Title: Online syntactic processing in native and non-native speakers of English

The current study explored potential quantitative and qualitative differences in sentence processing in native (L1) and non-native (L2) speakers of English using an online auditory word monitoring task in which participants are given a target word to listen for in a subsequent sentence and asked to respond via button press when they hear the target. In the current experiments, sentences were well-formed or ungrammatical, i.e., scrambled word order or a phrase violation, and some sentences contained primes for the target words, for example determiners before noun targets, adjectives before noun targets, and auxiliaries and adverbs before verb targets. Example stimuli are given below with the target in bold.

(1) Well-formed verb target condition:
Mary was so fed up with the endless rain that she **prayed** for a long drought.
(2) Ungrammatical verb target condition:
Mary was so fed up with the endless rain that **prayed** she for a long drought.
(3) Auxiliary-primed verb target condition:
Mary was so fed up with the endless rain that she would have **prayed** for a long drought.

Segalowitz and Segalowitz (1993) argued that qualitative differences in processing cannot be shown by response time (RT) data alone. They showed that the coefficient of variance (CV) of response times (standard deviation divided by the mean RT) allows for the differentiation between automatic and attentional processing, offering a measure of response variability that, in contrast to standard deviations, is corrected for response speed. Automatic processing is less noisy and less variable, resulting in smaller standard deviations and a smaller CV. Attentional processing is noisier and more variable, resulting in larger standard deviations and a larger CV. Expectancy generation in sentence processing should show more attentional processing (Kamide, 2008), reflected in higher CVs. L1 processing is likely to be automatic, but even L1 speakers may show expectancy-based priming effects, e.g., anticipating a noun following an adjective. L2 speakers, however, may show greater reliance on attentional mechanisms in sentence processing at least at lower levels of proficiency (Bowden et al., 2013). Thus RT and CV data from L1 and L2 speakers were compared to explore potential quantitative and qualitative differences sentence processing.

Age and education-matched L1 speakers of British English and L2 speakers of English were recruited. The L2 speakers were grouped as "high" and "low" proficiency based on two proficiency assessments: a language history questionnaire and a cloze test. RT and CV data were analyzed in separate repeated measures ANOVAs with primed, unprimed, grammatical and ungrammatical conditions as within-subjects factors and group (L1, L2-high and L2-low) as a between-subjects factor. The findings were as follows: (i) both L2 groups showed hyper-priming effects for noun targets primed by a determiner (*the*) and for verb targets primed by auxiliaries and adverbs in RT and CV data; (ii) both L2 groups showed longer RTs for targets in ungrammatical sentences; (iii) L1s and L2s showed RT and CV priming effects for noun targets primed by adjectives; and (iv) both L2 groups were generally slower than L1s. These results indicate general quantitative differences and that L2 speakers use different processing mechanisms in online sentence comprehension as tested here. Higher CVs for the hyper-priming conditions showed that they may rely on expectancy generation in sentence processing more so than L1 speakers. This over-reliance on expectancy generation can also explain the greater disruption in response speed for ungrammatical sentences. Comments will also be made on the usefulness of CV data in language processing research as a behavioral measurement of automaticity of language processing and on language proficiency assessment and the discrepancy between online and offline performance.

References

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