Slide 1
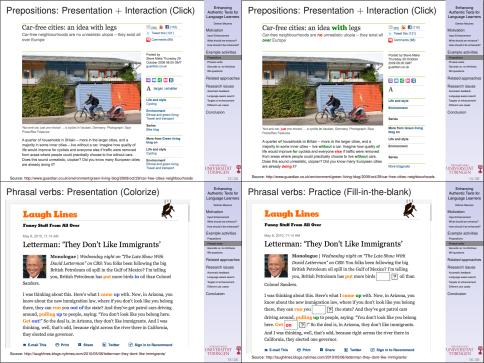
What Can ICALL Do for You?
Enhance Authentic Texts
for Language Learners!

Detmar Meurers
Universität Tübingen

CALICO 2011
Victoria, Canada – May 20, 2011

Enhancing Authentic Texts for Language Learners

Detmar Meurers

Motivation
Input Enhancement
What should we enhance?
How should it be enhanced?

Example activities
Prepositions
Phrasal verbs
Gerunds vs. to-infinitives
Wh-questions

Related approaches

Research issues
Automatic feedback
Language-aware search
Targets of enhancement
Different use cases

Conclusion

UNIVERSITÄT TÜBINGEN

Slide 2

Introduction

- Computers are widely used in foreign language teaching to help learners experience a foreign language & culture.
  - multimedia presentations, web-based TV/radio/news, email/chat with native speakers, . . .
- At the same time, **language awareness** is important for an adult learner to successfully acquire a foreign language.
  - (cf., e.g., Long 1991, 1996; Ellis 1994; Schmidt 1995; Lyster 1998; Lightbown & Spada 1999; Norris & Ortega 2000)
- ⇒ NLP can be used to in support of language awareness
  - **analyze learner language** to provide individual feedback on errors and other language properties
  - **analyze native language** to suport enhanced presentation and interaction with language

Slide 3

Why Analyze Learner Language?

Second Language Acquisition (SLA)

- SLA research is aimed at understanding how second languages are acquired (and how language works)
- research on **instructed** SLA studies the effect of instructional interventions
  - targeting different aspects of language, and
  - supporting different kinds of feedback or interaction

Foreign Language Teaching (FLT)

- develop, adapt, advance, and test effectiveness of intervention methods from SLA for teaching practice
- design and use language tests

Slide 4

Contact Points with Computational Linguistics

- **Learner corpora**: representation and annotation
  - can provide empirical evidence for SLA research
  - can provide insights into typical student needs in FLT

  annotation = off-line analysis

- **Writer's aid tools**: on-line analysis of learner language to provide immediate feedback *aimed at producing text.*

- **Intelligent Tutoring Systems**: on-line analysis
  - to provide immediate individualized feedback, e.g.:
    - meta-linguistic feedback in a form-focused activity
    - incidental focus-on-form in a meaning-based activity
    - feedback on meaning (very rare in ITS)
  - to determine progression through pedagogical material

  aimed at supporting language acquisition.

Motivation

- ► For second language acquisition, contextualized meaningful use of the language to be learned is crucial.

- ► At the same time, learners benefit from a **focus on form** to overcome incomplete or incorrect knowledge.
  - ► *focus on form*: "an occasional shift of attention to linguistic code features" (Long & Robinson 1998)

- ► There is no learning without awareness, but awareness without input is not sufficient (Schmidt 1995).

- ► Strategies highlighting the salience of language forms and categories are referred to as **input enhancement** (Sharwood Smith 1993).

- ⇒ Let's use NLP to provide automatic input enhancement for language learners! → WERTi

UNIVERSITÄT
TUBINGEN

WERTi: Working with English Real Text
Learner motivation

- ► Provide learners of English (ESL) with input enhancement for any web pages they are interested in.

- ► good for **learner motivation**:
  - ► learners can choose material based on their interests
  - ► includes up-to-date information, news, hip stuff
  - ► pages remain fully contextualized (audio, video, links)

UNIVERSITÄT
TUBINGEN

WERTi: Working with English Real Text
Learning contexts

- ► wide range of potential **learning contexts**:
  - ► can supplement *traditional*, *distance*, or *individualized* instruction
  - ► can contribute to the voluntary, self-motivated pursuit of knowledge → *lifelong learning*
  - ► can support *implicit learning* for adult immigrants:
    - ► already functionally living in second language environment, but stagnating in acquisition
    - ► without access or motivation to engage in explicit learning, but browsing the web for information and entertainment

UNIVERSITÄT
TUBINGEN

What language properties should we enhance?

- ► A wide range of linguistic features can be relevant for awareness, incl. morphological, syntactic, semantic, and pragmatic information (Schmidt 1995).

- ► We focus on enhancing language patterns which are well-established difficulties for ESL learners:
  - ► determiner and preposition usage
  - ► noun countability
  - ► use of gerunds vs. *to*-infinitives
  - ► phrasal verbs
  - ► *wh*-question formation
  - ► passive voice

  NLP identifying other patterns can be integrated as part of a flexible NLP architecture.

UNIVERSITÄT
TUBINGEN

How should the targeted forms be enhanced?

- WERTi offers three types of input enhancement:
  a) color **highlighting** of the pattern or selected parts thereof
  b) support **clicking** interaction with automatic color feedback
    - The automatic feedback compares automatic annotation of selected form with original text.
  c) support **fill-in-the-black** and **multiple choice** practice with automatic color feedback

- This follows standard pedagogical practice ("PPP")
  a) receptive presentation
  b) presentation supporting limited interaction
  c) controlled practice
  d) (free production)

Prepositions: Presentation (Color)

Source: http://www.bbc.co.uk/2/hi/5277090.stm

Prepositions: Practice (FIB)

Source: http://news.bbc.co.uk/2/hi/5277090.stm

Prepositions: Practice (Multiple Choice)

Source: http://news.bbc.co.uk/2/hi/5277090.stm

Prepositions: Presentation + Interaction (Click)

Car-free cities: an idea with legs

Car-free neighbourhoods are no unrealistic utopia – they exist all over Europe

'Not anti-car, just pro-choice' – a cyclist in Vauban, Germany. Photograph: Sipa Press/Rex Features

A quarter of households in Britain – more in the larger cities, and a majority in some inner cities – live without a car. Imagine how quality of life would improve for cyclists and everyone else if traffic were removed from areas where people could practically choose to live without cars. Does this sound unrealistic, utopian? Did you know many European cities are already doing it?

Posted by Steve Mela Thursday 29 October 2009 08.00 GMT
guardian.co.uk

Life and style
Cycling

Environment
Ethical and green living
Travel and transport

Series
Bike blog

More from Green living blog on

Life and style
Cycling

Environment
Ethical and green living
Travel and transport

Motivation
Input Enhancement
What should we enhance?
How should it be enhanced?

Example activities
Prepositions
Phrasal verbs
Gerunds vs. to-infinitives
Wh-questions

Related approaches

Research issues
Automatic feedback
Language-aware search
Targets of enhancement
Different use cases

Conclusion

UNIVERSITÄT TÜBINGEN

Prepositions: Presentation + Interaction (Click)

Car-free cities: an idea **with** legs

Car-free neighbourhoods are **no** unrealistic utopia – they exist all **over** Europe

'Not anti-car, **just** pro-choice' – a cyclist in Vauban, Germany. Photograph: Sipa Press/Rex Features

A quarter of households in Britain – more in the larger cities, and a majority in some inner cities – live **without** a car. Imagine how quality of life would improve **for** cyclists and everyone **else** if traffic were removed from areas where people could practically choose to live **without** cars. Does this sound unrealistic, utopian? Did you know many European cities are already doing it?

Posted by Steve Mela Thursday 29 October 2009 08.00 GMT
guardian.co.uk

Life and style

Environment

Series

More from **Green living** blog on

Life and style

Environment

More blogposts

Enhancing Authentic Texts for Language Learners

Detmar Meurers

Motivation
Input Enhancement
What should we enhance?
How should it be enhanced?

Example activities
Prepositions
Phrasal verbs
Gerunds vs. to-infinitives
Wh-questions

Related approaches

Research issues
Automatic feedback
Language-aware search
Targets of enhancement
Different use cases

Conclusion

UNIVERSITÄT TÜBINGEN

Phrasal verbs: Presentation (Colorize)

Laugh Lines

Funny Stuff From All Over

May 6, 2010, 11:14 AM

Letterman: 'They Don't Like Immigrants'

Monologue | Wednesday night on *"The Late Show With David Letterman"* on CBS: You folks been following the big British Petroleum oil spill in the Gulf of Mexico? I'm telling you, British Petroleum has **put** more birds **in** oil than Colonel Sanders.

I was thinking about this. Here's what I **came up** with. Now, in Arizona, you know about the new immigration law, where if you don't look like you belong there, they can **run you out of** the state? And they've got patrol cars driving around, **pulling up** to people, saying: "You don't look like you belong here. **Get out!**" So the deal is, in Arizona, they don't like immigrants. And I was thinking, well, that's odd, because right across the river there in California, they elected one governor.

✉ E-mail This   🖨 Print   ◀ Share   ▼ Twitter   ☑ Sign in to Recommend

Motivation
Input Enhancement
What should we enhance?
How should it be enhanced?

Example activities
Prepositions
Phrasal verbs
Gerunds vs. to-infinitives
Wh-questions

Related approaches

Research issues
Automatic feedback
Language-aware search
Targets of enhancement
Different use cases

Conclusion

Phrasal verbs: Practice (Fill-in-the-blank)

Laugh Lines

Funny Stuff From All Over

May 6, 2010, 11:14 AM

Letterman: 'They Don't Like Immigrants'

Monologue | Wednesday night on *"The Late Show With David Letterman"* on CBS: You folks been following the big British Petroleum oil spill in the Gulf of Mexico? I'm telling you, British Petroleum has **put** more birds [ ] ? oil than Colonel Sanders.

I was thinking about this. Here's what I **came up** with. Now, in Arizona, you know about the new immigration law, where if you don't look like you belong there, they can **run** you [ ] ? the state? And they've got patrol cars driving around, **pulling up** to people, saying: "You don't look like you belong here. **Get** **on** ?" So the deal is, in Arizona, they don't like immigrants. And I was thinking, well, that's odd, because right across the river there in California, they elected one governor.

✉ E-mail This   🖨 Print   ◀ Share   ▼ Twitter   ☑ Sign in to Recommend

Enhancing Authentic Texts for Language Learners

Detmar Meurers

Motivation
Input Enhancement
What should we enhance?
How should it be enhanced?

Example activities
Prepositions
Phrasal verbs
Gerunds vs. to-infinitives
Wh-questions

Related approaches

Research issues
Automatic feedback
Language-aware search
Targets of enhancement
Different use cases

Conclusion

UNIVERSITÄT TÜBINGEN

Slide 1

Gerunds vs. infinitives: Presentation (Colorize)

"The government says it is expanding access to university, but they are actually blocking people's aspirations and betraying a generation."

The government was forced to cap student numbers after discovering a £200m black hole in the university financing budget at the end of last year. Labour was accused of abandoning its pledge to expand higher education, addingpressure to a growing debate about how to fund the growing number of young people who want to do a degree. The government is due to announce a review of student finance.

The massive increase in applicants has put a strain on the university system this year, with one university forced to convert single bedrooms in halls into doubles, and others putting students up in hotels.

Source: http://www.guardian.co.uk/education/2009/oct/14/30000-miss-university-place

UNIVERSITÄT TÜBINGEN

17 / 26

Slide 2

Gerunds vs. infinitives: Practice (FIB)

"The government says it is expanding access to university, but they are actually blocking people's aspirations and betraying a generation."

The government was forced to cap student numbers after [_____] ? (discover) a £200m black hole in the university financing budget at the end of last year. Labour was accused of [_____] ? (abandon) its pledge to expand higher education, addingpressure to a growing debate about how to fund the growing number of young people who want [_____] ? (do) a degree. The government is due to announce a review of student finance.

The massive increase in applicants has put a strain on the university system this year, with one university forced to convert single bedrooms in halls into doubles, and others putting students up in hotels.

Source: http://www.guardian.co.uk/education/2009/oct/14/30000-miss-university-place

UNIVERSITÄT TÜBINGEN

18 / 26

Slide 3

Wh-questions: Presentation + Interaction (Click)

If someone takes drugs, they can become addictive depending on the drug. Overdoses typically happen with cocaine, opioids, benzos, especially mixing benzos and opioids (Xanex, Valium, or Klonopin).

Why do people use illegal drugs? subject   [change]

Most illegal drugs cause people to become intoxicated[needs proving]. The slang term for this experience is "getting stoned" or "getting high." When a drug user is intoxicated, they may feel strange, happy, dizzy, or weird. Some drugs such as marijuana and hashish often make users feel sleepy and relaxed. Some drug users have feelings that they are floating or dreaming. Drugs such as LSD make people feel intensely; they make one see and feel things like never before, and think things about the world they would normally not. Some say it increases knowledge and creates wisdom. Other drugs such as Crystal Meth make users feel excited and happy and full of energy.

Source: http://simple.wikipedia.org/wiki/Illegal_drugs

UNIVERSITÄT TÜBINGEN

19 / 26

Slide 4

Wh-questions: Presentation + Interaction (Click)

If someone takes drugs, they can become addictive depending on the drug. Overdoses typically happen with cocaine, opioids, benzos, especially mixing benzos and opioids (Xanex, Valium, or Klonopin).

Why do people use drugs? subject   [change]

Most illegal drugs cause people to become intoxicated[needs proving]. The slang term for this experience is "getting stoned" or "getting high." When a drug user is intoxicated, they may feel strange, happy, dizzy, or weird. Some drugs such as marijuana and hashish often make users feel sleepy and relaxed. Some drug users have feelings that they are floating or dreaming. Drugs such as LSD make people feel intensely; they make one see and feel things like never before, and think things about the world they would normally not. Some say it increases knowledge and creates wisdom. Other drugs such as Crystal Meth make users feel excited and happy and full of energy.

Source: http://simple.wikipedia.org/wiki/Illegal_drugs

UNIVERSITÄT TÜBINGEN

20 / 26

Related perspective
Data-Driven Learning

- ▸ One can view automatic input enhancement as an enrichment of Data-Driven Learning (DDL).
  - ▸ DDL is an "attempt to cut out the middleman [the teacher] as far as possible and to give the learner direct access to the data" (Boulton 2009, p. 82, citing Tim Johns)
- ▸ WERTi:
  - ▸ learner stays in control and directly accesses data,
  - ▸ but NLP uses 'teacher knowledge' about relevant language properties to make those more prominent to the learner.

UNIVERSITÄT TÜBINGEN

Related approaches

- ▸ Automatic Exercise Generation:
  - ▸ MIRTO (Antoniadis et al. 2004)
  - ▸ KillerFiller in VISL (Bick 2005)
  - ▸ ClozeFox (Colpaert & Sevinc, cf.
    https://wiki.mozilla.org/Education/Projects/JetpackForLearning/Profiles/ClozeFox)
- ▸ Reading Support Tools:
  - ▸ COMPASS (Breidt & Feldweg 1997)
  - ▸ Glosser-RuG (Nerbonne et al. 1998)
  - ▸ REAP (Heilman et al. 2008)
  - ▸ ALPHEIOS (http://alpheios.net)

UNIVERSITÄT TÜBINGEN

Research issues
Supporting users in choosing web pages

- ▸ In principle, any user-selected web page is enhanced.
  - ▸ Users typically use standard Internet search engines (Google) to obtain candidate pages on a topic of interest.
- ▸ This does not ensure sufficient representation and balance of occurrence of targets (questions, passives, . . .).
- ▸ A language aware search engine is needed to support retrieval and ranking based on
  - ▸ content of interest to learner
  - ▸ global readability
  - ▸ language properties to be enhanced
  - → Language Aware Search Engine
  (LAWSE, Ott & Meurers 2010)

UNIVERSITÄT TÜBINGEN

Research issue
Targets of enhancement

- ▸ Which language pattern types should be input enhanced?
  - ▸ e.g., adverb placement, tense and aspect
    - ▸ while tense/aspect involves complex semantic distinctions, lexical cues can be identified by the NLP
    ("*usually* go" vs. "are going *tomorrow*")
- ▸ Which aspects of language should be enhanced?
  - ▸ targets: lexical classes, morphemes, syntactic patterns
  - ▸ contextual clues for targets (optional or obligatory)
- ▸ How is it best determined which of the target instances on a page should be enhanced for practice?
- ▸ What is the best input enhancement
  - ▸ for a particular linguistic pattern,
  - ▸ given a specific web page
    with its existing visual design features (colors, fonts)?

UNIVERSITÄT TÜBINGEN

Enhancing Authentic Texts for Language Learners

Detmar Meurers

Motivation
Input Enhancement
What should we enhance?
How should it be enhanced?

Example activities
Prepositions
Phrasal verbs
Gerunds vs. to-infinitives
Wh-questions

Related approaches

Research issues
Automatic feedback
Language-aware search
Targets of enhancement
Different use cases

Conclusion

Research outlook

How should different use cases be taken into account?

- ► How can automatic input enhancement best support
  - ⋆ traditional classroom teaching, distance education, individualized instruction
  - ⋆ lifelong learning, immigrant information needs?
- ► Where teachers are involved,
  - ⋆ what aspects should we given them control over?
  - ⋆ what information should they be able to access and track?

  Should WERTi offer test or exercise generation modes with explicit teacher control?

- ► For foreign language teaching, explicit meta-linguistic information and dictionary lookup would be useful.
- ► For immigrants satisfying information needs, translation dictionaries and automatic translation could be useful,
  - ⋆ whereas translation is generally viewed as problematic in current foreign language teaching.

Conclusion

- ► We motivated and discussed an approach providing automatic input enhancement of authentic web pages.
  - ⋆ The sentences turned into activities can remain fully contextualized as part of the pages selected by learner.
  - ⋆ NLP identifies relevant linguistic categories and forms.

- ► NLP analysis offers interesting opportunities in the context of language learning
  - ⋆ analyzing **language for learners**
    → automatic input enhancement
  - ⋆ analyzing **learner language**
    → immediate feedback on form and contents in ITS

- ► Interdisciplinary collaboration integrating
  - ⋆ linguistic modeling and NLP,
  - ⋆ Foreign Language Teaching practice, and
  - ⋆ Second Language Acquisition research

  is crucial for sustainable progress in this field.

Enhancing Authentic Texts for Language Learners

Detmar Meurers

Motivation
Input Enhancement
What should we enhance?
How should it be enhanced?

Example activities
Prepositions
Phrasal verbs
Gerunds vs. to-infinitives
Wh-questions

Related approaches

Research issues
Automatic feedback
Language-aware search
Targets of enhancement
Different use cases

Conclusion

References

Amaral, L., V. Metcalf & D. Meurers (2006). Language Awareness through Re-use of NLP Technology. Pre-conference Workshop on NLP in CALL – Computational and Linguistic Challenges. CALICO 2006. May 17, 2006. University of Hawaii. URL http://purl.org/net/icall/handouts/calico06-amaral-metcalf-meurers.pdf.

Antoniadis, G., S. Echinard, O. Kraif, T. Lebarbé, M. Loiseau & C. Ponton (2004). NLP-based scripting for CALL activities. In L. Lemnitzer, D. Meurers & E. Hinrichs (eds.), Proceedings of eLearning for Computational Linguistics and Computational Linguistics for eLearning, International Workshop in Association with COLING 2004. Geneva, Switzerland: COLING, pp. 18–25. URL http://aclweb.org/anthology/W04-1703.

Bick, E. (2005). Grammar for Fun: IT-based Grammar Learning with VISL. In P. Juel (ed.), CALL for the Nordic Languages, Copenhagen: Samfundslitteratur, Copenhagen Studies in Language, pp. 49–64. URL http://beta.visl.sdu.dk/pdf/CALL2004.pdf.

Boulton, A. (2009). Data-driven Learning: Reasonable Fears and Rational Reassurance. Indian Journal of Applied Linguistics 35(1), 81–106.

Breidt, E. & H. Feldweg (1997). Accessing Foreign Languages with COMPASS. Machine Translation 12(1–2), 153–174. URL http://www.springerlink.com/content/v833650061168351/fulltext.pdf. Special Issue on New Tools for Human Translators.

Doughty, C. & J. Williams (eds.) (1998). Focus on form in classroom second language acquisition. Cambridge: Cambridge University Press.

Enhancing Authentic Texts for Language Learners

Detmar Meurers

Motivation
Input Enhancement
What should we enhance?
How should it be enhanced?

Example activities
Prepositions
Phrasal verbs
Gerunds vs. to-infinitives
Wh-questions

Related approaches

Research issues
Automatic feedback
Language-aware search
Targets of enhancement
Different use cases

Conclusion

Ellis, N. (1994). Implicit and Explicit Language Learning - An Overview. In Implicit and Explicit Learning of Languages, San Diego, CA: Academic Press, pp. 1–31.

Heilman, M., L. Zhao, J. Pino & M. Eskenazi (2008). Retrieval of Reading Materials for Vocabulary and Reading Practice. In Proceedings of the Third Workshop on Innovative Use of NLP for Building Educational Applications (BEA-3) at ACL'08. Columbus, Ohio: Association for Computational Linguistics, pp. 80–88. URL http://aclweb.org/anthology/W08-0910.

Johns, T. (1994). From printout to handout: Grammar and vocabulary teaching in the context of data-driven learning. In T. Odlin (ed.), Perspectives on Pedagogical Grammar, Cambridge: Cambridge University Press, pp. 293–313.

Lightbown, P. M. (1998). The importance of timing in focus on form. In Doughty & Williams (1998), pp. 177–196.

Lightbown, P. M. & N. Spada (1999). How languages are learned. Oxford: Oxford University Press. URL http://books.google.com/books?id=wIYTbuCsR7wC&lpg=PR11&ots=_DdFbrMCO0&dq=How20languages20are20learned&lr&pg=PR11#v=onepage&q&f=false.

Long, M. H. (1991). Focus on form: a design feature in language teaching methodology. In K. De Bot, C. Kramsch & R. Ginsberg (eds.), Foreign language research in cross-cultural perspective, Amsterdam: John Benjamins, pp. 39–52.

Long, M. H. (1996). The role of linguistic environment in second language acquisition. In W. C. Ritchie & T. K. Bhatia (eds.), Handbook of second language acquisition, New York: Academic Press, pp. 413–468.

Long, M. H. & P. Robinson (1998). Focus on form: Theory, research, and practice. In Doughty & Williams (1998), pp. 15–41.

Enhancing Authentic Texts for Language Learners

Detmar Meurers

Motivation
Input Enhancement
What should we enhance?
How should it be enhanced?

Example activities
Prepositions
Phrasal verbs
Gerunds vs. to-infinitives
Wh-questions

Related approaches

Research issues
Automatic feedback
Language-aware search
Targets of enhancement
Different use cases

Conclusion

Enhancing
Authentic Texts for
Language Learners

Detmar Meurers

Motivation
Input Enhancement
What should we enhance?
How should it be enhanced?

Example activities
Prepositions
Phrasal verbs
Gerunds vs. to-infinitives
Wh-questions

Related approaches

Research issues
Automatic feedback
Language-aware search
Targets of enhancement
Different use cases

Conclusion

UNIVERSITÄT
TÜBINGEN

26 / 26

Lyster, R. (1998). Negotiation of form, recasts, and explicit correction in relation to
    error types and learner repair in immersion classroom. *Language Learning* 48,
    183–218.

Metcalf, V. & D. Meurers (2006). Generating Web-based English Preposition
    Exercises from Real-World Texts. URL
    http://purl.org/net/icall/handouts/eurocall06-metcalf-meurers.pdf. EUROCALL
    2006. Granada, Spain. September 4–7, 2006.

Nerbonne, J., D. Dokter & P. Smit (1998). Morphological Processing and
    Computer-Assisted Language Learning. *Computer Assisted Language
    Learning* 11(5), 543–559. URL http://urd.let.rug.nl/nerbonne/papers/call_fr.pdf.

Norris, J. M. & L. Ortega (2000). Effectiveness of L2 Instruction: A Research
    Synthesis and Quantitative Meta-Analysis. *Language Learning* 50(3),
    417–528.

Ott, N. (2009). Information Retrieval for Language Learning: An Exploration of Text
    Difficulty Measures. ISCL master's thesis, Universität Tübingen, Seminar für
    Sprachwissenschaft, Tübingen, Germany. URL http://drni.de/zap/ma-thesis.

Ott, N. & D. Meurers (2010). Information Retrieval for Education: Making Search
    Engines Language Aware. *Themes in Science and Technology Education.
    Special issue on computer-aided language analysis, teaching and learning:
    Approaches, perspectives and applications* 3(1–2), 9–30. URL
    http://purl.org/dm/papers/ott-meurers-10.html.

Schmidt, R. (1995). Consciousness and foreign language: A tutorial on the role of
    attention and awareness in learning. In R. Schmidt (ed.), *Attention and
    awareness in foreign language learning*, Honolulu: University of Hawaii Press,
    pp. 1–63.

Sharwood Smith, M. (1993). Input enhancement in instructed SLA: Theoretical
    bases. *Studies in Second Language Acquisition* 15, 165–179.