TRANSLATION REVISION AND POST-EDITING

Translation Revision and Post-editing looks at the apparently dissolving boundary between correcting translations generated by human brains and those generated by machines. It presents new research on post-editing and revision in government and corporate translation departments, translation agencies, the literary publishing sector and the volunteer sector, as well as on training in both types of translation checking work.

This collection includes empirical studies based on surveys, interviews and keystroke logging, as well as more theoretical contributions questioning such traditional distinctions as translating versus editing. The chapters discuss revision and post-editing involving eight languages: Afrikaans, Catalan, Dutch, English, Finnish, French, German and Spanish. Among the topics covered are translator/reviser relations and revising/post-editing by non-professionals.

The book is key reading for researchers, instructors and advanced students in Translation Studies as well as for professional translators with a special interest in checking translations.

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Revision of translations is an old activity in Europe and probably dates back to Saint Jerome, who was commissioned by Pope Damasus I to revise existing versions of the Bible in the late 4th century. However, in the book publishing industry and in translation departments and agencies, translation revision became common practice only in the course of the 20th century. The earliest publications were practical and pedagogical: in-house manuals for institutional revisers and an article on evaluating the work of such revisers (Arthern 1983); a textbook for revision courses at Canadian translation schools (Horguelin 1978) and a book chapter on the role of such courses (Thaon 1984); advice on self-revision for professional translators (Mossop 1982). Then came the early work by translation researchers: a dissertation (Brunette 1995, published 1997) and a study of literary self-revision (Toury 1995).

In large institutions such as the UN or the EU, the function of reviser has been institutionalized for a few decades now, but in translation agencies, this development is probably more recent and has been encouraged by the publication of the European standard for Translation Services EN 15038 (European Committee for Standardization 2006a) and its successor, ISO 17100 (International Organization for Standardization 2015a). According to these standards, revision is compulsory, has to be carried out by somebody other than the translator and consists of a “bilingual examination of target language content against source language content for its suitability for the agreed purpose” (International Organization for Standardization 2015a: 2).

Although clear definitions of revision in that particular sense can be found in the literature, different terms continue to circulate to refer to the same activity and a consistent (multilingual) revision terminology within Translation Studies (TS) is still lacking. Briefly, translation revision can be defined as the act of examining a translation and making those changes which are necessary to achieve compliance with recognized linguistic and functional criteria. The term ‘revision’ is sometimes
restricted to the examination by one translator of another translator’s work (other-
revision), but it is also used to denote self-revision, where translators check their
own work. Revision involves checking the translation against the source text
whether with occasional glances at the source (‘unilingual revision’) or regular
checking (‘comparative revision’). It is therefore distinct from proofreading or edit-
ing, both of which involve work on a text in one language only. Technology is also
affecting the definition and practice of revision. Ever since translation memories
came into widespread use, translators have had to assess and perhaps adjust word-
ings recycled from a memory, and what is that if not revision?

As for post-editing\(^1\) of machine-translation outputs, the first mentions appear in
the literature in the 1950s, around the same time as the first proposals for machine
(or “mechanical”) translation (MT) systems (Garcia 2012: 294). Early adopters of MT
and post-editing workflows were large organizations such as the European Commis-
sion and the Pan-American Health Organization. As MT quality improved, first with
the adoption of phrase-based statistical systems, and then in the 2010s with machine-
learning approaches using neural networks, post-editing became more widespread.
The publication of an international standard for post-editing (ISO 18587) in 2017
reflects this increasing use. In 2014, van der Meer and Ruopp (2014: 46) even pre-
dicted that post-editing would become “the primary production process in translation”
by 2020. However, a Language Industry Survey published in 2019 indicates that less
than 20% of translation companies and around 10% of freelancers report using MT
frequently (ELIA et al. 2019). Post-editing has been used mainly in the context of
localization, although more recently studies have started to investigate post-editing of
literary texts or audiovisual material like subtitles, voice-overs and audio description.
In practice and in research, post-editing appears to be mostly carried out by bilingual
individuals utilizing both the source text and MT output. However, some research has
also explored the feasibility of monolingual post-editing, where the person perform-
ing the post-editing either does not understand the source language or otherwise does
not have access to the source text (Koponen and Salmi 2015).

Broadly, post-editing can be defned as editing and correcting machine-trans-
lation output, according to the International Standard ISO 17100 (term 2.2.4).
However, it is not always clear which practices are covered by the term. ISO 17100
limits its use with a note stating that the term is not applied when “a translator sees
and uses a suggestion from a machine-translation engine within a CAT (computer-
aided translation) tool”, although the reasoning for this is not clarified. In contrast
to this limitation, some authors have used the term post-editing for correcting not
only MT output but also segments from translation memories (TM) (Silva 2014:
27; Bundgaard and Christensen 2019: 15). Other authors draw further distinctions
based on how the user interacts with the MT system. In what is sometimes called
‘traditional’ post-editing (Alves et al. 2016: 80), the MT system provides the trans-
lations as complete suggestions without any actual human-computer interaction.
In contrast, interactive MT systems operate more like an autocompletion mode,
where the suggestion generated by the system changes based on edits made by the
user, which some authors do not consider post-editing as such.
While technology appears central to the practice of post-editing, an interesting feature of revision is that there are very few machine aids specific to this aspect of translation work. No software can help the reviser detect unidiomatic word combinations, language that is too formal or technical for the intended readership, nonsense, deficiencies in inter-sentence connections, or most errors in transfer of meaning or in the focus structure of sentences. For the time being, revision seems to remain largely an activity of human minds unassisted by machines (it is even sometimes done on paper rather than on screen), while the drafting work of translators is on the contrary increasingly machine-assisted. Post-editing, on the other hand, is carried out mostly in CAT tools (see Moorkens and O’Brien 2017). Machine translation and translation memories are also increasingly integrated in the same tools in the form of ‘MT assisted TM’ (Bundgaard and Christensen 2019), and they are used in parallel during a given translation project. As more translators are finding themselves checking not only human translation but also machine outputs, traditional boundaries between the functions of translators, revisers and post-editors are starting to blur, as are boundaries between professionals and non-professionals.

1. Research into revision and post-editing—the state of the art

Research interest in revision and post-editing has been gaining momentum in recent years, with a growing number of publications. Some are theoretical/conceptual (often personal reflections about specific aspects of revision or post-editing) and are based on a literature search or rely on argumentation. Others are empirical, involving one or more of the following: studies of the revision product, process, participants or environment (where the study is carried out). Empirical studies are based on experiments or observations and draw on qualitative and/or quantitative methods. Product-based methodologies include error analyses, quality assessment and corpus approaches, and, in the case of post-editing, automatic metrics that compare the MT output and its post-edited version and calculate the edit rate, or the number and type of changes (see Snover et al. 2006). Process-based methods generally involve the use of keylogging software, which records the user’s keystrokes and mouse clicks; eyetracking, where specialized cameras are used to collect data about the user’s gaze movements and fixations, or introspective methods like think-aloud protocols, where the participants verbalize their thoughts during the task or retrospectively. Participant-oriented methods include observation, interviews and surveys. Studies often combine product and process methods, making it sometimes difficult to clearly delineate product-oriented and process-oriented studies. Similarly, product or process studies may also involve participant-oriented methods, and participant-oriented studies may also involve the analysis of product and process data. Contexts for studies can be professional environments like language service providers (companies and freelancers) or in-house translation departments, translator training environments, or contexts where ‘non-professionals’ or ‘lay people’ (not working in a translation profession) carry out revision or post-editing.
2. Theoretical publications on revision

Theoretical publications are of three kinds. First, there are overviews of the field. The most complete is Robert (2018), in French, which combines a review of the literature (on which sections 1 to 3 of this introduction are based) with an analysis of bibliometric data on revision. Robert draws on Künzli’s (2014) work in German, the most complete at the time, where the author looked at the concept of revision, the state of research and desiderata for future work. An interesting overview with a focus on revision in literary translation is also provided in Scocchera (2017a). A few older overviews are presented by Mossop (2007a, 2011), and by Garcia (2008) on revising for localization. In this first group of publications, we also find an enlightening theoretical reflection on the boundaries between translation, revision and post-editing (Jakobsen 2019). The author explains that in much professional translation where technologies are ubiquitous, “there is less writing and less translation from scratch, than editing and post-editing of text suggested by TM/MT systems” (76), thus making the distinction between the three activities increasingly blurred, but still useful.

Second, there are articles on specific aspects of revision, such as revision terminology (Scocchera 2013; Brunette 2000), key concepts for revision (Tardaguila 2009), revision parameters (Lee 2006), methodological aspects of revision and revision as a method of quality assurance (Parra-Galiano 2016), risk management when deciding whether to revise (Martin 2007), the place of revision in the translation process, the importance of mentoring and of didactic revision in training future translators (Rochard 2004), revisers as guardians of translation rather than censors (Brunette 2002), interventions by publishers’ editors that make revised translations worse (Pergnier 1990), briefs for revisers (Allman 2007) and the need to incorporate unilingual and bilingual revision into translation quality assessment models (Mellinger 2018). Nord (2018) provides some thoughts on revision based on her experience as a professional reviser, looking at revision criteria, procedures, principles and competence, the notion of error, and relationships among those involved in revision. She also explains how the manufacturing principle of ‘quality at the source’ (the notion that quality must be measured at every step of a production process, not just at the end) could be applied to translation revision.

3. Empirical studies of revision

Studies of the product

Studies that focus on the revised translation as a product are recent and still fairly rare. They generally involve analysis of a corpus, sometimes limited in scope and thus more like case studies. In a few cases, the product analysis is based on data collected through an experiment. Bisiada (2018) draws on a parallel corpus of English source texts (business articles), their unrevised German translations and the published (revised) German, in order to examine revisers’ interventions, in particular with regard to nominalizations. He finds that revisers have a significant and systematic impact on translations, and that what some people see as literal translations are not necessarily the result of the translator’s work, but rather the reviser’s. McDonough (2015) analyses a corpus of translations of Wikipedia entries, and the revisions made to these translations, in order to discover the frequency of transfer problems on the one hand and language-and-style problems on the other, as well as the revisers’ solutions. She finds that both types of problem are nearly always present, that half of them remain typically undetected by the revisers, and that language-and-style problems are revised more frequently than transfer problems. Popič (2014) analyses a DIY corpus of translated and revised (popular) scientific texts to check application of the European standard EN 15038 in Slovenia. She finds that revision is very often unilingual rather than comparative and that the reviser has not necessarily been trained as a translator.

Some corpora consist of literary texts. Solum (2018) analyses a corpus of novels translated from English to Norwegian in order to identify which of the revisers’ proposed changes are accepted by the translators. While revisers are hardly ever mentioned in the acknowledgements of the published books, they are found to have a definite influence on those parts of the translations where they suggest changes. The translators accept a considerable number of the revisers’ suggestions, and Norwegian literary translators expect their publishers to provide a high standard of revision work. Robin (2014) analyses a corpus of fiction translated from English to Hungarian and the revised versions in order to discover what happens to ‘translation universals’ during the revision phase. She finds that while explicitation and implication are usually deemed to be the work of translators, they can be the result of revision or editing strategies (2019). She also suggests (Robin 2018) a typology of reviser interventions based on linguistic and translational rules, norms and strategies.

As already mentioned, some product studies are based on a restricted corpus or on the analysis of a small number of texts, sometimes one. Magris (1999) analyses the revised translation of a nursing handbook in order to investigate the reviser’s task definition and tolerance for the translator’s choices. Rega (1999) analyses the revisions of three German-to-Italian translations, giving examples of subjective changes, necessary stylistic changes and necessary changes made by a subject-matter expert. She finds numerous changes of the second type and says that style should receive more attention in university translation courses. Notaristefano
(2010) analyses the revised translation of a macroeconomics textbook from English to Italian, classifies and quantifies the changes, and presents an ideal professional profile for a reviser. Lemaire (2018) reflects on her own revision of a corpus of museum and exhibition panels. She suggests a redefinition of the multilingual editorial process of these panels, and calls for changes in mentality and working conditions to ensure editorial quality.

Finally, some researchers set up an experiment to collect data that they analyse mainly from a product point of view. This is the case of Van Rensburg (2012), who sought to determine the impact of the work done by various revisers on the quality of the draft translation, and also to compare the impact with the time spent on revision in order to determine the cost-effectiveness of the procedure. Four revisers revised two English-to-Afrikaans translations: an unspecialized text translated by a translation student and a specialized text translated by an experienced professional translator. For each text, three evaluators rated the unrevised translation and the four revised translations. Van Rensburg found that revision had less impact on the quality of the translation produced by the professional, leading to the question of whether it is necessary to revise the work of experienced translators. The results also showed that there is not necessarily a positive correlation between revision quality and revision experience. More recently, Pontrandolfo (2017) investigated the revision of one legal translation by four different types of professionals (legal linguists, professional translators with a specialization in legal translation, professional translators without that specialization, and lawyers without translation and/or revision experience) to determine whether translation competence suffices to revise complex legal translations and what the importance of subject-matter knowledge is. Although she acknowledges that her research is a case study and that generalizations are difficult to make, her hypothesis is confirmed: professional translators with experience in translation and revision but without training in legal translation do not seem to be well prepared to revise a complex legal translation.

Studies of revision competence and teaching

The first study of revision competence (Lorenzo 2002) uses keystroke logging to compare students’ self-revision and other-revision competence when working with translations into their second language. She finds that the students were not successful because they lacked strategies for detecting and evaluating errors, and that they were better at revising others than revising themselves. The second study, by Künzli (2006b), analyses think-aloud protocols from ten professional revisers with a view to discovering the components of revision competence and formulating an outline for a revision course. He suggests a module focused on strategic, interpersonal and instrumental competences. Next comes a longitudinal study (Hansen 2009) carried out in Denmark from 2003 to 2007 with 71 students and 28 professionals. Its purpose was to compare translation competence with revision competence based on both product and process analyses using keystroke logging, questionnaires and interviews. One of the main findings was that experienced translators are not
necessarily good revisers, and vice versa; revision competence requires additional aptitudes and attitudes.

More recently, a group of researchers at the University of Antwerp sought to validate their model of revision competence (Robert et al. 2018). The initial results appeared in three publications (Rigouts Terryn et al. 2017; Robert et al. 2017b; Robert et al. 2018). The researchers conducted an experiment with 21 students divided into an experimental group, who had taken a module on revision, and a control group, who had no revision training. The students first performed a set of revision tasks, recorded with keystroke logging, and then filled out an online questionnaire. One finding was that the experimental group used the same search tools as the control group, but more frequently; they performed more searches in order to be able to justify their changes, and their searches were more meticulous. The experimental group was also more tolerant of wording choices and made fewer pointless changes. However the researchers were not able to demonstrate that the students in the experimental group revised better, in the sense of making more necessary changes (an indicator of strategic competence). Their explanation was that the revision training had been brief and that a pilot study has inherent limitations (such as the number of participants).

The literature also includes three experimental studies of revision teaching. In the first (Shreve et al. 2014), the researchers compare the efficacy of screen recording data with that of Integrated Problem and Decision Reporting (Gile 2004) in assisting other-revision by 12 students. They found that the students performed better when they had access to screen recording data on the translation process. The second study (Robert and Brunette 2016) looks at the relationship between think-aloud, revision quality and ability to detect errors with 16 professional revisers, to see whether think-aloud would help learners. The researchers found that the more the revisers verbalized detailed diagnoses of error, the better their detection and correction work, but the longer they took to complete the task. Applying this to pedagogy, the researchers concluded that it might be useful to ask revision students to think aloud when revising at home. Finally, drawing from previous research on revision pedagogy and didactics (Scocchera 2014) and based on a multi-component view of revision competence (2017a), the third study (Scocchera 2019) investigates the general attitudes towards revision and the background skills of revision students taking part in a short-term course, as well as their progress in the acquisition of revision competence. By comparing the students’ output on different revision assignments, the study also tests the validity and efficacy of the teaching contents and methods and provides insights and practical suggestions for revision-specific education and training based on quantitative and qualitative data obtained through an end-of-study questionnaire.

**Relationship between the process and the quality of the product**

Among the many publications about the relationship between the revision process and the quality of the product, a set of experimental studies focus on the revision procedure and/or revision instructions. For example, in an experimental study
using think-aloud for three revision tasks performed by ten professionals, Künzli (2006c) found that a lack of clear instructions (a revision brief) had a negative effect on the revised translation. Künzli (2007b) also looked at changes made by revisers, changes which should have been made but were not and the task definition for revision (revision brief), and found that defective revision could be due to the reviser not having a clear definition of the task as well as a lack of well-structured procedures. Later, Künzli (2009) found that quality takes time, and that it did not seem to matter whether the reviser read a wording of the translation first or a wording of the source text first when comparing source text and translation.

As far as revision procedures are concerned, the first study was probably that of the GREVIS research group (Brunette et al. 2005), which looked at the revision interventions by 14 professional revisers, first with the source text, then without. Analysis of the result led to the conclusion that unilingual revision is inadvisable. Robert (2013, 2014b; Robert and Van Waes 2014) looked at how revision procedure is related to the quality of the product, the error detection potential and the duration of the task. Sixteen professional revisers had to each revise four translations, each time using a different procedure. Data collection was by think-aloud, keystroke logging and a questionnaire. She found that procedure did indeed have an impact, and she formulated recommendations. Marashi and Okhowat (2013) compared revision with and without the source text by 40 professional revisers, with a focus on the linguistic quality of the revision and the revisers’ profiles. The results were rated by professors of the target language. The finding was that recourse to the source had no effect on quality with this type of purely linguistic revision. Finally, Huang (2018) investigated the self-revision, other-revision and post-editing processes of translation trainees through eyetracking, keystroke logging and retrospection. Drawing on an analysis of the students’ reading and typing activities, together with the corresponding cognitive activities and purposes, she observed three working phases in the processes (planning, drafting and final check) and was able to identify four types of working styles, which roughly correspond to different revision procedures. One example is the Micro processing working style, which means one or two run-throughs of bilingual reading and detailed revision. She also found three types of reviser (habit-oriented, task-oriented and habit/task-oriented). By comparing the observed students’ working styles with those of professionals in the existing literature, she hoped “to offer insight into the behaviour of pre-career translators and contribute to translation pedagogy” (176).

Another set of studies pays more attention to the revisers and/or their profiles or expertise. Künzli (2005), for example, asked what principles guide translation revision, and he also looked at the quality of the product and the duration of the process. He found that revisers did not always apply the principles they had verbalized, such as “revising is not retranslating”. He then considered the sense of loyalty in decision-making (2006a) and concluded that revisers are faced with a dilemma: loyalty to self versus loyalty to other actors such as the client and the reader.

With regard to profiles, Van Rensburg (2017) designed instruments to measure the quality of revision in order to find a possible link between revision quality and
certain variables in the reviser’s profile. With 30 revisers and 3 language experts, she found a significant correlation between years of translation experience and just one of the indicators in her measuring instrument, namely necessary corrections to the target language. Scocchera (2017a) conducted a survey in the Italian publishing sector, and the findings enabled her to outline a profile of the reviser in terms of age, gender, expertise, education/training and work practices, providing a valuable contribution to higher visibility for this professional figure. Schaeffer et al. (2019a) used eyetracking and key logging to compare the revision behaviour of translation students and professional translators. The aim was to investigate the effect of error type on error recognition, the relation between eye-movement patterns and error detection, and the relation between translation expertise and error recognition behaviour. They concluded that professional translators are more strategic in terms of cost/benefit in their revision behaviour.

A last group of studies take into account the ubiquity of technologies in the translation and revision workflow and were thus carried out within a CAT tool environment. This is the case for Mellinger and Shreve (2016), who observed revision by nine professional translators using keylogging software. They found a tendency to make unnecessary changes. Ipsen and Dam (2016) had nine students perform a revision task in the CAT tool MemSource. Data were gathered using screen capture, interviews and retrospective think-aloud. The researchers found that regardless of the procedure, participants obtained better results when they read the translation before the source during comparison. However, the order of reading was established after completion of the task, through retrospective interviews, rather than during the task using eyetracking. Ciobanu et al. (2019) looked at the embedding of speech technologies in the revision workflow in order to determine their effect on the revisers’ preferences, viewing behaviour and revision quality. Five professional translators and six translation trainees were asked to revise the English translation of a French text in a CAT tool, with and without source text sound (via speech synthesis). Their eye movements were tracked and they had to fill in a post-eyetracking questionnaire. The authors found an improvement in revision quality, especially regarding accuracy errors, when sound was present.

**Participant-based studies**

Studies of participants in the revision process are based on surveys. Scocchera (2015) looked at revision by literary publishers in Italy from two points of view: first, she investigated the relationship between translator and reviser using a survey with 80 respondents; second, she considered the role of computer-based revision in the genesis of translations. She found that 43.6% of the translators surveyed always had contacts with their reviser, but the same proportion never had contact; the remaining 12.8% had sporadic contact. She also found that very few revisers had had any training in literary revision. The same study was drawn on by Scocchera (2014) to make suggestions for a course in literary revision, and to make a case for the use of specific tools: the Review functions in Word, publishers’ house-style guides,
Mossop’s (2014a) revision parameters and Berman’s (1985) typology of forces that tend to domesticate literary translations. Scocchera (2016) provides her personal reflections on the importance of a collaborative approach to revision, through an anecdote taken from her own experience as a reviser. Finally, still drawing on her survey, Scocchera (2017b) looks at translation revision as rereading and analyses the reviser’s strategies and purposes.

Rasmussen and Schjoldager (2011) conducted a survey to find out about procedures, revision parameters and reviser profiles at 22 Danish translation agencies, and then interviewed some of the revisers. She found that 10% of translations are not revised at all, while 90% receive a comparative revision. Few agencies had a revision manual, though most of the revisers are trained translators. Schjoldager et al. (2008) used a survey and interviews to develop a precis-writing, editing and revision module for a course. Hernández-Morin (2009) looked at practices and perceptions of revision in France through a survey with 115 respondents. She found that most freelance translators support the European translation service standard EN 15038, but while they endorse revision, they do not think it is always necessary. Robert (2008) examined the inconsistent terminology of revision through a literature review and then looked at revision procedures using two surveys (48 and 21 respondents). Robert and Remael (2016) conducted a survey (99 respondents) about revision of subtitles. Lafeber (2012) conducted a survey of in-house translators and revisers in order to identify the importance of various types of skill and knowledge, and the extent to which they are lacking in new recruits. The results confirmed that linguistic competence alone is not sufficient. In 2018, she confirmed these first results, explaining that at both the EU and the UN, the skills required also include analytical and research skills as well as procedural and substantive knowledge.

**Studies in different environments**

Studies in the translator training context are mostly descriptions and analyses of revision courses at the researcher’s university. Wolfson (2004, 2005) looks at 10 years of a distance revision course. Hine (2003) relates his experience of teaching revision in a multilingual environment. Brunette and Gagnon (2013) describe how they used translations of Wikipedia entries in their revision course. Pietrzak (2014) describes the operation of group revision within a translation course. Finally, Hagemann (2019) investigates directionality in revision teaching: she taught a course in which the target language was her B language but the students’ A language, and she concluded that directionality could be used to promote the instructor’s role as facilitator in the translation/revision classroom.

Workplace studies have often been conducted in the translation services of major international organizations. Arthern (1983, 1991) described a revision quality model he developed in order to evaluate the work of revisers in the English division of the Council of the European Communities’ translation service. Parra-Galiano (2006, 2007a, 2007b) carried out three case studies (one of them at the
Translation Centre for the Bodies of the European Union, https://cdt.europa.eu/en), on which she bases a proposed methodology for revision that includes principles, parameters and procedures for revision as well as qualifications for revisers. Prioux and Rochard (2007) draw on their experience to describe the cost/benefit approach to revision used at the translation service of the Organization for Economic Cooperation and Development. Yousif (2009) looks at revision in an institutional setting and proposes guidelines involving four tasks, each based on one or two parameters such as the institution’s terminology. Allain (2010) considers two-person revision (one speaking the translation aloud, the other reading the source), based on his experience at the Council of Europe. Bertaccini and Di Nisio (2011) describe revision at a private translation agency and at the European Commission’s Directorate General for Translation.

Some writers take a look at professional standards. Schopp (2007) looks at the European standard EN 15038 and also at DIN 16511, which deals with proofreading symbols. Biel (2011) analyses EN 15038 from the point of view of its implications for the translation industry and for the training of future translators. Parra-Galiano (2011) looks at various aspects of EN 15038 such as the degree of revision and its parameters. In Parra-Galiano (2017), she looks at the international standard ISO 17100.

Revision of literary translation has rarely been the object of scholarly research. Jones (2006) and Kolb (2013) investigate overall processes and specific, personal procedures adopted by literary translators of poetry and fiction respectively. Buzeлин (2007) studies three literary translations “in the making” from a Latourian perspective. Bogic (2010) analyses the translator-publisher relationship during the translation process into English of Simone de Beauvoir’s *Le deuxième sexe*. Siponkoski (2013) looks at unpublished editorial commentary on translators’ drafts of translations of Shakespeare into Finnish and highlights examples of negotiation between translators and copyeditors. Feinauer and Lourens (2017) report on a case study of revision in literary publishing to determine the loyalties of literary revisers by considering the various agents’ discussions with each other about a translation. Ándujar Moreno (2019) draws on the concept of translation universals to look at the way linguistic changes resulting from editorial revision, rather than from translation, can be seen as recurring editing tendencies or patterns at work in any final editing process of a translation. This is done through the analysis and comparison of different stages in the Spanish translation of Charles Bock’s *Beautiful Children*, with a particular focus on lexical choice. The study enables the researcher to categorize revisers’ activities and to develop a taxonomy of their changes and the reasons behind them. Marin–Lacarta and Vargas–Urpi (2019) study the revision process in literary translation in the context of non-profit digital publishing. Through interviews with translators and revisers, participants’ diaries, e-mail correspondence and translation drafts, the researchers expose the complex network of negotiated decisions and interactions between the actors involved, concluding that while revision is greatly appreciated by translators (thus dismantling the common stereotype of the translator-versus-reviser “tug of war”), different revision stages and activities are often blurred.
4. Theoretical publications on post-editing

As in the case of revision, theoretical publications on post-editing include overviews of the use of MT and post-editing in translation workflows. Garcia (2012) presents a historical overview of the use of post-editing and related research based on published research and other sources. Current use has been investigated in surveys by Gaspari et al. (2015) and Porro Rodríguez et al. (2017). Various authors have published accounts of the place of post-editing in the workflows of specific organizations, the post-editing services offered (O’Curran 2014; Silva 2014) and the work of post-editors (Robert 2013). Best practices and guidelines for post-editing have been published for specific organizations and languages and for general use. A comparative overview of various post-editing guidelines can be found in Hu and Cadwell (2016).

As interaction with MT and other technologies is a significant part of post-editing, publications include descriptions of tools for post-editing (Alabau et al. 2013) as well as more general analyses and reflections on tools and their features (Teixeira 2014; Alonso and Vieira 2017). Moorkens and O’Brien (2017) provide an overview of tools used for post-editing as well as a ‘wish list’ for the design of such tools based on a survey of translators and post-editors.

Theoretical publications also include reflections on post-editing competences. O’Brien (2002) discusses overlaps and differences in the skills needed for translation and for post-editing and argues that post-editing competences are distinct from translation competences, and that specialized training is needed. Other authors since then have addressed specific post-editing competences (Rico and Torrejón 2012; Nitzke et al. 2019).

5. Empirical studies of post-editing

Product-oriented studies

The quality of post-edited texts has been a central question in product-oriented studies about professional contexts (Guerberof Arenas 2017), post-editing by translation students (Ortiz-Boix and Matamala 2017) and non-professional post-editing of user-generated content (Mitchell et al. 2014). Studies have also addressed the correctness and necessity of changes in post-editing and identified unnecessary changes, changes introducing errors and errors missed by professional translators (de Almeida 2013) and by translation students (Koponen et al. 2019).

Research has also addressed questions related to the usability or acceptability of post-edited texts from the perspective of the end user of a translation. Bowker and Buitrago Ciro (2015) present a study of the acceptability of human-translated, machine-translated and post-edited texts and also take into account the time and cost of producing each version. Van Egdom and Pluymaekers (2019) compare various quality aspects and end-user impressions of texts with various levels of post-editing. Screen (2019) uses eyetracking as well as subjective evaluations of
readability and comprehensibility to address the end-user perspective. The effect of post-editing on usability has been investigated by having users complete tasks with the help of unedited machine-translated or post-edited instructions combined with measurements of user satisfaction (Castilho and O’Brien 2016).

Product-oriented studies have also investigated the overall patterns of changes made to the MT output during post-editing (Groves and Schmidtke 2009) or choices made by student post-editors (Koponen 2013) as well as terminological and lexical features (Čulo and Nitzke 2016; Moorkens and Sasamoto 2017) and textual features such as literality (Carl and Schaeffer 2017) and metaphors (Koglin and Cunha 2019). Čulo et al. (2014) present a study about the influence of post-editing on the strategies of professional translators and translation students and potential interferences from the source language in post-edited products. Drawing on the concept of ‘translationese’ (wordings that distinguish translated texts from texts originally written in the target language), some research has started to investigate whether specific features of ‘post-editese’ similarly differentiate post-edited texts from translations and from original texts (Daems et al. 2017a; Toral 2019).

Process-oriented studies

In the translation industry, the rationale for using MT and post-editing relies on the assumption that it requires less effort than translation ‘from scratch’. For this reason, the question of effort has received much interest in post-editing research. The influential model of post-editing effort by Krings (2001) distinguishes three aspects: temporal effort (the time needed for post-editing), technical effort to make corrections (for example, keystrokes) and cognitive effort to identify errors and plan corrections. A survey of studies on post-editing effort is given in Koponen (2016). Technical and temporal effort have been addressed in studies where translators’ productivity during post-editing has been compared to translation from scratch (Plitt and Masselot 2010; Läubli et al. 2013) and to translation with the aid of translation memory matches (Guerberof Arenas 2014a, 2014b; Teixeira 2014). Research has also investigated the effects of interactive and adaptive MT (Alabau et al. 2016) and recently the effect of neural MT as compared to earlier technologies (Toral Ruiz et al. 2018; Daems and Macken 2019; Jia et al. 2019; Sánchez-Gijón et al. 2019). Combining product and process, Vieira (2017b) investigates the connections between different measures of post-editing effort and the quality of the post-edited texts.

Cognitive effort is the most difficult of the three aspects to capture and measure, although considerable research interest has been focused on this topic. Some research has investigated the use of think-aloud protocols (O’Brien 2005; Vieira 2017a; Koglin and Cunha 2019). One of the approaches to identifying cognitive effort is based on detecting pauses in keylogging data. It has been suggested that extended pauses are points of increased effort (O’Brien 2005; Screen 2017), as are clusters of short pauses (Lacruz and Shreve 2014). Eyetracking technology has also been applied to investigating cognitive effort, on the assumption that more
frequent and longer gaze fixations indicate increased cognitive effort (Moorkens 2018a). Vieira (2017a) investigates and compares different indicators of cognitive effort using eyetracking, think-aloud protocols and subjective ratings. Herbig et al. (2019) experiment with physiological measures such as skin- and heart-based indicators.

Cognitive effort has also been explored in terms of the effort perceived by the person carrying out the post-editing. An annotation scale for collecting sentence-level information about the perceived effort in post-editing was proposed by Specia (2011). Such perceived effort ratings do not, however, always correspond to the technical effort involved in terms of number of changes, as was found by Koponen (2012). Correlations between effort perceived by the post-editor and measures of effort like time and number of keystrokes have also been investigated by others (Herbig et al. 2019).

Specific issues in investigations of temporal, technical or cognitive effort include the impact of source text features (O’Brien 2005; Aziz et al. 2014; Koglin and Cunha 2019), different types of errors in the MT output (Koponen 2012; Koponen et al. 2012; Daems et al. 2017b; Carl and Toledo-Báez 2019) and types of post-editing operations (Popović et al. 2014). Da Silva et al. (2017) investigate the effect of L2 to L1 versus L1 to L2 directionality on the post-editing process. Lacruz (2018) investigates stages of processing in post-editing.

**Participant-oriented studies**

The adoption and perception of MT post-editing in different settings has been a point of interest for participant-oriented studies. Guerberof Arenas (2013) presents a study based on online questionnaires and “debriefing” interviews with professional translators who participated in a post-editing experiment. Adoption and acceptance of MT and post-editing among translators at the European Commission have been explored in two studies using focus groups (Cadwell et al. 2016) and survey data (Rossi and Chevrot 2019). Bundgaard (2017a, 2017b) investigates translators’ resistance to and accommodation of post-editing and “translator-computer interaction” more broadly, through interviews and written answers to questions about expectations and experiences. Sakamoto (2019) also examines resistance to post-editing based on a focus group of translation project managers.

Participant-oriented studies have also examined the profiles, skills and competences of post-editors. Guerberof Arenas (2014b) examines the effect of professional experience on post-editing productivity as well as the quality of the post-edited translations. Alabau et al. (2016) present a longitudinal study of professional translators using an interactive MT system; they examine the effect of post-editing experience, and personal factors such as typing skills, on the post-editing process. Huang (2018) looks at translation students, comparing their profiles and approaches when post-editing, self-revising and other-revising. Daems et al. (2017c) compare the translation and post-editing processes of professional translators and translation students. Aranberri et al. (2014) examine the productivity of professional translators
and non-professionals. Temizöz (2016) compares the quality of post-edited texts by professional translators and subject matter experts, and Temizöz (2017) looks into both revision and post-editing by translators and experts.

**Studies in different environments**

In addition to accounts of individual experiences, post-editing in professional environments has been investigated through surveys, observational workplace studies and focus groups. Porro Rodríguez et al. (2017) present the results of a survey about post-editing among Swiss language service providers. Cadwell et al. (2016) discuss a focus group study of European Commission translators and the degree to which they use MT and post-editing, as well as reasons why it is used or not used. A more recent survey study by Rossi and Chevrot (2019) also examines post-editing by European Commission translators. Bundgaard and Christensen (2019) discuss the ways translators use translation memories and post-edit MT, as well as other resources, drawing on observation and retrospective think-aloud. Bywood et al. (2017) examine the use of MT and post-editing by subtitle translators in the audiovisual context. Post-editing of audiovisual material has also been explored in the case of voice-over (Ortiz-Boix and Matamala 2017) and audio description (Fernández-Torné 2016). Toral Ruiz et al. (2018) report on a case study of post-editing a novel.


Post-editing has also been researched in contexts where the people performing the post-editing are not professional translators or post-editors. Navarro (2012) discusses cases where MT post-editing is used by journalists for bilingual digital press publications. Mitchell et al. (2014) investigate post-editing of user-generated posts on a technical help forum by other users of the forum identified as subject-matter experts. Schwartz (2014) investigates the feasibility of monolingual post-editing (without source text) by subject-matter experts as a means of identifying the parts of a text needing most attention from a bilingual translator. Aranberri et al. (2014) present a study where university lecturers, who may need to produce materials in more than one language, post-edited a machine-translated text related to their
field; the authors compare the lay users’ performance to that of professional translators. O’Brien et al. (2018) examine the quality of post-edited texts in a case where academic writers machine-translated and then post-edited their own texts as a support for writing scientific articles.

6. The contributions of this volume

This book is original and relevant in several ways. First, it looks at revision and post-editing together, even within a single chapter (Nitzke and Gros, Chapter 1; Daems and Macken, Chapter 3). This has rarely been done in previous publications, although such a combination of activities might become a common practice in industry in the near future. Under the impulse of new technological developments, it may become the norm for translation, revision and post-editing to be carried out by one and the same person not only during different translation jobs but also during one and the same job.

Second, the book includes both empirical contributions and more theoretical contributions on the conceptual boundaries between translation, revision and post-editing (Carmo and Moorkens, Chapter 2) and the competences related to these activities (Ginovart Cid and Colominas Ventura, Chapter 12). Third, the book covers a wide variety of topics, such as training in revision and post-editing (Konttinen, Salmi and Koponen, Chapter 10; Van Egdom, Chapter 11), post-editing by non-professionals (Parra Escartin and Goulet, Chapter 5), relations between translators and revisers (Valdez and Vandepitte, Chapter 8) and studies of professional practices in three different contexts where revision is carried out: translation agencies (Schnierer, Chapter 6; Korhonen, Chapter 7), translation departments of large institutions (LeBlanc, Chapter 4) and the publishing sector (Feinauer and Lourens, Chapter 9).

Finally, the very extensive list of references at the end of the volume should prove useful to anyone carrying out research on revision and post-editing.

Existing work by TS scholars has brought to light some interesting questions for research, though only some of these are addressed here. First, studies have shown that, whether they are revising their own or someone else’s translation, different translators use different methods. Does the method have any effect on speed or on the quality of the output? The answer is still very unclear, and the question also applies to post-editing. Second, existing work has revealed problems: revisers failing to detect errors in translations, introducing errors or wasting time on unnecessary changes. A related problem is the conflict between professional and business concerns: revision seeks to create adequate quality but it takes time, and therefore—unless the time for the drafting phase can be reduced—it increases costs. This situation gives rise to an ethical question: to what and to whom will the reviser be loyal? More generally, little is known about the usefulness of revision: how many problems in translations—especially serious problems—are being corrected (or not corrected) per hour of revision effort in translation services? Again, the same questions apply, at least partially, to post-editing. Since the rationale for
using machine output as a raw version to be post-edited rests on the assumption that it increases productivity, the need for changes is a particularly important issue. Studies of revision and post-editing may at some point be able to help here if they shed light on the causes of problems or lead to improved revision and post-editing training. Finally, because revision and post-editing are mostly a reading rather than a writing process (the purpose is to spot problems in the draft translation or raw MT output), the study of revision and post-editing has potential for the development of research focusing on how translators read, whereas most studies in our field today are concerned with how they write.

Notes

1 The term originated by contrast with ‘pre-editing’ (of MT inputs). It has appeared both hyphenated and unhyphenated since the earliest publications, and both spellings continue to be used. In this volume, we use the hyphenated form, which appears to be more common in the 2010s. The acronyms PEMT, for Post-Editing of Machine Translation, and MTPE, for Machine Translation Post-Editing, are also both in use.

2 Translation genesis is a new area of research inspired by the textual genetics approach in literary criticism. This involves examining the different versions of a work (in this case, a translation) as well as manuscripts and other working documents that may have left traces in the work. See issue 14 (2015) of the Translation Studies journal LANS (https://lans-tts.uantwerpen.be/index.php/LANS-TTS(issue/view/16).
PART I

Post-editing versus revision