

Predictability effects in comprehension and production: eye-tracking evidence from an English-French sight translation task

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The present study examined transitional probability (TP) effects in reading comprehension and language production during sight translation (SiT). SiT involves reading a text in a source language (SL) and providing its oral translation in a target language (TL). Prediction may facilitate the SiT process by speeding up comprehension, allowing interpreters and translators to plan and produce their translation more quickly [1]. The possible modulating effect of overlapping translation and production processes on reading times of predictable words is unclear. To our knowledge, the latency between the first fixation on a word and the production of its translation has not yet been investigated. Finally, while some studies find that professional interpreters are more efficient at using predictive cues than trainee interpreters [3], others find no effect of experience on prediction [4].

Twenty-four professional and 21 trainee French L1 interpreters read L2 English sentences (e.g., *According to the news, very big organizations raised funds from different sources*) and sight translated these into L1 French. We manipulated TP to create more and less predictable verb-noun pairs in the SL and the TL (i.e., collocates like 'to raise funds/fonds récolter' vs. non collocates like 'to provide funds/fonds fournir'). We hypothesized that participants would make fewer and shorter fixations and regressions on collocates during reading, and that the eye-voice latency (EVL) between fixations on words and the production of their translation would be shorter for collocates than non-collocates. Moreover, we expected TP effects to be stronger in professionals than trainees. We employed four reading measures associated with earlier comprehension processes (e.g., prediction): skipping probability (SP), single fixation duration (SFD), first fixation duration (FFD), and gaze duration (GD). We employed four measures associated with later comprehension processes (e.g., integration): probability of regression out, regression path duration (RPD), re-reading duration (RRD), and total fixation duration (TD) [2, 6]. We also measured the latency between the first fixation on a critical region in the SL input (*funds*) and the onset of its translation in the TL output (*fonds*) to calculate the EVL. We applied reading and EVL measures across three critical regions: verb (*raised*), noun (*funds*) and the noun's spillover region (*from different sources*).

Mixed effects linear/logistic regression analyses of the reading measures data revealed significant effects of TP on fixation and regression durations. However, TP effects were observed for measures indicative of later comprehension processes only, and not for measures of earlier comprehension processes. Significantly longer RRDs ($b = 229.37$, $t(848.93) = 3.069$, $p < .01$) and TDs ($b = 174.61$, $t(985.38) = 5.711$, $p < .001$) were observed for the low TP than for the high TP condition in the verb region across groups (see Fig. 1). Similarly, significantly longer RPDs ($b = 721.19$, $t(978.37) = 6.364$, $p < .001$), RRDs ($b = 755.19$, $t(977.45) = 5.994$, $p < .001$) and TDs ($b = 137.83$, $t(989.05) = 3.032$, $p < .01$) were found in the low TP than in the high TP condition in the noun's spillover region across groups (see Fig. 2). TP effects were not observed in the noun region and they did not affect fixation/regression out ratios. EVL analyses revealed TP effects across critical regions and groups (see Figures 3-5). We found significantly longer EVL in the low TP than in the high TP condition in the verb region ($b = 947.18$, $t(955.93) = 5.932$, $p < .001$), the noun region ($b = 758.72$, $t(942.88) = 4.332$, $p < .001$), and the spillover region ($b = 734.27$, $t(980.20) = 3.977$, $p < .001$). There was no interaction between Group (professional vs. trainee) and TP for any measure. The present findings reveal shorter fixation and regression durations, as well as shorter EVL, on collocates than non-collocates during SiT from English into French, irrespective of interpreting experience. TP effects were observed on reading measures reflective of later comprehension processes only in SL comprehension, in line with theories of multiple reading stages in SiT [5].

References

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Figures

Figure 1: Verb region RRD by TP

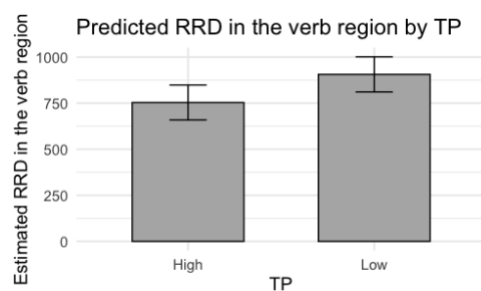
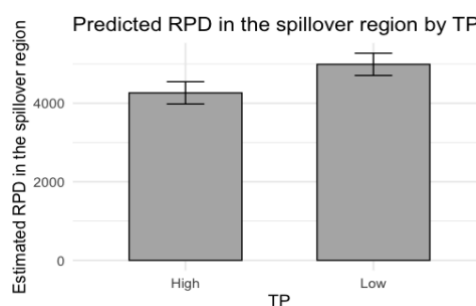


Figure 2: Spillover region RPD by TP



Note. Errors bars indicate ± 1 standard error of the estimated marginal means.

Fig. 3: Verb EVL by TP

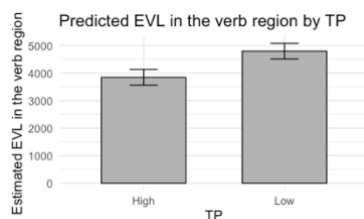


Fig. 4: Noun EVL by TP

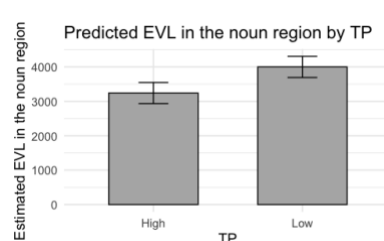
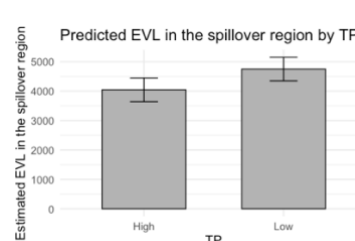


Fig. 5: Spillover EVL by TP



Note. Errors bars indicate ± 1 standard error of the estimated marginal means.