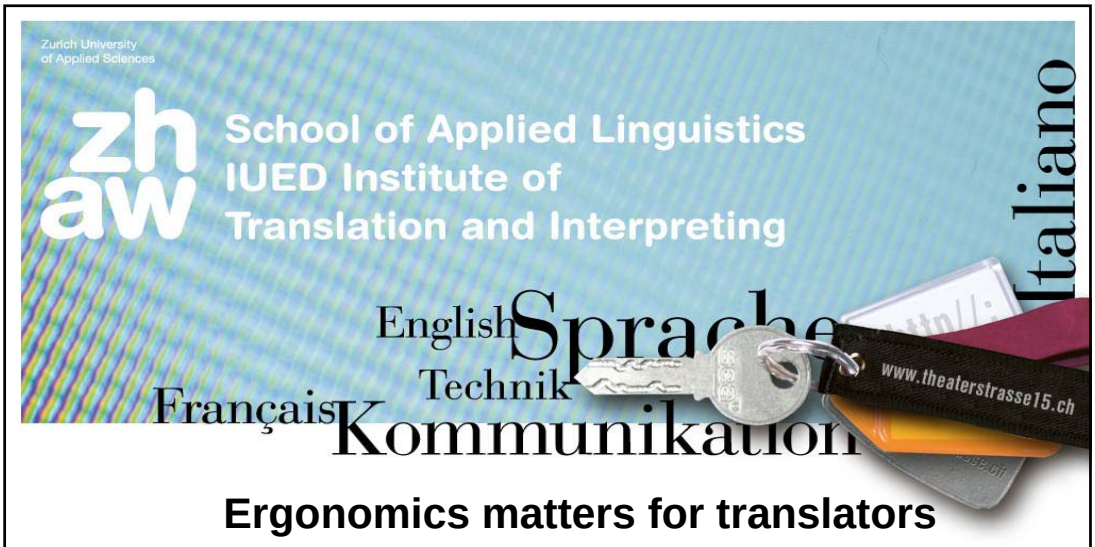

Ergonomics matters for translators and other knowledge workers

Maureen Ehrensberger-Dow
UFMG-ZHAW Ergonomics Workshop, 12-13 July 2016, Belo Horizonte
Ergonomics and technologized knowledge work: cognitive effort, creativity, and health issues

Ergonomics and Technologized Knowledge Work

cognitive effort, creativity, and health issues

an international workshop

Belo Horizonte 12-13 July 2016

LETRA

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zh aw

Local hosts: Fabio Alves, Adriana Pagano, Norma Fonseca
LETRA, FALE and UFMG International Office

Supported by: Brazilian-Swiss Joint Research Programme (BSJRP)

2

Situated act of professional translation

- human cognition extends beyond internal processes to individuals' physical and social situation
  (cf. Hutchins 1995; Clark & Chalmers 1998/2010)
- translation can be considered a type of situated cognition
  Translation is done not only by the brain, but also by complex systems, systems which include people, their specific social and physical environments and all their cultural artefacts.
  (Risku 2002: 529)
- competence in language technology (e.g. CAT, MT) now a prerequisite for professional translation
  (EN15038 2006; Gouadec 2007/2010)
- professional translation can be considered "a form of human-computer interaction" (O'Brien 2012: 101)

3

Situated act of professional translation

- memory has been extended by technology and CAT tools
  (Pym 2011)
- nature of translation task altered by language technology
  (Hansen-Schirra 2012; Jiménez-Crespo 2009)
- multiple applications and resources can increase mental load
  (Désilets et al. 2009)
- emotional state and concentration affected by technology
  (Beale & Peter 2008; Szameitat et al. 2009)
- ergonomic perspective on translation as new paradigm
  (Lavault-Olléon 2011)

→ Realities of professional translation with language technology?

→ Effects of ergonomic issues on cognitive (over)load?

4

Ergonomics: definitions

- Greek (ergon=work; nomos=laws) on analogy to “economics” (Jastrzebowski 1857/2006)
- synonymous with “human factors engineering” and “human factors” (Stramler, 1993, p. 148):
  *That field which is involved in conducting research regarding **human psychological, social, physical, and biological characteristics**, maintaining the information obtained from that research, and working to apply that information with respect to the design, operation, or use of products or systems for **optimizing human performance, health, safety, and/or habitability**.*
- human side of usability, with a focus on the **user** rather than on machines or tools (ISO 9241-210; Norros & Savioja, 2007)

5

Ergonomics: definitions

*Ergonomics (or human factors) is the scientific discipline concerned with the understanding of **interactions** among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to **optimize** human **well-being** and overall system **performance**.*

(IEA - International Ergonomics Association)
http://www.iea.cc/whats/index.html

6 6

Ergonomics: definitions

Physical ergonomics
is concerned with human anatomical, anthropometric, physiological and biomechanical characteristics as they relate to physical activity.

Cognitive ergonomics
is concerned with mental processes, such as perception, memory, reasoning, and motor response, as they affect interactions among humans and other elements of a system.

Organisational ergonomics
is concerned with the optimization of sociotechnical systems, including their organizational structures, policies and processes.

(IEA - International Ergonomics Association)
http://www.iea.cc/whats/index.html

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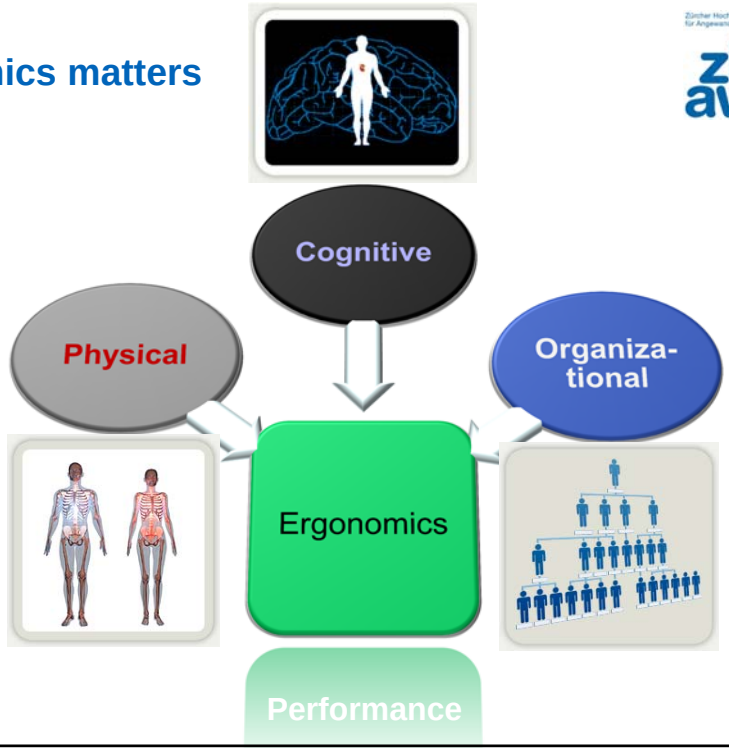
Ergonomics matters



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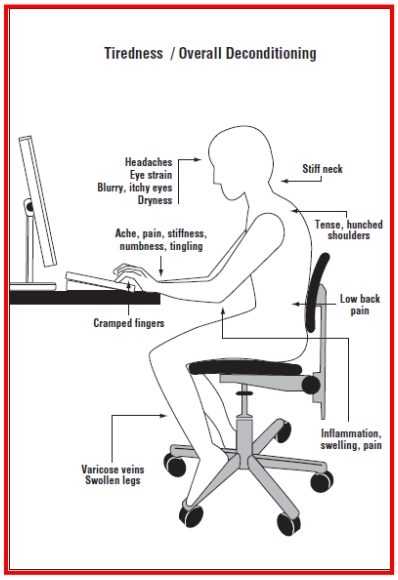
Physical aspects



(CCOHS 2011)

(SUVA 2016)

9

Physical aspects

Physical ergonomics is concerned with human anatomical, anthropometric, physiological and biomechanical characteristics as they relate to physical activity.

(IEA - International Ergonomics Association)

- design of equipment (desks, chairs, keyboards, mice)
- distortions of hand and wrist when keyboarding
- extended periods sitting in one position, resulting in stiffness in the neck or back, and leg pain
- context factors (noise levels, lighting, temperature)

→ … consequences for concentration and health

Risks: accuracy; translation quality; absenteeism

10

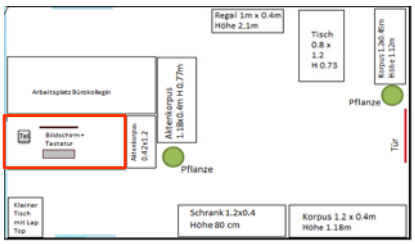
Physical aspects of translation

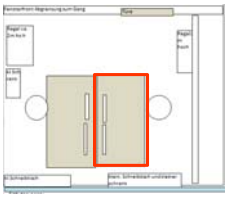
Group (processes)	Keystrokes/ minute	Switches to mouse/minute	Mouse clicks/minute	TT words after 15 minutes
Beginner (26)	49.2	3.3	7.6	52.5
Advanced (19)	56.9	2.9	6.6	67.4
Professional (15)	**70.7**	**2.5**	**5.6**	**92.4**

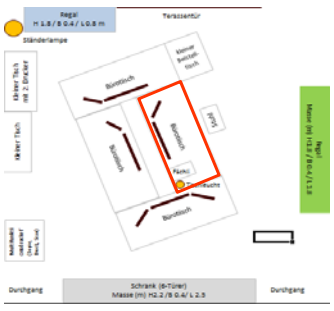
- QWERTY (English) keyboards arranged to prevent mechanical typewriters from jamming, not for ergonomic reasons
→ hand distortions, frequent finger extension, and imbalances between the use of the two hands
- repetitive movements from typing, clicking, scrolling
→ hand and wrist tendonitis, Carpal Tunnel Syndrome, and Cubital Tunnel Syndrome
(de León 2007; Lavault-Olléon 2011)

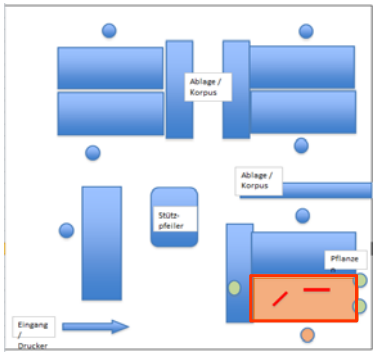
11

Physical aspects of translation









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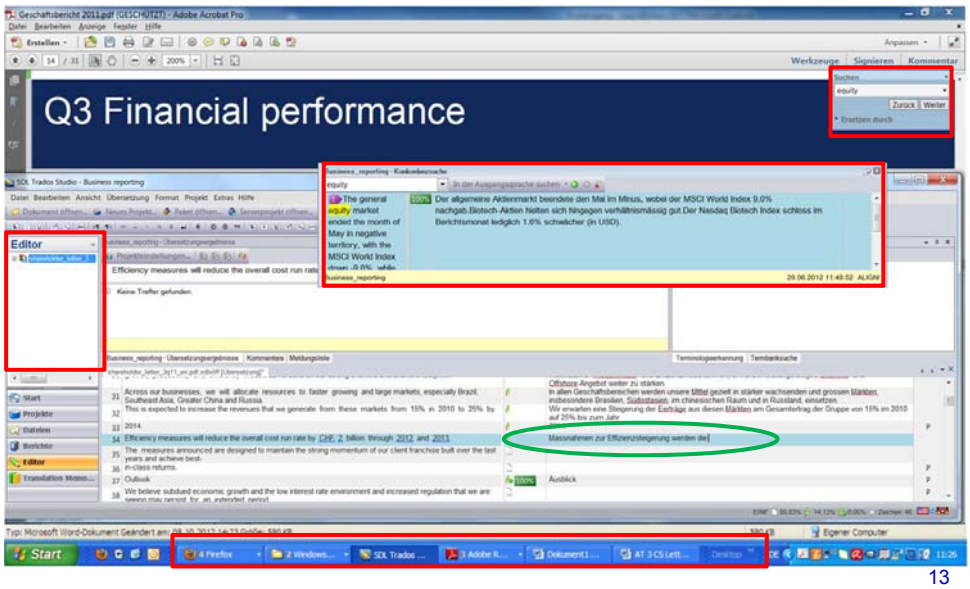
Cognitive aspects



13

Cognitive aspects

Cognitive ergonomics is concerned with mental processes, such as perception, memory, reasoning, and motor response, as they affect interactions among humans and other elements of a system.

(IEA - International Ergonomics Association)

- human-computer interactions (HCI)
- computer responsiveness
- digital resources
- over-crowded screens
- disturbances and interruptions
- time pressure

→ … consequences for efficiency and concentration

Risks: accuracy; translation quality; productivity

14

Cognitive aspects of translation

- translation requires concentrated text reception in one language and production in a different language
- language technology tools and information resources are an integral part of professional translation (ISO 17100)
- sophisticated degree of computer and information literacy required (Choudhury & McConnell 2013; DGT 2005)
- slight delays in computer responsiveness can negatively affect task performance and potentially contribute to stress (Szameitat et al., 2009)

- cognitive effort required to evaluate risks and take appropriate decisions (Canfora & Ottmann 2015; Pym 2015)

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Organizational aspects

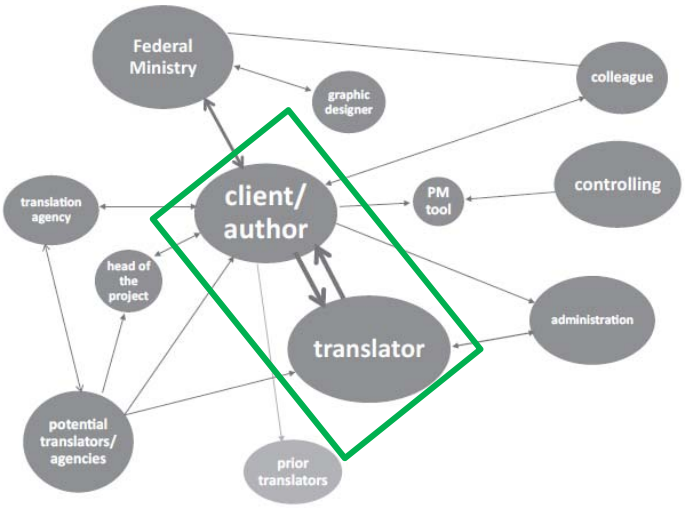

Figure 1. The client / author network.

(Risku 2014: 344)

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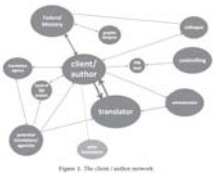
Organizational aspects

Organizational ergonomics is concerned with the optimization of sociotechnical systems, including their organizational structures, policies and processes.

(IEA - International Ergonomics Association)



- sociotechnical issues (cf. Doherty & King 2005)
- teamwork, communication (Vink & Kantola 2011)
- self-concept and professional identity
- job satisfaction

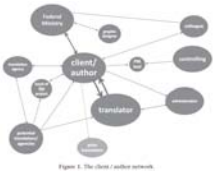
→ … consequences for autonomy and decision-making

Risks: company loyalty; organizational development

17

Organizational aspects of translation

- complex system of 'translational action' (Holz-Mänttäri 1984)
- constraints imposed by own organization as well as client-related tools and resources (e.g. style guides, parallel texts, websites, concordances, and translation memories)



- staff translators have little self-determination over their workload and workflow
- little say in infrastructure and procurement decisions (e.g. furniture, offices, technology)
- introduction of new language technology may be disorienting to the translators involved because "the human and organizational aspects are not addressed at all, or only implicitly, or in an ad-hoc fashion, when the system is being developed." (Olohan 2011, 345)

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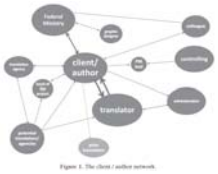
Ergonomics matters for translators

Cognitive

Physical

Organiza-tional

Ergonomics



Performance

19

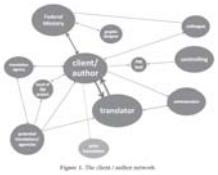
Ergonomics matters to translation act

Translation as a cognitive *act*

Physical

Organiza-tional

Ergonomics



Performance

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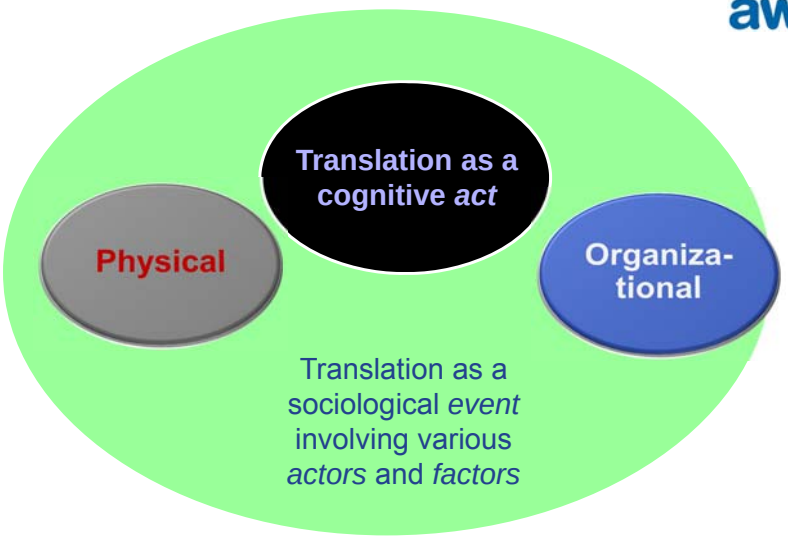
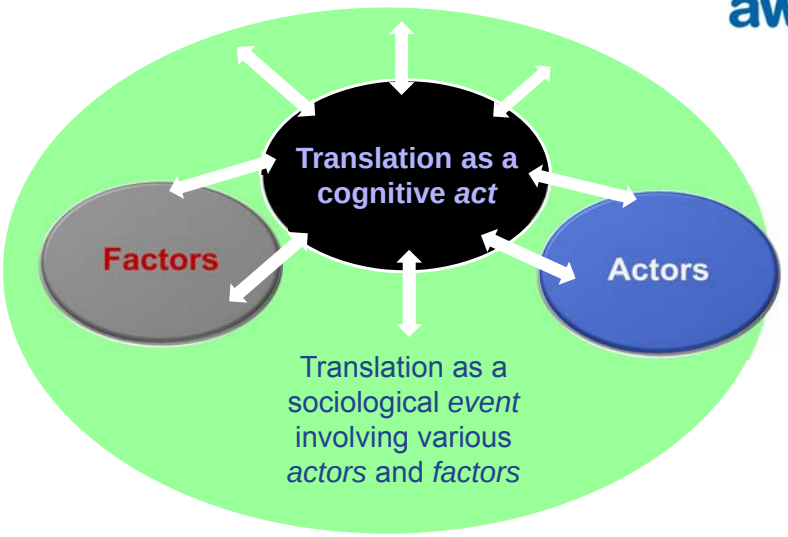
Ergonomics matters to translation act + event



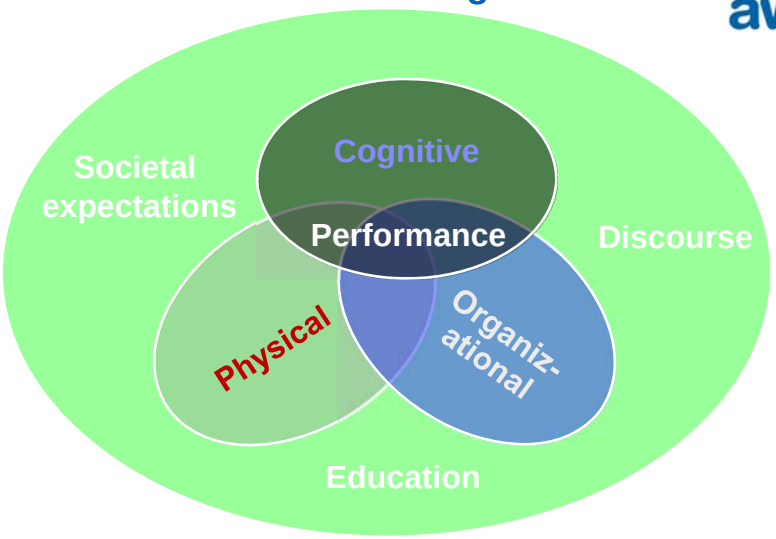
(Chesterman 2013/2015; Toury 2012) 21

Ergonomics matters to translation act + event



(Chesterman 2013/2015; Toury 2012) 22

Ergonomics matters for knowledge workers



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Ergonomics and Technologized Knowledge Work

cognitive effort, creativity, and health issues

an international workshop

Belo Horizonte 12–13 July 2016

Ergonomics matters!

- Research reports
- Hands-on workshop
- Poster presentations
- Round-table discussions
- Coffee breaks, lunches, workshop dinner

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Usability: Catherine Badras, Martin Schuler

Occupational Therapy: Heidrun Becker, Michèle Gasser, Ursula Meidert, Silke Neumann, Vera Aebischer

Further information: www.linguistik.zhaw.ch/ergotrans/en

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References

Beale, R. & Peter, C. (2008). The role of affect and emotion in HCI, *Lecture Notes in Computer Science* 4868: 1-11.

Canfora C., & Ottmann, A. (2015). Risikomanagement für Übersetzungen. *Trans-Kom 8*(2), 314-346. f

CCOHS 2011. *Office Ergonomics*. 6th Edition. Hamilton, ON: Canadian Centre for Occupational Health and Safety.

Chesterman, A. (2013). Models of what processes? *Translation and Interpreting Studies, 8*(2), 155-168.

Choudhury, R., & McConnell, B. (2013). *Translation technology landscape report*. De Rijp: TAUS BV.

Clark, A., & D. J. Chalmers. 1998/2010. The extended mind. In: Menary, Richard (ed), The Extended Mind. Cambridge, MA: MIT Press. 27-42

de León, M. E. (2007). Ergonomics for translators and interpreters. Retrieved April 8, 2016, from https://altranslations.co.uk/articles/ergonomics-translators-and-interpreters

Désilets, A., Melançon, C., Patenaude, G., & Brunette, L. (2009). How translators use tools and resources to resolve translation problems: An ethnographic study. In *MT Summit XII – Workshop: Beyond Translation Memories: New Tools for Translators*. http://www.mt-archive.info/MTS-2009-Desilets-2.pdf.

DGT (2005). *Translation tools and workflow*. Brussels: Directorate-General for Translation of the European Commission.

Doherty, N. F., & King, M. (2005). From technical to socio-technical change: Tackling the human and organizational aspects of systems development projects." *European Journal of Information Systems* 14 (1): 1-5. doi:10.1057/palgrave.ejis.3000517.

EN15038 (2006). *Translation services–service requirements.* Brussels: European Committee for Standardization.

Gouadec, D. (2007/2010). *Translation as a profession*. Amsterdam: John Benjamins.

26

References (cont'd)

Hansen-Schirra, S. (2012). Nutzbarkeit von Sprachtechnologien für die Translation, in: *trans-kom* 5 (2): 211-226.

Holz-Mänttäri, J. (1984). *Translatorisches Handeln. Theorie und Methode*. Helsinki: Suomalainen Tiedeakatemia.

Hutchins, Edwin (1995). *Cognition in the Wild*. Cambridge, MA: MIT Press.

ISO9241-210 (2010) *Ergonomics of human-system interaction-- Part 210: Human-centred design for interactive systems*. Geneva: International Organization for Standardization. https://www.iso.org/obp/ui/#iso:std:iso:9241:-11:ed-1:v1:en

ISO17100 (2015). *Translation services – Requirements for translation services*. Geneva: International Organization for Standardization. http://www.iso.org/iso/home/store/catalogue_tc/catalogue_detail.htm?csnumber=59149

Jastrzebowski, W. (1857/2006). An outline of ergonomics, or the science of work based upon the truths drawn from the science of nature. In: W. Karwowski (Ed.), *International encyclopedia of ergonomics and human factors*, Volume 3 (2nd ed., pp. 129-141). Boca Raton, FL: CRC Press.

Jiménez-Crespo, M. A. (2009). The effect of translation memory tools in translated web texts: Evidence from a comparative product-based study, in: *Linguistica Antverpiensia* 8: 213-232.

Lavault-Olléon, E. (2011). L'ergonomie, nouveau paradigme pour la traductologie. *ILCEA Traduction et Ergonomie* 14. http://ilcea.revues.org/1078

Norros, L., & Savioja, P. (2007). Towards a theory and method for usability evaluation of complex human-technology systems. *Activités, 4*(2), 143-150.

27

References (cont'd)

O'Brien, S. (2012). Translation as human-computer interaction, *Translation Spaces* 1: 101-122.

Olohan, M. (2011). Translators and Translation Technology: The Dance of Agency, *Translation Studies* 4 (3): 342-357.

Pym, A. (2011). What technology does to translating, *The International Journal for Translation & Interpreting* 3 (1): 1-9.

Pym, A. (2015). Translating as risk management. *Journal of Pragmatics, 85*, 67-80. doi:10.1016/j.pragma.2015.06.010

Risku, H. (2002). Situatedness in Translation Studies, *Cognitive Systems Research* 3: 523-533.

Risku, H. (2014). Translation Process Research as Interaction Research: From Mental to Socio-Cognitive Processes, MonTI Monographs in Translation and Interpreting 7: 331–353.

Stramler, James H. (1993). *The dictionary for human factors/ergonomics*. Boca Raton, FL: CRC Press.

SUVA (2016). Powerpoint-Präsentation für Ausbildner. http://www.suva.ch/startseite-suva/service-suva/lernprogramme-suva/ausbildungen-schulungen-suva.htm

Szameitat, A. J., Rummel, J., Szameitat, D. P., & Sterr, A. (2009). Behavioral and emotional consequences of brief delays in human-computer interaction, *International Journal of Human-Computer Studies* 67: 561-570.

Toury, G. (2012). *Descriptive translation studies–and beyond*. Revised edition. Amsterdam: John Benjamins.

Vink, P., & Kantola, J. (2011). *Advances in occupational, social, and organizational ergonomics.* Boca Raton, FL: CRC Press.

28

Recent and forthcoming publications

Ehrensberger-Dow, M. (2014). Challenges of translation process research at the workplace. *MonTI Monographs in Translation and Interpreting*, Special Issue 1: 355-383.

Ehrensberger-Dow, M. (2015). An ergonomic perspective of professional translation, *Meta* 60 (2): 328.

Ehrensberger-Dow, M. (forthcoming/2017). An ergonomic perspective of translation. In: Schwieter, John W. & Aline Ferreira (eds), *The Handbook of Translation Studies and Cognition* (Chapter 18). Wiley-Blackwell.

Ehrensberger-Dow, M. & Hunziker Heeb, A. (forthcoming/2016). Investigating the ergonomics of the technologized translation workplace. In: Ricardo Muñoz Martín (ed), *Reembedding Translation Process Research*. Amsterdam: John Benjamins.

Ehrensberger-Dow, M., Hunziker Heeb, A., Massey, G., Meidert, U., Neumann, S. & Becker, B. (forthcoming/2016). An international survey of the ergonomics of professional translation. *ILCEA.*

Ehrensberger-Dow, M. & Massey, G. (2014). Cognitive ergonomic issues in professional translation. In: Schwieter, J.W. & Ferreira, A. (eds), *The Development of Translation Competence: Theories and Methodologies from Cognitive Science.* Newcastle, UK: Cambridge Scholar Publishers. 58-86.

Ehrensberger-Dow, M. & Massey, G. (2014b). Translators and machines: working together. In: Man vs. Machine? Vol. I. *Proceedings of XXth World Congress of the International Federation of Translators*, Berlin, 4-6 August 2014, 199-207.

Ehrensberger-Dow, M. & O'Brien, S. (2015). Ergonomics of the translation workplace: Potential for cognitive friction. Special Issue of *Translation Spaces*, 4 (1): 98-118.

Hunziker-Heeb, A., Schaub-Torsello, R. & Ehrensberger-Dow, M. (2015). Ergonomie am Übersetzerarbeitsplatz. *Dolmetscher- und Übersetzervereinigung (DÜV) Bulletin* 2, 15-18.

Jud, P. & Massey, G. (2011). Machines as participants in the communication process: the implications of SEO for translation. In: Steinmann, Cary (ed), *Evolution der Informationsgesellschaft. Markenkommunikation im Spannungsfeld der neuen Medien*. Wiesbaden: VS Verlag, 143-153.

Massey, G. & Ehrensberger-Dow, M. (2011a). Investigating information literacy: A growing priority in translation studies. *Across Languages and Cultures*, 12 (2), 193-211.

Massey, G. & Ehrensberger-Dow, M. (2011b). Technical and instrumental competence in the translator's workplace: Using process research to identify educational and ergonomic needs, ILCEA Revue, 14, [online]. http://ilcea.revues.org/index1060.html

Meidert, U., Neumann, S., Ehrensberger-Dow, M. & Becker, B. (forthcoming/2016). Physical ergonomics at translators' workplaces: Findings from ergonomic workplace assessments and interviews. *ILCEA.*

O'Brien, Sharon & Ehrensberger-Dow, M. (2013). Ergonomic issues at the professional translation workplace, *ITIA Bulletin*. October 2013: 5-6.

O'Brien, Sharon, Ehrensberger-Dow, M., Hasler, M., & Connolly, M. (submitted). Irritating CAT tool features that matter to translators. *Hermes.*

Striebel, C., Massey, G., & Ehrensberger-Dow, M. (forthcoming). Übersetzerarbeitsplatz. In: *Best Practices Übersetzen.* Berlin: BDÜ

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