention it in stage 1. Many of the comments on the speakers' speed are made in the context of or linked to comments about the heightened emotion of the interaction. In some retrospections, speed is specifically identified as a difficulty (e.g., 'she was really fast') while in others the difficulty must be inferred from the interpreter's comments (e.g., 'it was difficult to get her to slow down'), but there is no clear difference in how novices and experts talk about monitoring speed. Although all of the

[66] Dialogue interpreters may also monitor others' comprehension of their target language output as signaled by the listener's nonverbal or verbal reactions to the interpretation (see Englund Dimitrova & Tiselius, 2016, discussed in Section 5.3.2). The word 'own' is included in this section heading in the interests of clarity.

retrospections touch on speed, only three of the interpreters (one expert and two novices) asked Mariela to slow down during the performance.

Monitoring of comprehension of specific lexical items was mentioned in seven of the eight retrospections. The majority of comments on lexicon occurred during stage 3 (verbal probes) of the retrospections—only one interpreter made a comment related to comprehension of lexicon in stage 1, and only two interpreters commented on the subject during stage 2 (minimal cues). Specific issues with lexicon, and examples from the data, are discussed further in the section below on monitoring of language transfer.

Overall, comprehension of lexicon was not seen as a major issue by these interpreters; indeed, several of them brought up the non-technical nature of the vocabulary in response to the verbal probe in stage 3 that asked whether any aspect of the interaction had been easy. This finding points to the need to consider the specific communicative situation when identifying factors that may affect interpreters' performance. The fact that these particular interpreters did not report on significant difficulties with comprehending the lexicon employed by the interlocutors does not imply that technical vocabulary and jargon are not salient features of the interpreting task: the fact that the lack of technical vocabulary was brought up in the retrospections as an 'easy' aspect of the interaction attests to this. The need to monitor comprehension of specialized terminology or jargon (and to employ control mechanisms in response to difficulties with comprehension of the same) is likely to be related to specific settings or types of interaction,[67] as well as to the interpreter's familiarity, or lack thereof, with the terminology employed in a given interaction.

9.6.1.3.2 Monitoring Retention

Seven of the eight interpreters in the study made comments indicating online monitoring of retention of information. Some self-evaluative comments indirectly pointed to monitoring of retention; for example, monitoring of retention may be inferred from comments regarding omissions in the target language rendition. Other comments contain more direct descriptions of monitoring of retention.

[67] A contrast between technical and non-technical vocabulary was part of the original study design—the simulation that was abandoned (see Section 7.2.2) was designed to include more technical vocabulary and jargon than the simulation that was carried out and is reported on here.

> *"Andrew and Mariela were very furious about the situation um so- so they were just – you know -- talking so fast* ***I had trouble um retaining some of the information*** *um to allow me to interpret"*—Benjamin (N), stage 1 (uncued)

> *"sorta when when people are very exalted very- very upset they tend to repeat sorta the same ideas --* ***it's sorta hard to keep track – 'ok how many versions of the same idea do I need to repeat'*** *"*—Ana (E), stage 3

> *"that part was really tough because then sometimes* ***when I would ask somebody to clarify what they had said, they would add on to what they had already said -- so then it was trying to keep two messages straight- it was -- that part that was difficult****"*—Laura (E), stage 3

> *"when I am in court you know many people say oh I understand English but I want to have an interpreter -- however they never let me say anything 'cause they answer right away and um -- so that's kind of frustrating for an interpreter because uh because you know that now you are dealing with somebody who is responding- somebody who asked and somebody who is responding and you have all of that in your brain and how are you going to deal with that --* ***you can't deal with- keep putting more and more information in your head*** *-- so at some point you have to stop the conversation and tell them ---- uh um 'I'm sorry you have to wait for me to interpret' "*—Erica (E), stage 1

These comments are general in nature: that is, the interpreters do not retrospect in detail about specific moments when they were aware of monitoring how well they were retaining information, but rather make general statements about omissions or not being able to remember everything. Comments touching on monitoring of retention also tend to co-occur with mentions of behavioral control mechanisms, thus suggesting that an identified issue with retention may be responded to either behaviorally (e.g., by asking a speaker to stop speaking and cede the turn) or cognitively (e.g., by concentrating on specific features of the discourse as illustrated by Ana's comment quoted just above).

9.6.1.3.3 Monitoring Language Transfer

The retrospections also provide evidence that interpreters monitor the process of language transfer (reformulation into the target language). This evidence comes primarily from moments when the interpreters discuss difficulties with specific lexical items, the majority of which are found in stage 3 (verbal probes) of the retrospections in response to questions about difficulties

in general or about specific instances I had noted on the observation sheet during the performance.

These portions of the retrospections are one point at which a difference between novices' and experts' process tracing becomes evident. The expert interpreters are generally better able to report on their processing of individual lexical items (including colloquialisms) than novices. Moreover, when asked for examples in follow up to a general comment, experts are more likely to give specific examples and to talk in detail about them. Novices, on the other hand, tend to affirm that they remember a specific incident or term, but are not generally as able to provide a detailed account of their processing.

For example, both Erica (E) and Sara (E) comment in detail on their processing and interpreting of the term 'despechado' (*resentful, spiteful*), which Mariela uses with reference to Andrew when she accuses him of retaliation. These retrospections are quoted in Figures 15 and 16. Note that Erica takes a few moments to move from a general recollection ('there was something... what was it?') to a specific account of her use of a covert control mechanism; the video recording of the performance demonstrates that she resolved the issue without any outward appearance of difficulty. Sara also provides a detailed account of resolving her difficulty with comprehending the same word. In her case, the control mechanism employed is a behavioral one: she queries the original speaker in order to clarify the meaning of the word. Sara's retrospection about the issue with 'despechado' also seems to trigger a second report, related to her rendition of an ambiguous phrase ('spend the night' as a euphemism for sleeping together with possible sexual implications, versus 'get through the night,' as in finishing the evening shift at work).

Despechado—Erica (E), stage 3

Researcher: so could you tell me what some of them *[AN: challenges encountered while interpreting]* were I guess and tell me if there were any of them you found either easy or hard to resolve?

Erica: well uh ---- let me see if I remember uh specifically -- *REFERS TO NOTEPAD* but I think *CONTINUES REFERRING TO NOTEPAD* ----- mmm ---- well I don't remember it specifically maybe I didn't even write it but there was something there that I thought oh ---- what was it mm mm I don't know

Researcher: generally speaking or was it like a term or an idiomatic expression

Erica: I think it was a term -- yeah -- I think it was ---- but I can't remember -- it was something that I said 'oh that's going to be a trouble when I want to' -- as I'm listening and I'm taking notes I thought 'oh that's going- that's going to be complicated -- for me' -- but I don't- I don't now ---- oh yeah despechado

Researcher: despechado

Erica: that was the one because I know what it means but I couldn't in my mind whi- many times when I am listening to what people are saying and I'm taking notes I'm already coming up with the words and that was the one that I said 'oh I can't think' and I thought 'oh I'll just explain it' so that was the one I explained because uh I couldn't come up with the term and I thought oh ok ---- whatever LAUGHTER

Figure 15. Monitoring language transfer—despechado, Erica, stage 3.

Despechado and Pasar la Noche—Sara (E), stage 3 (verbal probes)

Researcher: so actually one of the questions I want to ask first was because you mentioned while you were just talking about having some doubts about the content of some specific places can you remember any of the details of any of the specific places? It's OK if you can't but-

Sara: um not places -- words -- despacho I think she said -- despachar or something -- uh which ---- despache I can't even remember -- it was a word that I had never heard -- despachar I thought was like to like -- like I think I heard it in like airports where you despachar la maleta *[AN: check a suitcase]* like you uh what do you call that ---- check -- there you go -- but when she- she used it in the context of like UNINTELLIGIBLE a feeling and I was like I have -- so I stopped and I was like 'despacha what' -- and she was like 'despache' or whatever it was LAUGHTER -- and she's like 'herida pues' [*AN: wounded, then]* and I was like oh ok -- so I had to clarify and so that was one instance -- and um ---- there was another miscommunication where the- Theresa had said something about what can we do so that the rest of the night goes well or there's you know peace between you and I said 'pasar el resto de la noche en paz' -- which was a terrible interpretation really but I which -- so the woman was like 'what I'm not spending the night here' which that's what I said -- but I was like 'no no no' -- I had to clarify to her and then I had to clarify that to the English speakers -- but I think ---- those were the only two things that kind of caught me off guard

Figure 16. Monitoring language transfer—despechado and pasar la noche, Sara, stage 3.

In contrast, when prompted about a specific moment in the interaction, Jonathan (N) is able to recall that the moment occurred and its general context, but does not process trace, as illustrated by the quotation in Figure 17. In fact, Jonathan made a mistake at this point in the interaction, saying 'that's criminal' rather than 'that's discrimination,' and then immediately self-corrected. His retrospection does not indicate that he recalls this episode in any detail, however.

Discrimination/Criminal—Jonathan (N), stage 3

Researcher: OK what about when there was a moment when ---- Mariela accused or said that something that Andrew had done was discriminación *[AN: discrimination]* do you remember that moment

Jonathan: yes

Researcher: do you remember anything else about it

Jonathan: just that well -- she was accusing him of discrimination because she believed him to be resentful after she broke up with him

Figure 17. Monitoring language transfer--discrimination/criminal, Jonathan, stage 3.

Carla (N) comments that she had trouble with the dialect spoken by Mariela, the Spanish speaker, but is not able to recall any specific words or phrases that gave her difficulty. In the end, after talking in general about the difficulty of dealing with speakers from that region of the world, she concludes as follows, ending with a descriptor of a non-linguistic nature ("feisty"):

> *"I don't think she used anything different she just expressed herself you know in a -- and used a lot of different you know ummm -- just a little -- just the way they're more feisty"* – Carla, stage 3 (verbal probes).

She does process trace about two instances of language-transfer-related difficulty, however: the moments when she had trouble recalling the Spanish for 'human resources' and, later, expressing the phrase 'nuts and bolts' in Spanish, as illustrated in Figure 18. Interestingly, these are both terms that she originally heard in English (her native language) and had trouble rendering into Spanish (her weaker language). This contrasts with her inability to remember specific words or phrases in Spanish that caused difficulty with comprehension as illustrated in the quotation above, and contributes to the point made in Section 9.4.1 vis-à-vis the potential effects of language proficiency on performance. The second extract, about the issue with 'nuts and bolts' is interesting in that, in the performance, Carla stopped interpreting, laughed, and said in English, "I don't know how to say nuts and bolts," before continuing and saying in Spanish, "Estoy armando la situación," ('*I'm putting the situation together'*) and then engaging in two or three more turns with Mariela in which they jointly came up with a solution. Although Carla states in the retrospection that she used the word "piezas" (pieces), she did not in fact utter that word in the performance until after Mariela had said it (i.e., suggested it) as part of the back and forth between the two of them.

Human Resources—Carla (N), stage 2 (minimal cues) / Nuts and bolts—Carla, stage 3

Researcher: like does it trigger any memories of- of what you were thinking during those parts or if it doesn't that's OK

Carla: trigger memories yeah I- I almost forgot what recursos humanos *[AN: human resources]* were uh you know -- it's like when she said um we have to go to human resources and all of a sudden for a minute I became blank and then you know and that word came up a couple different -- but I got it you know

****

Researcher: I'm ta- how about challenges for you as an interpreter were there any challenges that were either easy or difficult to resolve

Carla: ---- uh oh well there was one thing I couldn't think about- about she was like we gotta put all the nuts and bolts together so I go 'how am I going to say nut' so I say 'las piezas' *[AN: pieces]* you know and then I thought of an alternative way of you know -- 'cause I caught myself going 'how do I say nuts and bolts' then I then I had to like creative thinking and think of something that would -- she could understand you know to put the pieces together you know in Spanish you know so something like that yeah

Figure 18. Monitoring language transfer--human resources, Carla, stage 2 / nuts and bolts, Carla, stage 3.

The differences in novices' and experts' retrospections about language transfer is a trend, but it is not universally encountered throughout the data. For example, Ana (E)'s retrospective comments about two moments of linguistic difficulty are limited to recalling that they happened, but do not involve process tracing, as illustrated in Figure 19. Later in the retrospection, she does briefly process trace about a specific linguistic issue when asked about it. In contrast to the brevity of her process tracing about linguistic issues, Ana provides more detailed retrospection about behavior and management than do some of the other interpreters. This contrast may point to differences in terms of what aspects of performance are most salient to individual interpreters; that is, the content of an interpreter's retrospection—and the aspects of performance most attended to—may be colored by the individual interpreter's individual characteristics and tendencies.

Cola de paja / Pick up—Ana (E), stage, 3; Special Treatment—Ana, stage 3

Researcher: can you give me any specific examples of any of those expressions *{that you found difficult}*?

Ana: cola de paja -- pick up -- Andrew used one ---- um -- I had the idea that Andrew also used one but I can't remember now

****

Researcher: there was one place um where the um-- Andrew accused her -- or the supervisor accused her of wanting special treatment -- do you remember that moment?

Ana: ---- and somebody said -- SIGH and I clarified because I said 'nice' first and then I said- I had to correct myself 'cause this was- means 'special' but that was when Andrew said it -- not when Theresa- I don't remember Theresa saying special treatment

Researcher: no I think it was Andrew that- yeah when Andrew talked about special treatment- you remember that- anything about that moment?

Ana: I remember the feeling- like I had misinterpreted by saying 'ni- uh goo- tr- que la traten bien- traten bien' *{AN: 'treat her well- treat well'}* and then I realized no she means 'trato especial' *{AN: 'special treatment'}* this means 'trato especial' so yeah I remember clarifying that

Figure 19. Monitoring language transfer—cola de paja / pick up / special treatment—Ana, stage 3.

9.6.1.3.4 Monitoring Production

Production is the cognitive process of interpreting of which there is least evidence of monitoring in the retrospections. One interpreter states, in response to a verbal probe, that she was not aware of having used the wrong language at the wrong time, which indicates a failure of production monitoring. Another comments that she was trying to use the correct tone of voice—that is, to replicate the original speaker's tone—while a third references the need to focus on her linguistic output in her weaker language. The paucity of references to production monitoring in the retrospections contrasts with the ample evidence of production monitoring found in the performance data, however: as discussed in Section 9.4.1, all of the performances contained evidence of output monitoring in the form of speech disfluencies. The retrospections thus suggest that, at least in the case of these interpreters and this interaction, monitoring of production was primarily an automated process not requiring a great deal of attention.

9.6.1.3.5 Monitoring Accuracy[68]

The retrospections provide evidence that interpreters check the semantic content of their target language output against the semantic content of source language input: that is, they do not only monitor speech production, but also the match between the source and target language utterances. Indeed, although the retrospections contain little evidence of monitoring of speech production, as discussed above, all of the retrospections contain evidence of monitoring accuracy. This contrast suggests that monitoring for accuracy is a less automated process than

[68] With regard to the use of terms such as 'accuracy' and 'match,' the reader is referred to Footnote 31.
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production monitoring. The conclusion that monitoring for accuracy requires controlled processing (i.e., attention) to a greater degree than does speech output monitoring is certainly highly plausible: although interpreters may be(come) familiar with a given setting or type of interaction, and thus be able to make some predictions about (i.e., anticipate) the semantic content of upcoming source language utterances, each interaction (and each interlocutor) is unique and is expected to contain novel source language utterances, thus requiring the interpreter to attentively monitor the match between source and target language utterances rather than rely on automated responses.

The salience of this target for monitoring to the interpreters in this study is demonstrated by the fact that evidence of monitoring accuracy (including performance evaluation) is found in stage 1 (uncued) of seven of the eight retrospections. The eighth retrospection contains a general introspective comment touching on the same theme in stage 3 (verbal probes). The novices generally made fewer and less-specific comments about their monitoring for accuracy than did the expert interpreters in the study. Although the retrospections indicate that interpreters were monitoring the accuracy of their renditions, the retrospections do not contain many detailed accounts of specific instances of such monitoring. Rather, comments touching on monitoring for accuracy tend to occur in the context of performance evaluation. The detailed accounts of specific instances of monitoring for accuracy that do occur in the data are generally focused on specific lexical items, as described in the section above on monitoring of language transfer.

The following are examples of comments that provide evidence of interpreters' monitoring for accuracy. As noted above, they are, for the most part, general comments on performance:

> *"um and **aware of some places where I messed up** and I was loo- losing the string of thought and I wasn't quite -- **I didn't catch the whole content** and I probably fudged a little bit on the- ah some of the interpreting"*—Ana (E), stage 1 (uncued)

> *"well as I said the main challenge was that uh she was saying a lot of things and um -- so I- **I hope I didn't forget anything** but I don't know -- I mean I would have to listen to myself and verify did I forget something -- because **I got the feeling that I was forgetting something**"*—Erica (E), stage 3

> *"---- **I was definitely ---- I was definitely um making some omissions** .... I wasn't able to ---- accurately interpret word for word"*—Jonathan (N), stage 1

> *"probably I- you know **I made some mistakes** but what doesn't kill you makes you stronger LAUGHTER"*—Carla (N), stage 1

> *"you know my goal is always to be accurate as an interpreter so* ***if I am not sure I would rather just clarify instead of pretending*** *I LAUGHTER under- understand and then moving on"*—Laura (E), stage 1

> *"um I was just -- to be honest I wasn't really thinking about what even- what they were talking about I was* ***more just thinking about the actual making sure I was interpreting everything that they were saying****"*—Sara (E), stage 3

In contrast with the first four extracts, the last two are not primarily evaluative in nature. Laura makes her comment in the context of discussing her frequent requests for the speakers to repeat turns at talk, while Sara is responding to a verbal probe (*"Are there any other things that you can remember thinking or any specific instances you wanted to bring up that we haven't already talked about?"*). These comments also provide important evidence that accuracy is a goal influencing interpreters' self-regulation as further discussed in Section 9.7.

9.6.1.4 Monitoring Context

9.6.1.4.1 Situational[69] Context and Interpreting: Background

The importance of contextual information to interpreting performance is well-documented in the Interpreting Studies literature (Kirchhoff, 1976/2002; Anderson, 1994; Setton, 1999; Gile, 2009). Scholars of conference interpreting have argued that interpreters' ability to comprehend speakers relies, to some extent, on their knowledge of speakers' backgrounds and their ability to anticipate the potential (communicative) acts that may transpire (Kirchhoff, 1976/2002; Kohn & Kalina, 1996; Setton, 1999; Chernov, 1994, 2004). The communicative acts that make up interactions, whether interpreted or not, are bounded and structured by social expectations (Roy, 2000), and different classes (genres) of interactions have prototypical scripts characterized by specific features or stages (Tebble, 1999, 2009; Meyer, 2002; Davitti, 2013). It has been suggested that the interpreter's knowledge and understanding of discourse practices within a given genre, including domain-specific schemata, plays a role in interpreting performance (Tebble, 1999; Meyer, 2002). Mental representations of knowledge are also understood to play an important role in expert performance, as discussed in Section 3.3.2. Tebble (1999) describes

[69] In the literature on self-regulation, and especially on self-regulated learning, 'context' often refers to the physical environment (e.g., location, objects, lighting, noise, etc.). In the Interpreting Studies literature, 'context' generally refers to background knowledge and knowledge of the setting, situation, speakers, etc. In order to differentiate between these two uses of the word, I employ 'physical context' to refer to the former and 'situational context' to refer to the latter.

how familiarity with the discourse practices of a given setting or genre of interaction is useful to interpreters:

> "If you understand the genre of the speech event for which you are interpreting, then you have in mind a schema, a frame or a structure for understanding where the consultation or interview is going. You will have a good idea of the order in which things will be said and as a consequence you can pace yourself in the way you expend your energy" .... "If you are familiar with your road map (the genre of the interpreted event) you know where you are going" (Tebble, 2009:208/210).

During the course of a communicative activity, speakers make assumptions about the listener's knowledge of the subject and context, and breakdowns in communication can occur if a speaker makes invalid assumptions about a listener's knowledge (Garwood, 2002; Janzen & Shaffer, 2008). This issue is of central importance to interpreted communication, given the likelihood that individuals from different linguistic/cultural groups will have differing backgrounds and assumptions. The potential for communication difficulties in interpreted interactions is compounded by the fact that the interpreter is a ratified listener but is not the intended addressee of the discourse s/he is interpreting, as has been pointed out by a number of scholars (see, for example, Kohn & Kalina, 1996; Setton, 1999 and Pöchhacker, 2012). As Shlesinger (1995:194) notes, speakers generally direct their remarks to their intended audience and are thus "unlikely to allow for whatever discrepancies exist between the knowledge available to the intended listener and that available to the interpreter serving as language mediator." Depending on the setting and the direction of interpreting at a given moment, the interpreter may have either less or more information than the addressee.[70] When the interpreter does not have or is unable to access sufficient background knowledge or context about the purpose for the interaction, content or subject being discussed, institutional values, individual goals, or the discourse type, s/he is likely to encounter more difficulty than if s/he is aware of, or at least on the lookout for, them.

The literature illustrates the importance of sufficient (shared) situational context to interpreting performance. Hale (2007) reports on a situation in which lack of context caused an interpreter to render a term in a way that did not correspond to the speaker's intended meaning, and on another in which insufficient understanding of a genre-specific questioning style (police interrogation methods) led to problematic target language renditions. Miguélez (2001) discusses examples from expert witness testimony in which common lexical items were used with

[70] For example, in an interpreted school meeting, the interpreter may know less than the majority-language-speaking teacher does about assessment procedures, but know more than the minority-language-speaking student or parent about the majority culture school system and approach to education.

specialized, domain-specific meanings that might be easily misunderstood and therefore misinterpreted by an interpreter lacking sufficient context. Meyer (2002) points to lack of knowledge of genre-specific goals and assumptions (specifically, those related to informed consent in medical settings) as a factor in ad hoc interpreters' performance during interpretations of informed consent processes.

Some aspects of the design of the simulation for this study were predicated on the assumption that insufficient information about situational context might affect interpreting performance. In the process of designing the simulation, lack of information about the situation and a conflicting/confusing story were identified as discourse-level difficulties to be included in the interaction (see Section 7.2.2). Therefore, the development of the simulation focused in part on revealing the backstory and the relationships between the parties in a somewhat nonlinear (i.e., unclear, convoluted) fashion. The pre-interpreting briefing given to the interpreters was purposefully kept short and did not provide a great deal of specific information about the situation. It was expected that these features of the design might increase the difficulty of the task for the interpreters, particularly for those in the expert group, who would be expected to draw more on established schemata than would the novice group.

9.6.1.4.2 Monitoring Situational Context

The retrospections provide ample evidence of interpreters' monitoring of three distinct, but related, aspects of the situational context of the interaction:

- monitoring the events taking place (including semantic content of the parties' utterances, the parties' behaviors, etc.)
- monitoring the interpreter's knowledge/understanding (or lack thereof) of the situational context
- monitoring the effect of said (lack of) knowledge on performance

That interpreters monitored the events/content of the interaction is evident in the retrospections—all of the interpreters made comments indicating they remembered some portion of the events and semantic content of the interaction. This finding is not surprising; indeed, it aligns with previous research indicating that simultaneous conference interpreters process incoming speech deeply enough to retain and subsequently recall some portion of the content of the material they have interpreted (Ivanova, 1999). In light of the fact that the research questions investigated in this study did not seek to explore interpreters' memory of the interaction itself, nor to identify differences in the quantity or quality of novices' and experts' recall of the content

of the interpreted interaction, analysis of the retrospections did not focus on how much of the content of the interaction the interpreters recounted, nor on the accuracy of their recollections.[71] Rather, it focused on qualitative analysis of the types of comments made in the retrospections.

The following extracts are illustrative of moments when interpreters' retrospections suggest that their monitoring of situational context was focused primarily on the content (i.e., story) of the interaction:

> "***I- I understand that um the history between Andrew and Mariela um led to the ongoing tension*** *and especially um with being romantically involved with someone who's at a higher working level than yourself um ---- I ----* ***I guess I understand both Mariela's unhappiness with her work assignment but the reasoning behind her scheduling for it*** *and I don't ---- I think they're fairly balanced um so I wouldn't really be able to speak to any ill intent on Andrew's part but that's-- yeah yeah I would be overstepping my boundaries if I was going to you know draw any assumptions about that"* —Jonathan (N), stage 2 (minimally-cued)

> *"****yeah I'm- I'm sorry but the only thing I didn't understand is why they were dating and they didn't speak the same language*** *-- that's what I was thinking about LAUGHTER I don't know if it has something to do with the encounter but that is what I was thinking"* —Naomi (E), stage 1 (uncued)

Some of the retrospections contain evidence of interpreters avoiding expending too much effort on monitoring the story. For example, when Laura is asked about whether she was aware of any reaction to any of the parties while interpreting (one of the verbal probes asked of all the interpreters), she responds in some detail, and then finishes by remarking on the need to avoid thinking too much about the events going on around her:

> *"but it's like something very brief I guess because* ***if you think about it too much then you can't interpret*** *LAUGHTER"*—Laura (E), stage 3 (verbal probes)

Sara makes a similar comment, indicating that she was monitoring the events of the interaction only to the extent necessary to interpret them:

> *"um I was just -- to be honest* ***I wasn't really thinking about what even- what they were talking*** *about I was more just thinking about the actual making sure I was interpreting*

[71] Scholars interested in dialogue interpreters' processing, retention, and post-task retrieval of semantic information from LTM might productively draw on the recall-testing portion of Ivanova's (1999) study as a model for further research.

> *everything that they were saying* -- ***I mean obviously thinking about what they were talking about to the extent that I need to understand what they are saying*** -- *but not really having an opinion one way or the other"* –Sara (E), stage 3

The second aspect of contextual monitoring mentioned at the beginning of this section involves interpreters' monitoring of <u>their own understanding</u> of the situational context. The retrospections provide ample evidence of interpreters' monitoring of their knowledge and understanding of aspects such as the type of interaction occurring (genre, setting); the backstory (what led to the interaction, why it is happening); identities of and relationships between the parties; and external factors bearing on the interaction and/or on the interpreting task. In addition to monitoring the extent to which they understood the situational context, some of the retrospections demonstrate monitoring of the <u>effect</u> of (lack of) knowledge of the situational context on performance.

Analysis of the portions of the retrospection touching on (lack of) knowledge of context and its effects on performance reveals differences in novices' and experts' monitoring of situational context. The interpreters in the expert group make more comments related to situational context than do those in the novice group. The expert interpreters' comments related to situational context tend to focus on the effects on their performance of having insufficient background knowledge about the setting, participants, and backstory, while novices' comments tend to focus more on the story itself (i.e., the first aspect of situational context mentioned just above). Experts often make comments related to situational context in multiple stages of their retrospection (i.e., they mention the subject on multiple occasions throughout the retrospection), usually in stage 1 (uncued) and stage 2 (minimal cues) of the retrospections. The fact that many of the experts' comments on this theme are spontaneous (i.e., not in response to verbal probes), and the fact that they return to the theme repeatedly throughout the retrospections, highlights the salience that situational context has for them.

Laura brings up the lack of situational context in all three stages of the retrospection, and indicates that she felt her performance might have been improved by having more situational context:

> *"it was really* ***hard to keep the events straight****"*—Laura (E), stage 1

> *"oh well that* ***I had no idea what I was interp- interpreting*** *-- I was expecting something else -- I don't know why I was expecting something in the medical field -- maybe because that's th- something I am very used to interpreting for um -- and then so* ***I was trying to figure out where I am -- what is the issue that I am going to be interpreting -- you know what type of terminology will I need to use****"*—Laura (E), stage 2

> *"sometimes I felt like it was difficult to do that* {AN: achieve the right tone} *very well or at a really good level- excellent level because I was so focused on the message -- and* ***I feel like if I would have understood the situation ahead of time then maybe I could have been able to do that a little bit better****."*—Laura (E), stage 3

Ana mentions the lack of situational context in stages 2 and 3 of her retrospection. She also indicates that insufficient situational context led her to become confused at one point:

> *"umm --* ***I was caught a little by surprise because I wasn't aware that this- I was walking right into the interaction*** *-- I would have known normally more of the setting -- I would have known the names of the people involved or whether we are in a school or hospital or a clinic --* ***so not having any context at all was a- a surprise****"*—Ana (E), stage 2

> *"****and that confused me -- the names -- I wasn't cognizant enough of the background*** *so I didn't know about that"*—Ana (E), stage 3

Erica comments on her emotional reaction to not having sufficient situational context in stages 1 and 3 of her retrospection:

> *"well the whole situation was ---- uh ----- unsettling 'cause I got there and I didn't know am I arriving in a- in a place of work in a company -- where am I arriving? ....* ***that was a little bit uncomfortable -- that you don't know you are being thrown into a situation LAUGHTER – and you don't know what is it -- what is the language that I am going to be using*** *-- is it legal is it what"* –Erica (E), stage 1

> *"um* ***I think I was a little bit upset at the beginning LAUGHTER just because I didn't know what it was and that I am- I am very much um ---- I like to be in a comfort zone*** *and so if I'm not I- I get a little upset -- so I think at the beginning I was a little upset"*—Erica (E), stage 3

Sara brings up the lack of situational context in all three stages of her retrospection, and talks about its effect on her performance at some length:

> *"yeah -- I think* ***at the very beginning I wasn't really- just not knowing what had happened between- I mean I could tell something had happened*** *between the two characters but I didn't know and I didn't know like what the overall situation was um .... yeah just not knowing that it was like oh this is a personnel problem this- between two coworkers and uh* ***not knowing their history obviously affects -- 'cause they're talking about things that happened in the past that I'm not you know -- as the interpreter I***

> ***wasn't aware of -- so that and things that came into play and so it's harder to interpret things where you have zero contex****t um but I didn't -- it became clear as questions were asked and um ---- yeah sometimes it's-* ***you start doubting what you're interpreting*** *when you don't really know what the context or background is"*—Sara (E), stage 1

> *"so I think I was just-* ***in my head I was just trying to kind of hash through what they were dealing with and trying to- to give myself context trying to understand*** *as I'm interpreting what is happening -- like what the deeper problem is"*—Sara (E), stage 2

> *"it was easier to manage the flow -- I mean they were good about pretty much listening to -- following my lead and so I could keep it at shorter segments because I didn't have any -- when- for me* ***if I don't have any context or background and I don't have anything to write with it's like I need to have shorter segments****"*—Sara (E), stage 3

There is also an example of a novice interpreter who identifies lack of background knowledge as an issue that affected his performance:

> "*I think you know it would have been nice to have a better understanding before going into the room about what was going to be -- you know what the encounter was going to be about or what the assignment was going to be -- as* ***I didn't have clear understanding of what the assignment -- and I think that led to some of the you know not being prepared mentally to be prepared what's the situation and that kind of deal.*** *"*—Benjamin (N), stage 2

The retrospections thus indicate that lack of situational knowledge was perceived as a potential threat to task performance by the majority of the interpreters in this sample. The fact that interpreters brought up the topic spontaneously in stages 1 and 2 of the retrospections, rather than in response to verbal probes, together with the fact that they returned to the theme multiple times within their retrospections, suggests that the lack of situational context was highly salient to these interpreters. Expert interpreters in this study clearly perceived contextual knowledge as important not only to their level of comfort with the interaction, but also to their ability to perform well.

For experts, who are presumed to have well-developed and stable mental representations of the genres or types of interactions they are accustomed to encountering, as well as of the interpreting task as a whole, receiving contextual knowledge in advance of, or even at the beginning of, an interaction would likely trigger the activation of relevant knowledge structures in LTM. As Miller & Cohen (2001) highlight, an individual's mental representation of a goal and the means/rules associated

with it generally "must be activated *in anticipation* of the behavior they govern" (p. 180, emphasis added). Not having sufficient information to activate relevant mental representations in advance of performance would be expected to make it more difficult for the expert interpreter, whose mental representations are presumably more developed and stable than the those of the novice, to rely on preestablished (i.e., automated) patterns and to act strategically based on his/her prior experience of similar situations, at least at the beginning of the interaction. Moreover, the experience of not being able to immediately draw on established mental representations in the manner to which one is accustomed would likely be a notable occurrence, and thus more likely to be attended to and recalled.

In stage 1 of her retrospection, Erica describes how she generally draws on schemata (although she does not use that term) to mentally prepare herself for assignments:

> *"I didn't know am I arriving in a- in a place of work in a company -- where am I arriving -- I'm in a hospital -- I am in a court -- I didn't know where I was so uh -- usually* ***even though you may not know exactly what's going on -- I know that if I am going to court if um I go to*** **[name of location]** ***it's probably traffic if I am going to*** **[name of location]** ***and it's the third floor it's probably housing -- so you know in my head – you- you kind of prepare --*** *if it is a hospital and I go to the emergency room I know what kind of situations I am going to encounter so –* ***the- the thing is that in your mind even as you walk and you don't know much you are preparing and thinking uh it could be this it could be that****"* —Erica (E), stage 1

While the study design does not allow for drawing conclusions about the effects of the lack of contextual knowledge on the interpreter's performance, qualitative analysis of the performance data suggests that the expert interpreters were able to perform effectively despite their expressed discomfort arising from lack of contextual knowledge. Additionally, the retrospections of the three most experienced interpreters suggest that they were able to adapt to the situation as it presented itself and recover from their initial discomfort.

The fact that novices did not, for the most part, comment on the lack of situational context is also suggestive. It may be that novices were too overwhelmed by the task to attend to their lack of contextual knowledge (in this context, it is important to note that Benjamin, the only novice who commented on the lack of background knowledge, is the only novice with roughly balanced skills in both languages). It also may be that novices have not had enough experience to develop schema for specific settings or genres of encounters, and, therefore, would not be as likely to experience insufficient situational context as problematic: that is, as novices are not accustomed

to knowing what to expect, the sensation of having little contextual knowledge (i.e., no or a poorly formed mental representation to draw on) may be less noteworthy, and thus less salient to their experience of task performance.

9.6.1.4.3 Monitoring Physical Context

One theme that did not arise in the data is the physical context. While experience, intuition, and anecdotal evidence suggest that the physical context—including factors such as physical positioning of the parties, ambient noise, and lighting—does play a role in interpreting performance, and may need to be adjusted in order to achieve optimal performance,[72] neither the performance nor the retrospection data provides evidence of monitoring and control related to the physical context.

This finding may be an artifact of the research methodology. I set up the room in advance of each simulation such that the seating and sight lines facilitated interpreting and video recording of a multi-party interaction. The actor playing Theresa told the interpreters where to sit after welcoming them to the room. The room was also free of extraneous ambient noise, and the lighting was adequate. The physical setup included a table on which the interpreter could rest a note-taking pad (for a screenshot of the physical setup, see Figure 9 in Section 7.6.1). These factors reduced both the potential need for and the possibility of adjusting the physical context.

Since the study's research questions were not specifically focused on interpreters' monitoring and control of the environment, the design of the simulation did not include environmental factors such as noise or less-than-ideal physical positioning of the parties (including possible problematic issues such as lack of space, insufficient seating, poor sight lines, computers/technology, parties moving about the room during the interaction, or lack of a surface on which to rest a notepad). Had such factors been included in the design of the simulation, the quality of the video and audio recordings might not have been of sufficient quality for subsequent analysis.

[72] See, for example, Dean & Pollard's (2013) textbook on the demand-control schema, which discusses a number of potential demands in the physical environment as well as potential responses to them. In addition, evidence suggesting that environmental factors may affect interpreters' mental fatigue has been collected as part of ongoing research into the relationship between encounter acuity and interpreter fatigue carried out at Children's Healthcare of Atlanta (USA). A PowerPoint presentation on this research in progress is available at http://www.marcus.org/images/choa/PowerPoint/2015-CFIE-Emory-Conference.pptx (Andrea Henry, CMI Staff Spanish Interpreter, and Kathy Murphy, MSN, RN, PCNS-BC, PNP-BC, Clinical Nurse Specialist/Pediatric Nurse Practitioner, personal communication).

Although these factors were not a part of this study's design, the interpreter's regulation of physical context, and the development of this ability over time, is an object of study with important implications for education and practice. Future research drawing on this study's methodology might consider how the simulation could be modified to include opportunities for monitoring and control of the physical context. Observation of naturally-occurring interactions—in which the physical environment is not controlled by a researcher—with subsequent process tracing might also be a fruitful way of exploring this aspect of online self-regulation.

9.6.2 Online Control

In addition to the evidence of online monitoring discussed in the preceding pages, the retrospections provide abundant information about the online control mechanisms employed by the interpreters in this study. As discussed in Chapter 4, control mechanisms are brought to bear when online monitoring indicates the need for action in order to create or maintain alignment between the current state and the goal state. The portions of interpreters' retrospections touching on the control mechanisms they employed provide insight into the means available to the interpreter to achieve or maintain equilibrium within the system of the interpreted interaction. They also provide insight into the goal states mediating online self-regulation. This analysis focuses on the mechanisms by which control is exerted rather than on the issue or problem in response to which a given mechanism is employed. The following sections report on affectual, cognitive, and behavioral control mechanisms mentioned in the retrospections, and discuss context and control.

9.6.2.1 Affectual Control Mechanisms

Six of the interpreters in this study mentioned affect-related control mechanisms in their retrospections, generally during stage 3 (verbal probes). None of the interpreters mentioned affectual control mechanisms during stage 1 (uncued) of the retrospections, and only one interpreter mentioned one in stage 2 (minimally-cued). This finding suggests that affectual control mechanisms were not highly salient to these interpreters. Affectual control mechanisms were more frequently mentioned by experts than by novices.

The affectual control mechanisms reported in the retrospections tend to focus on maintaining neutrality (which has been classified here an affectual control mechanism inasmuch as an attempt to maintain neutrality implies an attempt to control one's emotional response to the

situation/one of the parties), maintaining a calm emotional state, and positive self-talk.[73] The extracts below are illustrative of the mentions of affect-related control mechanisms in the retrospections:

> *"**trying to be neutral** you know -- you can't take sides but you have to express the message and that's- yeah"*—Carla (N), stage 3

> *"I focused on her* [Theresa] *more like -- because I had this like really bad energy here and I had like a really relaxed person on my- on the right so **I tried more like- to like to have empathy with that character -- you know like try to be relaxed**"*—Naomi (E), stage 3

> *"Well I- I- **I was trying not to react** to anything that the woman was saying -- things that could be annoying to me in particular 'cause she was asking me questions and she was being nice to me but she was kind of very disruptive -- and like what you don't want to have when you are interpreting and -- but **I try not to ---- react -- I- I didn't react actually** -- yeah -- and that was a control -- **I had to control myself to say 'ok no you're just interpreting** so you're not going to participate in any' -- so my face I tried to make it -- not to show anything with anybody"*—Erica (E), stage 3

> *"so I- I was having **a lot of doubts** about how well I was able to interpret at the same time **but just trying not to have that distract me** either and **just try to think you know 'I can do this'** kind of LAUGHTER"*—Laura (E), stage 3

9.6.2.2 Behavioral Control Mechanisms

Many of the behavioral control mechanisms employed by interpreters can be observed in the performance data, as discussed in Section 9.4. For the most part, the range of behavioral control mechanisms mentioned in the retrospections corresponds to those observed in the performance data. The retrospections also mention several control mechanisms not coded for in the performance data because they were either not observable or observable but not identifiable as control mechanisms in the absence of the evidence from the interpreter's retrospection (e.g., avoiding making eye contact with someone).

Analysis of the retrospections indicates two primary foci of behavioral control mechanisms: (a.) turn-taking, management, and accuracy, and (b.) maintaining professional role boundaries.

[73] Self-directed talk is discussed in detail by Maddux & Nicodemus (2016), who report on a study of American Sign Language-English interpreters' self-talk.

The behavioral control mechanisms mentioned by interpreters in the retrospections are summarized in Table 31.

Behavioral Control Mechanisms Mentioned in the Retrospections	
Focused on turn-taking, management, and maintaining accuracy:	• asking speakers to slow down • asking speakers to pause frequently (keep utterances/segments short) • requesting clarification or repetition • interrupting speakers to take a turn at talk • actively managing turn-taking—giving and taking turns at talk • using body language to get/give turns at talk • asking speakers to speak one at a time • using body language to indicate who said what when interpreting multiple turns in sequence (e.g., when there has been overlapping speech, or when a question and answer pair were rapidly produced in English without a pause for interpretation) • finishing the rendition in progress before dealing with overlap • omitting/ignoring overlapping speech or side comments • pausing the interaction to self-correct or to clarify confusion • switching interpreting modes • taking notes
Focused on professional role boundaries:	• avoiding making eye contact with parties • explaining interpreter's role/boundaries • redirecting talk directed at the interpreter • ignoring/not responding to comments directed at the interpreter

Table 31. Summary of behavioral control mechanisms mentioned in retrospections.

The following extracts are examples of interpreters' retrospections with regard to their use of behavioral control mechanisms aimed at interaction management:

> *"yeah it was difficult to deal with the other three people because the woman Mariela was really upset so that makes things really difficult and --* ***I mean two or three times what I said- I had to interrupt and say 'can each one respect their turns*** *and I am just going to interpret what is for the things you need to say in these meetings and I don't really want to um LAUGHTER I don't really want you to tell me anything personal' "*—Naomi (E), stage 3

> *"and um trying well -- yeah trying yeah -- like* ***trying to slow slow down the speakers and having only one speaker speak at time and realizing that I didn't say that at the beginning*** *because it usually doesn't happen --* ***I am so used to people that have worked with interpreters before -- so it's something I haven't had to do for a while I guess is manage the flow****"*—Laura (E), stage 2

> *"she wanted to be the one expressing all her you know -- emotions and what's going on and he was mad LAUGHTER 'cause he couldn't -- you know -- so* ***I had to say you know give him a chance to speak and you know it's like let him -- so I had to tell her 'hey could you please you know give him a minute you know to express himself'*** *"*—Carla (N), stage 3

> *"um yeah I realized um ----* ***I realized that I switched a couple times back and forth between first person and third person*** *and I think it happened more when I would be interpreting and another party would interrupt um --* ***in an attempt to include what they had just said I switched over to the third person uh to like finish the interpreting****"*—Jonathan (N), stage 3

> "*OK so I am supposed to be accurate and I am supposed to interpret everything -- so* ***if Andrew is saying something and Mariela is saying something under her breath but I am not interpreting that then it is not getting completed so then I need to start managing things more*** *-- and uh ---- um* ***and doing a little bit more of the 'he said' 'she said' 'they said' LAUGHTER sort of kind of thing -- um I was aware -- and I guess I didn't mention this -- of having to use a lot of body language*** *and- and she clarified or they clarified or things which I have probably started doing in the last years only*" –Ana (E), stage 3

> *"---- mm ---- I was just thinking that I- it was really hard to keep the events straight and to manage the flow of communication um --* ***I wanted to try to make sure I was***

> ***understanding so I had to ask for a lot of clarification****" ..... "oh just that this was very difficult that -- and I was trying to make sure that I didn't make anybody mad by asking for so many clarifications --* ***but just that I didn't wanna interpret something wrong because I thought that could further escalate the conflict*** *and then it -- you know* ***my goal is always to be accurate as an interpreter so if I am not sure I would rather just clarify instead of pretending*** *I LAUGHTER under- understand and then moving on"*—Laura (E), stage 1

The latter two extracts are especially revealing in that both Ana and Laura link their use of behavioral control mechanisms to a performance goal, which provides evidence of a goal state influencing their self-regulatory processes, as further discussed in Section 9.7.

The following extracts illustrate control mechanisms aimed at establishing and maintaining professional role boundaries:

> *"yeah maybe I should be like more serious and say that I am just going to interpret like what is nece- like what they say like in the group you know like --* ***since the very beginning I should have said 'I am just going to interpret like what you say to each other*** *and I am not going to like interpret like personal commenta- comments' you know -- so yeah maybe instead of waiting a little bit and say 'hey I am just going to interpret this' I should since the very beginning have said like* ***'this is my role and I am going to interpret this'*** *and bla bla bla"*—Naomi (E), stage 3

> *"uh noticing that Mariela was looking at me and wondering if I should have dealt with that but I* ***felt like it wasn't an important enough issue to try to tell her to look at somebody else -- uh so avoiding eye contact with her****"*—Ana (E), stage 1

> *"managing the flow was a little difficult especially at the beginning but I think it --* ***I think that once I explained my role and how I work then they were able to kind of um follow my lead a little bit more****"*—Sara (E), stage 1

Inasmuch as behavioral control mechanisms are observable in the data (as opposed to affectual or cognitive control mechanisms, which are covert), it is possible to compare interpreters' retrospections about behavioral control mechanisms with their behavior during performance. This allows an opportunity for triangulating between the two data sources in order to compare what a given interpreter <u>said</u> in the retrospection with what s/he <u>did</u> during performance.

Table 32 compares each interpreter's retrospective comments related to behavioral control mechanisms with the behaviors observed in the interpreter's performances (reported on in detail in Section 9.4). This analysis reveals a number of individual differences—for example, some interpreters comment frequently on the behavioral control mechanisms they employed, while others make few comments about them. As was the case with the quantitative data on control mechanisms observed in the performance data (see Section 9.4), this analysis points to variation among individuals but not to any clear pattern of differences between novices and experts.

Name	Behavioral Control Mechanisms Mentioned in RETROSPECTION	Behavioral Control Mechanisms Observed in PERFORMANCE	Comments/Other Noteworthy Aspects
Ana (E)	• Mentions switching modes • Talks at length about management approach & rationale for same	• Frequently interrupts to get turn at talk • Frequent use of gestures to get speakers to pause • Keeps arm stretched out on table ready to interrupt	• Does lots of active management, and retrospects at length about it
Laura (E)	• Frequently mentions asking for clarification • Mentions need to ask parties to slow down and take turns	• Infrequently interrupts to get turn at talk • Infrequent use of gestures to get speakers to pause • Very frequently requests repetition • Very frequently requests parties to speak one at a time	• Does less active management than some of the other interpreters, but requests a lot of repetition, which she brings up more than once in her retrospection • Renders overlapping speech very frequently
Sara (E)	• Mentions switching modes • Mentions needing to clarify with original speaker in re two lexical items • Mentions that the parties followed her lead in re pausing for interpretation—but doesn't talk otherwise about turn-taking	• Frequent use of gestures to get speakers to pause • Infrequently interrupts to get turn at talk	• Does a fair amount of management, but doesn't retrospect about management at length • This contrasts with her detailed retrospection about lexical items (see Section 9.6.1.3) and about situational context (see Section 9.6.1.4)

Name	Behavioral Control Mechanisms Mentioned in RETROSPECTION	Behavioral Control Mechanisms Observed in PERFORMANCE	Comments/Other Noteworthy Aspects
Naomi (E)	• Mentions interrupting parties to get a turn at talk • Mentions asking parties to take turns speaking • Mentions asking parties not to make personal comments directed to her	• Very frequently requests parties to speak one at a time • Infrequently interrupts to get turn at talk • Tells people she will only interpret relevant comments, not personal ones; later denies Mariela the turn at talk, tells her to wait	• When asked to talk about managing overlapping speech, doesn't process trace in detail
Erica (E)	• Mentions switching modes • Does not talk about managing turn-taking	• Frequently interrupts to get turn at talk • Often gives/takes turns at talk using gaze	• Does lots of active management, but does not retrospect about management at length • This contrasts with her detailed retrospection about "despechado" (a language-transfer issue; see Section 9.6.1.3) and about situational context (see Section 9.6.1.4)
Jonathan (N)	• Mentions difficulty of interrupting Mariela • Mentions asking parties to repeat themselves	• Does not engage in a lot of active management; he is in the middle group (i.e., neither frequent nor infrequent) in all of the categories analyzed in the quantitative analysis	• Retrospective mentions of management are in passing, in the context of comments focused on other things, rather than process tracing about his management-related actions • The interaction he interpreted had very frequent instances of overlap; he rendered them infrequently

Name	Behavioral Control Mechanisms Mentioned in RETROSPECTION	Behavioral Control Mechanisms Observed in PERFORMANCE	Comments/Other Noteworthy Aspects
Benjamin (N)	• Mentions asking parties to take turns and pause often • States that he avoided eye contact with parties • Mentions switching mode • Mentions intervening to clarify confusion (when asked about it)	• Infrequent use of gestures to request pauses • Very frequent use of verbal requests to get pauses • Infrequent requests for repetition • Frequently interrupts to get turn at talk	• States in retrospection that he felt more comfortable toward the end and things slowed down; in fact, his management style switched and became more active toward the end of the interaction, but he does not mention this in his retrospection
Carla (N)	• Multiple mentions of asking parties to slow down • Mentions asking parties to stop so she could interpret • Mentions telling Mariela to give Andrew a chance to speak	• Frequently interrupts to get turn at talk • Infrequent use of verbal requests for pauses • Infrequent requests for repetition	• Does not retrospect in detail about her management of turn-taking

Table 32. Comparison of behavioral control mechanisms mentioned in retrospections and behavioral control mechanisms observed in performances, by interpreter.

9.6.2.3 Cognitive Control Mechanisms

The retrospections also contain evidence of cognitive control mechanisms. Five of the retrospections mention redirecting or increasing attention to the task as illustrated by the following examples:

> *"mostly it was just* ***the effort to keep on task*** *-- to sort of just not let my mind go off."*—Ana (E), stage 3 (verbal probes)

> *"because I wasn't sure if that's* {AN: asking Mariela not to use her phone} *really my place as the interpreter .... **I should just try to focus on what Andrew was saying and try to block out distractions** because that's something that um -- actually where I work they grade interpreters on is can you funnel can you filter out distractions as kind of our job"*—Laura (E), stage 3

Benjamin, who completed a training course shortly before participating in the study, describes his use of a cognitive control mechanism taught during training:

> *"um I tried my best in retaining information –* ***um for example one of the*** *UNINTELLIGIBLE* ***techniques I used was as far as when they were starting to list items*** *like uh 'you have th- the two classrooms, you have the gym, and then you have uh the restrooms to be done' --* ***I tried like counting my fingers- like items -- so instead of remembering the whole thing I remember then in sections -- and I think that worked very well to recap stuff- not recap but interpret the message*** *that was trying to be conveyed from one person to another um -- so that's one of the items that I did"*—Benjamin (N), stage 1

Another example of a cognitive control mechanism appears in Erica's account of her mental search for a translation of the word 'despechado,' quoted in Section 9.6.1.3. Erica's statement that she explained the idea because she was unable to retrieve the correct translation is an example of circumlocution, which involves explaining the meaning of a word or concept that the interpreter understands but for which s/he does not know or recall the appropriate target language term. Although circumlocution is frequently observed in the performance data, the retrospections contain few descriptions of its use, and none of the interpreters refers to it by name.

Among the cognitive control mechanisms mentioned in the interpreting literature is strategic (i.e., purposeful) omission of a portion of a source language utterance, as described by Napier (2004), Napier & Barker (2004), & Arumí Ribas (2012). Although omissions are generally described as interpreting errors, Napier (2004:125) argues that "some omissions can be regarded as strategies whereby a conscious decision is made to leave something out, or to reduce the

amount of source-language information rendered in the target language." Her taxonomy of omissions distinguishes between omissions that are purposeful and those that are unintended, as well as between omissions that do not cause loss of "meaningful information" (Napier, 2004:125) and those that do. Arumí Ribas (2012:830) describes strategic omission as requiring "a certain amount of practice and decision-making ... to use it effectively," and notes that the advanced students in her study reported using this strategy more frequently than the beginning students did. The retrospections collected for the present study include multiple references to omissions, but the majority of these references are made in the context of performance evaluation and are not described as purposeful. Two interpreters in this study do appear to describe purposeful omission. One of them states that she omitted overlapping speech that she perceived as personal in nature or not relevant to the interaction's purpose (this interpreter rendered less than 20% of the instances of overlapping speech in the interaction she interpreted). The other recalls wondering if she should let side comments slip or not, but does not state what she actually did (this interpreter rendered less than 40% of the instances of overlapping speech in the interaction she interpreted).

Another related phenomenon observed in the data is summarizing. Although the performance data contains many instances in which a source language utterance is summarized in the target language, the retrospections contain only two comments indicative of purposeful summarizing. One interpreter mentions making a strategic choice to summarize information due to overload (i.e., too much incoming information), and another mentions being aware that she was occasionally "fudging," which, taken in the context of her retrospection, seems to mean that she was conscious of summarizing or giving partial target language renditions of the source language utterance.

Although circumlocution, omission, and summarizing are frequently observed in the performances, the paucity of mentions of these phenomena in the retrospections makes it impossible to know whether these control mechanisms were being employed purposefully (strategically), or spontaneously as a result of cognitive overload due to difficulties with one or more factors including comprehension, retention, language transfer, speech production, and/or task coordination. There are a number of possible reasons why the retrospections completed for this study do not contain more indications of cognitive control mechanisms:

- Use of frequently-employed cognitive control mechanisms, such as circumlocution, may be automated and thus not attended to or accessible for retrospection. In this case, one might expect novices, whose use of control mechanisms is likely to be less automated, to have attended more to their use of cognitive control mechanisms, and thus have

commented on them more. However, novices may have been suffering from cognitive overload (i.e., been overwhelmed by the task), and thus not have remembered.

- Interpreters may not have a meta-language with which to discuss cognitive control mechanisms—that is, they may not have been explicitly taught to use (and, thus, to identify and name) cognitive control mechanisms such as circumlocution.[74]
- Interpreters may not have become accustomed, via explicit training methods focused on developing metacognitive skills through self-assessment and reflection, to attend to and subsequently report on their use of cognitive control mechanisms.
- Interpreters may not report on omission or summarizing even if they strategically employed them. Interpreters who have been taught that they should never omit or summarize may be less likely to discuss their use of these strategies.[75]
- Interpreters were not presented with a transcript or video of the source material or of their performance as a cue for retrospection. While this methodological decision decreased the likelihood that the cue would create new memories or draw the interpreter's attention to new aspects of their performance, it may also have decreased the amount of data produced in the process tracing including comments related to cognitive control mechanisms.
- None of the verbal probes asked specifically about cognitive control mechanisms.

The data collected in this study do not allow for drawing conclusions about the reasons for the dearth of mentions of cognitive control mechanisms in the retrospections. It is likely that some combination of the factors mentioned above, plus others that may not have been identified, were at play. Future research might productively explore the incidence of retrospective mention of such control mechanisms by interpreters who have been explicitly trained to use specific strategies, or include design elements aimed at eliciting interpreters' comments about the use of specific control mechanisms as described by Napier (2004) and Napier & Barker (2004). It might also compare cued with uncued retrospection in order to further evaluate the strengths and weaknesses of the two methodological approaches.

[74] See Arumí Ribas (2012) for comments on explicitly teaching students about strategies and encouraging them to reflect on their use of same during performance.

[75] The fact that all of the participants were aware of my professional role as an instructor of interpreting at the study site may also have contributed to any unwillingness to discuss purposeful use of such control mechanisms.

9.6.2.3.1 Comparison with Cognitive Control Mechanisms Identified by Ivanova (1999)

This section compares the findings reported on in the preceding subsection with the strategies identified by Ivanova (1999) in her analysis of retrospections provided by simultaneous conference interpreters (see Section 3.4 for more details of the study). Although one would not expect the online strategies employed by simultaneous conference interpreters to correspond completely with the cognitive control mechanisms employed by dialogue interpreters, some commonalities may be identified. Comparison of the findings of the two studies is valuable in that it provides insight into the distinct parameters of the two tasks, and sheds further light on similarities and differences in interpreters' online self-regulation in dialogue interpreting and simultaneous conference interpreting.

The strategies described by Ivanova (1999:181) are as follows:

- selection—"selection of one SL[76] chunk for further processing because it is more informationally or pragmatically salient"
- summarization—"rendering the gist of a SL segment"
- restructuring—"changing the original syntactic structure of a SL segment (usu. by transposing clauses or segments within the clause), in order to improve the expression in TL or in anticipation of problems"
- creative interpretation—"compensating for missing information by guessing on the basis of previous knowledge"
- overgeneralization—"rendering an aspect of ST (e.g, a lexeme) by selecting a more abstract, hence less committing representation in TL"
- deletion—"omitting SL chunks because of time constraints without reference to their semantic and pragmatic role"
- explicitation—"explicitly expressing information inferred from the ST"
- compromise—"lower the acceptability standards for a TL production in order to minimise processing costs"

Several of the control mechanisms reported on by Ivanova correspond, in some degree, to those identified in the retrospections collected for this study. While not quite the same as circumlocution, "overgeneralization" refers to a similar type of mechanism in which the interpreter 'works around' a lexical item that is causing difficulty. Ivanova's description of

[76] SL refers to source language; TL to target language.

deletion refers specifically to the time constraints of simultaneous interpreting. While I do not speculate as to the reasons for using strategic omission in dialogue interpreting, it is unlikely that it would be due specifically to time constraints in the dialogue setting, except in cases in which the interpreter is performing in simultaneous mode (i.e., chuchotage/whispered simul) rather than consecutive at the time of the omission.[77] Her description of summarizing matches that used in the preceding section.

The other mechanisms mentioned by Ivanova are not found in the retrospections with the possible exception of compromise, which may be indicated in one interpreter's remarks that she was "fudging." This may be partly due to the fact that I did not set out to validate Ivanova's categories, and did not, therefore, ask questions designed to elicit information about them or seek evidence of them in the retrospection data. It also may be partly due to the nature of dialogue interpreting, in which the interpreter has recourse to a wide range of behavioral control strategies—such as stopping speakers when turns at talk get too long or asking for repetition—that are not generally available to the simultaneous conference interpreter. It also may be partly due to the fact that the interpreters in this study were not presented with a detailed cue for retrospection, in contrast with Ivanova's study, in which interpreters were presented with a transcript of the original.

Comparison of the cognitive control mechanisms identified in the retrospections in both studies thus confirms some commonalities in the online cognitive/linguistic control mechanisms employed by dialogue and conference interpreters, while also pointing to differences that could be fruitfully explored through further research. Further research would also help to clarify whether the differences identified are robust, or whether they may have been influenced by differences in task constraints or method. A clearer understanding of the control mechanisms employed by dialogue and conference interpreters will prove useful in clarifying similarities and differences in the task and in formulating a dialogue-interpreting-specific process model.

9.6.2.4 Control & Context

As previously noted, this dissertation defines and discusses control mechanisms as the means by which control is exerted rather than in terms of the target of the control mechanism (i.e., the thing upon which control is being exerted) or the class of problem that triggered employment of the control mechanism. This analytical approach precludes the identification of a set of 'contextual control mechanisms' inasmuch as context cannot be employed as a control

[77] Dialogue interpreters are generally trained to ask the speaker to repeat or clarify any portion of the source language utterance that was not understood before producing a target language rendition, especially when working in consecutive mode.

mechanism. Thus, when monitoring processes indicate a context-related mismatch between the goal state and the current state (i.e., the interpreting task being undertaken), any response that occurs would come in the form of an affectual, cognitive, or behavioral control mechanism.

Although the retrospections do not contain clear evidence of control mechanisms employed in response to issues arising from the physical context, the performance data does contain two instances that appear to be evidence of behavioral control mechanisms employed in response to monitoring of situational context. The first occurs when an interpreter briefly intervenes to verify that the interaction was supposed to be taking place at night (the simulation itself was taking place during the day). The second occurs when another interpreter briefly verifies that Andrew's work position places him in a supervisory role over Mariela, although, in the absence of retrospective comments from the interpreter about this moment, it is not clear whether this request for verification was made in response to a difficulty related to insufficient context or to language comprehension issues (i.e., the interpreter may not have fully understood a previous turn at talk). Other than these two moments, the performances do not provide evidence of other possible behavioral responses to a need for a better understanding of situational context, such as requests for explanation or clarification of the parties' identities, roles, relationships, or backstories.

The paucity of evidence of control mechanisms arising from insufficient situational context contrasts notably with the frequency of mentions of having insufficient contextual information as discussed in Section 9.6.1.4. Given the interpreters' stated desire for more background information, it is noteworthy that they did not intervene to get more information during the course of the interaction itself.

It is possible that the fact that the interaction was simulated played a role in this phenomenon—in a naturally occurring interaction, where any issues with the quality of performance arising from insufficient knowledge of the situation could have significant consequences, the interpreters might have acted differently. Although some of the retrospections seem to indicate that the interpreters who provided them were highly immersed in the simulation, others do include comments indicating that the interpreters who provided them were aware of the simulated nature of the interaction as they interpreted and that this awareness may have affected their performance (see Section 8.8.1). Of the two instances of context-related behavioral control mechanisms described in the preceding paragraph, one occurred in the performance of an interpreter whose retrospection indicated awareness of the simulation, and one occurred in the performance of an interpreter whose retrospection suggested deep immersion in the 'world' of the simulation. It is also possible that the expert interpreters, who made the most comments about having insufficient situational context, had recourse to effective cognitive coping

mechanisms and were thus able to covertly compensate for the lack they identified. Sara's comments, quoted in full in Section 9.6.1.4.2, are suggestive in this regard—in stage 1, she states that "*it* [AN: the situational context] *became clear as questions were asked,"* and in stage 2, she states that she was "*trying to give myself context- trying to understand."* Erica indicates a similar cognitive process in stage 3 of the retrospection. After stating that she had been upset at the beginning of the interaction due to being out of her comfort zone (see full quotation in Section 9.6.1.4.2), I responded "*mm and did that continue or*" and she replied, *"it continued for a little while and then- and then it got better as I got a- a hand of it."*

Having sufficient background knowledge of the situation and terminology is generally considered important to interpreting performance (Hale, 2007; Gile, 2009; Dean & Pollard, 2013; Russell & Winston, 2014). The retrospections provided by the interpreters in this study indicate that interpreters—particularly expert interpreters—share this perception. However, neither the retrospections nor the performance data offer evidence of control mechanisms employed by interpreters when faced with insufficient background information. The study design—which was focused on process tracing, rather than on inquiring into interpreters' rationales for their actions or on their decision-making—did not include follow-up questions vis-à-vis control mechanisms that could have been employed to remedy insufficient situational context, nor about interpreters' rationale for not employing such mechanisms. Future research approaching the issue of situational context from a different angle, with different aims and method, might provide further insight into control mechanisms available to interpreters when faced with a lack of situational context, as well as the situations in which they employ such mechanisms.

9.7 Goal States: Evidence from the Retrospections

In this section, I explore insights from the retrospection data with regard to the goals mediating interpreters' online self-regulation. As discussed in Chapter 4, self-regulation is an ongoing process that involves achieving or maintaining alignment between a current state and a goal state, which may be composed of a number of sub-goals. Analysis of the interpreters' retrospective process tracing provides important information about the goals mediating their online-self regulation. The retrospections also provide some insight into the hierarchical organization of goals, including some indications of the connections between 'be' and 'do' goals, as discussed in Section 4.4. That is, a number of the interpreters' comments point to connections between more abstract, higher-level goals (such as 'be accurate') and more-concrete, lower-level goals that support the higher-level goals (such as 'avoid leaving things out' or 'don't guess'). It

is not the aim of this analysis to propose a comprehensive or definitive list of interpreters' performance goals, nor to suggest that all interpreters share the same goals, but rather to discuss the goal states identified in this group of interpreters' retrospections.

Providing an **accurate** target language rendition of source language utterances was a primary goal of the interpreters in this study, as demonstrated by the following extracts:

> *"I wasn't able to ---- **accurately interpret** word for word"* —Jonathan (N), stage 1

> *"um I was just -- to be honest I wasn't really thinking about what even- what they were talking about I was **more just thinking about the actual making sure I was interpreting everything that they were saying**"*—Sara (E), stage 3

> *"just that **I didn't wanna interpret something wrong** because I thought that could further escalate the conflict and then it -- you know **my goal is always to be accurate** as an interpreter so if I am not sure **I would rather just clarify instead of pretending I LAUGHTER under- understand** and then moving on"*—Laura (E), stage 1

> "***OK so I am supposed to be accurate and I am supposed to interpret everything** -- so if Andrew is saying something and Mariela is saying something under her breath but I am not interpreting that then it is not getting completed so then I need to start managing things more -- and uh ---- and doing a little bit more of the 'he said' 'she said' 'they said' LAUGHTER sort of thing"* —Ana (E), stage 3

> *"sometimes I could have missed some parts where I think I failed to interpret the message -- you know when I could- I did try to find sense of what she was trying to say but um I- **I was thinking like should I say this literally or should I be interpreting what it actually meant in the English speaking world**"*—Benjamin (N), stage 3

The extracts quoted above provide some evidence of lower-level goals connected to higher-level goals. For example, Laura's comment suggests that 'don't make mistakes' and 'don't pretend to understand' are concrete sub-goals contributing to the higher-level goal of 'be accurate.' Similarly, Sara's and Ana's comments suggests that 'interpret everything' is a sub-goal contributing to the achievement of accuracy. Benjamin's doubt as to whether to opt for form- or meaning-based target language renditions suggests that he is aware of two potentially competing goals—the desire to 'be accurate,' as he understands it, versus that of achieving understanding (i.e., by producing a more comprehensible, but possibly less 'accurate' in terms of form, target language rendition).

The retrospections also indicate that **effective management of turn-taking and the flow of communication** may be a performance goal for interpreters:

> *"um I think in* ***the dynamic you sort of figure OK this is the way things are happening*** *so a- -- it might take a while to adjust* ***but then starting to do the more management of the conversation -- it takes a while to decide OK all I have to do is- LAUGHTER kind of thing****"*—Ana (E), stage 3

> *"um uh* ***hard to resolve -- again that was the lack of um organization um they -- I repeatedly asked them to please take turns to speak and pause often yet that did not happen*** *even after you know several attempts -- it did not happen"*—Benjamin (N), stage 3

> *"she wanted to be the one expressing all her you know emotions and what's going on and he was mad LAUGHTER 'cause he couldn't you know so* ***I had to say you know give him a chance to speak and you know it's like let him so I had to tell her hey could you please you know give him a minute you know to express himself****"*—Carla (N), stage 3

> *"****yes and I was very aware of that*** **{AN: using third person}** ***because I don't usually do that but it was like a situation where um they were talking over each other and so I had to*** *say uh she's saying it was when Theresa was saying something usually when Theresa spoke and I don't know* ***I was definitely I was very aware*** *but I now I can't really remember what she was talking about or"*—Sara (E), stage 3

While the extracts quoted above do not explicitly connect effective management of turn-taking to accuracy, it seems reasonable to assume that this goal is closely connected to that of being accurate if not a sub-goal thereof. It is certainly plausible that accuracy and completeness would suffer if the parties to an interaction did not allow the interpreter sufficient opportunity to interpret their respective utterances.

Another goal that seems closely linked to that of accuracy is **checking/ensuring understanding**, including clarifying misunderstanding:

> *"I said pasar el resto de la noche en paz*[78] *-- which was a terrible interpretation really but I- which- so* ***the woman was like 'what I'm not spending the night here'*** *which*

[78] Literally glossed, this means 'pass the rest of the night in peace.' It could be understood to mean 'get through the night' (i.e., the rest of the evening work shift) or 'spend the night' (with possible sexual implications, as in English). In the simulation, Mariela reacted to the latter potential meaning. See Figure 16 for further context of this extract.

> *that's what I said* -- ***but I was like 'no no no' -- I had to clarify to her and then I had to clarify that to the English speakers****"* —Sara (E), stage 3

> *" 'cause I caught myself going 'how do I say nuts and bolts' then I- then I had to like creative thinking and* ***think of something that would she could understand****"*—Carla (N), stage 3

> *"yes yes you know I- I* ***decided to intervene 'cause I think there was uh -- I did notice that I needed to do an intervention*** *and I did introduce myself to both parties that I -- you know that I was going to be -- I identified myself as interpreter and* ***told them you know what was going on to each party to um clarify on things*** *-- once that part was clarified as far as Julio to July um then that you know -- I think that did get you know -- we did we did get that uh you know cloudiness away from that name confusion" —* Benjamin (N), stage 3

> *"um I feel like* ---- ***I feel like um -- hopefully Andrew's explanation that they were short staffed um um was resolved or fully explained****."*—Jonathan (N), stage 3

These extracts suggest that interpreters monitor the interlocutors' comprehension of the target language output in addition to monitoring accuracy. Monitoring of others' comprehension is certainly likely, given that, in general, speakers are known to be attentive to signs of comprehension (or lack thereof) in those with whom they are speaking (Janzen & Shaffer, 2008). The extracts from Sara's and Carla's retrospections seem to link their monitoring of comprehension to the higher-level goal of accuracy: the realization that an ambiguity in the target language rendition, in Sara's case, or the lack of a readily available target language reformulation of an idiomatic expression, in Carla's case, might cause issues with comprehension leads to attempts to remedy the problem. The extracts from Benjamin's and Jonathan's retrospections do not seem to link their monitoring of comprehension with accuracy; rather, they suggest that, for these interpreters, mutual understanding may have been a primary goal in and of itself.

Several extracts from the retrospections suggest that **understanding the situation/context** was also a goal for some interpreters:

> *"oh well that I had no idea what I was interp- interpreting -- I was expecting something else -- I don't know why I was expecting something in the medical field -- maybe because that's th- something I am very used to interpreting for um -- and then so* ***I was trying to figure out where I am -- what is the issue that I am going to be interpreting -- you know what type of terminology will I need to use****"* —Laura (E), stage 2

> *"so I think I was just-* ***in my head I was just trying to kind of hash through what they were dealing with and trying to- to give myself context trying to understand*** *as I'm interpreting what is happening --* ***like what the deeper problem is****"*—Sara (E), stage 2

> *"um I think I was a little bit upset at the beginning LAUGHTER just because* ***I didn't know what it was*** *and that I am- I am very much um ----* ***I like to be in a comfort zone*** *and so if I'm not I- I get a little upset -- so I think at the beginning I was a little upset"*—Erica (E), stage 3

Laura and Sara state directly that they were actively engaged in trying to figure out what was going on (i.e., the context, the story, the terminology). While they do not link these attempts to the concept of accuracy, it seems reasonable to infer that the desire to understand what is going on is related to a desire to be able to provide an accurate interpretation. In this extract, Erica discusses her emotional response to being out of her comfort zone; however, in other portions of the retrospection (such as that quoted in Section 9.6.1.4.2), she makes it clear that this emotional discomfort is related to her inability to draw on established schemata at the beginning of the interaction. Given the established relationship between schemata and expert performance, it may be that inability to draw on established schemata is experienced by the interpreter as a potential threat to the quality of the performance, including the accuracy of the interpretation.

A desire to **be neutral/maintain impartiality** is also evident in the retrospections of several of the interpreters:

> *"****just trying to be neutral*** *to both parties and be respectful -- that type of thing"* —Laura (E), stage 2

> *"mmmm well just -- well there's a lot of things it -- that course* [AN: the interpreter training course she completed] *helped me with -- um and well in this situation you know you know* ***being neutral is really important and um -- and just trying to be as professional as you can be****"* —Carla (N), stage 3

> *"the only person I- I was kind of like OK this is kind of somebody that* ***I align with as far as being neutral*** *is Theresa -- the person facilitating -- because* ***she was just trying to kind of gather the facts and I felt like I was kind of doing the same thing****"* —Laura (E), stage 3

> *"it's hard not to believe one side or the other -- I mean I don't take sides and I don't say 'oh you poor thing' and 'you nasty' ---- no -- but but in my mind sometimes I think 'oh that person sounds like that they could be lying' especially when it's something in in a*

> *court or something that doesn't make sense* ***and I try to -- not to do anything about it 'cause- 'cause you have to be impartial****" —*Erica (E), stage 3

In contrast with extracts regarding accuracy, these extracts do not shed much light on lower-level goal states supporting the higher-level goal of neutrality/impartiality, although Erica's comment, which is generally focused (i.e., she is not process tracing about the simulated interaction interpreted for the study), suggests that 'not acting on/revealing one's reactions to a situation' might be a relevant sub-goal.

Several portions of the retrospections suggest that interpreters' goals included **establishing/maintaining professional boundaries** or **being treated with professional respect**:

> *"well I- I- I was trying not to react to anything that the woman was saying --* ***things that could be annoying to me in particular 'cause she was asking me questions and she was being nice to me but she was kind of very disruptive -- and like what you don't want to have when you are interpreting*** *and --* ***but I try not to ---- react*** *-- I- I didn't react actually -- yeah -- and that was a control --* ***I had to control myself to say 'ok no you're just interpreting so you're not going to participate*** *in any' -- so my face I tried to make it -- not to show anything with anybody"*—Erica (E), stage 3

> *"yeah maybe I should be like more serious and say that I am just going to interpret like what is nece- like what they say like in the group you know like --* ***since the very beginning I should have said 'I am just going to interpret like what you say to each other*** *and I am not going to like interpret like personal commenta- comments' you know -- so yeah maybe instead of waiting a little bit and say 'hey I am just going to interpret this' I should since the very beginning have said like* ***'this is my role and I am going to interpret this'*** *and bla bla bla"*—Naomi (E), stage 3

> *"um ---- well there was the- the- and I didn't really deal with it specifically -- um this wasn't really a challenge- but as far as the interaction went --* ***Mariela kept saying 'well we'll talk' 'cause she wanted me to interpret for her tomorrow and so I didn't really deal with it*** *because I didn't really know how much I was supposed to get into the role playing or not --* ***but she was like 'we'll talk' like 'telephone give me your card' kind of thing and I just interpreted everything that she said*** *-- so that's a challenge as far as ethics go but I don't know if that's what you're referring to"*—Sara (E), stage 3

> *"****trying to decide whether or not I should ask Mariela to not use her telephone -- because I wasn't sure if that's really my place as the interpreter*** *-- I felt like that might*

> *have been more of Theresa's role since she was the one that was facilitating the meeting between the two"*—Laura (E), stage 3

> *"sometimes I felt like* ***I was doing more of the role of the managing the discussion which should have actually been in the hands of the person in charge and not in my hand*** *-- uh telling people to stop or to giving turns speaking --* ***that was probably a bit more than I wa- should have been doing ---- but the person in charge wasn't doing it****"*—Ana (E), stage 1

> *"people were speaking too fast and* ***were not respecting their turns um to allow me to interpret um even after repeated um requests to please take turns and pause often to allow me to interpret they were not uh following my directions****"*—Benjamin (N), stage 1

These extracts do point to a number of related 'do'-type sub-goals, including not reacting to others' disruptive behavior (Erica), establishing role boundaries via a formal introduction/contract[79] (Naomi), dealing appropriately with comments directed toward the interpreter (Sara), only taking on a more active management style if the person perceived as being in authority fails to do so (Ana), and having the interlocutors respect one's attempts at control (Benjamin).

Another goal suggested by the retrospections, **direct communication between the interlocutors**, seems closely linked to that of maintaining professional role/boundaries:

> *"****Mariela asking to use me as an interpreter was OK*** *in the sense that I have had to deal with the situation before --* ***it probably would have been nicer if we had been- had more eye contact and the session had been a little more appropriate*** *with her discussing actually with the others and not using me"*—Ana (E), stage 2

> *"Well for example the first thing I asked them to do was to please uh speak in first person -- uh speak among each other not to me uh -- that was not really the case --* ***people were still staring at me talking in like a- not in third person but they were definitely trying to keep an eyesight to me um even though I tried to keep my head down -- to not make eye contact so I can you know have them look upon each other and not me um -- not sure if that was really effective****"*—Benjamin (N), stage 1

[79] Dialogue interpreters are often trained to begin the interaction with a formal introduction/contract in which they describe their role in the interaction to both parties; such introductions often cover issues such as interpreting in the first person, interpreting everything that is said, maintaining confidentiality, procedures for requesting pauses and/or clarifications, etc. See Tebble (2012) for a discussion of introductions/contracts in dialogue interpreting encounters from an Australian perspective.

In the USA, dialogue interpreters are generally taught to interpret in the first person ('I' statements, rather than 's/he said') and to encourage the interlocutors to address each other directly and maintain eye contact with each other rather than with the interpreter. These interpreters' indications of awareness of encouraging direct communication thus suggest that they have internalized these aspects of professional behavior. The contrast between the expert's relative unconcern about Mariela's behavior ("*it probably would have been nicer*") and the novice's greater preoccupation with 'correct' behavior (*"I tried to keep my head down .... not sure if that was really effective"*) is also worth noting, inasmuch as it hints at the possibility of novice/expert differences in terms of a desire to follow the 'rules' versus focus on the relative importance of one aspect of behavior within the bigger picture of the interaction as a whole. In connection with this point, the contrast between Benjamin's frustration at the interlocutors' not following his directions to take turns speaking and Ana's realization that she would need to take on a more active management role in the absence of any active management from Theresa (both quoted immediately above in the discussion of professional boundaries/respect) is also noteworthy: again, the novice is concerned with the 'rules' while the expert realizes that circumstances demand a different response and adapts to the reality of the situation at hand.

The self-regulatory goals identified in the interpreters' retrospections align closely with the major tenets of codes of ethics and standards of practice for dialogue interpreters in the United States. For example, accuracy, impartiality, and maintenance of professional role boundaries are among the tenets that appear in the principal codes of ethics for medical and legal interpreters in the US, including those of the National Council on Interpreting in Health Care (NCIHC) and the National Association of Judicial Interpreters and Translators (NAJIT),[80] while management of turn-taking, encouragement of direct communication between interlocutors, and maintenance of role boundaries are included in the NCIHC's standards of practice (also see Hale, 2007, for a comparative analysis and discussion of codes of ethics and standards of practice from across the globe). The retrospection data collected in this study suggests that the participating interpreters had internalized ethical and performance standards propagated by relevant professional organizations, and that these standards influenced their online self-regulation.

At the same time, it is important to recall that the evidence of goal states presented in this section was inferred from comments made by the interpreters during process tracing. The interpreters were not asked to comment on role, decision-making, or ethics/standards, as such questions did not fit within the study's focus or methodological approach. Similarly, no

[80] The NCIHC's Code of Ethics and Standards of Practice are available at https://ncihc.memberclicks.net/ethics-and-standards-of-practice (last accessed 30 October 2017). NAJIT's Code of Ethics is available at https://najit.org/wp-content/uploads/2016/09/NAJITCodeofEthicsFINAL.pdf (last accessed 30 October 2017).

systematic analysis was made of connections between the portions of the retrospection that provided information about goal states and the interpreters' performances.

Further investigation of the goal states mediating performance might directly question interpreters about their performance goals and decision-making. It might also compare interpreters' actions (i.e., their performance) with their statements about their performance goals—that is, explore whether interpreters' actual task performance coheres with their descriptions of ideal task performance. Such an approach might provide further insight into the well-documented tensions between normative descriptions of the interpreter's role (i.e., in codes of ethics and standards of practice) and the lived reality of interpreting performance (Angelelli, 2004; Hale, 2007; Hsieh, 2008; Mikkelson, 2008; Mason & Ren, 2012). Further investigation of the goal states mediating online self-regulation might productively use interviews or a combination of observation and interviews to compare individual interpreters' actions with their statements about those actions, or ask interpreters to comment directly on their understanding of the goals guiding their interpreting performance. It might also seek to clarify the hierarchy of goals—that is, what lower-level 'do' goals support/facilitate the realization of higher-level 'be' goals—and to explore whether there are differences in how novices and experts understand and carry out their performance goals.

9.8 Conclusion

In Chapters 1 and 5, I positioned my research as a first attempt to systematically study dialogue interpreting from the perspective of the interpreter-as-task-performer. As noted in the introduction to this chapter, the research study (and, perforce, the analysis of the data) cast a wide net, seeking to describe as complete a range of targets of online monitoring and online control mechanisms as possible. This approach proved productive, as evidenced by the findings discussed in the preceding sections.

The retrospective process tracing data gathered in this study clearly indicates that dialogue interpreters monitor a wide range of factors, including the interpreter's own cognition, affect, and behavior; the interlocutors' affect and behavior; and physical and situational context. The fact that interpreters attended to and subsequently recalled a wide range of aspects of the interaction confirms that non-linguistic factors such as context, behavior, and emotion are salient features of the complex system that is the interpreted interaction. The interpreters in this study also had recourse to a broad range of control mechanisms in order to maintain or increase alignment between the current and goal states. In addition to the overt control mechanisms observable in

the performance data, the retrospective process tracing contained plentiful evidence of interpreters' recall of their use of affectual, behavioral, and cognitive control mechanisms.

Although the study sought to identify differences in online self-regulation at different levels of training and experience, few clear novice/expert differences were identified. Several factors may have contributed to this result, including the small sample size, the heterogeneity of the group in terms of years of experience and relative strength of the working languages, and the inability to make intra-subject comparisons due to the fact that each interpreter interpreted only one interaction (rather than the originally planned two). Nevertheless, the results of this study do suggest some areas of novice/expert difference. First, a number of patterns of difference were observed in novices' and experts' performances with regard to aspects such as management style, self-authored turns, use of chuchotage, and body language. Second, portions of the retrospection data suggested the possibility of novice/expert differences in monitoring of the interpreter's affect, monitoring of specific lexical difficulties, monitoring of accuracy, monitoring of situational context, and use of affectual control mechanisms.

Several aspects of the data also indicate that personality or individual style may play a role in online self-regulation. The retrospection data contains evidence of a number of commonalities in interpreters' online monitoring, but also indicates differences in the targets for monitoring that were mentioned most frequently by individual interpreters. That is, while the broad categories of targets for monitoring identified in the retrospections were present in all or almost all of the retrospections, the frequency with which a given category was mentioned tended to vary from interpreter to interpreter. Some interpreters' process tracing focused more on one aspect of performance, such as behavior, while other interpreters focused more on lexical difficulties or on affect. Similarly, employment of overt control mechanisms as observed in the performance data varied from interpreter to interpreter, without any pattern of novice/expert differences in preferred or dispreferred overt control mechanisms. These findings suggest that the individual interpreter's style/personality, training, or background might influence online self-regulation. Previous research has suggested that personality, general cognitive ability, and self-regulatory ability play a role in interpreting skill acquisition and task performance (Bontempo & Napier, 2011; Macnamara, et al., 2011; Fan, 2012). These or other idiosyncratic factors may also play a role in interpreters' self-regulatory ability, their approach to online self-regulation (e.g., which control mechanisms they prefer), and their process tracing.

This study provides important empirical evidence of interpreters' experience of task performance and will, I hope, inspire and inform ongoing research into the complexities of the dialogue interpreting task and the developmental trajectory from novice to competent performer.

10. General Conclusions, Directions for Further Research, and Modelling Dialogue Interpreting

10.1 General Conclusions & Directions for Further Research

As discussed in Chapter 1, research into dialogue interpreting has generally focused on the sociocultural and interactional aspects of the task, and has primarily approached the object of study through the lens of conversation analysis. While such a research approach has proved productive, it generally takes an outside, observational perspective on the interactional constellation, and thus does not provide direct insight into the dialogue interpreter's experience of his/her work. In my research, I have placed the interpreter-as-performer at center stage, undertaking a broadly focused, systematic exploration of the task from the perspective of the task performer. The findings discussed in Chapter 9 provide foundational evidence of the processes involved in dialogue interpreting. They also provide unique access to interpreters' retrospective accounts of their experience of task performance, shedding light on the aspects of the interactional system that interpreters monitor, the control mechanisms they employ during performance, and the goal states mediating their online self-regulation. In addition to increasing our knowledge of the features of and variables influencing the interpreted-interaction-as-system, the findings indicate a number of differences between dialogue interpreting and simultaneous conference interpreting, thereby highlighting the need to carry out further process-focused research in order to better understand and model this complex performance task.

In addition to contributing to the scholarly literature on dialogue interpreting, this research has a number of implications for practitioners and educators. In light of oft-repeated calls to strengthen connections between interpreting-related research and interpreter education and practice (Metzger, 1999; Hale, 2007; Angelelli, 2008; Pöchhacker, 2010; Wadensjö, 2011; Winston, 2013), to which I wholeheartedly subscribe, the following paragraphs discuss the value of this research to interpreters, to interpreter educators (and, by extension, students of interpreting), and to researchers.

For practitioners, the empirical evidence of the many factors and variables involved in performance reinforces the view of dialogue interpreters as highly-skilled professionals carrying out a complex task that goes beyond the ability to speak two languages. In this, it contributes to a sense of pride in one's work and supports ongoing efforts to professionalize the field. A clear understanding of the complexity of the task and of the factors potentially affecting performance may also serve practitioners in discussions with individuals outside the field who are not well-informed about interpreting (i.e., who may view it as a simple, mechanistic process of linguistic transcoding) or who need to be educated about specific issues such as the potential for

emotionally-charged or traumatic interactions to affect performance or the need for interpreters to receive pertinent background information in advance of an assignment.

For educators, the research findings help to clarify similarities and differences between the processes involved in dialogue interpreting and simultaneous interpreting, thus taking a first step toward improving dialogue interpreter education through the development of models that are better aligned with the task-specific skills that students need to acquire, such as managing turn-taking and requesting clarification. This research also illuminates the role of online self-regulation in performance, highlighting the importance of taking into account and nurturing students' developing self-regulatory skills when designing, implementing, and evaluating training activities. It suggests the possibility of refining or developing training activities to focus on specific variables or aspects of the interaction—for example, having learners focus on monitoring their emotional state and its effect on their performance, or having learners focus on monitoring a given cognitive process such as comprehension or production[81]—as well as the possibility of taking a structured approach to discussing and teaching the use of online control mechanisms.

For researchers, this study demonstrates the potential of self-regulation and expertise as theoretical frameworks through which to approach the study of dialogue interpreting. In employing a novel combination of methods and providing a detailed description and critique of their use, this study has contributed to the development of Interpreting Studies methodology. It has proposed conceptualizing the interpreted interaction as a complex system, described the components of the system, and suggested a number of variables that may influence the system. The findings have informed the proposal of multiple partial models of dialogue interpreting with distinct but complementary approaches and foci, presented in Section 10.2, and furnished a baseline of empirical data on dialogue interpreters' experience of task performance as a point of reference for future research.

As is to be expected in an exploratory study, the results leave a number of questions unanswered and raise new questions for further research in a number of areas. Throughout Chapter 9, I identified findings that point to the need for further investigation. In the following paragraphs I summarize key findings of this study and suggest a number of avenues for further research.

As discussed in Section 1.3.1, one of the aims of this research was to explore differences in novice and expert interpreters' performance. Qualitative analysis of the performance data

[81] Use of metacognitive guides to direct interpreting students' post-task reflection has been discussed by Cañada & Arumí Ribas (2012).

(Section 9.3) revealed differences in how experts and novices navigate a number of aspects of interaction management, including management of turn-taking, characteristics of self-authored turns, pronoun shifts when dealing with multiple speakers, note-taking, and use of the simultaneous mode. Quantitative analysis of the retrospections pointed to possible differences in the number of reports of online monitoring in different stages of novices' and experts' retrospective process tracing (Section 9.5), while qualitative analysis of the retrospections suggested novice/expert differences with regard to monitoring of the interpreter's emotional state (Section 9.6.1.1), monitoring difficulties with comprehension and retrieval of lexical items (Section 9.6.1.3), and monitoring of situational context (Section 9.6.1.4). In other areas, including frequency of use of overt control mechanisms and in patterns of retrospective comment on control mechanisms, no patterns of novice/expert differences were identified. Overall, fewer clear patterns of novice/expert difference were identified than had been expected.

Replication of the study with larger sample sizes would provide a larger amount of data for analysis, potentially leading to the identification of other patterns of novice/expert differences, as well as supporting or contradicting the findings reported on here. Such research will contribute to more fully describing the characteristics of novice and expert performance, and to increasing understanding of the developmental trajectory of skill acquisition in dialogue interpreting. This will, in turn, aid educators—and interpreters-in-training—by providing evidence-based insight into the skills that learners need to acquire in order to perform effectively (see Winston, 2013, who argues strongly in favor of evidence-based pedagogy). Empirical evidence of the characteristics of effective, competent performance may also contribute to ongoing efforts to professionalize the field and improve access to services for members of the community who do not speak the majority language by, for example, informing the development and refinement of evidence-based standards for evaluating performance.

Analysis of the retrospection data led to the identification of a number of variables and factors monitored by interpreters during performance, including the interpreter's affect, behavior, and cognition; the interlocutors' affect and behavior; and the situational context. The performance and retrospection data contained plentiful evidence of the range of affectual, behavioral, and cognitive control mechanisms that interpreters have at their disposal. Despite the abundant indicators of online monitoring and of online control in the data, few clear patterns emerged. Analysis of the frequency and quality of indicators of online monitoring in the retrospections indicates that the salience of a given target of monitoring may differ from interpreter to interpreter, thus suggesting that individual differences in background, style, personality, or some other factor may play a role in interpreters' online monitoring and in their retrospective process tracing (Section 9.6.1). A similar tendency was identified with regard to online control mechanisms: individual interpreters' use of overt control mechanisms during

performance and their retrospective reports touching on employment of overt and covert control mechanisms varied notably, and no clear patterns of difference emerged from the data (Section 9.6.2). Replication of the study with a larger sample would allow for confirmation or contradiction of these findings and might lead to the identification of patterns of novice/expert difference. In addition, more detailed exploration of participants' backgrounds, personalities, or decision-making in a future iteration of the study might provide additional insight into interpreters' online self-regulation.

Although the highly situated nature of interpreting practice makes it likely that the setting, context, and other particularities of a given interaction will influence interpreting performance, this study did not allow for comparison of interpreters' self-regulation across multiple interactions or settings. More research is needed in order to reach a nuanced understanding of the complex system that is the interpreted interaction, to better understand what aspects of the system tend to be constant and which tend to vary significantly from situation to situation, the extent to which they vary, how they vary, and how interpreting performance changes in response to situational demands. Future research should focus on describing and classifying a variety of dialogue interpreting situations, clarifying the potential salience of specific targets for monitoring in different classes of situations, and identifying situations in which specific control mechanisms are preferred or dispreferred. It should also compare the performances of the same interpreters in multiple situations or settings in order to gain further insight into the extent to which a given individual's performance is affected by situation-specific variables.

10.2 Modelling Dialogue Interpreting

In Section 5.4, I argued for conceptualizing the interpreted interaction as a complex system, and discussed the difficulties inherent in developing a model of the system that would reflect the interplay of the features that compose it, the variables that influence it, the perspectives of the various parties to the interaction, and the social and interactional context. Drawing on that discussion, and on the research findings reported in Chapter 9, in this section I propose modelling the interaction-as-system and the processes involved in dialogue interpreting from multiple perspectives through multiple partial models. I begin with a brief discussion of models and modelling, and of the importance of developing models with the potential for practical use beyond the research community.

Models are simplified and abstracted representations of an object or phenomenon (Pöchhacker, 2004; Chesterman, 2013). They generally depict the components of the object or phenomenon of interest, the way the components are arranged or interact, and, in some cases,

causal or functional relationships between the components (Pöchhacker, 2004; Chesterman, 2013). As Pöchhacker (2004:84) puts it, "a model is an assumption about what something is like and how it functions." Although models are by nature reductive (Muñoz Martín, 2016), one of their virtues is the possibility of succinctly depicting or describing the phenomenon of interest, usually, although not always, in graphic form. While they may illustrate or draw on aspects of a theory, models should not be seen as theory in and of themselves; as Frigg & Hartmann (2018:section 4.2, para. 2) note, scientific models are "neither derived entirely from data nor from theory," and perform functions that theories do not, such as allowing for workable (manipulable) simplification of complex theories, complementing abstract theories by facilitating contemplation of concrete situations, and substituting or standing in for theories in cases where no overarching theory exists or a theory is being developed.

Models come in a variety of shapes and sizes and have a range of purposes and uses. They may, for example, describe the phenomenon of interest, make predictions about it, or illustrate causal relationships (Pöchhacker, 2004; Chesterman, 2013). Some are intended primarily as tools for or artifacts of research, while others are developed with goals such as education in mind (see Gile's (2009) Efforts Model of interpretation, which was developed primarily as a pedagogical tool). A single model need not represent the entirety of a phenomenon. In fact, it is common in many disciplines to model only a portion of a given phenomenon or to have multiple partial models of a broader phenomenon (Muñoz Martín, 2016). Such an approach is particularly appropriate for interpreting, as suggested by Pöchhacker, who argues for the impossibility of producing an all-encompassing model of 'interpreting':

> "Aspects of society and culture, social institutions, settings and situations, purposes of interaction, features of text and discourse, mental structures and neurophysiological processes are shown to be involved in interpreting as a communicative activity and process. Therefore, no single model, however complex and elaborate, could hope to be validated as an account for the phenomenon as a whole, that is, for 'interpreting as such' " (Pöchhacker 2004:106).

Although Pöchhacker is writing about interpreting in general, without specifying a type or subdomain, his point is applicable to the specific case of dialogue interpreting. Even if one were to develop a single comprehensive model of dialogue interpreting that takes into account the many components, variables, and processes of multi-party interpreted interactions; reflects the perspectives of the various participants in the interaction; and is sensitive to the effects of situation and context, it is likely that it would be so unwieldy as to be of little practical use. In contrast, partial models that focus on a portion of the interaction-as-system or that adopt a narrower perspective may be accessible without sacrificing explanatory power or scientific rigor.

The argument for developing models amenable to applications in practice and education is rooted in the potential for such models to influence practitioners', students', educators', and researchers' understanding of dialogue interpreting both as a system and as a performance activity. As discussed in Sections 2.3 and 3.3, mental representations of knowledge (both procedural and declarative), systems, and problems shape how individuals understand the world and approach task performance. Such representations have also been shown to play an important role in expert performance. Mental representations of goal states and the means by which they may be achieved are a key part of online-self regulation, as discussed in Section 4.4

The mental representation of interpreting—of the 'what', 'how', 'why' and so forth of the task—held by a given individual, whether interpreter, educator, researcher, or some combination thereof, inevitably colors the individual's view of and approach to interpreting, whether as a job to be performed, a skill to be learned or taught, or an object of study. While each individual's mental representation of a phenomenon or task forms and evolves in response to the accumulation of experience (Norman, 1983; Jones, et al, 2011), it is also unavoidably influenced by the conceptualizations of the phenomenon or task that the individual encounters in the course of socialization into a community of practice, including interactions with educators and fellow practitioners, codes of professional conduct, academic texts, and research findings (see Roy, 1993; Wilcox & Shaffer, 2005; Janzen, 2013, and following commentaries; and Shaffer, 2013 and following commentaries, for discussions of the relationships among and evolution of metaphors, models, and views of language and communication in ASL-English interpreting; see also Diriker, 2004, on the meta-discourse of simultaneous conference interpreting).

Inasmuch as the results of academic research and the models of interpreting proposed by researchers have the potential to influence practitioners', students', and educators' conceptualization of and approach to interpreting, there is great potential for the results of research into dialogue interpreting to have a significant impact on education, practice, and even professional/societal discourse, in addition to its contribution to the scholarly literature. This point is highlighted by Winston (2013:178), who calls on researchers to "make their findings relevant and practical to educators," as well as by other scholars and educators who have emphasized the need to strengthen connections and exchanges among practitioners, educators, and researchers (Metzger, 1999; Hale, 2007; Angelelli, 2008; Pöchhacker, 2010; Wadensjö, 2011; Winston, 2013).

Given the likelihood that mental representations of dialogue interpreting—and, thus, approaches to task performance—may be affected by the academic representations of the task encountered by practitioners, educators, and students of interpreting, it is important to develop models of the task on the basis of dialogue-interpreting-specific research and theory. As an

interpreter, educator, and researcher, I believe that models should be accessible—amenable to practical use beyond the community of researchers—in addition to being rooted in the available data and current scholarly thinking. With that in mind, I have not undertaken to suggest a single model of dialogue interpreting, but rather propose multiple partial models that take distinct but complementary perspectives on the interaction-as-system and interpreters' online self-regulation.

Figure 20 depicts the interaction-as-system from a bird's-eye perspective.[82] This model permits a wide-angle view of social, interactional, and situational aspects of the interpreted interaction, allowing for consideration of the communicative context, the components of the system, the variables influencing the interlocutors and the interpreter, and the interactions among the parties. While not a process model in the sense of a step-by-step flow chart, it aligns with Pöchhacker's (2005) recommendation that Interpreting Studies scholars should understand and apply the notion of 'process' broadly, encompassing not only cognitive processes but also social and interactional processes.

In situating the interpreter firmly within the interaction-as-system, the bird's-eye perspective coheres with the general scholarly consensus around the need to study the dialogue interpreter within the context of the communicative event as discussed in Chapter 1 (Pöchhacker, 2005; Wadensjö, 2004; Englund Dimitrova & Tiselius, 2016; see also Muñoz Martín, 2016, on the inseparability of cognition and the environment; and Diriker, 2004, for a similar perspective on simultaneous conference interpreting). This model does not, however, provide insight into the interpreter's processing—that is, it does not shed light on the interpreter's experience of the task.

[82] Pöchhacker (2005:689) also proposes a bird's-eye view of the triadic constellation. His graphic representation, which he labels an "interactant model of the interpreting situation," does not differentiate between the interpreter and the majority/minority language speakers (that is, the graphic representation and text corresponding to each party in the triad is the same).

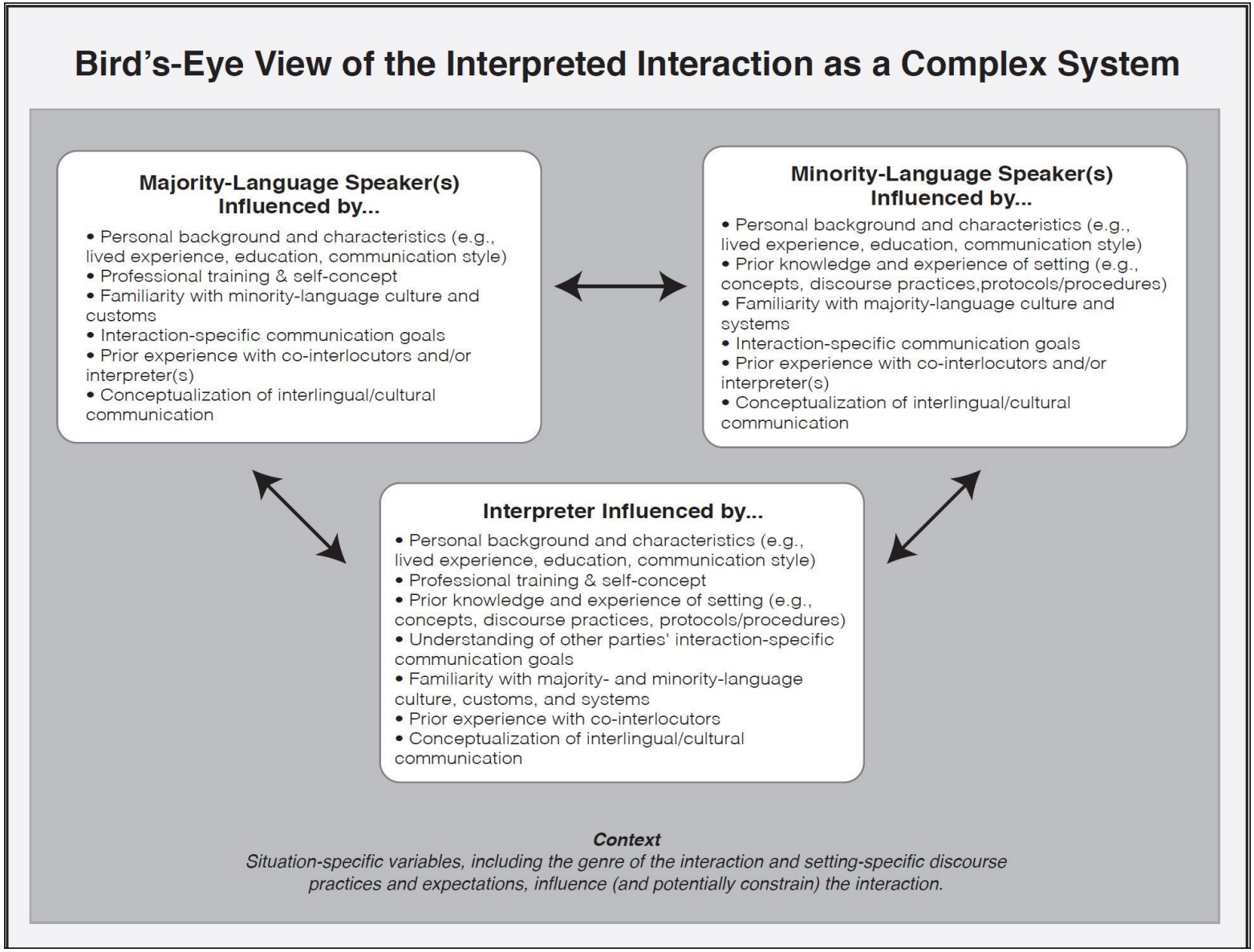

Figure 20. Bird's-eye view of the interpreted interaction as complex system.

In approaching modelling from the perspective of the interpreter-as-task-performer—as has been a goal of this research—one might begin with a basic question: "What happens when you interpret?" A simplified answer to this question is provided by Gile (1994:40), who describes interpreting (and translation) "as a process P acting on an input I and producing an output O," as illustrated in Figure 21.

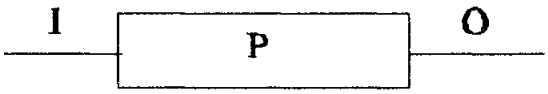

Figure 21. Translation/interpretation process as illustrated by Gile (1994:40). Adapted from Gile, D. (1994). Methodological aspects of interpretation and translation research. In Moser-Mercer, B. & Lambert, S. (Eds.) *Bridging the gap: Empirical research in simultaneous interpretation* (39-56). Amsterdam, NL: John Benjamins.

This graphic displays a very simple representation of the core cognitive processes of interpreting—something goes in (i.e., the source language utterance), something happens (i.e., language transfer), something else comes out (i.e., the target language utterance). This basic representation could be modified, as in Figure 22, to better reflect the interactional aspects of dialogue interpreting: each chunk of output serves as a stimulus for a new chunk of input produced by a different speaker in response to the immediately preceding chunk of output and connected to all of the input/process/output units that preceded it in the course of the interaction in progress. That is, multiple chunks of input produced by multiple speakers are, over time and with the interpreter's participation, woven together into a larger chunk of interactive discourse.

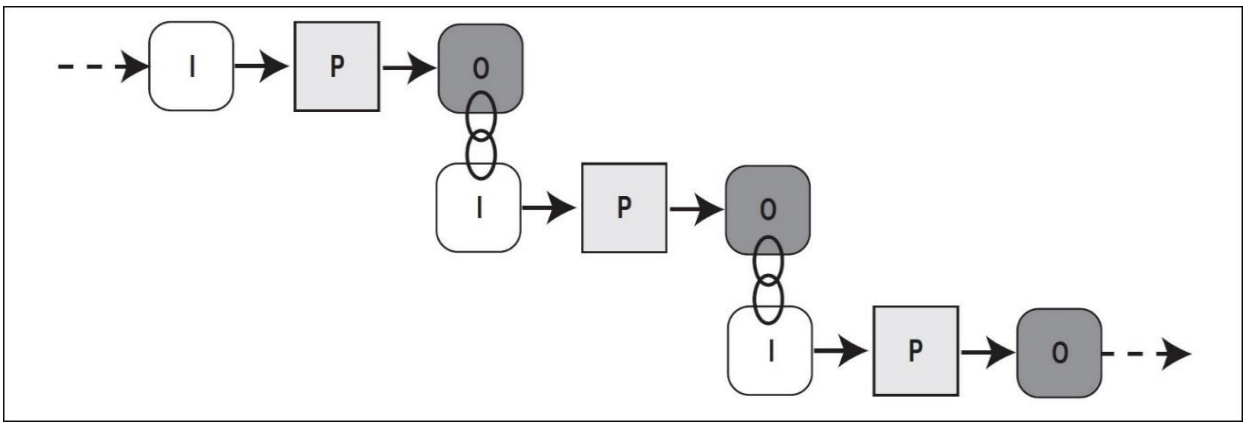

Figure 22. Input/process/output chain modified for dialogue interpreting.

Input does not, however, always lead directly to output in the manner implied by the model in Figure 22. For example, at any point in the process—while listening ('input'), during language transfer ('process'), or during production ('output')—the dialogue interpreter may seek and receive additional input (e.g., repetition or clarification) from a speaker before proceeding to the next step in the process, as illustrated in Figure 23.

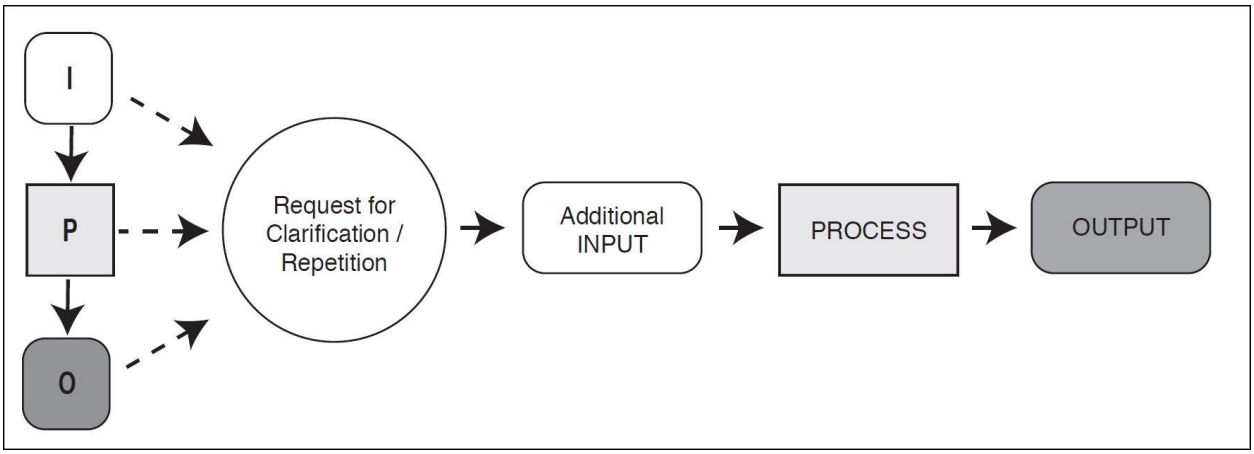

Figure 23. Input/process/output chain modified for request for repetition/clarification.

Such flowchart models provide an effective, albeit highly simplified and incomplete, way of representing the cognitive processes involved in dialogue interpreting, and are undoubtedly accessible. They do not, however, reflect the complexity of the task and the variables involved in task performance. While a flowchart-type model of all of the processes involved in dialogue interpreting could conceivably be developed, it is likely that it would be so detailed and complex as to be of little practical value.

As discussed above, another approach to modelling is to develop a partial model that describes one aspect of the task in detail while recognizing its place within and connection to other aspects of the task. In the case of this research, the specific phenomenon of interest was the interpreter's online self-regulation, defined here as *online monitoring of affect, behavior, cognition, and context, and the online employment of affectual, behavioral, or cognitive control mechanisms in order to maintain or increase alignment between the current state of the interactional system and the interpreter's performance goals*. The data gathered in this study provide sufficient evidence to allow for the proposal of a detailed representation of online self-regulation in dialogue interpreting. Figure 24 depicts at its center the monitoring and control cycle as described by Nelson & Narens (1990; see Section 4.3), in which a current state (object level) is continuously compared with a goal state (meta level), and control processes are brought

to bear when monitoring processes indicate a need to take action to maintain or increase alignment between the current and goal states. Within the goal state, I have highlighted the need for interpreters to actively—attentively—check the current state against the goal state and decide whether or not to employ control mechanisms (that is, to react). The potential targets for monitoring identified and discussed in Chapter 9 are listed on the left-hand side of the model, and the classes of control mechanisms identified in this study are summarized on the right-hand side (the lists of targets for monitoring and classes of control mechanisms appear in alphabetical order, without any intent to suggest an order or ranking).

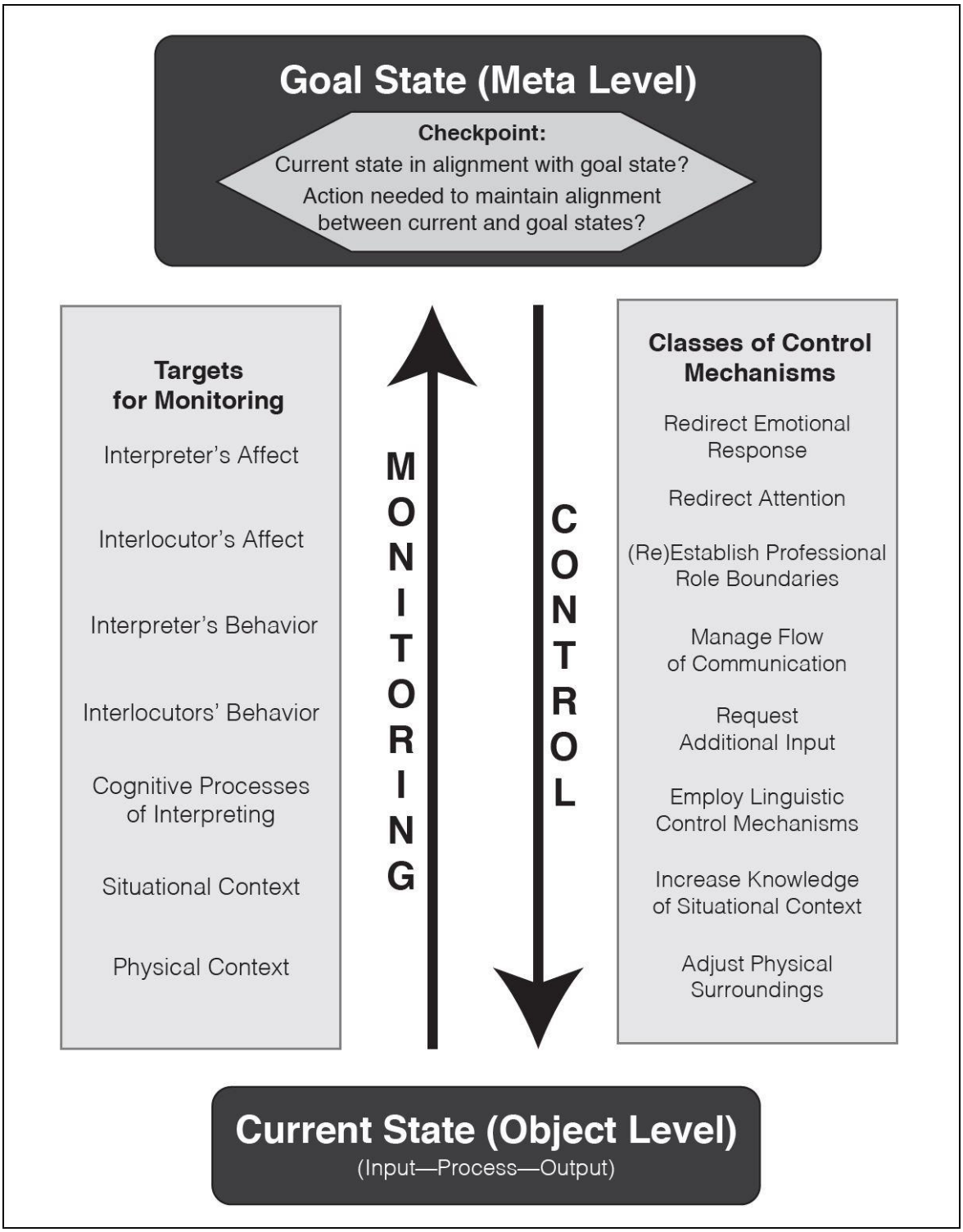

Figure 24. Model of online self-regulation in dialogue interpreting.

The model presented in Figure 24 is partial by design—it does not, for example, depict the complexities of the core cognitive processes of interpreting described in the input/process/output flowcharts, nor does it integrate other factors that inevitably influence the interpreter's decision-making and performance, such as prior knowledge, context, and situational constraints. The partial nature of this model does not, however, detract from its utility; indeed, as argued earlier in this section, dialogue interpreting is a field of study that may be best served by the development of multiple partial models.

While each of the models proposed in the preceding pages contributes to our understanding of dialogue interpreting, they do not provide a unified, coherent account of the interpreting task from the perspective of the task-performer. One means to such an end is to employ a non-graphic (i.e., narrative, text-based) approach to modelling. Figure 25, below, presents such a narrative account, integrating key features of the graphic representations depicted in Figures 20 through 24 into a coherent whole encompassing (a.) the variables influencing performance, (b.) the core cognitive processes of interpreting, (c.) online monitoring, and (d.) online control mechanisms. The account is couched in the first person (i.e., from an emic perspective) in order to draw attention to the interpreter's experience of and centrality to the task of dialogue interpreting. In addition to being firmly rooted in the existing empirical research into dialogue interpreting, including that collected for this research study, the narrative account has the virtue of being accessible to educators, practitioners, and students.

A Narrative Account of Dialogue Interpreting, from the Interpreter's Perspective

As a dialogue interpreter, I carry out a complex, dynamic, and goal-directed communicative task: helping individuals who do not share a language in common to communicate with each other.

Every interaction I interpret is influenced by many variables that I must take into account during performance, and which may affect my performance and decision-making:

- One set of variables has to do with me, the interpreter—for example, my emotional and physical state (e.g., level of confidence, physical health, fatigue), my prior knowledge of the setting and/or interlocutors, and my background (e.g., training and experience).
- Another set of variables has to do with the interlocutors participating in the interaction—for example, their respective backgrounds, communication goals, and prior experiences with or feelings about intercultural/interlingual communication.
- A third set of variables has to do with the setting in which the parties are interacting; for example, setting-specific discourse practices, expectations, or constraints.

Carrying out the core cognitive processes of interpreting is a major component of the work I do. These processes include:

- Attending (listening) to an individual's linguistic and paralinguistic output in order to understand, to the fullest extent possible, what that person desires to communicate within the context of the setting and of the unfolding interaction.
- Retaining the comprehended information in memory.
- Converting or transferring that information into another language while taking into account, to the extent possible, the communicative context and the differing sociocultural realities of each speaker.
- (Re)producing—that is, communicating via spoken/signed language and paralinguistic means—the information in the target language.

To the extent that I have cognitive (attentional) resources available, I continuously check whether I have understood correctly, retained the information, converted it faithfully into the target language, and produced correct and comprehensible output in the target language; that is, insofar as possible, I monitor the alignment between my performance goals and the current state of affairs.

In addition to monitoring the cognitive processes of interpreting, I monitor other internal and external factors:

- I monitor my own emotions, because my emotional reactions to the situation and my internal state (self-doubt, confidence) can influence my performance.

- I monitor my own behavior as well as the effectiveness of any behavioral control mechanisms that I employ. I pay attention to what I am doing and the extent to which it meets or supports my performance goals. I also monitor whether the behavioral control mechanisms I employ (e.g., asking for pauses, giving and taking turns at talk) are having the desired effect.
- I monitor my understanding of the situation at hand, assessing whether my knowledge of the context is adequate to allow me to understand and communicate ideas and information back and forth between the parties.
- I monitor my physical surroundings, for example, making sure that I can hear and see adequately, and that I can be heard and seen.

I also monitor a number of aspects of the other parties involved in the interaction:

- I monitor other people's behavior, because things that other people do can convey meaning (for example, body language) and can potentially interfere with achieving my performance goals (for example, if several people speak at once it may interfere with my ability to hear and understand everything that is communicated).
- I monitor other people's emotional state, because others' emotional state contributes to communicating meaning; emotion can also affect how people communicate (e.g., talking faster, interrupting). Other people's emotions can also affect my ability to perform effectively—for example, if I hear something sad it may provoke an emotional response in me, which may impair my ability to listen effectively.

As part of monitoring (sometimes automatically, sometimes via attended/controlled processing) these aspects of the 'system' that is the interpreted interaction, I assess, to the extent possible, whether the situation at hand is in alignment with my performance goals, and whether I need to take action to maintain or increase alignment between my performance goals and the current state of the system (i.e., what is going on in the interaction). When the need to avoid or remedy a problem arises, I have recourse—whether consciously or unconsciously—to a range of control mechanisms, some overt (i.e., visible to an observer), and others covert (i.e., not visible to an observer).

- Some of these control mechanisms are cognitive; for example, I can employ interpreting strategies such as circumlocution or redirect my attention.
- Some are affect-related; for example, I can refocus my emotional response or employ positive self-talk.
- Some are behavioral; for example, I can ask speakers to pause or repeat themselves, interrupt a speaker to take a turn at talk, or reposition myself so as to hear or see better.

Figure 25. A narrative account of dialogue interpreting.

At the outset of this dissertation, I stated my intention to focus attention on the interpreter-as-task-performer. By juxtaposing multiple models with distinct theoretical approaches and foci, I have attempted to partially address the challenges inherent in focusing attention on the interpreter's processing and experience of the task while at the same time taking into account the nuances and complexity of the interactional and social context in which the interpreter performs. The bird's-eye view model (Figure 20) depicts the interpreter firmly situated within the interaction-as-system, while two flow-chart models (Figures 22 and 23) suggest how the basic input-process-output model might be refined to account for the particularities of dialogue interpreting. A model of online self-regulation (Figure 24), formulated on the basis of the data collected in the research study and including potential targets of online monitoring and available online control mechanisms, depicts a portion of the process in more detail. The final, narrative, model (Figure 25) integrates aspects of the other models into a coherent whole, from the perspective of the task performer. In so doing, it concludes the dissertation in the same vein in which it began:[83] by telling the interpreter's story, in the interpreter's voice.

[83] The dissertation's title, *"I could only think about what I was doing, and that was a lot to think about,"* is a quotation from stage 3 (verbal cues) of Carla's retrospection.

References

Alexander, P. A., Dinsmore, D. L., Parkinson, M. M., & Winters, F. I. (2011). Self-regulated learning in academic domains. In B. J. Zimmerman & D. H. Schunk (Eds.), *Handbook of self-regulation of learning and performance* (pp. 393-407). New York, NY: Routledge.

Alexander, P. A., Murphy, P. K., & Kulikowich, J. M. (2009). Expertise and the adult learner: A historical, psychological, and methodological exploration. In M. C. Smith & N. DeFrates-Densch (Eds.), *Handbook of research on adult learning and development* (pp. 485-523). New York, NY: Routledge.

Alvstad, C., Hild, A., & Tiselius, E. (2011). Methods and strategies of process research: Integrative approaches in translation studies. In C. Alvstad, A. Hild & E. Tiselius (Eds.), *Methods and strategies of process research* (pp. 1-9). Amsterdam, NL: John Benjamins.

Anazawa, R., Ishikawa, H., & Kiuchi, T. (2012). The accuracy of medical interpretations: A pilot study of errors in Japanese-English interpreters during a simulated medical scenario. *Translation and Interpreting 4*(1), 1-20.

Anderson, J. R. (2015). *Cognitive psychology and its implications*, 8th edition. New York, NY: Worth Publishers.

Angelelli, C. (2004). *Revisiting the interpreter's role: A study of conference, court, and medical interpreters in Canada, Mexico, and the United States*. Amsterdam, NL: John Benjamins.

Angelelli, C. (2008). The role of the interpreter in the healthcare setting: A plea for a dialogue between research and practice. In C. Valero-Garcés & A. Martin (Eds.), *Crossing borders in community interpreting: Definitions and dilemmas* (pp. 147-163). Amsterdam, NL: John Benjamins.

Arrow, H., McGrath, J.E., & Berdahl, J.L. (2000). *Small groups as complex systems: Formation, coordination, development.* Thousand Oaks, CA: Sage.

Arumí Ribas, M. (2012). Problems and strategies in consecutive interpreting: A pilot study at two different stages of interpreter training. *Meta: Translators' Journal, 57*(3), 812-835.

Arumí Ribas, M., Dogan, A., & Mora Rubio, B. (2006). *Metacognition in interpreting: Tools towards self-regulation.* Retrieved from http://archive-ouverte.unige.ch/unige:28299

Arumí Ribas, M. & Vargas-Urpi, M. (2017). Strategies in public service interpreting: A roleplay study of Chinese-Spanish/Catalan interactions. *Interpreting 19*(1), 118-141.

Baddeley, A. (2012). Working memory: Theories, models, and controversies. *Annual Review of Psychology, 63*, 1-29.

Baraldi, C., & Gavioli, L. (Eds.). (2012). *Coordinating participation in dialogue interpreting.*

Amsterdam, NL: John Benjamins.

Bartlomiejczyk, M. (2006). Strategies of simultaneous interpreting and directionality. *Interpreting 8*(2), 149-174.

Bauer, I.M., & Baumeister, R. F. (2011). Self-regulatory strength. In K. D. Vohs & R. F. Baumeister (Eds.), *Handbook of self-regulation: Research, theory, and applications,* 2nd edition (pp. 64-82). New York, NY: The Guilford Press.

Beilock, S.L., Carr, T.H., MacMahon, C., & Starkes, J.L. (2002). When paying attention becomes counterproductive: Impact of divided versus skill-focused attention on novice and experienced performance of sensorimotor skills. *Journal of Educational Psychology, Applied 8*(1), 6-16.

Bélanger, D. (2004). Interactional patterns in dialogue-interpreting. *Journal of Interpretation 17,* 1-18.

Berk-Seligson, S. (2002). *The bilingual courtroom: Court interpreters in the judicial process.* Chicago, IL: The University of Chicago Press.

Bilalić, M., McLeod, P., & Gobet. F. (2008). Inflexibility of experts--reality or myth? Quantifying the Einstellung effect in chess masters. *Cognitive psychology 56*(2)*,* 73-102.

Blair, C., & Ursache, A. (2011). A bidirectional model of executive functions and self-regulation. In K. D. Vohs & R. F. Baumeister (Eds.), *Handbook of self-regulation: Research, theory, and applications,* 2nd edition (pp. 300-320). New York: The Guilford Press.

Blair, E. (2015). A reflexive exploration of two qualitative data coding techniques. *Journal of Methods and Measurement in the Social Sciences 6*(1), 14-29.

Bohle Carbonell, K., Stalmeijer, R. E., Könings, K. D., Segers, M., & van Merriënboer, J. J. G. (2014). How experts deal with novel situations: A review of adaptive expertise. *Educational Research Review 12*, 14-29.

Bontempo, K., & Malcolm, K. (2012). An ounce of prevention is worth a pound of cure: Educating interpreters about the risk of vicarious trauma in healthcare settings. In L. Swabey and K. Malcolm (Eds.), *In our hands: Educating healthcare interpreters* (pp. 105-130). Washington, D.C.: Gallaudet University Press.

Bontempo, K., & Napier, J. (2011). Evaluating emotional stability as a predictor of interpreter competence and aptitude for interpreting. *Interpreting 13*(1), 85-105.

Bower, G. H. (2000). A brief history of memory research. In E. Tulvig & F. I M. Craik (Eds.), *The Oxford handbook of memory* (pp. 3-32). Oxford, UK: Oxford University Press.

Bransford, J., Brown, A. L., & Cocking, R. R. (Eds.). (2000). *How people learn: Brain, mind,*

experience, and school. Washington, D.C.: National Academy Press.

Braun, S. (2007). Interpreting in small-group bilingual videoconferences: Challenges and adaptation processes. *Interpreting* 9:1, 21-46.

Braun, S. (2013). Keeping your distance? Remote interpreting in legal proceedings: A critical assessment of a growing practice. *Interpreting 15*(2), 200-228.

Brown, S. C., & Craik, F. I. M. (2000). Encoding and retrieval of information. In E. Tulvig. & F. I. M. Craik (Eds.), *The Oxford handbook of memory* (pp. 93-107). Oxford, UK: Oxford University Press.

Brulé, L., & Labrell, F. (2014). Expertise in biological conceptions: The case of the vineyard. *Thinking and Reasoning 20*(4), 432-453.

Brunette, L., Bastin, G. J., Hemlin, I., & Clarke, H. (Eds.). (2003). *The critical link 3: Interpreters in the community. Selected papers from the third international conference on interpreting in legal, health and social service settings, Montreal, Quebec, Canada 22-26 May 2001.* Amsterdam, NL: John Benjamins.

Burns, K. (2005). Mental models and normal errors. In H. Montgomery, R. Lipshitz & B. Brehmer (Eds.), *How professionals make decisions* (pp. 15-28). Mahwah, NJ: Lawrence Erlbaum Associates.

Byrne, D. S. (1998). *Complexity theory and the social sciences: An introduction*. London, UK: Routledge.

Calderhead, J. (1981). Stimulated recall: A method for research on teaching. *British Journal of Educational Psychology 51*(2), 211-217.

Cambridge, J. (1999). Information loss in bilingual medical interviews through an untrained interpreter. *The Translator 5*(2), 201-219.

Cañada, M. D., & Arumí Ribas, M. (2012). Self-regulating activity: Use of metacognitive guides in the interpreting classroom. *Educational Research and Evaluation 18*(3), *245-264.*

Carr, S. E., Roberts, R. P., Dufour, A., & Steyn, D. (1997). *The critical link: Interpreters in the community: Papers from the 1st international conference on interpreting in legal, health and social service settings, Geneva Park, Canada, 1-4 June 1995.* Amsterdam, NL: John Benjamins.

Carver C. S. (2004). Self-regulation of action and affect. In R. F. Baumeister & K. D. Vohs (Eds.), *Handbook of self-regulation: Research, theory, and applications* (pp. 13-39). New York, NY: The Guilford Press.

Carver, C. S., & Scheier, M. F. (2000). On the structure of behavioral self-regulation. In M. Boekaerts, P. R. Pintrich & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 41-84).

San Diego, CA: Academic Press

Carver, C. S., & Scheier, M. F. (2011). Self-regulation of action and affect. In K. D. Vohs & R. F. Baumeister (Eds.), *Handbook of self-regulation: Research, theory, and applications,* 2nd edition (pp. 3-21). New York, NY: The Guilford Press.

Chang, C., & Schallert, D. L. (2007). The impact of directionality on Chinese/English simultaneous interpreting. *Interpreting 9*(2), 137-176.

Chang, Y. (2014). Reorganization and plastic changes of the human brain associated with skill learning and expertise. *Frontiers in Human Neuroscience, volume 8*, article 35.

Chernov, G.V. (1994). Message redundancy and message anticipation in simultaneous interpretation. In S. Lambert & B. Moser-Mercer (Eds.), *Bridging the gap: Empirical research in simultaneous interpretation* (pp. 139-153). Amsterdam, NL: John Benjamins.

Chernov, G.V. (2004). *Inference and anticipation in simultaneous interpreting: A probability-prediction model.* Amsterdam, NL: John Benjamins.

Chesterman, A. (2013). Models of what processes? *Translation and Interpreting Studies 8*(2), 155-168.

Chi, M. T. H. (2006a). Two approaches to the study of experts' characteristics. In K. A. Ericsson, N. Charness, P. Feltovich & R. Hoffman (Eds.), *The Cambridge handbook of expertise and expert performance* (pp. 21-30). Cambridge, UK: Cambridge University Press.

Chi, M. T. H. (2006b). Laboratory methods for assessing experts' and novices' knowledge. In K. A. Ericsson, N. Charness, P. Feltovich & R. Hoffman (Eds.), *The Cambridge handbook of expertise and expert performance* (pp. 167-184). Cambridge, UK: Cambridge University Press.

Chi, M. T. H. (2011). Theoretical perspectives, methodological approaches, and trends in the study of expertise: An international perspective. In Y. Li & G. Kaiser (Eds.), *Expertise in mathematics instruction* (pp. 17-39). New York, NY: Springer.

Chi, M. T. H., & VanLehn, K.A. (2012). Seeing deep structure from the interactions of surface features. *Educational Psychologist 47*(3), 177-188.

Chen, F., Ruiz, N., Choi, E., Epps, J., Khawaja, M.A., Taib, R., Yin, B., & Wang, Y. (2012). Multimodal behavior and interaction as indicators of cognitive load. *ACM transactions on interactive intelligent systems (TiiS) 2*(4), article 22.

Corsellis, A. (2005). Training interpreters to work in the public services. In M. Tennent (Ed.) *Training for the new millennium: Pedagogies for translation and interpreting* (pp. 153-174). Amsterdam, NL: John Benjamins.

Cowan, N. (1999). An embedded-processes model of working memory. In A. Miyake & P. Shah (Eds.), *Models of working memory: Mechanisms of active maintenance and executive control* (pp. 62-101). Cambridge, UK: Cambridge University Press.

Cowan, N. (2000/01). Processing limits of selective attention and working memory: Potential implications for interpreting. *Interpreting 5*(2), 117-146.

Cowan, N. (2001). The magical number 4 in short-term memory: A reconsideration of mental storage capacity. *Behavioral and Brain Sciences 24*(1), 87-114.

Cowan, N. (2005). *Working memory capacity.* New York, NY: Psychology Press.

Cowan, N. (2008). What are the differences between long-term, short-term, and working memory? In W. S. Sossin, J. Lacaille, V. F. Castellucci & S. Belleville (Eds.), *Progress in brain research 169: The essence of memory* (pp. 323-338). Amsterdam: Elsevier.

Cowan, N. (2014). Working memory underpins cognitive development, learning, and education. *Educational Psychology Review 26*, 197-223.

Cowan, N., Elliott, E. M., Saults, J. S., Morey, C. C., Mattox, S., Hismjatullina, A., & Conway, A. R. A. (2005). On the capacity of attention: its estimation and its role in working memory and cognitive aptitudes. *Cognitive Psychology 51*, 42-100.

Crezee, I., Atkinson, D., Pask, R., Au, P., & Wong, S. (2015). Teaching interpreters about self-care. *International Journal of Interpreter Education 7*(1), 74-83.

Dane, E. (2010). Reconsidering the trade-off between expertise and flexibility: A cognitive entrenchment perspective. *Academy of Management Review 35*(4), 579-603.

Dane, E. (2013). Things seen and unseen: Investigating experience-based qualities of attention in a dynamic work setting. *Organization Studies 34*(1), 45-78.

Davidson, B. (2000). The interpreter as sociolinguistic gatekeeper: The social-linguistic role of interpreters in Spanish-English medical discourse. *Journal of Sociolinguistics 4*(3), 379-405.

Davitti, E. (2013). Dialogue interpreting as intercultural mediation: Interpreters' use of upgrading moves in parent-teacher meetings. *Interpreting 15*(2), 168-199.

De Leeuw, E. (2007). Hesitation markers in English, German, and Dutch. *Journal of Germanic Linguistics 19*(2), 85-114.

Dean, R. K., & Pollard, R. Q. (2011). Context-based ethical reasoning in interpreting: A demand control schema perspective. *The Interpreter and Translator Trainer 5*(1), 155-182.

Dean, R.K., & Pollard, R.Q. (2012). Beyond “interesting”: Using demand control schema to

structure experiential learning. In L. Swabey & K. Malcolm (Eds.), *In our hands: Educating healthcare interpreters* (pp. 77-104). Washington, DC: Gallaudet University Press.

Dean, R. K., & Pollard, R. Q. (2013). *The demand control schema: Interpreting as a practice profession*. North Charleston, SC: CreateSpace Independent Publishing Platform.

Díaz-Galaz, S., Padilla, P., & Bajo, M. T. (2015). The role of advance preparation in simultaneous interpreting: A comparison of professional interpreters and interpreting students. *Interpreting 17*(1), 1-25.

Dinsmore, D .L., Alexander, P. A., & Loughlin, S. M. (2008). Focusing the conceptual lens on metacognition, self-regulation, and self-regulated learning. *Educational Psychology Review 20*(4), 391-409.

Diriker, E. (2004). *De-/re-contextualizing conference interpreting: Interpreters in the ivory tower?* Amsterdam, NL: John Benjamins.

Dunlosky, J., & Metcalfe, J. (2009). *Metacognition.* Los Angeles, CA: Sage.

Engelhardt, P. E., Nigg, J. T., & Ferreira, F. (2013). Is the fluency of language outputs related to individual differences in intelligence and executive function? *Acta Psychologica 144*(2), 424-432.

Englund Dimitrova, B. E., & Tiselius, E. (2009). Exploring retrospection as a research method for studying the translation process and the interpreting process. In F. Alves, S. Göpferich & I. M. Mees (Eds.), *Methodology, technology and innovation in translation process research. Copenhagen studies in language, 38* (pp. 109-134). Copenhagen, Denmark: Samfundslitteratur.

Englund Dimitrova, B., & Tiselius, E. (2014). Retrospection in interpreting and translation: Explaining the process? *MonTi special issue 1—Minding translation*, 177-200.

Englund Dimitrova, B., & Tiselius, E. (2016). Cognitive aspects of community interpreting: Toward a process model. In R. Muñoz Martín (Ed.), *Reembedding translation process research* (pp. 195-214). Amsterdam, NL: John Benjamins.

Ericsson, K. A. (2000). Expertise in interpreting: An expert-performance perspective. *Interpreting 5*(2), 187-220.

Ericsson, K. A. (2003). The acquisition of expert performance as problem solving: Construction and modification of mediating mechanisms through deliberate practice. In J. E. Davidson & R. J. Sternberg (Eds.), *The psychology of problem solving* (pp. 31-83). Cambridge, UK: Cambridge University Press.

Ericsson, K.A. (2005). Superior decision making as an integral quality of expert performance:

Insights into the mediating mechanisms and their acquisition through deliberate practice. In H. Montgomery, R. Lipshitz & B. Brehmer (Eds.), *How professionals make decisions* (pp. 135-167). Mahwah, NJ: Lawrence Erlbaum Associates.

Ericsson, K.A. (2006a). An introduction to *Cambridge handbook of expertise and expert performance*: Its development, organization, and content. In K. A. Ericsson, N. Charness, P. Feltovich & R. Hoffman (Eds.), *The Cambridge handbook of expertise and expert performance* (pp. 3-19). Cambridge, UK: Cambridge University Press.

Ericsson, K.A. (2006b). The influence of experience and deliberate practice on the development of superior expert performance. In K. A. Ericsson, N. Charness, P. Feltovich & R. Hoffman (Eds.), *The Cambridge handbook of expertise and expert performance* (pp. 683-703). Cambridge, UK: Cambridge University Press.

Ericsson, K.A. (2006c). Protocol analysis and expert thought: Concurrent verbalizations of thinking during experts' performance on representative tasks. In K. A. Ericsson, N. Charness, P. Feltovich & R. Hoffman (Eds.), *The Cambridge handbook of expertise and expert performance* (pp. 223-241). Cambridge, UK: Cambridge University Press

Ericsson, K. A., & Charness, N. (1997). Cognitive and developmental factors in expert performance. In P. Feltovich, K. Ford & R. Hoffman (Eds.), *Expertise in context: Human and machine* (pp. 3-41). Menlo Park, CA: AAAI Press.

Ericsson, K. A., Charness, N., Feltovich, P., & Hoffman, R. (Eds.). (2006). *The Cambridge handbook of expertise and expert performance.* Cambridge, UK: Cambridge University Press.

Ericsson, K.A., and Delaney, P.F. (1999). Long-term working memory as an alternative to capacity models of working memory in everyday skilled performance. In A. Miyake & P. Shah (Eds.), *Models of working memory: Mechanisms of active maintenance and executive control* (pp. 257-297). Cambridge, UK: Cambridge University Press.

Ericsson, K. A., & Kintsch, W. (1995). Long-term working memory. *Psychological Review 102*(2), 211-245.

Ericsson, K.A., & Simon, H.A. (1993). *Protocol analysis: Verbal reports as data*, revised edition. Cambridge, MA: MIT Press.

Ericsson, K.A., & Smith, J. (1991). Prospects and limits of the empirical study of expertise: An introduction. In K.A. Ericsson & J. Smith (Eds.), *Towards a general theory of expertise: Prospects and limits* (pp. 1-38). Cambridge, UK: Cambridge University Press.

Endsley, M.R. (2006). Expertise and situation awareness. In K. A. Ericsson, N. Charness, P. Feltovich & R. Hoffman (Eds.), *The Cambridge handbook of expertise and expert performance* (pp. 633-651). Cambridge, UK: Cambridge University Press.

Fan, D. (2012). *The development of expertise in interpreting through self-regulated learning for trainee interpreters.* (unpublished doctoral dissertation). University of Newcastle upon Tyne. Accessed 21 July 2018 at https://theses.ncl.ac.uk/dspace/bitstream/10443/1741/1/Fan%2012%20%2812mnth%29.pdf.

Færch, C., & Kasper, G. (1987). From product to process—introspective methods in second language research. In C. Færch & G. Kasper (Eds.), *Introspection in second language research* (pp. 5-23). Clevedon, Avon, UK: Multilingual Matters.

Feltovich, P., Prietula, M., & Ericsson, K. A. (2006). Studies of expertise from psychological perspectives. In K. A. Ericsson, N. Charness, P. Feltovich & R. Hoffman (Eds.), *The Cambridge handbook of expertise and expert performance* (pp. 41-67). Cambridge, UK: Cambridge University Press.

Feltovich, P., Spiro, R., & Coulson, R. (1997). Issues of expert flexibility in contexts characterized by complexity and change. In P. Feltovich, K. Ford & R. Hoffman (Eds.), *Expertise in context: Human and machine* (pp. 125-146). Menlo Park, CA: AAAI Press.

Fitzsimons, G. M., & Bargh, J. A. (2004). Automatic self-regulation. In R. F. Baumeister & K. D. Vohs (Eds.), *Handbook of self-regulation: Research, theory, and applications* (pp. 151-170). New York, NY: The Guilford Press.

Fontes, L. A. (2008). *Interviewing clients across cultures: A practitioner's guide.* New York, NY: The Guilford Press.

Frigg, R. & Hartmann, S. (2018). "Models in Science." In Zalta, E.N. (Ed.) *The Stanford encyclopedia of philosophy* (Summer 2018 Edition). Accessed 18 August 2018 at https://plato.stanford.edu/archives/sum2018/entries/models-science/.

Gallagher, M. S., & Hargie, O. D. W. (1989). An investigation into the validity of role play as a procedure for counsellor skill assessment. *British Journal of Guidance & Counselling 17*(2), 155-165.

Garwood, C. J. (2002). Autonomy of the interpreted text. In G. Garzone & M. Viezzi (Eds.), *Interpreting in the 21st century: Challenges and opportunities* (pp. 267-276). Amsterdam, NL: John Benjamins.

Gass, S. M., & Mackey, A. (2000). *Stimulated recall methodology in second language research.* Mahwah, NJ: Lawrence Erlbaum Associates.

Gerich, M., & Schmitz, B. (2016). Using simulated parent-teacher talks to assess and improve prospective teachers' counseling competence. *Journal of Education and Learning 5*(2), 285-301

Gerver, D. (1976). Empirical studies of simultaneous interpretation: A review and a model. In R.

W. Brislin (Ed.), *Translation: Applications and research* (pp.165-207). New York, NY: Gardner Press.

Gile, D. (1994). Methodological aspects of interpretation and translation research. In B. Moser-Mercer & S. Lambert (Eds.), *Bridging the gap: Empirical research in simultaneous interpretation* (pp. 39-56). Amsterdam, NL: John Benjamins.

Gile, D. (2009). *Basic concepts and models for interpreter and translator training*, revised edition. Amsterdam, NL: John Benjamins.

Gile, D. (2015). The contributions of cognitive psychology and psycholinguistics to conference interpreting: A critical analysis. In A. Ferreira & J. W. Schwieter (Eds.), *Psycholinguistic and cognitive inquiries into translation and interpreting* (pp. 41-64). Amsterdam, NL: John Benjamins.

Goldsmith, M., Pansky, A., & Koriat, A. (2014). Metacognitive control of memory reporting. In T. J. Perfect & D. S. Lindsay (Eds.), *The SAGE handbook of applied memory* (pp. 480-500). London, UK: Sage.

González Montesino, R. H. (2016). *La estrategia siempre a mano: Propuestas didácticas para la interpretación en lengua de signos* [The strategy always at hand: Proposals for teaching signed language interpreting] (unpublished doctoral dissertation). Universidad de Vigo, Spain.

Guida, A., Gobet, F., Tardieu, H., & Nicolas, S. (2012). How chunks, long-term working memory and templates offer a cognitive explanation for neuroimaging data on expertise acquisition: A two-stage framework. *Brain and Cognition 79*, 221-244.

Hacker, D. J. (1998). Definitions and empirical foundations. In D. J. Hacker, J. Dunlosky & A. C. Graesser (Eds.), *Metacognition in educational theory and practice* (pp. 1-23). Mahwah, NJ: Lawrence Erlbaum Associates.

Hale, S. (2001). How are courtroom questions interpreted? An analysis of Spanish interpreters' practices. In I. Mason (Ed.), *Triadic exchanges: Studies in dialogue interpreting* (pp. 21-50). Manchester, UK: St. Jerome.

Hale, S. B. (2004). *The discourse of court interpreting: Discourse practices of the law, the witness, and the interpreter.* Amsterdam, NL: John Benjamins.

Hale, S. B. (2007). *Community interpreting.* New York, NY: Palgrave Macmillan.

Hale, S. B., Ozolins, U., & Stern, L. (2009). *The critical link 5: Quality in interpreting—a shared responsibility.* Amsterdam, NL: John Benjamins.

Hansen, G. (2005). Experience and emotion in empirical translation research with think-aloud and retrospection. *Meta: Translators' Journal*, *50*(2), 511-521.

Harvey, M. (2015). Reaping the benefits of vicarious trauma. *International Journal of Interpreter Education 7*(2), 5-20.

Hatano, G., & Inagaki, K. (1986). Two courses of expertise. In H. Stevenson, A. Hiroshi & K. Hakuta (Eds.), *Child development and education in Japan* (pp. 262-272). New York, NY: W. H. Freeman and Company.

Hatim, B., & Mason, I. (1997/2002). Interpreting: A text linguistic approach. Originally published in B. Hatim & I. Mason (Eds.), *The translator as communicator*, ch. 3. London: Routledge. Reprinted in abridged form in F. Pöchhacker & M. Shlesinger (Eds.), *Interpreting studies reader* (pp. 255-265). London, UK: Routledge.

Headland, T. N., Pike, K. L., & Harris, M. (Eds.) (1990). *Frontiers of Anthropology, Volume 7. Emics and etics: The insider/outsider debate.* Newbury Park, CA: Sage.

Held, C., Knauff, M., & Vosgerau, G. (2006). General introduction. In C. Held, M. Knauff & G. Vosgerau (Eds.), *Mental models and the mind: Current developments in cognitive psychology, neuroscience, and philosophy of mind* (pp. 5-22). Amsterdam, NL: Elsevier.

Hemforth, B., & Konieczny, L. (2006). Language processing: Construction of mental models or more? In C. Held, M. Knauff & G. Vosgerau (Eds.), *Mental models and the mind: Current developments in cognitive psychology, neuroscience, and philosophy of mind* (pp. 189-204). Amsterdam, NL: Elsevier.

Henderson, L., & Tallman, J. (2006). *Stimulated recall and mental models: Tools for teaching and learning computer information literacy.* Lanham, MD: The Scarecrow Press, Inc.

Hervais-Adelman, A., Moser-Mercer, B., & Golestani, N. (2011). Executive control of language in the bilingual brain: Integrating the evidence from neuroimaging to neuropsychology. *Frontiers in Psychology volume 2*, article 134.

Hervais-Adelman, A., Moser-Mercer, B., & Golestani, N. (2015). Brain functional plasticity associated with the emergence of expertise in extreme language control. *Neuroimage 114*, 264-274.

Hervais-Adelman, A., Moser-Mercer, B., Michel, C. M., & Golestani, N. (2014). fMRI of simultaneous interpretation reveals the neural basis of extreme language control. *Cerebral Cortex 25*, 4727-4739.

Hervais-Adelman, A., Moser-Mercer, B., Murray, M. M., & Golestani, N. (2017). Cortical thickness increases after simultaneous interpretation training. *Neuropsychologia 98*, 212-219.

Hild, A. (2015). Discourse comprehension in simultaneous interpreting: The role of expertise and information redundancy. In A. Ferreira & J. W. Schwieter (Eds.), *Psycholinguistic and*

cognitive inquiries into translation and interpreting (pp. 67-99). Amsterdam, NL: John Benjamins.

Hild, A. (2014). The role of self-regulatory processes in the development of interpreting expertise. *Translation and Interpreting Studies 9*(3), 128-149.

Hild, A. (2011). Effects of linguistic complexity on expert processing during simultaneous interpreting. In C. Alvstad, A. Hild & E. Tiselius (Eds.), *Methods and strategies of process research* (pp. 249-267). Amsterdam: John Benjamins.

Hill, N. M., & Schneider, W. (2006). Brain changes in the development of expertise: neuroanatomical and neurophysical evidence about skill-based adaptations. In K. A. Ericsson, N. Charness, P. Feltovich & R. Hoffman (Eds.), *The Cambridge handbook of expertise and expert performance* (pp. 653-682). Cambridge, UK: Cambridge University Press.

Hmelo-Silver, C. E., Marathe, S., & Liu, L. (2007). Fish swim, rocks sit, and lungs breathe: Expert-novice understanding of complex systems. *The Journal of the Learning Sciences 16*(3), 307-331.

Hmelo-Silver, C. E., & Pfeffer, M. G. (2004). Comparing expert and novice understanding of a complex system from the perspective of structures, behaviors, and functions. *Cognitive Science 28*(1), 127-38

Hogan, T., & Rabinowitz, M. (2009). Teacher expertise and the development of a problem representation. *Educational Psychology 29*(2), 153-169.

Hoffman, R. (1997). The cognitive psychology of expertise and the domain of interpreting. *Interpreting 2*(1/2), 189-230.

Hofmann, W., Friese, M., Schmeichel, B. J., & Baddeley, A. D. (2011). Working memory and self-regulation. In K. D. Vohs & R. F. Baumeister (Eds.), *Handbook of self-regulation: Research, theory, and applications,* 2nd edition (pp. 204-225). New York, NY: The Guilford Press.

Hofmann, W., Schmeichel, B. J., & Baddeley, A. D. (2012). Executive functions and self-regulation. *Trends in cognitive science 16*(3), 174-180.

Hsieh, E. (2008). "I am not a robot!" Interpreters' views of their roles in health care settings. *Qualitative Health Research 18*(10), 1367-1383.

Holyoak, K. J. (1991). Symbolic connectionism: Toward third-generation theories of expertise. In K. A. Ericsson & J. Smith (Eds.), *Towards a general theory of expertise: Prospects and limits* (pp. 301-335). Cambridge, UK: Cambridge University Press.

Howard, R. W. (1987). *Concepts and schemata: An introduction.* London, UK: Cassell.

Hsu, Y. (2006). The effects of metaphors on novice and expert learners' performance and mental model development. *Interacting with Computers 18*(4), 770-792.

Ivanova, A. (1999). *Discourse processing during simultaneous interpreting: An expertise approach* (unpublished doctoral dissertation). University of Cambridge, UK.

Ivanova, A. (2000). The use of retrospection in research on simultaneous interpreting. In S. Tirkonnen-Condit. & R. Jääskeläinen (Eds.), *Tapping and mapping the process of translation and interpreting: Outlooks on empirical research* (pp. 27-52). Amsterdam, NL: John Benjamins.

Jääskeläinen, R. (2000). Focus on methodology in think-aloud studies on translating. In S. Tirkonnen-Condit. & R. Jääskeläinen (Eds.), *Tapping and mapping the process of translation and interpreting: Outlooks on empirical research* (pp. 71-82). Amsterdam, NL: John Benjamins.

Jääskeläinen, R. (2010). Are all professionals experts? Definitions of expertise and reinterpretation of research evidence in process studies. In E. Angelone & G. M. Shreve (Eds.), *Translation and cognition* (pp. 213-227). Amsterdam, NL: John Benjamins.

Janzen, T. (2013). The impact of linguistic theory on interpretation research methodology. In E. A. Winston & C. Monikowski (Eds.), *Evolving paradigms in interpreter education* (pp. 87-118). Washington, D.C.: Gallaudet University Press.

Janzen, T., & Shaffer, B. (2008). Intersubjectivity in interpreted interactions: The interpreter's role in co-constructing meaning. In J. Zlatev, T. P. Racine, C. Sinha & E. Itkonen (Eds.), *The shared mind: Perspectives on intersubjectivity* (pp. 333-355). Amsterdam, NL: John Benjamins.

Jee, B. D., Uttal, D. H, Spiegel, A., & Diamond, J. (2013). Expert-novice differences in mental models of viruses, vaccines, and the causes of infectious disease. *Public Understanding of Science 24*(2), 241-256.

Johnson-Laird, P. N. (1980). Mental models in cognitive science. *Cognitive Science: A Multidisciplinary Journal 4*(1), 71-115.

Jones, N. A., Ross, H., Lynam, T., Perez, P., & Leitch, A. (2011). Mental models: An interdisciplinary synthesis of theory and methods. *Ecology and Sociology 16*(1), article 46. Accessed 19 August 2017 at https://www.ecologyandsociety.org/vol16/iss1/art46/

Kimball, D. R., & Holyoak, K. J. (2000). Transfer and expertise. In E. Tulvig & F. I. M. Craik (Eds.), *The Oxford handbook of memory* (pp. 109-122). Oxford, UK: Oxford University Press.

Kirchhoff, H. (1976/2002). Simultaneous interpreting: Interdependence of variables in the

interpreting process, interpreting models and interpreting strategies. Originally published in H. W. Drescher & S. Scheffzek (Eds.), *Theorie und praxis des übersetzens un dolmetschens*. Frankfurt am Main: Peter Lang. Reprinted abridged and in English translation in F. Pöchhacker & M. Shlesinger (Eds.), *Interpreting studies reader* (pp. 111-119). London, UK: Routledge.

Klein, G., Phillips, J. K., Rall, E. L., & Peluso, D. A. (2007) A data-frame theory of sensemaking. In R. Hoffman (Ed.), *Expertise out of context: Proceedings of the sixth international conference on naturalistic decision making* (pp. 113-155). New York, NY: Laurence Erlbaum Associates.

Kohn, K., & Kalina, S. (1996). The strategic dimension of interpreting. *Meta: Translators' Journal 41*(1), 118-138.

Köpke, B., & Nespoulous, J. (2006). Working memory performance in expert and novice interpreters. *Interpreting 8*(1), 1-23.

Köpke, B., & Signorelli, T. M. (2012). Methodological aspects of working memory assessment in simultaneous interpreters. *International Journal of Bilingualism 16*(2), 183-197.

Koriat, A. (2000). Control processes in remembering. In E. Tulvig & F. I. M. Craik (Eds.), *The Oxford handbook of memory* (pp. 333-346). Oxford, UK: Oxford University Press.

Kormos, J. (2006). *Speech production and second language acquisition.* Mahwah, NJ: Lawrence Erlbaum Associates.

Kovač, M.M. (2014). The influence of task type on speech monitoring. *International Review of Social Studies and Humanities 8*(1), 113-137.

Ladyman, J., Lambert, J., & Wiesner, K. (2013). What is a complex system? *European Journal of Philosophy of Science 3*(1), 33-67.

Lai, M., Heydon, G., & Mulayim, S. (2015). Vicarious trauma among interpreters. *International Journal of Interpreter Education 7*(1), 3-22.

Lambert, S., & Moser-Mercer, B. (Eds.). (1994). *Bridging the gap: Empirical research in simultaneous interpretation.* Amsterdam, NL: John Benjamins.

LaRocque, J. J., Lewis-Peacock, J. A., & Postle, B. R. (2014). Multiple neural states of representation in short-term memory? It's a matter of attention. *Frontiers in Neuroscience 8*, article 5.

Lapadat, J. C. (2000). Problematizing transcription: Purpose, paradigm and quality. *International Journal of Social Research Methodology 3*(3), 203-219.

Leeson, L. (2005). Making the effort in simultaneous interpreting: Some considerations for

signed language interpreters. In T. Janzen (Ed.), *Topics in signed-language interpreting: Theory and practice* (pp. 51-68). Amsterdam, NL: John Benjamins.

Lewis-Peacock, J. A., Drysdale, A. T., Oberauer, K., & Postle, B. R. (2012). Neural evidence for a distinction between short-term memory and the focus of attention. *Journal of Cognitive Neuroscience 24*(1), 61-79.

Leys, C., Ley, C., Klein, O. Bernard, P., & Licata, L. (2013). Detecting outliers: Do not use standard deviation around the mean, use absolute deviation around the median. *Journal of Experimental Social Psychology 49*, 764-766.

Liu, M. (2001). *Expertise in simultaneous interpreting: A working memory analysis* (unpublished doctoral dissertation). University of Texas at Austin, USA.

Liu, M. (2008). How do experts interpret? Implications from research in interpreting studies and cognitive science. In A. Chesterman, H. Gerzymisch-Arbogast, D. Gile & G. Hansen (Eds.), *Efforts and models in interpreting and translation research: A tribute to Daniel Gile* (pp. 159-177). Amsterdam, NL: John Benjamins.

Lyle, J. (2003). Stimulated recall: A report on its use in naturalistic research. *British Educational Research Journal 29*(6), 861-878.

MacCoon, D. G., Wallace, J., & Newman, J. P. (2004). Self-regulation: Context-appropriate balanced attention. In R. F. Baumeister & K. D. Vohs, (Eds.), *Handbook of self-regulation: Research, theory, and applications* (pp. 422-444). New York: The Guilford Press.

Macnamara, B. N., Moore, A. B., Kegl, J. A., & Conway, A. R. A. (2011). Domain-general cognitive abilities and simultaneous interpreting skill. *Interpreting 13*(1), 121-142.

Maddux, L., & Nicodemus, B. (2016). "The committee in my head": Examining self-talk of American Sign Language-English interpreters. *Translation and Interpreting Studies 11*(2), 177-201.

Major, G. (2013). *Healthcare interpreting as relational practice* (unpublished doctoral dissertation). Macquarie University, Australia.

Major, G. (2014). "Sorry, could you explain that"? Clarification requests in interpreted healthcare interaction. In B. Nicodemus & M. Metzger (Eds.) *Investigations in healthcare interpreting* (pp. 32-69). Washington, DC: Gallaudet University Press.

Mauthner, N. S., & Doucet, A. (2003). Reflexive accounts and accounts of reflexivity in qualitative data analysis. *Sociology 47*(3), 413-431.

Mason, I. (2001). Introduction. In I. Mason (Ed.), *Triadic exchanges: Studies in dialogue interpreting* (pp. i-vi). Manchester, UK: St. Jerome.

Mason, I. (1999). Introduction. *The Translator 5*(2), 147-160.

Mason, I., & Ren, W. (2012). Power in face-to-face interpreting events. *Translation and Interpreting Studies 7*(2), 233-252.

Mason, I., & Stewart, M. (2001). Interactional pragmatics, face, and the dialogue interpreter. In I. Mason (Ed.) *Triadic exchanges: Studies in dialogue interpreting* (pp. 51-70). Manchester, UK: St. Jerome.

Mead, P. (2002). Exploring hesitations in consecutive interpreting: An empirical study. In G. Garzone & M. Viezzi (Eds.), *Interpreting in the 21st century: Challenges and opportunities* (pp. 73-82). Amsterdam, NL: John Benjamins.

Metzger, M. (1999). *Sign language interpreting: Deconstructing the myth of neutrality.* Washington, DC: Gallaudet University Press.

Metzger, M., & Roy, C. (2011). The first three years of a three-year grant: When a research plan doesn't go as planned. In B. Nicodemus & L. Swabey (Eds.), *Advances in interpreting research: Inquiry in action* (pp. 59-84). Amsterdam, NL: John Benjamins.

Meyer, B. (2002). Medical interpreting: Some salient features. In G. Garzone & M. Viezzi (Eds.), *Interpreting in the 21st century* (pp. 160-169). Amsterdam, NL: John Benjamins.

Miguélez, C. (2001). Interpreting expert witness testimony: Challenges and strategies. In I. Mason (Ed.), *Triadic exchanges: Studies in dialogue interpreting* (pp. 3-19). Manchester, UK: St. Jerome.

Mikkelson, H. (1999). Interpreting is interpreting--or is it? [Paper originally presented at the Monterey Institute of International Studies GSTI 30th anniversary conference, January 1999.] Retrieved from https://acebo.myshopify.com/pages/interpreting-is-interpreting-or-is-it on 2 September 2017

Mikkelson, H. (2008). Evolving views of the court interpreter's role: Between Scylla and Charybdis. In C. Valero-Garcés & A. Martin (Eds.), *Crossing borders in community interpreting: Definitions and dilemmas* (pp. 81-97). Amsterdam, NL: John Benjamins.

Miller, E. K., & Cohen, J. D. (2001). An integrative theory of prefrontal cortex function. *Annual Review of Neuroscience 24*(1), 167-202.

Mizuno, A. (2005). Process model for simultaneous interpreting and working memory. *Meta: Translators' Journal 50*(2), 739-752.

Monacelli, C. (2000). Mediating castles in the air: Epistemological issues in interpreting studies. In M. Olohan (Ed.), *Intercultural faultlines: Research models in translation studies I: Textual and cognitive aspects* (pp. 193-213). Manchester, UK: St. Jerome.

Moser, B. (1978). Simultaneous interpretation: A hypothetical model and its practical applications. In D. Gerver & W. H. Sinaiko (Eds.), *Language interpretation and communication. Proceedings of the NATO symposium on language interpretation and communication, Venice, 1977* (pp. 353-368). New York, NY: Plenum Press.

Moser-Mercer, B. (1994). Paradigms gained or the art of productive disagreement. In S. Lambert & B. Moser-Mercer (Eds.), *Bridging the gap: Empirical research in simultaneous interpretation* (pp. 17-23). Amsterdam, NL: John Benjamins.

Moser-Mercer, B. (1997/2002). Process models in simultaneous interpretation. Originally published in C. Hauenschild & S. Hizmann (Eds.), *Machine translation and translation theory* (pp. 3-17). Berlin: Mouton de Gruyter. Reprinted in abridged form in F. Pöchhacker & M. Shlesinger (Eds.), *Interpreting studies reader* (pp. 149-161). London, UK: Routledge.

Moser-Mercer, B. (2000a). The rocky road to expertise in interpreting: Eliciting knowledge from learners. In M. Kadric, K. Kaindl, K. & F. Pöchhacker (Eds.), *Translationswissenschaft: Festschrift Für Mary Snell-Hornby Zum 60. Geburtstag* (pp. 340-352). Tübingen, Germany: Stauffenburg.

Moser-Mercer, B. (2000b). Simultaneous interpreting: Cognitive potential and limitations. *Interpreting 5*(2), 83-94.

Moser-Mercer, B. (2003). Remote interpreting: Assessment of human factors and performance parameters. *aiic.net* May 19, 2003. Accessed 27 July 2017 at https://aiic.net/page/1125/remote-interpreting-assessment-of-human-factors

Moser-Mercer, B. (2005). Remote interpreting: Issues of multi-sensory integration in a multilingual task. *Meta: Translators' Journal 50*(2), 727-738.

Moser-Mercer, B. (2007). Skill acquisition in interpreting: A human performance perspective. *The Interpreter and Translator Trainer 2*(1), 1-28.

Moser-Mercer, B. (2010). The search for neuro-physiological correlates of expertise in interpreting. In G. M. Shreve & E. Angelone (Eds.), *Translation and cognition* (pp. 263-287). Amsterdam, NL: John Benjamins.

Moser-Mercer, B., Frauenfelder, U. H., Casado, B., & Künzli, A. (2000). Searching to define expertise in interpreting. In B. Englund Dimitrova & K. Hyltenstam (Eds.), *Language processing and simultaneous interpreting* (pp. 107-131). Amsterdam, NL: John Benjamins.

Mouzourakis, T. (2003). That feeling of being there: Vision and presence in remote interpreting. aiic.net June 19, 2003. Accessed 29 July 2017 at https://aiic.net/p/1173

Mumford, M. D., Hester, K. S., Robledo, I. C., Peterson, D. R., Day, E. A., Hougen, D. F., &

Barrett, J. D. (2012). Mental models and creative problem-solving: The relationship of objective and subjective model attributes. *Creativity Research Journal 24*(4), 311-330.

Muñoz Martín, R. (2014). A blurred snapshot of advances in translation process research. *MonTI special issue 1—minding translation*, 49-84.

Muñoz Martín, R. (2016). Processes of what models? On the cognitive indivisibility of translation acts and events. *Translation Spaces 5*(1), 145-161.

Napier, J. (2004). Interpreting omissions: A new perspective. *Interpreting 6*(2), 117-142.

Napier, J., & Barker, R. (2004). Sign language interpreting: The relationship between metalinguistic awareness and the production of interpreting omissions. *Sign Language Studies 4*(4), 369-393.

Niemants, N. S. A. (2012). The transcription of interpreting data. *Interpreting 14*(2), 165-191.

Neisser, U. (1976). *Cognition and reality: Principles and implications of cognitive psychology.* San Francisco: W. H. Freeman and Company.

Nelson, T. O., & Narens, L. (1990). Metamemory: A theoretical framework and new findings. In G. H. Bower (Ed.), *The psychology of learning and motivation: Advances in research and theory* Vol. 26 (pp. 125-173). San Diego, CA: Academic Press.

Neumann, N., Lotze, M., & Eikhoff, S. B. (2016). Cognitive expertise: An ALE meta-analysis. *Human Brain Mapping 37*, 262-272.

Norman, D. A. (1983). Some observations on mental models. In D. Gentner & A. L. Stevens (Eds.), *Mental models* (pp. 7-14). Hillsdale, NJ: Lawrence Erlbaum Associates.

Oh, H. & Solomon, P. (2014). Role-playing as a tool for hiring, training, and supervising peer providers. *Journal of Behavioral Health Services & Research 41*(2), 216-229.

Paletz, S. B. F., Kim, K. H., Schunn, C. D., Tollinger, I., & Vera, A. (2013). Reuse and recycle: The development of adaptive expertise, routine expertise, and novelty in a large research team. *Applied Cognitive Psychology 27*(4), 415-428.

Papies, E. K, & Aarts, H. (2011). Nonconscious self-regulation, or the automatic pilot of human behavior. K. D. Vohs & R. F. Baumeister (Eds.), *Handbook of self-regulation: Research, theory, and applications,* 2nd edition (pp. 125-142). New York, NY: The Guilford Press.

Pauen, M. (2006). Emotion, decision, and mental models. In C. Held, M. Knauff & G. Vosgerau (Eds.). *Mental models and the mind: Current developments in cognitive psychology, neuroscience, and philosophy of mind* (pp. 173-188). Amsterdam, NL: Elsevier.

Pillai, S. (2006). Self-monitoring and self-repair in spontaneous speech. *Kata: A biannual*

publication on the study of languages and literature 8(2), 114-126.

Pintrich, P. R. (2000). The role of goal orientation in self-regulated learning. In M. Boekaerts, P. R. Pintrich & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 451-502). San Diego, CA: Academic Press.

Pintrich, P. R., & Zusho, A. (2002). The development of academic self-regulation: The role of cognitive and motivational factors. In A. Wigfield & J. S. Eccles (Eds.), *Development of achievement motivation* (pp. 249-284). San Diego, CA: Academic Press.

Pöchhacker, F. (2012). Interpreting participation: Conceptual analysis and illustration of the interpreter's role in interaction. In C. Baraldi & L. Gavioli (Eds.), *Coordinating participation in dialogue interpreting* (pp. 45-69). Amsterdam, NL: John Benjamins.

Pöchhacker, F. (2010). The role of research in interpreter education. *Translation and Interpreting 2*(1), 1-10.

Pöchhacker, F (2005). From operation to action: Process-orientation in interpreting studies. *Meta*: *Translators' Journal 50*(2), 682-695.

Pöchhacker, F. (2004). *Introducing interpreting studies.* London, UK: Routledge.

Pöchhacker, F., & Shlesinger, M. (2002). Introduction. In F. Pöchhacker & M. Shlesinger (Eds.), *The interpreting studies reader* (pp. 1-12). London, UK: Routledge.

Pöllabauer, S. (2006). "Translation culture" in interpreted asylum hearings. In A. Pym, M. Shlesinger & Z. Jettmarová (Eds.), *Sociocultural aspects of translating and interpreting* (pp. 151-162). Amsterdam, NL: John Benjamins.

Postma, A. (2000). Detection of errors during speech production: A review of speech monitoring models. *Cognition 77*, 97-131.

Roberts, R. P., Carr, S. E., Abraham, D., & Dufour, A. (2000). *The critical link 2: Interpreters in the community. Selected papers from the second international conference on interpreting in legal, health and social services settings, Vancouver, BC, Canada, 19-23 May 1998.* Amsterdam, NL: John Benjamins.

Rose, R. L. (2013). Crosslinguistic corpus of hesitation phenomena: A corpus for investigating first and second language speech performance. In *Proceedings of the annual Conference of the International Speech Communication Association, INTERSPEECH* (pp. 992-996). International Speech and Communication Association.

Ross, K., Shafer, J., & Klein, G. (2006). Professional judgments and "naturalistic decision making." In K. A. Ericsson, N. Charness, P. Feltovich & R. Hoffman (Eds.), *The Cambridge handbook of expertise and expert performance* (pp. 403-419). Cambridge, UK: Cambridge University Press.

Roy C. B. (1993). The problem with definitions, descriptions, and the role metaphors of interpreters. *Journal of Interpretation 6*(1), 127-154.

Roy, C. B. (2000). *Interpreting as a discourse process.* Oxford, UK: Oxford University Press.

Rudvin, M. (2006). Negotiating linguistic and cultural identities in interpreter-mediated communication for public health services. In A. Pym, M. Shlesinger & Z. Jettmarová (Eds.), *Sociocultural aspects of translating and interpreting* (pp. 173-190). Amsterdam: John Benjamins.

Rueda, M. R., Posner, M. I., & Rothbart, M. K. (2011). Attentional control and self-regulation. In K. D. Vohs & R. F. Baumeister (Eds.), *Handbook of self-regulation: Research, theory, and applications*, 2nd edition. New York, NY: The Guilford Press.

Russell, D. L. (2002). *Interpreting in legal contexts: Consecutive and simultaneous interpretation*. Burtonsville, MD: Linstok Press.

Russell, D. (2005). Consecutive and simultaneous interpreting. In T. Janzen (Ed.), *Topics in signed-language interpreting: Theory and practice* (pp. 135-163). Amsterdam: John Benjamins.

Russell, D., & Winston, B. (2014). Tapping into the interpreting process: Using participant reports to inform the interpreting process in educational settings. *Translating and Interpreting 6*(1), 102-127.

Schäffner, C., Kredens, K., & Fowler, Y. (2013). *Interpreting in a changing landscape: Selected papers from critical link 6.* Amsterdam, NL: John Benjamins.

Schunk, D. H. (2001). Social cognitive theory and self-regulated learning. In B. J. Zimmerman & D. H. Schunk (Eds.), *Self-regulated learning and academic achievement: Theoretical perspectives,* 2nd edition (pp. 125-151). Mahwah, N. J.: Lawrence Erlbaum Associates.

Schweppe, J., & Rummer, R. (2014). Attention, working memory, and long-term memory in multimedia learning: An integrated perspective based on process models of working memory. *Educational Psychology Review 26*, 285-306.

Seel, N. M. (2006). Mental models in learning situations. In C. Held, M. Knauff & G. Vosgerau (Eds.), *Mental models and the mind: Current developments in cognitive psychology, neuroscience, and philosophy of mind* (pp. 85-107). Amsterdam, NL: Elsevier.

Setton, R. (1998). Meaning assembly in simultaneous interpretation. *Interpreting 3*(2), 163-199.

Setton, R. (1999). *Simultaneous interpretation: A cognitive-pragmatic analysis.* Amsterdam, NL: John Benjamins.

Shaffer, B. (2013). Evolution of theory, evolution of role: How interpreting theory shapes interpreter role. In E. A. Winston & C. Monikowski (Eds.), *Evolving paradigms in interpreter education* (pp. 128-150). Washington, D.C.: Gallaudet University Press.

Shamy, M., & de Pedro Ricoy, R. (2017). Retrospective protocols: Tapping into the minds of interpreting trainees. *Translation and Interpreting 9*(1), 51-71.

Shlesinger, M. (1995). Shifts in cohesion in simultaneous interpreting. *The Translator 1*(2), 193-214.

Shlesinger, M. (2000). Interpreting as a cognitive process: How can we know what really happens? In S. Tirkonnen-Condit. & R. Jääskeläinen (Eds.), *Tapping and mapping the process of translation and interpreting: Outlooks on empirical research* (pp. 3-15). Amsterdam: John Benjamins.

Sloboda, J. (1991). Musical expertise. In K. A. Ericsson & J. Smith (Eds.), *Towards a general theory of expertise: Prospects and limits* (pp. 153-171). Cambridge, UK: Cambridge University Press.

Smit, G. N., & van der Molen, H. T. (1996). Simulations for the assessment of counselling skills. *Assessment & Evaluation in Higher Education 21*(4), 335-345.

Sperling, R. A., Howard, B. C., Staley, R., & DuBois, N. (2004). Metacognition and self-regulated learning constructs. *Educational Research and Evaluation: An International Journal on Theory and Practice 10*(2), 117-139.

Skukauskaite, A. (2012). Transparency in transcribing: Making visible theoretical bases impacting knowledge construction from open-ended interview records. *Forum: Qualitative Social Research 13*(1), article 14.

Styles, E. A. (2005). *Attention, perception, and memory: An integrated introduction.* New York, NY: Psychology Press.

Takimoto, M. (2009). Characteristics of an interpreted situation with multiple participants: Iimplications for pedagogy. *International Journal of Interpreter Education 1*, 33-44.

Takimoto, M., & Koshiba, K. (2009). Interpreter's non-rendition behavior and its effect on interaction: A case study of a multi-party interpreting situation. *Translation and Interpreting 1*(1), 15-26.

Tebble, H. (1999). The tenor of consultant physicians: Implications for medical interpreting. *The Translator 5*(2).

Tebble, H. (2009). What can interpreters learn from discourse studies? In S. Hale, U. Ozolins & L. Stern (Eds.), *The critical link 5: Quality in interpreting--a shared responsibility* (pp. 201-219). Amsterdam, NL: John Benjamins.

Tebble, H. (2012). Interpreting or interfering? In C. Baraldi & L. Gavioli (Eds.), *Coordinating participation in dialogue interpreting* (pp. 23-44). Amsterdam, NL: John Benjamins.

Timarová, S. (2008). Working memory and simultaneous interpreting. In P. Boulogne (Ed.), *Translation and its others: Selected papers of the CETRA research seminar in translation studies 2007*. Last accessed 21 June, 2017 at https://www.arts.kuleuven.be/cetra/papers/files/timarova.pdf

Timarová, S., Čeňcová, I., Meylaerts, R., Hertog, E., Szmalec, A., & Duyck, W. (2014). Simultaneous interpreting and working memory executive control. *Interpreting 16*(2), 139-168.

Timarová, S., Čeňcová, I., Meylaerts, R., Hertog, E., Szmalec, A., & Duyck, W. (2015). Simultaneous interpreting and working memory capacity. In A. Ferreira & J. W. Schwieter (Eds.), *Psycholinguistic and cognitive inquiries into translation and interpreting* (pp. 101-126). Amsterdam, NL: John Benjamins.

Tipton, R., & Furmanek, O. (2016). *Dialogue interpreting: A guide to interpreting in public services and the community*. London, UK: Routledge.

Tiselius, E. (2013). *Experience and expertise in conference interpreting: An investigation of Swedish conference interpreters.* (unpublished doctoral dissertation). University of Bergen, Norway. Accessed 21 July 2018 at https://bora.uib.no/bitstream/handle/1956/8747/dr-thesis-2013-Elisabet-Tiselius.pdf?sequence=1&isAllowed=y.

Tiselius, E., & Jenset, G. B. (2011). Process and product in simultaneous interpreting: What they tell us about experience and expertise. In C. Alvstad, A. Hild, & Tiselius, E. (Eds), *Methods and strategies of process research* (pp. 269-300). Amsterdam, NL: John Benjamins.

Turner, G. H., & Harrington, F. (2000). Issues of power and method in interpreting research. In M. Olohan (Ed.), *Intercultural faultlines: Research models in translation studies I, textual and cognitive aspects* (pp. 253-265). Manchester, UK: St. Jerome.

Valero-Garcés, C., & Martin, A. (Eds.). (2008). *Crossing borders in community interpreting: Definitions and dilemmas.* Amsterdam, NL: John Benjamins.

Vargas-Urpi, M., & Arumí Ribas, M. (2014). Estrategias de interpretación en los servicios públicos en el ámbito educativo *[Strategies in public service interpreting in the educational setting]. inTRAlinea 16.* Last accesses 18 July 2018 at http://www.intralinea.org/archive/article/2040.

Vik-Tuovinen, G. (2000). The interpreters' comments in interpreting situations. In S. Tirkonnen-Condit. & R. Jääskeläinen (Eds.), *Tapping and mapping the process of translation and*

interpreting: Outlooks on empirical research (pp. 17-26). Amsterdam, NL: John Benjamins.

Vik-Tuovinen, G. (2002). Retrospection as a method of studying the process of simultaneous interpreting. In G. Garzone & M. Viezzi (Eds.), *Interpreting in the 21st century: Challenges and opportunities* (pp. 63-71). Amsterdam, NL: John Benjamins.

Vik-Tuovinen, G. (2011). Developing professional thinking and acting within the field of interpreting. In C. Alvstad, A. Hild & E. Tiselius (Eds.), *Methods and strategies of process research* (pp. 301-315). Amsterdam, NL: John Benjamins.

Vohs, K. D., & Baumeister, R. F. (Eds). (2011). *Handbook of self-regulation: Research, theory, and applications,* 2nd edition. New York, NY: The Guildford Press.

Vohs, K. D., & Baumeister, R. F. (2004). Understanding self-regulation: An introduction. In R. F. Baumeister & K. D. Vohs (Eds.), *Handbook of self-regulation: Research, theory, and applications* (pp. 1-9). New York, NY: The Guilford Press.

Wadensjö, C. (1998). *Interpreting as interaction.* London, NY: Longman.

Wadensjö, C. (2004). Dialogue interpreting: A monologising practice in a dialogically organised world. *Target: International Journal of Translation Studies 16*(1), 105-124.

Wadensjö, C. (2011). Interpreting in theory and practice: Reflections about an alleged gap. In C. Alvstad, A. Hild & E. Tiselius (Eds.), *Methods and strategies of process research* (pp. 13-21). Amsterdam, NL: John Benjamins.

Wadensjö, C., Englund Dimitrova, B., & Nilsson, A. (2007). *The critical link 4: Professionalisation of interpreting in the community. Selected papers from the 4th international conference on interpreting in legal, health and social services settings, Stockholm, Sweden, 20-23 May 2004.* Amsterdam, NL: John Benjamins.

Weiss, D.J., & Shanteau, J. (2014) Who's the best? A relativistic view of expertise. *Applied Cognitive Psychology 28*, 447-457.

Wilcox, S. [Sherman]. (1986). *The thinking interpreter: Explorations of expectancy in interpreting* (unpublished doctoral comprehensive paper). University of New Mexico, USA.

Wilcox, S. [Sherman], & Shaffer, B. (2005). Towards a cognitive model of interpreting. In T. Janzen (Ed.), *Topics in signed-language interpreting: Theory and practice* (pp. 27-50). Amsterdam, NL: John Benjamins.

Wilcox, S. [Stéphane], & Trudel, P. (1998). Constructing the coaching principles and beliefs of a youth hockey coach. *Avante 4*(3), 39-66.

Winne, P. H. (2001). Self-regulated learning viewed from models of information processing. In B. J. Zimmerman & D. H. Schunk (Eds.), *Self-regulated learning and academic achievement: Theoretical perspectives,* 2nd edition (pp. 153-189). Mahwah, N. J.: Lawrence Erlbaum Associates.

Winston, E. A. (2013). Infusing evidence into interpreting education: An idea whose time has come. In E. A. Winston & C. Monikowski (Eds.), *Evolving paradigms in interpreter education* (pp. 164-187). Washington, D.C.: Gallaudet University Press.

Wolff, C.E., van den Bogert, N., Jarodzka, H., & Boshuizen, H.P.A. (2015). Keeping an eye on learning: Differences between expert and novice teachers' representations of classroom management events. *Journal of Teacher Education 66*(1), 68-85.

Woods, D.D. (1993). Process-tracing methods for the study of cognition outside of the experimental laboratory. In G. Klein, J. Oranasu, R. Calderwood & C. E. Zsambok (Eds.), *Decision-making in action: Models and methods* (pp. 228-251). Norwood, NJ: Ablex Publishing Corporation.

Yates, J. F. (2001). "Outsider": impressions of naturalistic decision making. In E. Salas & G. Klein (Eds.), *Linking expertise and naturalistic decision making* (pp. 9-33). Mahwah, NJ: Lawrence Erlbaum Associates.

Yinger, R.J. (1986). Examining thought in action: A theoretical and methodological critique of research on interactive teaching. *Teaching & Teacher Education 2*(3), 263-282.

Zeidner, M., Boekaerts, M., & Pintrich, P. R. (2000). Self-regulation: Directions and challenges for future research. In M. Boekaerts, P. R. Pintrich & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 749-768). San Diego, CA: Academic Press.

Zeitz, C. (1997). Some concrete advantages of abstraction: How experts' representations facilitate reasoning. In P. Feltovich, K. Ford & R. Hoffman (Eds.), *Expertise in context: Human and machine* (pp. 43-65). Menlo Park, CA: AAAI Press.

Zimmerman, B. J. (2000). Attaining self-regulation: A social cognitive perspective. In M. Boekaerts, P. R. Pintrich & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 13-39). San Diego, CA: Academic Press.

Zimmerman, B. J. (2002). Achieving academic excellence: A self-regulatory perspective. In M. Ferrari (Ed.), *The pursuit of excellence through education* (pp. 85-110). Mahwah, NJ: Laurence Erlbaum Associates.

Zimmerman, B. J. (2006). Development and adaptation of expertise: The role of self-regulatory processes and beliefs. In K. A. Ericsson, N. Charness, P. Feltovich & R. Hoffman (Eds.), *The Cambridge handbook of expertise and expert performance* (pp. 421-438). Cambridge, UK: Cambridge University Press.

Zimmerman, B. J. (2008). Investigating self-regulation and motivation: Historical background, methodological developments, and future prospects. *American Educational Research Journal 45*(1), 166-183.

Appendix A—Parameters for Simulations

Note: The Genetic Counseling scenario was planned but not carried out as a part of the study.

1. Genetic Counseling Scenario

Parameters for Genetic Counseling Scenario *(NB: This scenario was not carried out as part of the study.)*

- Participants: two (in addition to interpreter)
  - Genetic Counselor—gender/age/ethnicity to correspond with identified actor
  - Patient—young, unmarried Hispanic female

- Scenario:
  - The genetic counselor is seeing a patient for an initial visit, and has been provided no information about the reason for visit or the patient beyond a reason for visit that says "CF sister."
  - The patient's sister has just given birth, and the baby has been diagnosed with cystic fibrosis. The patient has been referred for genetic counseling because of the possibility that she may be a carrier. The patient does not have any previous knowledge of cystic fibrosis, and her understanding of genetics is limited. She is in a committed relationship but is not currently pregnant or planning to become pregnant.
  - *For this scenario, the actor playing the patient is provided with detailed information about her family and their medical history, sufficient to participate in a family-history gathering session of the sort typically carried out by genetic counselors. The patient will need to have this information memorized. The detailed family history may be modified to bring it more in line with the actor's own family history (e.g., having the same number of siblings, or nieces/nephews of a specific gender) if necessary for ease of memorization, but the history must be kept at a similar level of detail and complexity.*

#	Difficulty	Description/Example *GC=genetic counselor; PT=patient*
1	Portion of encounter involves sensitive subject matter/demonstrations of increased affect (no conflict between parties)	--PT's newborn niece born with cystic fibrosis—upsetting to PT; possibly to interpreter --GC discusses possibility that PT may be a carrier and could pass risk to future children—this could upset or confuse PT; possibly also interpreter --GC discusses health problems and shorter life span of individuals with cystic fibrosis—this could upset PT; possibly also interpreter
2	Technical terms used and subsequently explained clearly	--GC uses terms such as "carrier"; "chromosome"; "recessive"; "allele"; others… without explaining their meaning; if requested by interpreter, GC provides clear explanation of meaning of term
3	Idiomatic expressions	--PT or GC uses idiomatic or colloquial expressions
4	Presentation of conceptually complex information (not 'broken down' or simplified)	--GC describes abstract and fairly complex concept (what it means to be a carrier, recessive inheritance) in mid- to high-register language
5	Disfluent/incomplete utterances—isolated	--PT or GC does not have thoughts well organized—backtracks, hesitates, corrects self in mid-statement
6	interruptions (phone/EMR/etc)	--GC's phone rings during session
7	overlapping speakers—isolated	--GC or PT speaks over interpreter; GC or PT speak over each other
8	Speed	--GC or PT speaks very fast, but only on occasion; respond well to requests to speak more slowly
9	Speaker produces isolated word(s) in a language s/he does not speak fluently	--GC may use a word or two of Spanish (e.g. greeting, congratulations on new baby) --PT may employ some English words when speaking Spanish; may attempt a farewell or thank you in English if comfortable
10	Speakers address interpreter	--GC may ask interpreter about PT (e.g. "do you think she understood") or make comment to interpreter (e.g., "now let me know if I go too fast again") --PT may ask interpreter personal questions (e.g. "where are you from?" or "do you have children") or for advice (e.g. "what do you think?")
11	speakers make side comments not intended to be heard by the other party	--GC may engage in self-talk or comments about the fact that the records were misplaced and she has little information (e.g. "those front desk people are always losing things") --PT may make side comments or comments under her breath vis a vis GC
12	Speaker rude/condescending/otherwise inappropriate to situation	--PT may use slang/vulgar language --GC may make remarks such as "wow, that's a lot of kids" or similar

2. Employee Dispute Scenario

Parameters for Employee Dispute Scenario

- Participants: three (in addition to interpreter)
  - Employee 1 (Mariela)—speaks only Spanish; South-American descent; female; works as janitorial staff at a college
  - Employee 2 (Andrew)—speaks English and some Spanish; Caucasian; male; lead/supervising janitor (i.e., in charge of shift assignments, etc, but not a direct supervisor of employee 1) at a college
  - College administrator (Theresa); Caucasian; female

- Scenario:
  - Workplace disagreement between Mariela and Andrew regarding shift assignments and possible sexual harassment
  - Employees were heard arguing in the hallway near students and faculty and were brought into a classroom to talk with an administrator in order to get them to calm down and to figure out what is going on and determine next steps. This is an initial and unplanned meeting and therefore confusing/chaotic.
  - Andrew thinks he is doing a good job and is proud of his ability to speak a little Spanish and understand the world/customs/approaches of Hispanic employees
  - Mariela does not agree with Andrew's self-concept in terms of speaking some Spanish, relating well to Hispanic employees

Grid for Employee Dispute Scenario

#	Difficulty	Description/Example
1	Confusing/contradictory story; latter parts may contradict or change information from previous parts	Both have their perception/side of things—neither is 100% clearly true (he's making me work weird shifts/gross places VS someone else did the schedule, someone was out sick, etc) Bus confusion—also changing start times, etc
2	Communication difficulties (assumptions, culture, genre-specific expectations)	Salir vs date; expectations vis a vis relationships
3	Highly-charged/emotional content; conflicting goals/emotional states among parties	Story starts in mid stream; questions of possible sexual harassment, improper behavior by lead, etc.
4	Technical jargon used and not subsequently explained/explained unclearly	*N/A*
5	Idiomatic expressions	Idiomatic expressions
6	Presentation of conceptually complex information (not 'broken down' or simplified)	*N/A*
7	Speakers habitually speak disfluently or elliptically (talking around topics, ramble)	Mariela habitually; also Andrew when answering ?s in re date/harassment (deflecting attention) Lack of clarity about buses (times, shift changes); also circular/unclear in discussions of shift times; ditto timing of dates/relationship
8	Interruptions (phone)	Mariela is on phone at beginning and takes a phone call during the interaction
9	Overlapping speakers	Throughout as appropriate
10	Speed	Throughout as appropriate
11	One speaker uses both languages (interpreter does not know which language to expect)	Andrew misunderstands a comment made in Spanish by Mariela
12	One speaker uses both languages (makes judgments/comments in re interpretation)	Andrew may question interpreter when interpreter is actually correct
13	Speakers make comments to interpreter (about other speakers; about situation; about interpreter)	Gender-specific comments (made my whichever employee is of same gender as interpreter)
14	Speakers make side comments not intended to be heard by the other party	Muttering—Andrew
15	Speakers expect interpreter to resolve communication difficulties	Theresa doesn't impose order—looks to interpreter to get speakers to stop interrupting, talking over each other
16	Speakers are rude/condescending/otherwise inappropriate	Andrew and Mariela—rude to each other
17	Speakers blame interpreter for mistakes/confusion	As appropriate; linked to correction of interpreter ("you didn't explain it right")

Appendix B—Observation Sheet & Materials Used during Retrospective Process Tracing

1. Observation Sheet

Employee Dispute Observation Form **Participant ID:_____** **Start time: _____**

Speaker	Issue	Resolution	Notes
Admin Sup LEP	Linguistic □ Affect/Tone □ Style □ Speed □ Length □ Overlap □ Compl/Ambig. □ Part. Behav. □ Other □	Request pause □ Interrupt sp. □ Repeat/Clarify □ Paraphr/Compress □ Omit □ Tone/Style Shift □ Ref. Contract □ No observable response □ Other □	
Admin Sup LEP	Linguistic □ Affect/Tone □ Style □ Speed □ Length □ Overlap □ Compl/Ambig. □ Part. Behav. □ Other □	Request pause □ Interrupt sp. □ Repeat/Clarify □ Paraphr/Compress □ Omit □ Tone/Style Shift □ Ref. Contract □ No observable response □ Other □	
Admin Sup LEP	Linguistic □ Affect/Tone □ Style □ Speed □ Length □ Overlap □ Compl/Ambig. □ Part. Behav. □ Other □	Request pause □ Interrupt sp. □ Repeat/Clarify □ Paraphr/Compress □ Omit □ Tone/Style Shift □ Ref. Contract □ No observable response □ Other □	
Admin Sup LEP	Linguistic □ Affect/Tone □ Style □ Speed □ Length □ Overlap □ Compl/Ambig. □ Part. Behav. □ Other □	Request pause □ Interrupt sp. □ Repeat/Clarify □ Paraphr/Compress □ Omit □ Tone/Style Shift □ Ref. Contract □ No observable response □ Other □	

2. Materials Used during Retrospective Process Tracing

2.1 Text handed to interpreter at the beginning of the retrospection

I would like to hear anything you remember thinking during the encounter.

The goal of retrospection is to reconstruct your thought processes as you interpreted, NOT to evaluate your work or explain your decisions.

Please begin by sharing anything and everything that went through your mind as you interpreted.

2.2 Text handed to interpreter to initiate stage 2 (minimally-cued retrospection)

I would like to hear anything else you can remember thinking.

Here is an outline of the main parts of the encounter:

- Arrival in room / beginning of interaction
- What led to this meeting (what is the problem)
- Unhappiness with work assignment
- Rationale for current work assignment
- Accusation of retaliation
- Personal history between employees
- Discussion of how to move forward
- Closing

2.3 Verbal Probes (used by researcher during stage 3; not seen by participants)

Was there anything that you found to be easy?

Was there anything that you found to be difficult?

Did you encounter any challenges? If so, were any easy to resolve? If so, were any hard to resolve?

Tell me about your mood or state of mind during the interaction (GENERAL OR SPECIFIC POINT).

Were you aware of any emotional reaction to the situation (GENERAL OR SPECIFIC POINT)?

Were you aware of any reaction to the participants in the interaction (GENERAL OR SPECIFIC POINT)?

During the course of the interpretation, did you find yourself identifying with any of the parties?

During the course of the interpretation, did you find yourself believing one person's story over the other's?

During the course of the interpretation, did you think about how the situation might resolve?

ASK ABOUT SPECIFIC INSTANCES THAT SEEMED TO CAUSE TROUBLE.

Appendix C—Demographic Questionnaire

Demographic Questionnaire for Interpreting Study Participant ID: _____

Gender: _____ Age: _____

Country of birth: _____

If other than US, age at which you came to the US: _____

Age at which you started studying English:

Age at which you started studying Spanish:

Describe any formal training as an interpreter you have received:

Length of program: Organization offering training:

Degree/certificate obtained:

What is the highest level of education you have completed? (circle your answer)

High school some college associate's degree bachelor's degree graduate degree

In what language did you complete your highest level of education? _____

Please describe any formal education you completed in the language in which you did not complete your highest level of education (for example, if you have a BA that you completed in English, did you complete any formal education in Spanish?):

_____

Describe your interpreting experience:

How long have you been working as an interpreter?

On average, how many days a week do you spend working as an interpreter?

In what settings do you usually work?

Appendix D—Length of Performances & Retrospections

1. Duration of Simulated Interaction (i.e., Performance)

Length of Performance (entirety of encounter) ***(minutes:seconds)***	
Ana: 20:51	Jonathan: 24:57
Laura: 23:33	Benjamin: 24:56
Sara: 17:05	Carla: 18:27
Naomi: 21:20	
Erica: 18:01	
Total Mean: 21:09	
Expert Mean: 20:10	Novice Mean: 22:47

2. Duration of Retrospective Process Tracing

Length of Retrospection (includes researcher's speaking time) ***(minutes:seconds)***	
Ana: 16:38	Jonathan: 15:03
Laura: 11:32	Benjamin: 20:38
Sara: 13:16	Carla: 16:50
Naomi: 14:30	
Erica: 14:09	
Total Mean: 15:19	
Expert Mean: 14:01	Novice Mean: 17:30

3. Word Counts of Retrospective Process Tracing (Total and by Stage)

Words in Retrospection (interpreter's words only)[84]				
	Total	**Stage 1 (uncued)**	**Stage 2 (minimally-cued)**	**Stage 3 (verbal probes)**
Ana	1,594	252	417	925
Laura	1,351	123	186	1,042
Sara	1,500	443	171	886
Naomi	1,806	193	308	1,305
Erica	1,525	479	277	769
Jonathan	1,018	216	154	648
Benjamin	2,211	538	398	1,275
Carla	2,010	265	144	1,601

[84] Word counts were obtained by stripping the transcripts of the researcher's turns at talk as well as indicators of pauses and pragmatic features (e.g. "LAUGHTER") and subsequently using Microsoft Word's word counting feature.

Appendix E—Quantitative Results from the Performance Data

1. Total Monitoring Indicators from Performance Data

PERFORMANCE INDICATORS	Total (N=8)	Mean
Speech disfluency indicators	787	98.4
Management indicators	329	41.1
Other indicators	84	10.4

2. Monitoring Indicators from Performance Data by Group

SPEECH DISFLUENCY indicators by group				MANAGEMENT indicators by group				OTHER performance indicators by group		
Group	Total	Mean		Group	Total	Mean		Group	Total	Mean
Experts (N=5)	405	81		Experts (N=5)	208	41.6		Experts (N=5)	28	5.6
Novices (N=3)	382	127.3		Novices (N=3)	121	40.3		Novices (N=3)	56	18.7

3. Individual Monitoring Indicators from Performance Data

Individual total SPEECH DISFLUENCY indicators				
Experts	**Total**		**Novices**	**Total**
Ana	68		Jonathan	114
Laura	122		Benjamin	138
Sara	81		Carla	130
Naomi	105			
Erica	29			

Individual total MANAGEMENT indicators				
Experts	**Total**		**Novices**	**Total**
Ana	67		Jonathan	48
Laura	34		Benjamin	45
Sara	31		Carla	28
Naomi	44			
Erica	32			

Individual total OTHER performance indicators				
Experts	**Total**		**Novices**	**Total**
Ana	7		Jonathan	10
Laura	4		Benjamin	18
Sara	9		Carla	28
Naomi	3			
Erica	5			

Appendix F—Quantitative Results from the Retrospection Data

1. Total Monitoring Indicators, by Category

Total monitoring indicators by category	
Category	**Total**
Monitoring only	66
Monitoring with online control	56
Monitoring failure	4
Post-hoc control	8
Introspection	11
Retelling the story	7

2. Total Monitoring Indicators, by Interpreter

Individual total monitoring indicators				
Experts	**Total**		**Novices**	**Total**
Ana	29		Jonathan	17
Laura	21		Benjamin	16
Sara	20		Carla	11
Naomi	20			
Erica	18			

3. Total *Monitoring Only* and *Monitoring with Online Control* Indicators, by Interpreter

Individual totals—*monitoring only* AND *monitoring with online control*	
Ana	24
Laura	17
Sara	16
Naomi	17
Erica	14
Jonathan	12
Benjamin	13
Carla	9

4. Monitoring Indicators by Stage of Retrospection

Monitoring indicators at different stages of retrospection						
	Monitoring only	Monitoring w/ online control	Monitoring failure	Post-hoc control	Introspection	Re-telling the story
Uncued (stage 1)	11	10	0	0	3	1
Minimally-cued (stage 2)	12	8	0	2	1	5
Verbal probes (stage 3)	42	56	4	5	7	0

Appendix G—Quantitative Results of Initial Thematic Analysis

1. Quantitative Results of Initial Thematic Analysis, by Group

DEMAND indicators by group				**RESPONSE indicators by group**				**OTHER indicators by group**		
Group	**Total**	**Mean**		Group	Total	Mean		Group	Total	Mean
Experts (N=5)	110	22		Experts (N=5)	72	14.4		Experts (N=5)	58	11.6
Novices (N=3)	57	19		Novices (N=3)	36	12		Novices (N=3)	34	11.3

2. Quantitative Results of Initial Thematic Analysis, by Interpreter

Demands on Performance			**Response to Demand**			**Other Aspects of Interaction**	
Interpreter	**Total**		**Interpreter**	**Total**		**Interpreter**	**Total**
Ana	37		Ana	20		Ana	16
Laura	20		Laura	15		Laura	13
Sara	14		Sara	16		Sara	8
Naomi	21		Naomi	10		Naomi	14
Erica	18		Erica	11		Erica	7
Jonathan	15		Jonathan	7		Jonathan	7
Benjamin	22		Benjamin	16		Benjamin	9
Carla	20		Carla	13		Carla	18