

Retention of Surface Information During L1 and L2 Reading: An Eye-tracking Study



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1 Background

Research on memory for gist vs. surface linguistic information:

→ verbatim information **decays rapidly** as soon as **hierarchically superior structures are built**; **not retained verbatim, but converted to conceptual form which is then stored in the long term memory** (Sachs, 1967, 1974; Caplan, 1972; Just & Carpenter, 1992; Potter & Lombardi, 1992, 1998; Rummer & Schewpe, & Martin, 2013)

Research on grammar acquisition:

→ **grammatical knowledge is derived from a large database of memorized chunks**; sequences of words that are **stored verbatim** in memory are used to abstract regularities and mental grammar develops through gradual assembling of **knowledge about distributional and semantic-distributional relationships between words** (Bybee, 1985; Ellis, 1996; Goldberg, 2006; Langacker, 1988; Tomasello, 2003)

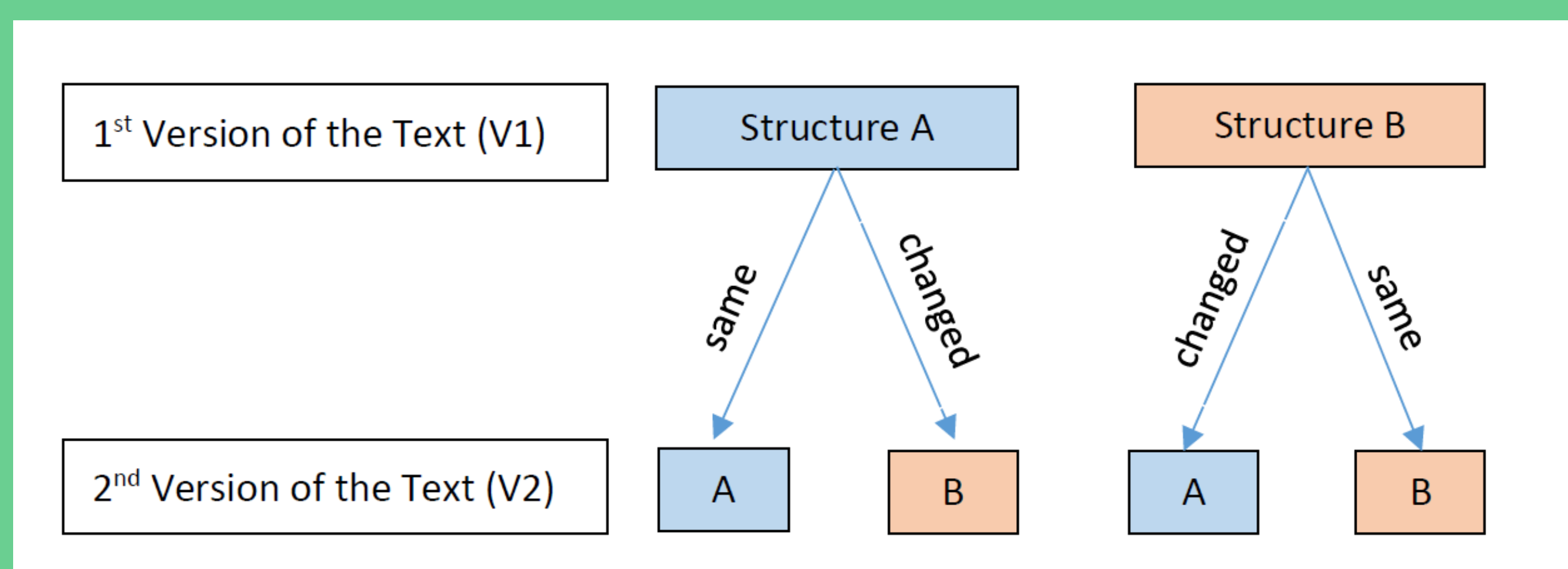
Research question: Do L2 learners retain surface linguistic information during reading to a larger extent than L1 native speakers?

2 The Present Study

Experimental Design

Participants read a German text twice, in two versions. Two types of surface linguistic information were manipulated in the 2nd version:

- 1) **Lexical** (synonyms; e.g. *Begabung/Talent*);
- 2) **Syntactic** (active/passive alternation).



Rationale of the study:

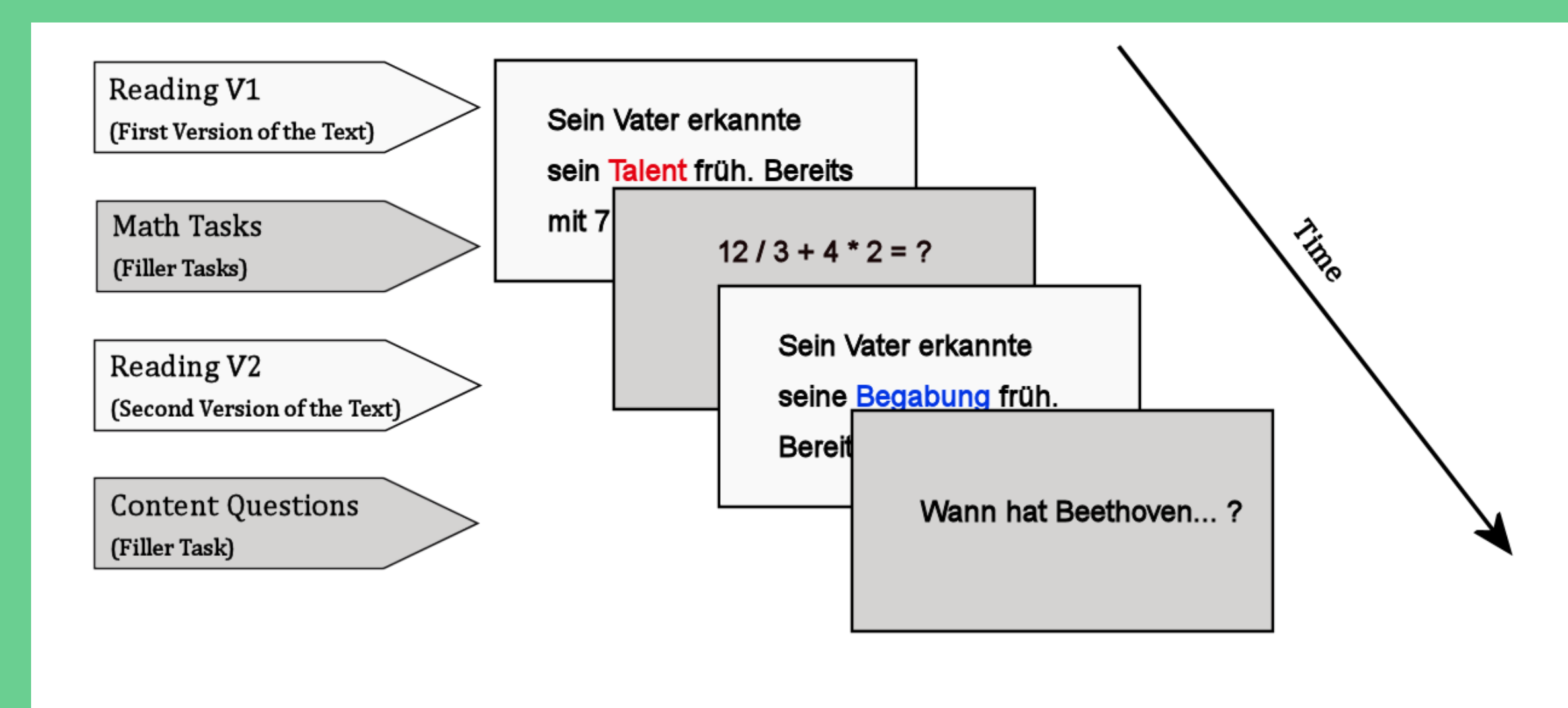
If participants respond to the change in the 2nd text version of the text (e.g. longer total fixation time, more fixations in the changed vs. same condition), it means that they retained the text (part) verbatim during first reading - surprisal effect in the changed condition in V2.

Task and materials:

Each participants read six different texts (each 300 – 400 words).

Each text contained four ROIs for the lexical and four ROIs for the syntactic condition.

The attention of the participants was drawn towards the meaning of the texts (instructions, comprehension questions).



Participants

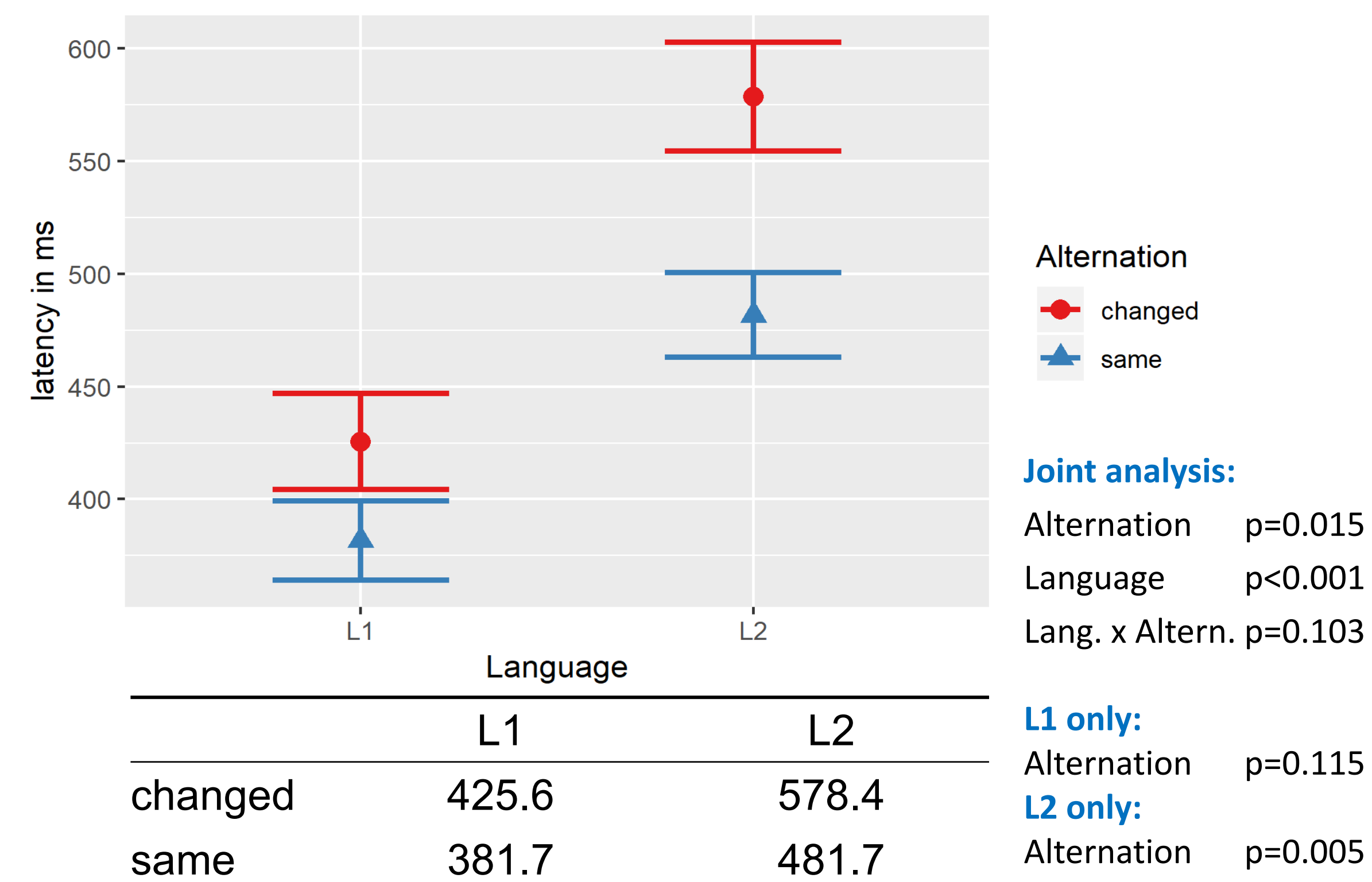
L1: 24 German native speakers.

L2: 24 German learners with Slavic and Romance L1s at B2-C1 level

3a Results Lexical Condition (Synonyms) 3b Results Syntactic Condition (Active-Passive)

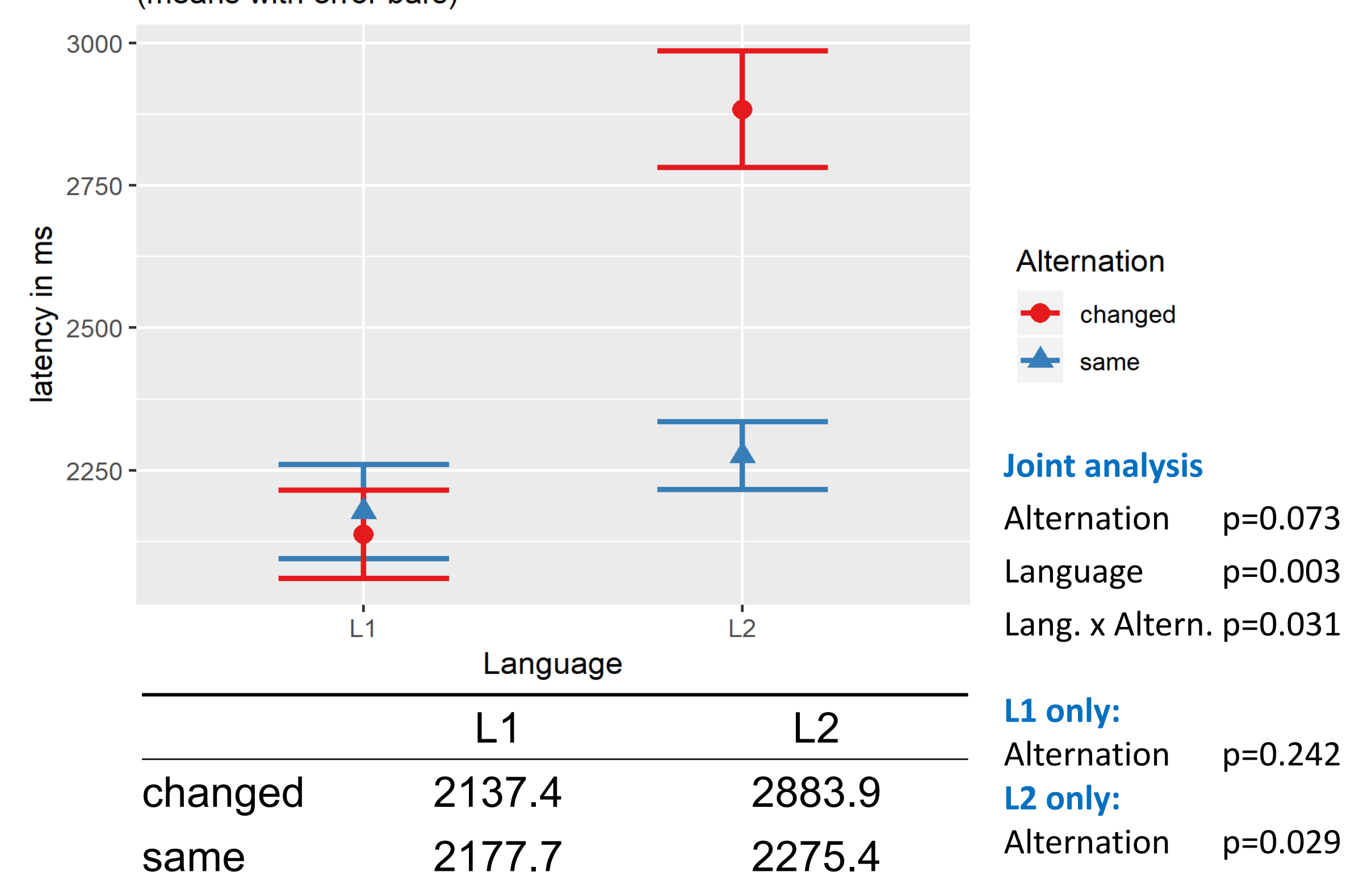
Total fixation times

(means with error bars)



Total fixation times

(means with error bars)



linear mixed effect models with participants and items as random effects (random intercepts and slopes)

4 Summary of Results

Initial hypothesis confirmed: L2 learners retain surface linguistic information during reading (it becomes at least temporarily a part of their mental text model). In both lexical and syntactic conditions, the **total fixation time of L2 participants was longer in the changed than in the same condition.**

L1 participants manifested only a tendency towards the same effect in the lexical condition and showed no difference between the same and the changed condition with the active/passive alternation.

5 Discussion

Non-proficient readers retain more details regarding linguistic surface information during reading (recently also Gurevich, Johnson, & Goldberg, 2010; Sampaio & Konopka, 2013), since they might either need it more for acquisition purposes and/or compensate with it for e.g. more shallow representations without hierarchical structure organization (cf. Shallow Structure Hypothesis, SSH, Clahsen & Felser 2006, 2017).

The finding is in line with the current approaches regarding

Processing: e.g. Shallow Structure Hypothesis (Clahsen & Felser, 2006);

Acquisition: e.g. Declarative/Procedural Model (Ullman, 2004): L2 learners tend

to rely more strongly on declarative memory, even for functions that depend on the procedural system in L1. Reliance on verbatim storage in declarative memory and on associative generalizations over them could thus compensate for the limited L2 ability to acquire and process grammar procedurally.

Cognition: e.g. Fuzzy Trace Theory (Reyna, 2012) decision-making – experts: meaning-based gist representations, which support fuzzy (yet advanced) intuition; novices - superficial verbatim representations of information, which support precise analysis.