

LING411.01 Final Paper
Semantic Priming in Turkish

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1 Present Study

In this study, I aimed to examine whether semantic priming leads to the faster recognition of the target word compared to words with no priming in Turkish, with a unimodal lexical decision task. Secondly, I investigated if semantic priming increases the accuracy of participants' performances in the experiment. That is, the present study explores whether native speaking Turkish participants recognize or process words faster and more accurately when they are immediately preceded by a semantically associated prime. I do not hold any expectations regarding the results of this particular experiment given that this paper lacks a literature review.

2 Method

2.1 Participants

32 native or advanced speakers of Turkish participated in the study. The participants were all undergraduate or graduate students of Linguistics enrolled at the LING411 course entitled "Linguistic Methodology" at Boğaziçi University for the 2020/2021-1 semester. Participants were given an informed consent form prior to the onset of the experiment and confirmed that they are volunteering in the experiment for no purpose other than their instructor's request. I fail to include any further demographic participant background information due to the lack of resources.

2.2 Task

Participants were given a self-paced lexical decision task in which they were shown a series of letter strings and asked to indicate whether they were real words in Turkish by pressing either "J" for "yes" or "F" for "no" as fast as they can. All the instruction was given in the written form. A fixation point (a "+" sign) was provided for the participants to avoid distraction during the experiment. This was followed by the prime and then the target item. Participants pressed the space bar after each word to continue with the next one. The experiment was hosted in an IbexFarm server (Drummond, 2013). Before the experimental trial, all participants were given a practice session.

2.3 Stimuli

The experiment included a within-subject Latin Square design with a single factor (related vs. unrelated condition). The experiment stimuli consisted of 69 pairs of semantically related primes and 69 semantically unrelated prime-target pairs where there the target and the prime was not related to each other neither semantically nor associatively. To minimize the effect of covariates, the writers of the stimuli set made sure that target and prime words are also phonologically and morphologically unrelated to each other. An example of a pair is given in (1).

		Target	Related Prime	Unrelated Prime
(1)	a.	bilgisayar 'computer'	monitör 'screen'	findık 'hazelnut'

In addition to the target items, we included 61 fillers which were all non-sense words to make sure that participants do not always respond in “yes.” An example of a filler word is given in (2).

		Filler	Prime
(2)	a.	turus <i>nonword</i>	hücre 'cell'

2.4 Statistical Analysis

I imported the dataset to R for analysis. The dependent variables in this study were (i) the reaction times (RTs) given for the target items (ii) response accuracy which was dichotomized into “correct” and “incorrect”. Using the *brms* package (Bürkner, 2018) in R, I fitted a linear regression model with the predictor “condition” for the RT values. I fitted a logistic linear regression model with the same predictor for the response accuracy. Sum contrasts were used for the categorical variables. I used the default uninformed prior settings in the *brms* package. I did not use the filler items for any of the analyses. The data and the R scripts are available upon request.¹

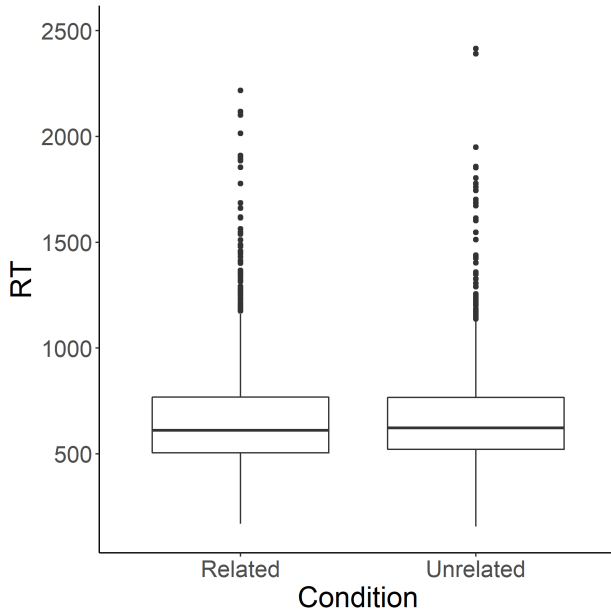
¹I do not explain the codes I have written in this paper but I added comment lines in the R script for that.

3 Result

3.1 Priming Effect on Reaction Time

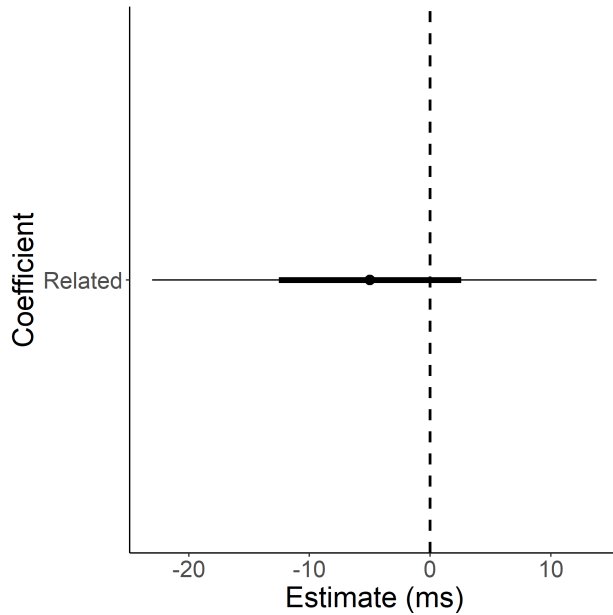
For this analysis, I only included the correct responses. Figure 1 shows that the median reaction time for both conditions is very similar (610 ms for related and 622 ms for unrelated). The mean reaction time between the conditions is also very similar, with 678 ms for the related condition and 683 ms for the unrelated condition. In number, participants accurately responded faster to the target words preceded by semantically related primes, compared to the unrelated condition. In addition, the interquartile range (i.e., 50% of the distribution) for RT values is approximately between 500 and 750 ms. There were responses which had a very slow (over 2000 ms) or a very fast (below 300 ms) RT. However, it is important to note that for the statistical analysis, I did not exclude these responses.

Figure 1: Reaction Time by Condition



Using the brms package (Bürkner, 2018) in R, I fitted a linear regression model for the RT values with the predictor of condition (related or unrelated primes). The plot for the model is given in Figure 2.

Figure 2: Linear Regression Results for Reaction Time by Condition



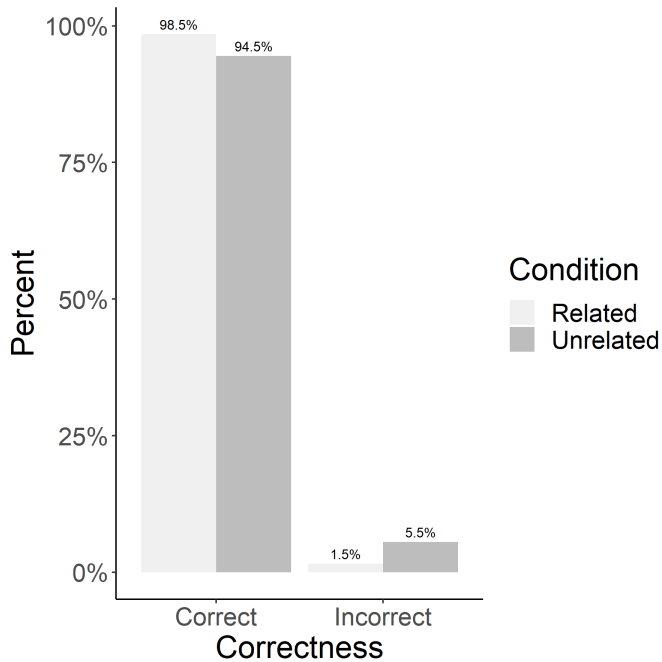
According to the model results in 2, it is evident that there is not much of a priming effect given the wide posterior distributions.² Although the estimate is in the negative side of the distribution, the wide credible intervals suggest that priming might also increase reaction time. The median estimate for the predictor “Condition” is -5.00 with 95% CI (-.26.84, 17.23). The intercept has the median estimate of 680.31 with 95% CI (669.30, 691.24).

3.2 Priming Effect on Accuracy

For this analysis, I did not exclude the incorrect responses and examined whether priming in the related condition (e.g., semantic priming) had an effect on participants’ accuracy in the lexical decision task. Figure 3 demonstrates that most of the responses given by the participants were correct (over 94%). However, participant accuracy was higher in the related condition 98.5%) than in the unrelated one (94.5%). This shows that, in number, participants responded more accurately to the target words following semantically related primes compared to unrelated primes.

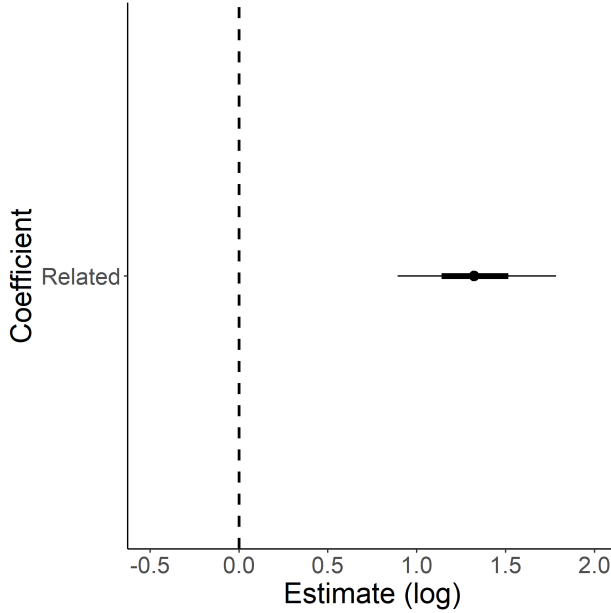
²The point is the median estimate. The wide horizontal line represents the 50% credible interval while the narrow line represents the 95% credible interval.

Figure 3: Accuracy by Condition



This time, I fitted a logistic regression model for correct responses with the predictor of “Condition.” The plot for the model can be seen in Figure 4. The model results indicates that the related condition highly increased the number of correct responses. All of the posterior distribution is on the positive side. The magnitude of this effect can vary given the relatively wide posterior distribution, but it is possible to argue that participants give more accurate responses to the target word when it is preceded by a semantically related prime. The median estimate for the predictor “Condition” is 1.33 with 95% CI (0.82, 3.25). The intercept has the median estimate of 3.51 with 95% CI (3.25, 3.79).

Figure 4: Logistic Regression Model for Correct Responses by Condition



4 Conclusion

In this study, I did not find a semantic priming effect for reaction time in Turkish. However, there was a strong semantic priming effect for participants' accuracy in the task. The reason that participants of the present study did not differ in their reaction times depending on the semantic relatedness of the prime could be that they were also the ones who prepared the stimuli. Having already been acquainted with the items, the participants' reaction times to the target words might thus become insensitive to priming effects. This is obviously a great conflict of interest. The participants were also informed about the experimental design and the predictions of the study. Interestingly, this was not the case for response accuracy. Participants responded more accurately to the target words preceded by semantically related primes. I would argue that a co-variate such as the familiarity with the task items only affects the participants' reaction times but not their response accuracy for which we can observe a priming effect. For more inference, I encourage more research to investigate how familiarity with the test items affects participants' reaction times and response accuracy in priming.

References

- Bürkner, P.-C. (2018). Advanced bayesian multilevel modeling with the r package brms. *The R Journal*, 10(1), 395. <https://doi.org/10.32614/RJ-2018-017> (cit. on pp. 2, 3)
- Drummond, A. (2013). Ibex farm. *Online server: http://spellout.net/ibexfarm* (cit. on p. 1).