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Empirical studies of revision: what we know and need to know

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ABSTRACT

Translators and quality controllers generally acquire knowledge of how to revise their own or others' work by trial-and-error, by working under an experienced reviser, or by attending workshops. There are also one or two publications and in-house manuals that purvey advice for successful revising. Recently, however, Translation Studies scholars have begun to conduct empirical studies in which they observe the revision process through methods such as recording and playing back keystrokes, asking translators to think aloud into a microphone as they revise their own work, or comparing different revised versions of a given draft translation. This article reviews a selection of studies of revision in English, and concludes with some suggestions about questions that need attention.

KEYWORDS
revision, empirical studies, quality control

Almost all talk and writing about revision tells us what *supposedly* happens ("all our translations are re-read by a second translator"), or how revisers *ought* to go about their jobs ("make no unnecessary changes"), or what techniques they *could* use ("try reading it aloud"). But what do revisers and self-revisers *actually* do? In human affairs, what we imagine people do, or what we think people ought to do, or what people claim that they do, may bear little relationship to what they really do.

This is where empirical studies come in: people are observed in the process of revising, or the output of their revision work is analysed. For example:

- Special software is used to record a translator's screen actions, including of course their revisions; the actions can later be played back or printed out and analysed (I'll refer to this as the keystroke method).
- Subjects are asked to utter their thoughts while they revise, or comment on their revisions after they have finished revising, and these statements are recorded, printed out and analysed (think-aloud method).
- Subjects are asked to revise a draft translation and the changes are analysed; in addition the changes may be evaluated by an expert in the field: were the changes necessary? Were errors introduced? Were errors in the draft missed?

The various methods can of course be combined. In addition, translators' claims about how they revise, as given in interviews or on questionnaires, are not without value, though ideally they should be combined with

observations since people may report ideals rather than realities or may not be very self-observant.

In this article, I look at a selection of reports in English about empirical studies. I won't be considering the validity of the methods employed or the validity of the authors' interpretations of their observations. Rather I shall take their findings and conclusions at face value and relate them to practical issues in revision and quality control work.

1. Other-revision

The revision of the work of other translators may become increasingly important, at least in Europe, with the publication in 2006 of the new standard EN 15038 *Translation services – Service requirements*. If this standard is widely taken up, then questions about the nature of other-revision will come more sharply into focus.

Unilingual revising

The standard specifically states that in addition to "checking" by the translator (i.e. self-revising), "the Translation Service Provider shall ensure that the translation is revised. The reviser shall be a person other than the translator…" (section 5.4.3). More specifically, the standard states that "The reviser shall examine the translation for its suitability for purpose. This shall include, as required by the project, comparison of the source and target texts for terminology consistency, register and style." This statement is vague about the circumstances ("as required by the project") under which the check must be comparative (compare translation with source) rather than unilingual (read translation only, either without looking at the source, or just referring to it occasionally). Two empirical studies of other-revision are concerned with the question of unilingual revising, a crucial practical matter since comparative revision is much more time-consuming: there is twice as much text to read, and it takes time to consider whether the translation adequately reflects the meaning of the source text.

> 1. Brunette, Louise, C. Gagnon and J. Hine (2005). "The GREVIS project: revise or court calamity." *Across Languages and Cultures* 6(1): 29-45.
>
> This study compared the result of unilingual revision of 5 French-English texts (5,000 words) and 18 English-French texts (14,000 words) in a variety of genres with the results of comparative revision of the same translations by the same subjects a few days earlier. The subjects were 14 professional translators working into their L1. Their revisions were analysed by a group of university instructors and professional translator/revisers, who worked both separately and

together to reach a consensus on the subjects' work. It was found that comparative revision yielded a better quality final product than unilingual, not only (as one might expect) with regard to accuracy but also with regard to the readability, the linguistic correctness and the appropriateness to purpose and to readership of the revised translations. Numerical results are given for the English-to-French subjects. When working unilingually, they more often failed to make needed corrections than when working comparatively (total of 890 failures to correct versus 727 in comparative). They did manage to introduce fewer errors when working unilingually (total of 89 versus 113 in comparative), though the figure of 89 error introductions is actually more than the 81 errors they managed to correct!

From the point of view of translation practice, this result is somewhat alarming. It suggests that the less time-consuming process of unilingual re-reading is not a good idea if one wants high quality. However no practical conclusions can be drawn from a single study. More studies are needed to confirm (or, we may hope, disconfirm!) the findings of Brunette and her co-workers. At one point, the authors suggest that the subjects were not used to the unilingual method. This may explain their finding to some extent.

2. Krings, Hans (2001). *Repairing Texts* [edited by G.S. Koby, translated from German by G.S. Koby, G.M. Shreve, K. Mischerikow and S. Litzer]*. Kent, Ohio: Kent State University Press.

This is a study of the post-editing (i.e. revision) of English-German, French-German and German-English machine translation output, by 52 German-speaking students in a technical translation program. The methods used were thinking aloud and video recording (a camera was trained on the piece of paper on which subjects were revising, so that they could be asked for commentary after completing the task). The book is a translation of a 1994 dissertation, and a large portion of its 636 pages is concerned with methodological issues and with extremely detailed reporting of results. Section 11.8 provides a seven-page summary.

Unilingual revision (with no access at all to the source text) is just one of many topics which Krings considers (see sections 7.3, 7.6 and 11.6). He asked some translation instructors and professional translators to rate, on a 1-5 scale, the quality of each sentence of the raw English-to-German MT output and of the unilingually revised output of each subject. The raters were not given specific criteria to use, except that in rating the revised version they were to pay special attention to whether or not it reflected the correct and complete meaning of each sentence of the source text. The average quality of

the raw MT output was 2.39, and of the revised output 3.38 (out of a possible 5.0). Almost 80% of errors were successfully corrected (though one must bear in mind that MT output contains many more gross, easily spotted errors than human translation). Unfortunately the remaining uncorrected errors were typically ones that would seriously mislead the reader about the meaning of the source text. Most notable were cases where the MT system misrecognized the part of speech in the source text—a type of error that would rarely be found in human translation. Only about half the errors of this type were successfully remedied by the revisers, who attempted to use world knowledge and context to guess the intent and commonly ended up with sentences wildly different in meaning from the source text.

This finding raises what is perhaps the central practical issue in revision and self-revision: will the reviser find and correct the most serious mistakes, or only correct large numbers of minor errors?

Experience in the field of the text
Standard EN 15038 stipulates, in section 3.2.3 (Professional competences of revisers) that they "should have translating experience in the domain under consideration". This is a recommendation rather than a requirement ("should", not "shall"), perhaps reflecting the fact that in practice, translators are commonly asked to revise material in fields in which they do not in fact have translating experience. The following study is relevant to this question. The study also reflects another common occurrence: the reviser has no contact with either the translator or the author of the source text.

3. Künzli, Alexander (2006). "Translation revision - A study of the performance of ten professional translators revising a technical text" in Maurizio Gotti & Susan Sarcevic (eds), *Insights into specialized translation,* Bern/Frankfurt: Peter Lang, 195-214.

In this study, ten professional translators' spoken comments were recorded as they revised French-German translations, and then a freelance technical translator with a degree in engineering evaluated their revision work. All but one subject had previous experience revising. None were specialised in technical translation. The entire article is devoted to how the revisers dealt with a single terminological problem, where the draft translation had four possible equivalents as alternatives. Only one of the ten revised it correctly— yet another rather alarming result! The spoken comments reveal that only this one translator considered the relationship of the term to the rest of the sentence in which it appeared, and realized that it was a synonym of a term used earlier in the sentence. The others only considered the term in isolation, researching it in term banks and

Google, but not thinking to use the text itself as an information source. The author opines that even experienced translators and revisers start working at the lexical level at the expense of the textual level when doing technical texts, because they are mesmerized by technical terms.

Time required for revision
A vital practical question is how quickly a good revision can be done. The one study relevant to this matter had (yet again) rather discouraging results:

4. Künzli, Alexander (2007). "Translation Revision: a study of the performance of ten professional translators revising a legal text" in Y. Gambier, M. Shlesinger & R. Stolze (eds), *Translation Studies: doubts and directions*, Amsterdam: Benjamins, 115-126.

This article concerns the same ten translators revising a legal text. Again their spoken comments were recorded as they revised, and then a teacher of legal translation with degrees in both translation and law evaluated their output by comparison to the unrevised translation. If the changes made by the translators are counted (without regard to the types of error, which are not described in the article), and the number of justified changes are compared to the total of changes that were unnecessary + changes that introduced errors + changes that ought to have been made but were not, only 3 of the 10 subjects had more good changes than bad changes or failures to change. And 4 of the 10 ended up with revised versions deemed worse than the draft!

As regards time spent, the two translators who spent the most time turned out the two best revised versions, and these were not merely better than the others but were also deemed acceptable by the evaluator. These two were also among the four who said they were familiar with legal translation. However the next two subjects in terms of time spent turned out two of the worst revised versions— and both were worse than the draft; one of these was among the four familiar with legal translation. In other words, spending a lot of time on revision did not necessarily produce a high quality text.

These results need to be understood in light of the fact that the subjects had two other (non-legal) texts to revise. Those who did the legal text first made the draft translation better, while those who did it last made the draft worse. Thus performance was probably affected by how tired the subjects were, as manifested in some of the recorded comments ("I'm fed up"). The subject who did worst on the legal text, and did it last, was ranked best on one of the other texts. This question of tiredness is certainly of practical interest: should

people be assigned to other-revise all day long, or should the revision task be interspersed with other activities? A study specifically focused on revision quality as time passes would be of use.

Analysis of the recorded comments made by the translators revealed subjects explicitly *saying* that they should not make unnecessary changes, even though they were in fact making such changes. Interestingly, however, one subject went back over his changes and explicitly asked himself whether they were necessary. This was the subject who took longest to revise, but also produced the second best final product. There are also examples of subjects trying to think how else something might have been translated without first deciding whether the draft was alright as it was. Another interesting comment: "I'd have to invest more time [on researching this term] or know that the text has been translated by a trustworthy legal translator". This shows awareness of the need to revise on the basis of who did the translation.

Revision quality

An issue that comes up in all the above studies is the quality of the subjects' revisions. An empirical study concerned solely with describing revision does not need to consider quality, but all of the above studies touch on the practical question of success in revision and must therefore have some way of evaluating the subjects' efforts. This is not only an issue for those conducting empirical studies; it is of course also an issue in translation practice, since salaried revisers must be evaluated, and employers may want to know how much revisers are contributing to their products.

While Brunette, Krings and Künzli do each provide quantitative evaluations of revision quality, there is also an early study devoted entirely to this question of evaluation (though in a practical rather than scientific context):

5. Arthern, Peter (1983). "Judging the Quality of Revision", *Lebende Sprachen* 28(2), 53-57.
A somewhat reworked version is also available:
Arthern, Peter (1987). "Four Eyes are Better than Two." Catriona Picken (ed.), *Translating and the Computer 8*: A Profession on the Move. London: Aslib, The Association for Information Management, 14-26.

In this study, the author looked at work by twelve revisers in the into-English translation service (which he headed) of the former Council of the European Communities, now the Council of the European Union. For each reviser, he checked enough of a month's output to find 200 interventions or failures to intervene, and

he categorized each of these as X ("substantive error left unchanged or introduced by reviser"), F ("formal error left unchanged"), U ("unnecessary change made") or C ("necessary correction or improvement in readability"). A formal error is one which "does not distort the overall meaning of the text" (unfortunately no textual examples are given, so that it is hard to know what is meant by this). Arthern proposed a scoring formula, namely S= X+F/2 + U/3. A reviser's score is the number of substantive errors remaining after revision, plus half the number of formal errors remaining, plus one-third of the number of unnecessary changes made. In this formula, the three kinds of defect are weighted by seriousness, with unnecessary changes being regarded as least serious since they waste time but do not affect quality.

Scores of the twelve revisers considered ranged between 17 and 65 in one year; in a later year, the same twelve scored between 8 and 40. The lower the score, the better the reviser's work. The worst score, 65, represents 16 substantive errors remaining, 92 formal errors remaining, and 9 unnecessary changes; this means that out of 200 interventions, only 83 corrections/improvements were made by this reviser. The best score, 8, represents 1 substantive error remaining, 2 formal errors remaining, and 18 unnecessary changes; thus 179 corrections/ improvements were made.

In a follow-up study:

Arthern, Peter (1991). "Quality by numbers: Assessing revision and translation." *Proceedings of the Fifth Conference of the Institute of Translation and Interpreting*, London: Aslib, The Association for Information Management, 85-91.

Arthern sought to find out what would happen if he simplified the formula to S= X+F, that is, if he ignored the time wasted on unnecessary changes and eliminated the weighting of formal errors. The latter move meant that it was no longer necessary to classify each change as substantive or formal, since the formula treats them identically. When he applied both the old and new formulas to the same set of revised texts, he found only small differences in the order of quality of 14 revisers rated from best to worst, though one reviser moved from 13th to 10th place under the new scheme because his many unnecessary changes were now being ignored. (Unfortunately Arthern does not give each reviser's actual numbers for X, F and U.)

Though Arthern was examining the work of these revisers for purposes of employee evaluation, empirical studies of revision would also benefit if some such scoring method could be agreed on. Otherwise, the outcomes of different studies involving an evaluator will not be comparable. Ideally,

there should be a panel of scorers for each text, as in Krings' and Brunette's studies, in order to reduce the effects of personal preference.

2. Self-revision

The great majority of empirical studies of translation concern the translation process in general. In a few of these studies, the researchers pay particular attention to the self-revision aspect of the translator's work. Self-revision differs from other-revision in several ways: self-revision is intermixed with the drafting process; the self-reviser is familiar with the source text when the task begins; since the operation is on one's own work, the relationship to the translator is not a factor, and the temptation to substitute one's own translations or one's own approach to translation is not an issue.

There is no space here to look at all studies of self-revision, so I have selected four. As will be seen, these studies tend to focus on uncovering psychological processes rather than on the more directly practical concerns of the other-revision studies discussed above. There is also a great interest in the distribution of revision work between the drafting phase (when the translation is being first composed) and the post-drafting phase.

In most early empirical studies (1985-1995), the subjects were all students; indeed sometimes they were language rather than translation students. As a result, these studies mainly shed light on the mental processes of learners and do not tell us about what happens when experienced professionals self-revise. On the other hand, a couple of more recent studies contrast students with professionals, which is of considerable interest for characterizing translational expertise, and for training purposes.

> 6. Englund Dimitrova, Birgitta (2005). *Expertise and Explicitation in the Translation Process.* Amsterdam: Benjamins.
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> This 243-page study used both keystroke recording and thinking aloud. The subjects translated a two-page text from Russian (L2) to Swedish (L1). Of the 9 subjects, 2 were senior (very experienced) professional translators, 2 were junior professionals, 2 were translation students and 3 were language students. Several sections of the book (2.3.5, 4.5, 4.6.4 and 6.2.2) are specifically concerned with self-revision.
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> Perhaps the most striking finding was how often the results for the two senior professionals differed markedly from the results for the other seven participants. For example, they made far fewer revisions

(of 1002 changes made by all nine translators, the two senior professionals together accounted for just 66), and almost none of their revisions were made during the post-drafting phase (of the 627 changes made in the post-drafting phase by all nine translators, only 9 were by the senior professionals). Less experienced people more often waited until the post-drafting phase to revise, and the author suggests that this is because they need to be able to see the full TL text in order to spot requirements for revision. This was more particularly the case for inter-sentence connection problems, which it seems senior professionals are often able to identify even while translating small chunks of text in the drafting phase.

Like Künzli, Englund Dimitrova found that the professionals did not always do what they said they were going to do, for example: let the text rest before proceeding to the post-drafting phase; let someone else read the draft translation; print out the draft and revise it on paper because this would show problems that the translator might not notice on screen. Three of the four professionals did none of these things. The author speculates that they might have been saying what they think translators should do as a rule, or what they might do with a different text type or in a real workplace situation.

An interesting finding was that only about 10% of the comments uttered by the subjects while making a revision concerned correspondence with the source text; the rest concerned various aspects of the target language. And even more interestingly, none of the ST-related comments were made by the senior professionals.

Englund Dimitrova also found that professionals often use literal translation of short chunks (words to clauses) for their initial attempt. Sometimes the literal translation is produced only mentally (as revealed by the think-aloud transcripts) and then mentally revised to something non-literal before words are set down; sometimes the literal translation is written down and then immediately (or later) revised to something less literal. The author suggests that quickly setting down such a wording frees up short-term memory for the processing of larger units, and gives a wording that can be visually compared with ST and also evaluated for style, pragmatics, i.e. for achieving the purpose of the translation. The author surmises that the use of literal translation as a strategy is more common when the two languages are typologically similar.

A study of the revisions made in a literary translation also revealed a translator who started by producing TL wording formally similar to ST, and then revised:

7. Toury, Gideon (1995). "Studying Interim Solutions", in *Descriptive Translation Studies and Beyond*. Benjamins: Amsterdam, 181-192.

This study looked at four successive stages (manuscript, typescript, proofs, pre-print) in the production of a sentence from the English translation of a German novel. The article is focused on methodology rather than results, and Toury notes that nothing can be concluded from a single sentence. Still, the sequence of changes he found is of interest. For example, the manuscript first had the expression 'stomachs full of haricots and beef' (mirroring the German order of the two food items), but this was crossed out and replaced with 'full of pork and beans' (the beef being changed to pork to yield an Anglicized dish, plus a change in word order, presumably to reflect the usual English order for such two-part dishes, with the meat item named first as in bacon&eggs, fish&chips, chicken&dumplings). Three further changes were then made so that finally, by the proofs stage, the translation read 'beef and haricot beans' (with the English order retained, but avoiding the suggestion that German soldiers were eating an Anglo-Saxon dish). Thus the sequence was from formal similarity to extreme equivalent-effect translation and then back to a compromise.

8. Asadi, Paula and Séguinot, Candace (2005). "Shortcuts, strategies and general patterns in a process study of nine professionals." *Meta* 50(2), 522-547.

In this study, nine professionals working in the pharmaceutical industry translated texts in this field, two working from French to English and the rest from English to French (all subjects were working into L1). All their screen actions were recorded, and their spoken thoughts on what they were doing were recorded.

The study identified two different approaches to the initial composition of the translation. Some of the translators seemed to create their translations in their minds and only then enter them on-screen, making only a few changes immediately after typing; others seemed to translate-by-revising, so to speak, that is, they would very frequently type words and then immediately revise what they had typed. This same difference in approach was found by Englund Dimitrova, and also by Krings in a part of his study where he compared human translation with post-editing of MT output.

The study also identified different distributions of writing, researching and revising tasks over the pre-drafting, drafting and post-drafting phases. At one end of the scale were people who wrote very quickly, leaving much of the work of research and revision until the post-

drafting phase; at the other end of the scale were people who did most of their revision as they drafted the translation, so that there was relatively little left to be done during post-drafting. I can add that this difference is regularly reported by professionals attending self-revision workshops; I call the former approach 'steamrolling' through the text.

9. Jakobsen, Arnt Lykke (2002) "Translation drafting by professional translators and by translation students." *Empirical Translation Studies: Process and Product*. Copenhagen Studies in Language 27, 191-204.

In this study, 4 student translators and 4 professionals each translated four texts—two Danish-English and two English-Danish, and their keystrokes were recorded. An analysis was then made of the time devoted to each of three phases: orientation (pre-drafting), drafting and post-drafting. Unsurprisingly, the professionals were able to complete the drafting phase more quickly than the students. More interestingly, they spent more time on the post-drafting phase than the students, yet made fewer changes during this phase (as was also found by Englund Dimitrova in her later study). Once a professional had set a wording down in the drafting phase, it was much more likely to survive the post-drafting stage.

All subjects were Danish speakers, and Jakobsen briefly mentions differences between L1-L2 and L2-L1 work, though only one difference pertains to self-revision: both professionals and students did slightly more revision during the drafting phase when working into L2. This is a subject worthy of more study since so many professional translators work into L2.

A related matter that might be worth studying is the ability of native speakers of the target language to detect mistranslations when revising the work of others. It would be of interest to take a draft translation prepared by a native speaker of the target language and give it to a group of revisers half of whom are native speakers of TL (with SL as second language) and half of whom are native speakers of SL (with TL as second language), and see whether they are equally good at finding mistranslations.

3. Work Habits and Workplace Procedures

The studies considered so far are concerned with the wording of the text. However self-revision and other-revision can also be studied in terms of the methods used in a workplace and personal revision habits.

Personal revision habits

At revision workshops, I have frequently heard people describe their revision habits, and I have wondered how accurate these statements are. Are they simply ideals, or do they reflect reality? Perhaps they reflect the reality with some texts and not with others. That is, people's revision habits may well differ markedly with such factors as text length, text familiarity, direction of translation (from or to the mother tongue), and quality of writing of the source text.

While observational studies have the greatest promise when it comes to finding out what people really do, their statements about their habits are not without value.

> 10. Shih, Claire Yi-yi (2006). "Revision from translators' point of view: an interview study." *Target* 18:2, 295-312.
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> The author interviewed 26 professional non-literary translators who work from English, French or German into Chinese. They were asked how many times they go over a translation, how long they put their drafts aside before revising, what they are looking for when revising, and whether they think they use any untypical revision practices.
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> Most subjects reported that they went over their translations once or twice, though a few did three or four read-throughs. They mentioned variation with the type of job and the deadline. One translator said that self-revision was less important when she knew there would be a reviser. Another mentioned that self-revision after completion of the draft (as opposed to changes made while drafting) was not important or necessary in his work (fragmented chunks from software documentation).
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> The most common answer to the question of how long drafts are put aside before revising was 'no time': the translators either said that the deadline did not allow setting aside, or else they felt no need. The second most commonly mentioned time was overnight. Some said that with long texts, there was a natural waiting time (at least for the earlier part of the text, presumably) since it took a long time to produce the draft.
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> Concerning things checked for, the most common answer was 'readability', followed by 'accuracy', then 'terminology'. About 20 other points were mentioned, but much less frequently; only a few mentioned 'meeting reader needs', 'omissions' and 'grasping the main idea'. Some of the points mentioned are very specific, such as 'checking numbers and dates'. Shih suggests specific answers indicated that these respondents are aware of things that go wrong in their own work, and they revise accordingly.

One translator reported re-reading the previous paragraph before drafting the next paragraph to ensure coherence, especially when there was no time for a post-drafting revision. Seven reported that they only consulted the source text occasionally during revision, and two reported that they never looked at the source text. Shih interprets this in the light of the typically small amount of time between completing the draft and proceeding to revision: the translator does not actually look at the ST but has a memory of it still in mind. Alternatively, she suggests, many translators just assume that their drafts are accurate, and use the revising phase to check other things; they may mention 'accuracy' as important when asked, but they don't actually check for it during the post-drafting phase.

Office quality procedures
An area that cries out for empirical work is office quality control procedures. Every translation company and translation department has some procedure, formal or informal, for checking and correcting translation work—some combination of comparative reading to detect mistranslation, and unilingual reading to detect nonsense and incoherence, correct terminology, improve style, or just remove mechanical errors. Depending on such factors as the purpose of the text, the translator and the client, all or part of a text will be subjected to one or more checking/correcting processes, by one or more people. As always, however, what happens officially and what happens in practice may be two quite different things. While some translating organizations have no doubt conducted internal studies of their quality control processes, and while anecdotal descriptions can sometimes be found in proceedings of translators' conferences, to my knowledge there are no published empirical studies in English that describe in detail the control procedures actually used at a translation workplace. However, readers who have German might like to look at:

> Risku, Hanna (2004). *Translationsmanagement. Interkulturelle Fachkommunikation im Informationszeitalter.* Tübingen: Narr

This book describes the organization of translation work at a Vienna translation company, including information on quality control (sections 9.2.2.3 and 9.3.1.4).

In passing it is worth noting that most empirical studies are still taking place *in vitro*, usually at a university campus. There is a need to study revision in workplaces, during actual production for the market, since otherwise subjects' decisions may be determined by the fact that they know their output will never be delivered to a client. Thinking aloud and recording of conversations among colleagues may not always be practical in an office setting, but screen actions can be recorded, and emails to and from colleagues, clients and subject experts can be inspected.

On-screen versus on-paper revision

To my knowledge there is no published empirical research in English on translators' use of paper rather than screen for revising. However, researchers interested in technical editing have conducted studies on this matter. Of course editing is more like unilingual revision; it does not include any task comparable to comparison with the source text. Nevertheless readers might like to consult three articles reporting on a questionnaire and interview study by David Dayton:

> (2003). "Electronic editing in technical communication: a survey of practices and attitudes." *Technical Communication* 50(2), 192-205.
>
> (2004). "Electronic editing in technical communication: the compelling logics of local contexts." *Technical Communication* 51(1), 86-101.
>
> (2004). "Electronic editing in technical communication: a model of user-centered technology adoption." *Technical Communication* 51(2), 207-223.

Dayton found that the use of computers is spreading rather erratically: some editors have stuck to paper, some have tried e-editing and then reverted to paper, others have enthusiastically adopted computers, and still others use a combination. I can add that translators at workshops also report a diversity of approaches. Many claim that they find it difficult to do comparative revision on screen. (By the way, Dayton found no correlation between the screen versus paper choice and the age or sex of the editor.)

4. What we need to know

Empirical studies are of interest in themselves, for the light they shed on mental processes and different styles of translating. But they may also help us answer practical questions. I'd like to conclude by pinpointing some specific questions that I think merit attention.

1. Why do revisers overlook errors?

It would be interesting to identify translators who are good at finding mistakes, and to see whether their procedure or their self-concept (as revealed in think-aloud protocols) differs from that of translators who overlook mistakes. Of course there are different kinds of mistake, which call for different kinds of attention. Some people may be good at finding micro-errors and others good at finding macro-errors, for example.

Eye-tracking technology (a device that sits at the top of the screen and tracks the subject's eye movements) may soon allow us to correlate keystroke records with data on what the translator was looking at just before a revision was made—or not made. Perhaps this will shed some light on why errors in the draft translation are not noticed.

2. What is the effect of reducing revision time?

An empirical study in which subjects are given different amounts of time to revise a text by another translator could be valuable. Does the proportion of introduced errors decline? Does failure to make necessary changes increase? Among the changes made, does the proportion which was unnecessary decline?

Unnecessary changes are usually thought of as merely time-wasting rather than quality-reducing. But that is only true when a good translation is replaced by another good translation. Whenever a reviser makes a change, there is always a potential for introducing error and not noticing it. Translation students tend to make vast numbers of changes, and typically manage to reduce quality in doing so. They often say that they wish they had simply left their original draft alone. On tests, where time for making changes is limited, many students do better than on assignments which they have a week to prepare. Readers with Spanish may be interested in the following empirical study of self- and other-revision by students working into L2:

> Lorenzo, María Pilar (2002). "Competencia revisora y traducción inverse." *Cadernos de Tradução* 10, 133-166.

She found that the more time the students spent revising, and the more changes they made, the worse the output.

3. Is there a revising method that produces higher quality?
While different approaches to revision have been identified, and correlated to some degree with experience, it would be nice to identify differences between successful and less successful revisers (with success measured by some combination of time taken, percentage of errors corrected, and non-introduction of errors). Is there a correlation between success and familiarity with the subject matter of the text? Does success in self-revision go hand in hand with success in other-revision? Do successful revisers tend to prefer this or that work method?

One might expect that there is no one method that yields the best results (i.e. everything depends on individual psychology), but on the other hand the whole point of empirical studies is to determine whether such expectations are true. For example, some people at workshops report that during comparative revision, they read a sentence or so of the translation first, and then the corresponding bit of source text, while others say they do the opposite. Does one of these produce better results? Or again, some people report that when self-revising, they think they make a change whenever they happen to see a problem, while others think they make certain kinds of change during drafting and other kinds during post-drafting, or certain kinds during a first read-through and other kinds during a second read-through. The latter sounds more organized and efficient, but does it actually produce better results?

A final general comment: the empirical studies reported above tend to deal with a variety of revision issues. What is perhaps now needed is more studies that focus on a single variable, holding other factors constant as much as possible; for example: self-revision into L2 as opposed to L1; other-revision quality in the first hour as opposed to the second or third consecutive hour of work; or revision by those with experience in a given type of text as opposed to those not familiar with it.

Biography

Brian Mossop has been a translator, reviser and in-house trainer in the Canadian federal government's Translation Bureau for the past 33 years, and for the past 28 years he has taught specialized translation, revision, translation theory and translation into the second language at the York University School of Translation in Toronto. He is the author of *Revising and Editing for Translators* (St Jerome, 2nd edition 2007).