Expertise in interpreting
An expert-performance perspective

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This paper describes how the expert-performance perspective differs from the common-sense view of professional ability and how this approach can be applied to the study of professional interpreting. The expert-performance approach is first introduced with findings from many traditional domains of expertise, such as chess, music, medicine, and sports. Most importantly, expert performance is shown to be primarily acquired through the engagement in designed training activities, namely deliberate practice (Ericsson et al., 1993). The second part of the paper briefly discusses earlier research on expert interpreting motivated by more traditional views of expertise in interpreting. Finally, the expert-performance approach is applied to the study of superior interpreting performance and potential studies of superior interpreting under representative conditions are outlined.

Experience is necessary for individuals to improve their performance in any domain of expertise. When individuals are first introduced to a professional domain after completing training and education they are often overwhelmed and rely on help from others. After months and sometimes years of experience individuals attain a level of acceptable proficiency and are able to work independently and further develop their professional reputation. Although all individuals improve with experience in any domain, some individuals develop faster than others and after years of experience are viewed as experts and masters. In contrast, after years of practice, other individuals eventually reach a stable mediocre level that is maintained for the rest of their careers. These individual differences in attained levels of performance are not fully understood. The most common explanation is that individuals’ potential or attainable achievement in a given domain is limited by factors that cannot be changed.
through experience and training, namely, their basic endowment, such as abilities, mental capacities and innate talents. Within this common-sense view of professional development the focus has been on identifying those individuals with the necessary innate talents that would allow them to reach expert levels with experience. Therefore, the best schools and professional organizations nearly always rely on extensive testing and interviews to identify the most talented applicants.

In a few recent reviews my colleagues and I (Ericsson & Charness, 1994; Ericsson, Krampe, & Tesch-Romer, 1993) traced this common-sense view back Galton’s (1869/1979) seminal book on “Hereditary Genius”. These reviews documented that this view is still advocated by the main contemporary theories of human ability, such as Howard Gardner’s (1983, 1993) theory of Multiple Intelligences. The subsequent debate between us and Howard Gardner (Ericsson & Charness, 1995; Gardner, 1995), the interchange between Robert Sternberg (1996) and me (Ericsson, 1996), and the lead article and commentaries in Brain and Behavioral Science (Howe, Davidson, & Sloboda, 1998, Ericsson, 1998) validates the relevance and controversies over the role of limits set by innate abilities. Sternberg (1996, p.349) nicely captured the enduring common-sense view: “Without the ability, hours of practice can be for minimal or no rewards”.

**Recent criticisms of the common-sense view of professional development**

During the last couple of decades several theoretical developments have questioned the common-sense view of professional development and have carefully examined the empirical evidence cited in its support. Recent reviews (Ericsson, 1998; Ericsson & Lehmann, 1996; Ericsson et al., 1993) have shown that the firm empirical evidence backing the common-sense view of professional development is surprisingly limited and the available evidence is sometimes even inconsistent with the assumptions of this view of expert performance. First, in many domains the assessment of expertise is questionable because individuals’ reputation and their level of training are often used as substitutes for individuals’ level of expert performance. Most alarmingly, these social indicators of expertise do not relate closely to objective measures of representative performance. For example, the length of training and professional experience of the clinical psychologist is not related to their efficiency and success of
treating patients (Dawes 1994). Similarly, when wine experts are required to
detect, describe, and discriminate characteristics of wines without knowledge of
its identity (seeing the label on the bottle) their performance is only slightly
better than those generated by regular wine drinkers (Gawel, 1997; Valentin,
Pichon, de Boishebert, & Abdi, 2000). More generally, the accuracy of decision-
making involved in medical diagnosis for common diseases, and in investment
in the stock market do not improve with further professional experience or
social status within the respective domain (Ericsson & Lehmann 1996).

Second, the fixed limits, assumed by the common-sense view of profession-
al development, are not consistent with observed ability of individuals to
improve their performance through training. Research has shown that when
highly experienced individuals are appropriately motivated they are able to
improve their objective performance, sometimes dramatically (Ericsson,
Krampe, & Tesch-Römer, 1993). Finally, it has been surprisingly difficult to use
measurements of innate talents to predict adult professional achievement.
These efforts have been disappointing and largely unsuccessful (Ericsson
& Lehmann, 1996). There is now evidence that shows that most successful
selection programs in sports are systematically biased by factors unrelated to
talent. For example, professional athletes in soccer and ice-hockey have been
found to be born much more frequently (3–6 times) in some months of the
year than other months (Boucher & Mutimer, 1994). The factors determining
this “birth-date” effect are now widely accepted. When children start participat-
ing in sports they are nearly always grouped together in age cohorts. For
example, children born between January 1st and December 31st in a year are
grouped together to form teams in hockey. Consequently, the oldest children in
that cohort will be almost one year older than the youngest children in the same
age cohort. Children often start to compete at young ages, such as around six
years of age. At that young age one additional year of development will result in
considerable differences between children in the same cohort. In fact, some
seven-year olds will be competing with six-year olds. Coaches who are unaware
of the birth dates of the children tend to perceive the oldest and most physically
mature children within an age cohort as more talented. The older children are
thus more frequently selected into talent-development groups at a young age.
Selection into these talent-development groups allows children access to better
training resources which, in turn, facilitates the development of their perfor-
mance. A recent review by Musch and Hay (1999) has now fairly conclusively
linked the birth-date effect to the relative age of children competing within the
same age cohort. The most compelling evidence comes from a recent study
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(Helsen, Starkes & Winckel, 2000) that has analyzed a natural experiment, when the dates defining the age cohorts have been changed. In Belgium, the age cohort for soccer players originally consisting of all children born from August 1st to July 31st, where children born in August, September and October were highly successful. This age cohort was changed in 1997 to children born from January 1st to December 31st. Within a single year children born in January to March showed a dramatically increased selection and emerged as the most highly selected among the young soccer players.

It has been very difficult to find characteristics of individuals that are critical to attaining expert performance yet are innately determined and cannot be modified extensively by training. Although it was long believed that most physical characteristics, such as the proportion of fast and slow twitch muscle fibers, sizes of hearts, number or muscle fibers, and aerobic power, were primarily determined innately, more recent research has now uncovered how these characteristics can be modified by extended intense training (Ericsson, 2003a, 2003b, in press). The only such characteristics that are generally accepted to be determined by innate genetic factors and critical to successful expert performance are body size and height (Ericsson, 1990, 1996), where above average height provides an advantage in basketball and below average height facilitates elite performance in gymnastics.

Outline of paper

The findings discussed in the previous section of this paper, raise doubts about the common-sense view of professional development and suggest that highly motivated individuals can influence their attained level of performance to a much greater degree than traditionally assumed. If this is true then it would be very interesting to study the performance of highly accomplished individuals. In particular, it would be informative to study in more detail how elite individuals attained their expert levels of achievement.

In this paper I will examine how the expert-performance perspective can be applied to the professional domain of translation and interpreting. Given that I have not conducted research in this domain of expertise I will outline how the structure and acquisition of expert performance in interpreting might be studied. Following the structure of a recent chapter that applied the expert-performance perspective to another domain of which I had essentially no personal knowledge, namely golf (Ericsson, 2001), I will organize the paper into
two parts. In the first part of this paper I will briefly outline how the expert-performance approach was developed in other domains of expertise, such as chess, music, medicine, and sports. I will then briefly describe the evidence supporting the claim that expert performance in these domains is primarily acquired through the engagement in designed training activities, namely deliberate practice (Ericsson et al., 1993). In the second part of the paper I will propose how researchers using the expert-performance approach have attempted to address some of the problems emerging from studies in the traditional expertise approach. I will also sketch how the expert performance approach may be extended to studies of superior performance in interpreting under representative conditions.

The scientific study of expert performance and its acquisition

From childhood almost everyone has heard amazing anecdotes about the achievements of athletes, musicians and scientists. When the proposed scientific evidence for the most amazing achievements is scrutinized, most of these incidents cannot even be substantiated by independent and unbiased sources (Ericsson, 1996). Often the only sources of these anecdotes were the exceptional persons themselves telling stories about their childhood when interviewed as adults. In other cases, the individuals observing the event may have misinterpreted what actually happened. For example, when a PGA golfer sinks a 40-ft putt to win a golf tournament, it is often assumed that he did so because of his amazing ability to control his hitting action. In fact, some professional golfers claim that they can reproduce their shots exactly, at least when they are “hot” (Ericsson, 2001b). However, when scientists have set up experimental tests asking elite golfers to hit the same shot 10–20 times, it becomes clear that although the consistency of their shots is higher than that of less skilled golfers, their shots are still quite variable. Hence, world-class golfers acquire knowledge about the inherent variability of their respective shots and develop strategies (course management) that take this variability into account to minimize the shots necessary to complete a given golf course. In order to build a science of exceptional performance it is necessary to restrict the scientific evidence to phenomena that can be repeatedly and reliably observed, and preferably reproduced and analyzed under standardized conditions in the laboratory.

It is possible to objectively measure expert performance and reproduce such superior performance under controlled laboratory conditions (see Ericsson and
Smith, 1991, for an extended discussion)? Many types of superior performance by experts are spontaneously reproduced repeatedly in everyday life. For example, elite runners who finish the mile in less than four minutes can reproduce their exceptional performance repeatedly at different track competitions. Athletic competition has a long history of attempting to design standardized situations that will allow fair competition between athletes. The same is true for competitions in music, dance, and chess. In all of these domains, elite individuals very reliably outperform less accomplished individuals. In most individual sporting events, such as track, swimming, and golf, one can easily compare athletes’ performance on traditional measures, such as speed and accuracy.

Expert performers can reliably reproduce their performance anytime when required such as during competitions and training. Ericsson and Smith (1991) described how it is possible to design representative tasks that capture the essence of expertise where experts can repeatedly reproduce their superior performance under controlled laboratory conditions. For example, one can present chess players with unfamiliar chess positions and instruct them to select the best move. Ability to select the best chess moves is closely correlated with chess ratings for playing chess tournaments. Similarly, one can present doctors with descriptions of medical patients’ symptoms and ask them to make the correct diagnosis. Snooker players can be asked to make several shots for each of a series of fixed configurations of billiard balls, and golfers can be asked to make several putts for each of many ball locations on a green (Ericsson, 2001b). In most domains it is possible to identify a collection of representative tasks that capture the essence of expertise in a domain and that can be administered to all participants under controlled and standardized conditions.

The acquisition of superior reproducible (expert) performance

It is possible to identify several claims about expertise that generalize across different domains when we consider only the superior, reproducible performance of experts that can be measured during development (Ericsson, 1996; Ericsson & Lehmann, 1996).

First, longitudinal assessments of performance reveal that the level of achievement increases gradually. There is no evidence for abrupt improvements in performance from one time to the next even when the performance of child prodigies in music and chess are considered. Second, the age at which experts typically reach their peak career performance is the middle to late 20s for many vigorous sports, and a decade later, in the 30s and 40s, for the arts and sciences.
This continued, often extended, development implies that the best individuals are able to engage in practice activities that lead to improvements in performance even when physical maturation is completed at around age 18. Finally, the most compelling evidence for the requirement of engagement in domain-related activities prior to attaining high levels of performance is that even the most “talented” need around ten years of intense involvement before they reach an international level in sports, sciences, and the arts (Ericsson et al., 1993, Simon and Chase, 1973). Interestingly, most elite individuals take considerably longer than 10 years of intensive practice to reach an international level.

From retrospective interviews of international-level performers in several domains, Bloom and his colleagues showed that elite performers are typically introduced to their future domain in a playful manner. As soon as they enjoy the activity and show promise (compared to peers in the neighborhood), they are encouraged to seek out a teacher and initiate regular practice. Based on their interviews, Bloom (1985) argued that access to the best training resources is necessary to reach the highest levels.

The best evidence for the value of current training methods and practice schedules comes from historical comparisons (Ericsson, 2001b; Lehmann & Ericsson, 1998). The most dramatic improvements in the level of performance over historical time are found in sports. In competitions such as the marathon and swimming events, many serious amateurs of today could easily beat the gold medal winners of the early Olympic Games.

To further explore these issues, Ralf Krampe, Clemens Tesch-Römer, and I (Ericsson et al., 1993) tried to identify those training activities most closely associated with optimal improvement of performance and classified them as deliberate practice. Let us first consider some characteristics of effective practice.

Based on a review of laboratory studies of learning and skill acquisition during the last century, we found that improvement of performance was uniformly observed when individuals, who were motivated to improve their performance, were given well-defined tasks, were provided with feedback, and had ample opportunities for repetition. Individuals were often able to keep improving during a series of training sessions as long as the sessions were limited to around an hour — the time that college students could maintain sufficient concentration to make active efforts to improve. These deliberate efforts to increase one’s performance beyond its current level involve problem solving and finding better methods to perform the tasks. Engaging in an activity with the primary goal of improving some aspect of performance is a prerequisite of deliberate practice.
For an overview of the essential characteristics of deliberate practice its mediating mechanisms, the reader is referred to recent reviews (Ericsson, 2001b, 2002).

The importance of deliberate practice in attaining expert performance was first demonstrated in a study of three groups of expert musicians who differed in level of attained music performance. We (Ericsson et al., 1993) examined how expert musicians spent their daily lives by interviewing them and having them keep detailed diaries for a week. Although all expert musicians were found to spend about the same amount of time on all types of music-related activities, the two most accomplished groups of expert musicians were found to spend more time in solitary practice. When the expert musicians practiced by themselves on practice tasks assigned to them by their music teachers, they focused (with full concentration) on improving specific aspects of the music performance, thus meeting the criteria for deliberate practice. The best groups of expert musicians spent around 4 hours every day, including weekends, in this type of solitary practice. From retrospective estimates of practice, Ericsson et al. (1993) calculated the number of hours of deliberate practice that five groups of musicians at different performance levels had accumulated by a given age, as is illustrated in Figure 1. By the age of 20, the most accomplished musicians had spent over 10,000 hours of practice, which is 2,500 and 5,000 hours more than two less accomplished groups of expert musicians or 8,000 hours more than amateur pianists of the same age (Krampe & Ericsson, 1996).

Several subsequent studies have found a consistent correlation between the level of attained performance and the amount and quality of solitary activities meeting the criteria of deliberate practice in many types of domains (Ericsson, 1996, 2001b, 2002; Helsen, Starkes, & Hodges, 1998). The concept of deliberate practice also accounts for individual differences in the maintenance of expert performance (Krampe & Ericsson, 1996). It also is consistent with the findings from longitudinal studies of elite athletes (Schneider, 1993).

The complex mechanisms mediating expert performance and their acquisition through deliberate practice

In this section I will attempt to explain why most individuals’ increases in performance asymptote within months whereas the expert performers are able to keep improving their performance for years and decades.

When individuals are first introduced to an activity their primary goal is to reach some level of mastery that is sufficient to allow them to engage in playful activities with their friends or meaningful activities with their professional
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During the first phase of learning and skill acquisition (Fitts & Posner, 1967), individuals need to concentrate on what they are going to do in order to reduce gross mistakes, as is illustrated at the lower arm of Figure 2. With more experience their obvious mistakes become increasingly rare, their performance appears smoother, and they no longer need to concentrate as hard to perform at an acceptable level. After some limited period of training and experience — frequently less than 50 hours for most recreational and everyday activities, such as skiing, tennis, and driving a car — an acceptable standard of performance is attained without much need for effortful attention. As individuals’ behavior is adapted to the performance demands and is increasingly automated, they no longer exert conscious control and lose the ability to make specific intentional adjustments. For example, people do not know how they tie their shoelaces or how they stand up from sitting in a chair. Under those circumstances, further experience will not be associated with any marked
improvements and amount of accumulated experience will not be related to attained level of performance.

In direct contrast, expert performance continues to improve as a function of more experience coupled with deliberate practice. The key challenge for aspiring expert performers is to avoid the arrested development associated with automaticity and to acquire cognitive skills to support their continued learning and improvement. The expert performer actively counteracts the tendencies toward automaticity by actively acquiring and refining cognitive mechanisms to support continued learning and improvement, as is shown in the upper arm of Figure 2. The experts deliberately construct and seek out training situations

**Figure 2.** An illustration of the qualitative difference between the course of improvement of expert performance and of everyday activities. The goal for everyday activities is to reach as rapidly as possible a satisfactory level that is stable and “autonomous”. After individuals pass through the “cognitive” and “associative” phases they can generated their performance virtually automatically with a minimal amount of effort (see the gray/white plateau at the bottom of the graph). In contrast, expert performers counteract automaticity by developing increasingly complex mental representations to attain higher levels of control of their performance and will therefore remain within the “cognitive” and “associative” phases. Some experts will at some point in their career give up their commitment to seeking excellence and thus terminate regular engagement in deliberate practice to further improve performance which results in premature automation of their performance. (Adapted from “The scientific study of expert levels of performance: General implications for optimal learning and creativity” by K. A. Ericsson in *High Ability Studies*, 9, p. 90. Copyright 1998 by European Council for High Ability).
in which the desired goal exceeds their current level of performance. They acquire mechanisms that are designed to increase their control and ability to monitor performance in representative situations from the domain of expertise (Ericsson, 1998, 2001b, 2002).

Although the structure of these mechanisms reflect general principles, their detailed structure and the detailed practice activities that mediate their acquisition will differ from one domain of expertise to another. Therefore I have selected two domains of expertise, namely chess and typing, out of a very large number of domains that have been studied (Ericsson, 1996, 2001b, 2002; Ericsson & Lehmann, 1996). For each domain I will outline how the expert performance was captured with representative tasks in the laboratory. Then I will briefly describe how their mediating acquired mechanisms were identified and how these mechanisms probably have been acquired by deliberate practice. I will first discuss chess and then typing.

Chess. The domain of expertise in chess is often viewed as one of the most cognitively demanding activities, and it is often seen as a prototype of superior intelligence. A chess master seems to be able to understand all aspects of any chess position and can thus easily anticipate every plan of attack by less skilled players. Is it possible to uncover the detailed processes that allow world-class chess players to analyze chess positions and to find their best move for each position? In his pioneering work on chess expertise, de Groot (1946/1978) instructed expert and world-class players to “think aloud” while selecting the best move in a set of unfamiliar chess positions. He found that the quality of the selected moves was closely associated with the performers’ play in tournaments and thus captured the essence of chess skill. The players’ “think aloud” protocols revealed that the players first formed a rapid impression of the chess position and then retrieved potential moves from memory. The promising moves were then evaluated by mentally planning consequences of potential chess moves. During the course of this evaluation even the world-class players would discover better moves.

A key challenge for successful planning and chess skill is that the chess players are able to represent the chess positions in working memory in a manner that allows evaluation and flexible exploration of sequences of moves. The skills required to represent and manipulate chess positions in long-term memory appear to develop slowly as a function of increased chess skill (Ericsson, Patel & Kintsch, 2000). Consequently, more skilled chess players have been shown to be able to plan and evaluate the consequences of longer sequences of moves and are more able to represent chess positions in the mind so they can
reason about potential moves. Furthermore, their memory for briefly presented chess positions is vastly superior to those of less skilled players. However, this memory superiority is limited to representative chess positions and disappears almost completely when chess positions are randomly re-arranged.

How is it possible to improve one’s ability to plan and to select the best action in a given game situation? To deal with this challenge chess players typically seek to improve by studying published games between the very best chess players in the world. They play through the games one move at the time to see if their selected move will match the corresponding move originally selected by the masters. If the chess master’s move differed from their own selection, it would imply that in their planning and evaluation the less skilled chess players must have overlooked some aspect of the position. Through more careful and extended analysis, the aspiring chess expert is generally able to discover the reasons for the chess master’s move. Serious chess players spend as much as four hours every day engaged in this type of solitary study (Charness, Krampe, & Mayr, 1996; Ericsson et al., 1993).

The key method that chess players use to improve their selection of chess moves involves extended analysis of the consequences of moves for a chess position. Although chess experts can rapidly retrieve appropriate actions for a new chess position (cf. Calderwood et al., 1988 and Gobet & Simon, 1996), their move selection can be further improved by planning, reasoning, and evaluation (Ericsson et al., 2000). By spending more time analyzing the same chess position players can increase the quality of their move selection for that position. During years of chess study, aspiring chess experts keep refining their representations of chess positions so they can access or generate the same or similar moves faster. For example, chess masters can typically recognize an appropriate move for a given chess position immediately, while it will take a competent club player around 15 minutes to uncover a good move for the same position by successive planning and evaluation. The superior ability of skilled players to plan out consequences of move sequences is well documented. In fact, chess masters are able to play blindfold, without a visible board showing the current position, at a relatively high level (Karpov, 1995; Koltanowski, 1985). Experiments show that chess masters are able to follow chess games in their head when the experimenter reads a sequence of moves from a chess game, and are also able to retrieve any aspect of the position when probed by the experimenter (see Ericsson and Oliver’s studies described in Ericsson & Staszewski, 1989). Highly skilled players can even play several simultaneous games mentally, thus maintaining multiple chess positions in memory (Saarilouma, 1991).
Typing. Most adults are able to type, yet there are often large individual differences in their attained proficiency. As long as the typed copy is correct the differences between typists will only concern speed. The measurement of typing speed is relatively straightforward. During a typing test individuals are given a previously unseen text and are asked to type as fast as they can without making errors for 2–3 minutes. A careful analysis of the processes of typing using high-speed films shows that the faster typists start moving their fingers toward their desired locations on the keyboard well before the keys are struck. The superior typists’ advantage is linked to looking further ahead in the text beyond the word that they are currently typing (Salthouse, 1984). By looking further ahead they can prepare future keystrokes in advance. This finding has been confirmed by experimental studies where expert typists have been restricted from looking ahead. Under such constrained conditions typing speed is dramatically reduced and approaches the speed of other less skilled typists (Salthouse, 1984). In sum, the superior speed of expert performers appears to depend primarily on mediating representations that allow advance preparation rather than faster basic speed of their nervous system.

Extensive research on typing provides the best insights into how speed of performance can be increased through deliberate practice that refines the representations mediating anticipation. The central finding is that individuals can systematically increase their typing speed by pushing themselves as long as they can maintain full concentration, which is typically only 15–30 minutes per day for untrained typists. While straining themselves to type at a faster speed (typically around 10–20% faster than their normal speed) typists seem to strive to anticipate better — possibly by extending their gaze ahead further.

The faster tempo also serves to uncover keystroke combinations that are comparatively slow and poorly executed. These combinations are then trained in special exercises and incorporated in the typing of regular text in order to assure that any modifications can be integrated with the representations mediating regular typing. By successively eliminating weaknesses, typists can increase their average speed and practice at a rate that is still 10–20% faster than the new average typing speed. The general approach of finding methods to push performance beyond current levels of performance (even if that performance can be maintained only for short time) offers the potential for identifying and correcting weaker components and enhancing anticipation that will result in improved performance.

Broader view. The theoretical framework of expert performance makes the fundamental claim that improvement in superior reproducible performance of
adult experts doesn’t happen automatically nor magically. Performance improvement can be linked to changes in cognitive mechanisms mediating how the brain and nervous system control performance and in the degree of adaptation of physiological systems of the body. The principal challenge to attaining expert level performance is to induce stable changes that allow the performance to be incrementally improved.

Once physiological and cognitive adaptations have been attained, then performance of the practice activities on the same regular daily schedule will not lead to further improvements, and the performance will remain at the same level. Further improvement of performance requires increased challenges and engagement in selected activities specifically designed to improve one’s current performance — namely deliberate practice.

Once we conceive of expert performance as mediated by complex integrated systems of representations for the execution, monitoring, planning and analysis of performance, it becomes clear that the acquisition of expert performance requires an orderly and deliberate approach. Deliberate practice is therefore designed to improve specific aspects of performance in a manner that assures that attained changes can be successfully integrated into representative performance. Hence, practice aimed at improving the integrated expert performance cannot be executed mindlessly nor independently from the representative context in which the expert performance will naturally occur. In any domain of expertise more accomplished individuals, ideally professional coaches and teachers, will play an essential role in guiding future experts to acquire superior performance in a safe and effective manner. Aspiring expert performers need help from colleagues, teachers, and coaches to design appropriate training activities that will allow them to reach a higher level of performance. They also need help to negotiate the many constraints for sustaining daily deliberate practice for extended periods such as respecting the essential need for intermittent rest and daily recuperation.

**Expertise in interpreting**

The domain of interpreting has many characteristics in common with other domains of professional expertise, such as computer programming, medicine and accounting. Professional interpreters must have considerable experience prior to becoming professionals. They must have mastered the source and target languages and are likely to have studied languages and various aspects of
translation at the university level. Another similarity between expertise in interpreting and expertise in other professional domains is that interpreters are specialists, and there are a very small number of people in the world who regularly perform the same task. For example, there is a very small number of professional interpreters who regularly translate from one specific language, such as Swedish, to another language, such as Hungarian. The dramatic specialization creates problems for evaluation and measurement of expertise, because only other professional interpreters with the same language combinations are even able to judge the quality of their real-time performance of interpreting at a given event.

Based on my search of the literature I have found only a small number of published studies that compared professional interpreters to less-accomplished individuals. I will, therefore, start by describing traditional approaches to studying skilled and expert interpreters and then illustrate how the expert-performance approach to studying expert interpreting would differ.

Traditional approaches to the study of skilled and expert interpreting

The pioneering research on simultaneous interpreting was conducted within the theoretical framework of information theory where the act of repeating a message (shadowing) was compared to interpreting the same message into another language (Gerver, 1976). The early studies attempted to assess how interpreters were able to listen and comprehend the current part of a presented message while simultaneously vocalizing a translation of another part of that message that had been presented earlier. The focus of this research was on how the activity of listening and speaking could be performed within the constraints of human memory and perception in general. Consequently individual differences in interpreting performance were mostly ignored in this research. Consistent with the common-sense view of expertise described in the introduction, interpreting performance was assumed to be constrained by the basic processing capacities that would allow only some individuals to become successful interpreters. Longley, one of the pioneering investigators in this line of research, even claimed that experience in interpreting had minimal effect on performance: “no special training was required [for interpreting]” and that “it all depended on an innate special skill” (see Dillinger, 1989, p.17). If this hypothesis were correct, one would expect that professional interpreters would differ from the general population in terms of some basic capacities and abilities. However, subsequent studies have failed to find and link success in
interpreting to basic, and possibly innate, abilities (see Moser-Mercer, Frauenfelder, Casado, & Kunzli, 2000).

A more inductive approach would examine the differences in performance between professional interpreters and of regular bilinguals to identify qualitative, presumably innate, differences in ability. Dillinger (1989, 1994) completed one of the few studies with large samples of professional interpreters. He compared professional interpreters (N=8, an average of 8.5 years of experience or 3830 hours of actual interpreting) with bilingual participants (N=16) without any professional experience in interpreting. Surprisingly Dillinger found no qualitative differences between the two groups. Expert interpreters and bilinguals showed virtually the same pattern of performance across conditions. The experts differed from the bilingual participants primarily in being better in all the aspects measured. For example, experts translated more propositions (basic units of meaning), namely 70%, compared to 54% translated by the bilinguals. These findings led Dillinger to conclude that expert interpreting depends on skills and abilities to process discourse in both languages. However, Dillinger’s (1989, 1994) cross-sectional design doesn’t allow assessment of causality. Did the professional interpreters become proficient because of these previously acquired skills or did they acquire these skills during their training and experience as interpreters?

**Development of expert performance in interpreting.** Longitudinal studies of the development of expert performance are extremely rare, but it is often possible to study the rapid development of mastery during intensive education and training. Prior to the start of an intensive course for interpreters Gerver, Longley, Long and Lambert (1984) tested several types of abilities to predict the attained performance (course grade). Gerver et al. were reasonably successful and found that the students’ memory for text and logical memory (depth of understanding) predicted individual differences in consecutive interpreting performance. In the more time-constrained simultaneous interpreting Gerver et al. found that cloze tests, where the students had to fill in the missing word, and generate synonyms, predicted individual differences in performance. All of these findings are consistent with a larger body of literature on interpreting that suggests that interpreters develop new supplementary skills that build on their pre-existing mastery of the two languages. Hence, expert interpreting is mediated not by fully automatic translation processes but rather by mechanisms and mental representations that provide interpreters with tools to gain more control over their translations (Kiraly, 1997; Seguinot, 1997; Shreve, 1997). The increased facility with which expert interpreters perform tasks — typically
viewed as evidence of automation — can be explained by the acquisition of refined representations in line with restructuring during second-language learning (McLeod & McLaughlin, 1986). By refining their representations expert interpreters are able to attend and focus on only those aspects of the presented message that are relevant and critical to an accurate translation. These aspects can be encoded and stored in LTWM (Ericsson & Kintsch, 1995), whereas other less pertinent aspects can be disregarded.

**Introspective description of mediating mechanisms.** In the domain of interpreting, most of the evidence on these complex mechanisms and strategies mediating expert interpreting is based on introspective analysis by the expert interpreters on their own cognitive processes. Much of the current evidence therefore lacks independent verification and experimental validation and doesn’t meet the standards of laboratory research as argued by Massaro and Shlesinger (1997). In fact, when expert translators are instructed to “think aloud” while working, they primarily verbalize the resulting thoughts rather than describe any detailed strategies (House, 2000). This has led some investigators to move away from the verbalizing instructions of think aloud and towards designing a task where two translators have to work together to produce a single translation of the text (Kussmaul, 1995). The latter method produces a much richer set of methods and strategies. However, the conversational method elicits descriptive information that would not necessarily have been accessed and then verbalized if a single translator had focused fully on the translation task. For an excellent discussion of the differences between conversations between two translators and other types of verbal reports, such as think aloud protocols, the reader is referred to the chapter by Jääskeläinen (2000).

A different approach toward collecting more detailed information on the cognitive processes in translation has been taken by Jakobsen (2002, 2003). In addition to the translators’ think-aloud protocols he collects a detailed trace of their typing responses when they first type in their translation and then edit and revise it.

**Alternative verbal reports methods.** Through the history of psychology, there has always been the temptation to ask participants to describe the factors controlling their performance. If subjects could give valid descriptions of their behavior and the detailed processes that mediate this behavior, then the time-consuming and tedious work collecting data with experimental tasks in the laboratory would not be necessary. However, verbal descriptions and explanations given by experts and other subjects are often inconsistent with careful observations of their actual behavior. In fact, Herb Simon and I (Ericsson & Simon,
K. Anders Ericsson (1980, 1984, 1993, 1998) discuss several examples of inconsistencies between actual behavior and answers from interviews and questionnaires. Similar types of inconsistency between verbal reports and observed behavior have been frequently documented even when participants are engaged in experimental tasks and asked to explain why they selected one of several possible actions (see Nisbett and Wilson, 1977, for a classic review).

There are many types of behaviors, especially habitual behaviors, where a behavior is emitted without any reportable thoughts that are necessary to mediate and control it. There are, however, many types of behavior where all participants will spontaneously report mediating thoughts. When we ask college students to “think aloud” (see Ericsson and Simon, 1984, 1993, pp. 375–379, for instructions) while they multiply 36*24 mentally, they all verbalize intermediate thoughts. For example, they might say something like “four times six is twenty four”, “carry the two”, “four times three is twelve”, “fourteen”, “one forty four”, …, “eight, six, four, eight hundred sixty four”. Without going into the theoretic model, Herb Simon and I (Ericsson & Simon, 1980, 1984, 1993) proposed that participants are able to report many of the mediating thoughts concurrently (think aloud) or recall the mediating thoughts immediately after the completion of the task. Based on reviews of over one hundred studies we also showed that when the appropriate verbal reporting procedures are used then participants can generate these types of reports without changing the structure of the underlying processes. Within the cognitive science community there has now evolved a consensus that with appropriate verbal-report instructions participants provide valid concurrent and retrospective verbal reports on their cognitive processes that match other evidence for the associated performance and process-trace data (Ericsson, 2001a, Von Eckardt, 1998). The methodology of protocol analysis provides a tool that allows researchers to identify information that pass through expert performers’ attention while they generate their behavior without any need to embrace any controversial theoretical assumptions. In support of this claim, protocol analysis has emerged as a practical tool to diagnose thinking outside the cognitive tradition. For example, researchers in behavior analysis (Austin & Delaney, 1998), designers of surveys (Sudman, Bradburn, & Schwarz, 1996) and computer software developers (Henderson, Smith, Podd, & Varela-Alvarez, 1995) regularly collect verbal reports and rely on protocol analysis. There are, however, limits for the use of concurrent think aloud to study interpreting. For example, it is impossible for an interpreter to both think aloud and present a simultaneous oral translation to an audience. On the other hand “think-aloud” methodology has been
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successfully applied to translation where the translated information is generated in an non-oral modality and typed into a computer (Jakobsen, 2002, in press).

*Think-aloud protocols and retrospective reports emitted during translation.*

The think-aloud verbalizations elicited from experts engaged in translation appear to be similar to those observed when college students think aloud while reading texts (Ericsson, 1988a). When instructed to think aloud while reading well-written text, individuals mostly read portions of the text aloud. This is reasonable when one conceives of a given text as a path laid out to help the reader construct the author’s intended ideas. Consequently the author has found the best words and the most natural way to express the ideas presented in the text. The reader is thus inclined to verbalize these ideas using the same words and thus they can express the comprehension of the presented ideas by reading the text aloud. However, when the text is written in an unusual manner that uses a different vocabulary and style from those of the readers, such as legal documents and instructions, then the readers will “translate” the written text into their own mode of expressing ideas. Similarly, when the text is difficult to understand because of unfamiliar vocabulary or lack of necessary background knowledge the reader begins to engage in problem-solving activities in an attempt to assimilate the meaning of the text (Kintsch, 1988). When engaging in these problem-solving efforts in order to integrate the presented information, the think-aloud verbalizations will reflect the intermediate thoughts generated to reach an understanding of the presented text (Ericsson, 1988a). I will later discuss how one might be able to rely on these principles to gain information about the thought processes of translators and interpreters using concurrent and retrospective verbal reports (Ericsson & Simon, 1993).

*Experimental disruptions of comprehension and translation.* An alternative methodology to study text comprehension is based on the observation that readers can be interrupted by some attention-demanding, yet irrelevant, task and then resume reading with minor difficulties. Reading times for the first couple of sentences are somewhat longer because the readers need to access the memory of the text stored in long-term memory but there are no reliable effects on the comprehension of the text. It is possible to study the semantic representation of the text in LTWM (Ericsson & Kintsch, 1995) with various cued-recall probes to assess how the relevant information in the text has been encoded and integrated. Although I do not know of studies of interpreting and translation that have used this methodology, I am aware of some results that show that long-term memory for presented text while interpreting is considerable. Gerver (1974a) found that recall after interpreting the text was 51%, which was only
slightly lower than when individuals just listened to it (58%), but higher than when they had to shadow the text (43%).

General comments on approaches to the study of interpreting. There are different approaches to studying complex processes such as comprehension and interpreting. The more traditional laboratory approaches of cognitive psychology tend to study the basic processes such as word recognition and categorization. However, there are compelling reasons against attempting to break apart the complex process of comprehension and translation into independent components. Shlesinger (2000) reviews the evidence against the decomposability of interpreting into components, subprocesses and sub-subprocesses. For example, she discusses why the study of contextual facilitation of accessing meaning for isolated words may not tell us anything useful about “how it works when combined with the many other components of the process” (Shlesinger, 2000, p. 5). She shows the importance of the complex semantic context at the level of the discourse for generating the meaning of a word and a sentence. Consequently, she makes a strong case that studies of interpreting should use ecologically valid materials that have the normal variability and structure of discourse encountered in representative situations for interpreting.

The expert-performance approach (Ericsson & Smith, 1991) was proposed as an alternative to the traditional search for basic processes studied with carefully designed materials and experiments. The central idea of this approach is to identify stable phenomena of superior performance in everyday life and then reconstruct in the laboratory the representative conditions that elicited this performance in everyday life. This approach recognizes that some experts are surprisingly unable to perform well on tasks outside their very narrow domain of expertise — some of them may not even be clearly superior on slightly modified tasks. Hence, the focus of empirical research on expertise should be on identifying reproducibly superior performance and then developing methods to reproduce that performance under standardized conditions in the laboratory.

An expert-performance approach to interpreting

The expert-performance approach (Ericsson & Smith, 1991) to studying expertise in a domain, such as interpreting, proceeds in three steps. The first step involves capturing the reliably superior performance of expert interpreters over other less skilled individuals, such as bilinguals that have all the necessary knowledge about languages but lack training and experience in simultaneous or
consecutive interpreting. Consequently, the key challenge is to find those representative real-time tasks that capture the essence of interpreting and show a clearly superior performance of the expert interpreters. It makes sense to examine the processes that mediate this superior performance in order to identify the mediating mechanisms, only when a robust superiority of expert interpreters on some tasks is established. The final step then involves explaining the origin of these mechanisms and, if they are acquired, what kinds of practice activities led to their acquisition.

Finding a collection of representative tasks. It may seem reasonable to expect that the closer one gets to capturing the actual conditions that professional interpreters experience in their daily work, the larger the superiority of their performance in comparison to inexperienced bilinguals. If that were the case then one wonders why the differences in performance are not larger in studies, such as Dillinger’s (1989, 1994), where the interpreting tasks were designed to approximate many aspects of the representative conditions of interpreting. However, a more careful analysis shows that the presented materials were texts designed with more complex structure than an individual is likely to generate in ad-lib speech or comment. Furthermore, the texts were presented at unusually high rates of presentation to challenge the professional interpreters. Dillinger’s messages were presented at a fixed level of around 145 words per minute. Interestingly (similar to what Dillinger found in his study) Gerver (Dillinger, 1989) found this speed to lead to accuracy of translated words at around 75%. With slower rates around 112 words per minute Gerver (Dillinger, 1989) found nearly perfect translation by the professional interpreters. It is therefore likely that the results would have been different if the texts and speech rates had better approximated the representative conditions of professional interpreters. Until researchers agree on well-defined criteria for representative task conditions that consistently elicit superior interpreting performance, it will be difficult to proceed to study the mechanisms that mediate such superior performance.

Based on attempts to capture expert performance in other domains there are some heuristics that have been successfully applied to identify tasks that elicit reproducibly superior performance. One approach focuses on individual expert interpreters, and it studies their naturally-occurring assignments in interpreting and then examines the conditions that are necessary for them to exhibit clearly superior performance than less skilled interpreters. In fact, Dillinger (1989) discusses several ways that his experimental conditions intentionally deviated from standard practice in interpreting. The interpreting
task was decontextualized and the participants were not given a plausible context for a naturally occurring event where the texts might have been presented. Furthermore, the interpreters were not allowed to make any preparation for their performance or assess whether their background knowledge would be sufficient for accepting the assignment. These deviations from normal practice might have influenced the results, because preparation and primed domain knowledge have very potent effects on expert performance in other domains. Highly specialized knowledge is critical to superior performance in many domains of expertise. For example, auditors’ ability to detect fraud depends on their knowledge of a particular industry, such as pharmacological companies, and thus doesn’t generalize to other types of companies (see Ericsson and Lehmann, 1996). Similarly, scientists’ ability to test hypotheses does not always generalize to other areas within the same academic discipline (Schraagen, 1993). There are many instances of highly restricted domain-specific superiority of experts’ superior performance (Ericsson & Lehmann, 1996).

Another approach is motivated by the fact that many experts frequently do not show their superiority with typical and routine situations. Many airline pilots and medical doctors in training may be quite able to master routine cases where there are no unusual circumstances or unexpected problems. In these domains experts demonstrate their superiority in handling unexpected problems and rare and extreme conditions. Similarly, when chess players are presented with positions from unfamiliar chess matches and asked to select the best move (unlike the start of a real chess match), these players are not presented the opening position, where there are many equally good moves, nor are positions presented where the best move is obvious. Chess players are instead presented with positions from the middle part of chess games where many possible and acceptable moves are available and the best move is difficult to find for the less accomplished players. Similarly, the superiority of medical experts is seen most clearly when they have read and diagnosed charts and descriptions of medical patients with rare and infrequent diseases or with multiple interactive diseases. According to this approach to capturing expert performance one should search for representative challenging situations that require an immediate response and where the superior actions are only elicited by the experts (Ericsson & Smith, 1991).

This approach can be extended to the domain of interpreting by searching for difficult, yet representative situations in interpreting that can be induced by having individuals translate relatively short segments that may only span a couple of minutes. It might be fruitful to interview professionals and teachers
to identify segments that they have experienced and consider to be challenging, especially for less skilled interpreters. To study superior interpreting performance the experts and novices would be presented with segments of messages that had been carefully analyzed and then selected to confront the interpreters with one or more specific representative challenges. It would be possible to reinstate a new representative context for each task and then have the participants interpret a series of tasks with interspersed breaks, thus providing repeated independent observations of the interpreters’ performance.

Another challenge for interpreters is to be able to sustain their interpreting performance for a long time, especially when a single interpreter is responsible for translating all the presented information at an event. It is likely that skilled interpreters may develop special techniques to cope with the challenges of maintaining an acceptable quality of translation when they are engaged for extended periods with only limited opportunities for rest.

Finally, most individuals who are considered to be expert in a specific domain may not be capable of demonstrating general superiority of their performance. In the introduction I mentioned the lack of reproducibly superior objective performance of “expert” stockbrokers, “expert” psychotherapists and the weak superiority of wine-experts in describing unfamiliar wines. When “experts” are not exhibiting superior performance, then it is quite legitimate to pre-test “experts” and then select only those that are able to consistently interpret at a superior level to bilinguals and less skilled interpreters.

In sum, the key challenge for the study of expert performance is to identify the collection of tasks that capture the superior performance of, at least some, experts in a repeatable and reproducible fashion. In the ideal case performance is so superior that on virtually every trial with the selected representative tasks the expert performers are able to exhibit a qualitatively superior performance, such as selecting a better move for chess players, generating the correct diagnosis for medical experts, and typing faster than less accomplished individuals (Ericsson, et al., 2000).

Process-tracing and experimental analysis of reproducibly superior performance. In those domains where it has been possible to repeatedly reproduce experts’ superiority in performance on a set of specific tasks, it is possible to apply process-tracing and experimental methods to identify the mediating mechanisms that are responsible for the performance advantage (Ericsson & Simon, 1993; Ericsson & Smith, 1991). However, in the domain of interpreting researchers have not identified such demonstrations of consistently superior performance. Given that studies on simultaneous interpretation (Chernov,
1979; Dillinger, 1989, 1994; Gerver, 1974b) only report average performance across all interpreters and their different responses, it is not possible to assess individual differences among interpreters. Hence, it is quite possible that some of the best interpreters would show a large and consistent superiority on a selection of the translation tasks. Until investigators have searched for and designed such representative tasks where some experts consistently produce superior responses, it will not be possible to apply the standard set of analytic tools, such as task analysis, protocol analysis and experimental analysis of performance as measured by accuracy and latencies. Even then it will be necessary to adapt some of these tools, such as think-aloud and retrospective protocols, to study simultaneous and consecutive interpreting.

Based on my reading of the literature of expert interpreting it seems likely that the most superior and reproducible performance in interpreting would be observed with a small number of experts, perhaps even a single expert who may exhibit his/her performance for a restricted set of interpreting tasks. Whereas traditional experimental research requires relatively large samples of participants, research on expert performance has confronted the methodological problems of how to study a single individual’s performance experimentally and to trace the mediating cognitive processes. The most extensive experimental investigations of exceptional performers have been completed in the domain of memory. It is not uncommon for individuals with exceptional memory to be able to recall 80–100 digits presented under the same task conditions where college students can recall no more than 10–11 digits. If one were to quantify this superiority using estimates of traditional effect sizes, the superiority of experts over college students exceeded ten, sometimes fifty, standard deviations (Ericsson, Chase, & Faloon, 1980). Exceptional memory performance has been repeatedly reproduced in the laboratory. Exceptional individuals performed experimental variants of the standard memory task while giving concurrent or retrospective reports on their thought processes (Ericsson, 1988b). Based on a task analysis and a protocol analysis of the verbal reports Chase and Ericsson (1982) proposed encoding and retrieval mechanisms that appeared to be essential for successful exceptional memory performance. These proposed mechanisms were tested by comparing the memory performance under control conditions to performance under altered experimental conditions. Especially when there are stable differences in strategies and representations between experts, it is important to be able to study the mechanisms of each expert and design tailor-made experiments to validate specific characteristics of the proposed mechanisms. Most importantly, it was possible to design experimental
conditions that essentially disrupted the acquired skilled mechanisms underlying the exceptional memory performance (Chase & Ericsson, 1982; Ericsson, 1988b; Ericsson & Kintsch, 1995). Performance differences of comparable magnitude have been demonstrated for expert music performers, chess masters and elite athletes. In these cases, the reproducible performance of the experts is completely outside the normal range of performance of novices, and sometimes even beyond the achievements of less skilled performers (Ericsson & Lehmann, 1996; Ericsson et al., 2000).

The research on exceptional memory for digits has another interesting connection to superior interpreting. The mechanisms uncovered to mediate exceptional memory for digits were later generalized to LTWM (Ericsson & Kintsch, 1995) that could explain experts’ expanded working memory and skilled readers’ working memory during the comprehension of text. Ericsson and Kintsch (1995) reviewed the extensive evidence on how encoding skills and knowledge related to the text’s theme facilitate understanding and memory of the information in the text. The theoretical framework of LTWM should be particularly well suited to explicate how better comprehension and encoding of information in the source language might improve the generation and production of interpretations (Dillinger, 1989, 1994; Gerver et al., 1984).

Examination of how the mechanisms mediating the experts’ superior performance are acquired. Until it is possible to specify the mechanisms mediating the experts’ stable performance advantage, it may be premature to examine how these mechanisms have been acquired. On the other hand, it is unquestionable that students in schools of interpreting improve their performance as function of their training and interpreting experience. For example, Moser-Mercer (2000) reports evidence on the development of interpreting performance and documents the types of mistakes that are gradually eliminated during training. However, the analysis of experts’ superior performance in other domains, such as chess, music and sports (Ericsson, 1998, 2002), has repeatedly shown that the mechanisms mediating the fairly rapid attainment of an acceptable average level of performance may rely on different types of processes than those that have to be acquired to attain elite levels.

If we are primarily interested in the development of elite interpreting performance, it may be necessary to seek out those individuals that have attained outstanding reproducible level of interpreting performance. Based on the evidence reviewed in the first part of this paper, it is likely that elite interpreters have studied and practiced interpreting for 10–20 years, which makes longitudinal studies very difficult. Consequently, the most time-effective approach to
gain initial information on how individuals attained their elite performance involves interviews where the interpreters report salient and reliable information about their developmental history. The development of the elite interpreters’ performance can then be compared to that of less proficient interpreters. From this type of interview, combined with diaries of the activities of the expert performers, our group (Ericsson et al., 1993) was able to identify the type of training activities that are most closely related to the attainment of the highest levels in music performance, i.e. deliberate practice. Although the detailed characteristics of deliberate practice differ as a function of the demands on the expert performance in each domain of expertise, the best individuals have been found to engage in a greater quantity and quality of deliberate practice in a wide range of domains (Ericsson, 1996, 1998, 2001b; Krampe & Ericsson, 1996).

Based on the earlier review of characteristics of expert interpreting one can in a speculative vein distinguish two aspects that might mediate superior performance. The first aspect concerns the comprehension of the original message. The quality of the encoding of the information to be interpreted will impose obvious limits on the quality of the generated interpretation. For example, Gerver et al. (1984) found that scores on ability tests related to comprehension and quality of encoding in the source language were related to performance on consecutive interpretation.

How could someone improve comprehension and the original encoding in LTWM of the source message? Deliberate-practice activities that might improve such initial encoding would involve processes similar to those identified for chess playing and sports, where the individuals receive feedback on their own mistakes or sub-optimal selections of their actions and moves. The performers then go back to the target situation, such as the chess position or videotaped game, and then examine how they could have made a better selection of actions in the future. Ideally, the time interval between making the mistake and the retrospective analysis should be short to maximize memory for the individuals’ own thoughts that mediated the sub-optimal behavior. Similar to deliberate practice in chess where players try to predict the moves made by chess masters in published games, it might be very beneficial for interpreting students to listen to the messages interpreted by experts. In the case of consecutive interpretation, the students could generate their own interpretation of the message and then listen and compare their interpretation to that of the expert. If the two interpretations matched there would be no need for further action except to continue to the next part of the message. However, in the case of a mismatch, the interpreters
would need to analyze the difference and how they would be able to generate a better encoding in the future. It would be even more effective and desirable to have a master teacher observe the process and help the interpreter to identify the important aspects.

The second aspect concerns the challenges of simultaneous interpretation. Gerver et al. (1984) found that this form of interpretation performance was related to the scores on ability tests that required inferring missing words in texts and generating synonyms. The real-time constraint of simultaneous interpreting forces interpreters to be selective and to extract the main ideas concurrently. It is an important skill to be able to omit redundant and less important information in messages (Shlesinger, 2000). The challenges of these tasks resemble those of musicians who are forced to sight-read music, that is to play without prior preparation, when they accompany a singer. Lehmann and Ericsson (1993, 1996) found that all pianists were able to perform the sight-reading task but no pianist was able to play all the notes. The challenge was to preserve the core melody and leave out the less important notes. They also found that the best accompanists were able to infer the structure of the music. For example, in an experiment they were able to continue playing the music and more successfully predict sections of notes in the score that had been blanked out for selected short segments. Most importantly, Andreas Lehmann and I (Lehmann & Ericsson, 1993, 1996) found that the best sight-readers were those pianists who reported having spent the most number of hours of sight-reading during their musical career. The same musicians had also engaged the most time in preparation and specific practice designed to deal with specific challenges of accompanying, which are activities more closely related to deliberate practice in other domains. It would be reasonable to predict a similar pattern for the best simultaneous interpreters.

Concluding remarks

In this paper I have presented how the mechanisms mediating reproducibly superior performance of experts differ from that of less accomplished individuals in a given domain of expertise. The experts’ superior performance and its complex mechanisms have been found to be the result of gradual improvements through deliberate practice that extends for years and thousands of hours of practice. In those cases where expert performers were introduced to the domain as children it appears that virtually all the essential aspects of elite
performance have been acquired through training, with the exception of height and body size.

In this paper I have drawn parallels between findings on expert performance in many different domains and actual and potential findings on expert interpreting. There are, however, some important differences between interpreting and the more traditional domains of expertise. In interpreting, most students of interpreting are introduced to training in interpreting in the late teens and early twenties, whereas the introduction to training in traditional domains of expertise, such as music, ballet, chess and sports, occurs around five to ten years of age. At the point of introduction to formal training in interpreting most individuals have already acquired their language skills in the relevant languages. The challenge for teachers thus becomes how to modify and adapt these skills to meet the demands of consecutive and simultaneous interpreting. Once we recognize that the interpreting performance will depend on the level and structure of pre-existing skills in encoding and producing language messages, it raises the possible role of individual differences in acquired skills. It is possible that some of the aspects of these skills cannot easily be extensively modified and re-organized and thus makes it difficult for some individuals to attain a high level of interpreting performance. It is likely that as our understanding of the mechanisms mediating expert interpreting improves and instruments to assess those mechanisms during the training of interpreters are developed, education and training can be made more individualized and effective.

In this paper I have argued that our understanding of expert interpreting will improve as we attempt to capture the reproducibly superior performance of expert interpreters. Once captured, we should be able to identify the mechanisms that mediate this performance and determine how these mechanisms can be acquired through training. At the same time, I believe that the study of interpreting will provide insights that will benefit the understanding of mechanisms mediating expert performance more generally. The domain of interpreting offers a unique window on real-time comprehension and will contribute significant insights into the acquisition and refinement of meaning representations to allow translation into a completely different language. Interpreting appears to provide a sufficiently constrained task to allow investigators in Cognitive Science to study one of the most elusive phenomena in skilled activities, namely comprehension and production of verbal messages, at the level of individual performers. Only future research will tell whether the application of the expert-performance approach to interpreting will advance our understanding of language comprehension and production, translation, and interpreting.
Note

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References


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