

L3 morphosyntactic sensitivity: Online versus metalinguistic processing

Nawras Abbas, Anat Prior and Tamar Degani

Edmond J. Safra Brain Research Center, Faculty of Education, University of Haifa

Introduction

Does L3 morphosyntactic sensitivity differ as a function of processing measure?

- Online measures reflect unconscious behaviour and automatic real-time processing, while offline measures are open to conscious inspection and reflect metalinguistic decision making (Marinis, 2010; Tokowicz & MacWhinney, 2005).

- Comparing between online and offline processing measures allows us to better understand the mechanisms of syntactic processing.

- L2 morphosyntactic research shows dissociation between online and offline measures (e.g., Tokowicz & Warren, 2010 ; Tokowicz & MacWhinney, 2005), but less is known of how L3 morphosyntactic processing unfolds in real time.

- Abbas et al. (2021) reported a dissociation between online early eye tracking measures and L3 grammaticality judgments, and an association between late eye tracking measures and grammaticality judgments. However, the measures were jointly collected which could have influenced natural reading.

How might language proficiency modulate L3 online and metalinguistic measures of L3 morphosyntactic processing, regardless of cross language influences?

The Current Study

➤ Carries a different approach, as it:

- Separates between the online and offline tasks to maintain cleaner measures.

- Focuses purely on L3 morphosyntactic sensitivity regardless of cross-language influences (i.e., no conflicting cues from L1/L2).

- Assesses L3 proficiency using subjective and objective measures.

Method

➤ Participants:

- 104 Arabic-Hebrew-English trilinguals; 1st-year university students.
- Partially immersed in L2; moderately proficient users of L3 English.
- Trilinguals due to their social-educational context (not self-selected).

➤ Tasks:

- Online: Eye tracking measures (FFD, GD, TT)
- Offline: Grammaticality judgment task (D'prime)
- Proficiency: Multilingual Naming Test- MINT Sprint (Garcia & Gollan, 2022) and Self-rated proficiency (a modified version of the LEAP-Q, Marian, et al., 2007).

Construction	Grammatical	Ungrammatical
Verb-time expression agreement	Last night, all of my friends <u>ordered</u> a cup of coffee after dinner.	Last night, all of my friends <u>*order</u> a cup of coffee after dinner.
Quantifier-noun agreement	The next train will leave in ten <u>minutes</u> from the train station nearby.	The next train will leave in ten <u>*minute</u> from the train station nearby.

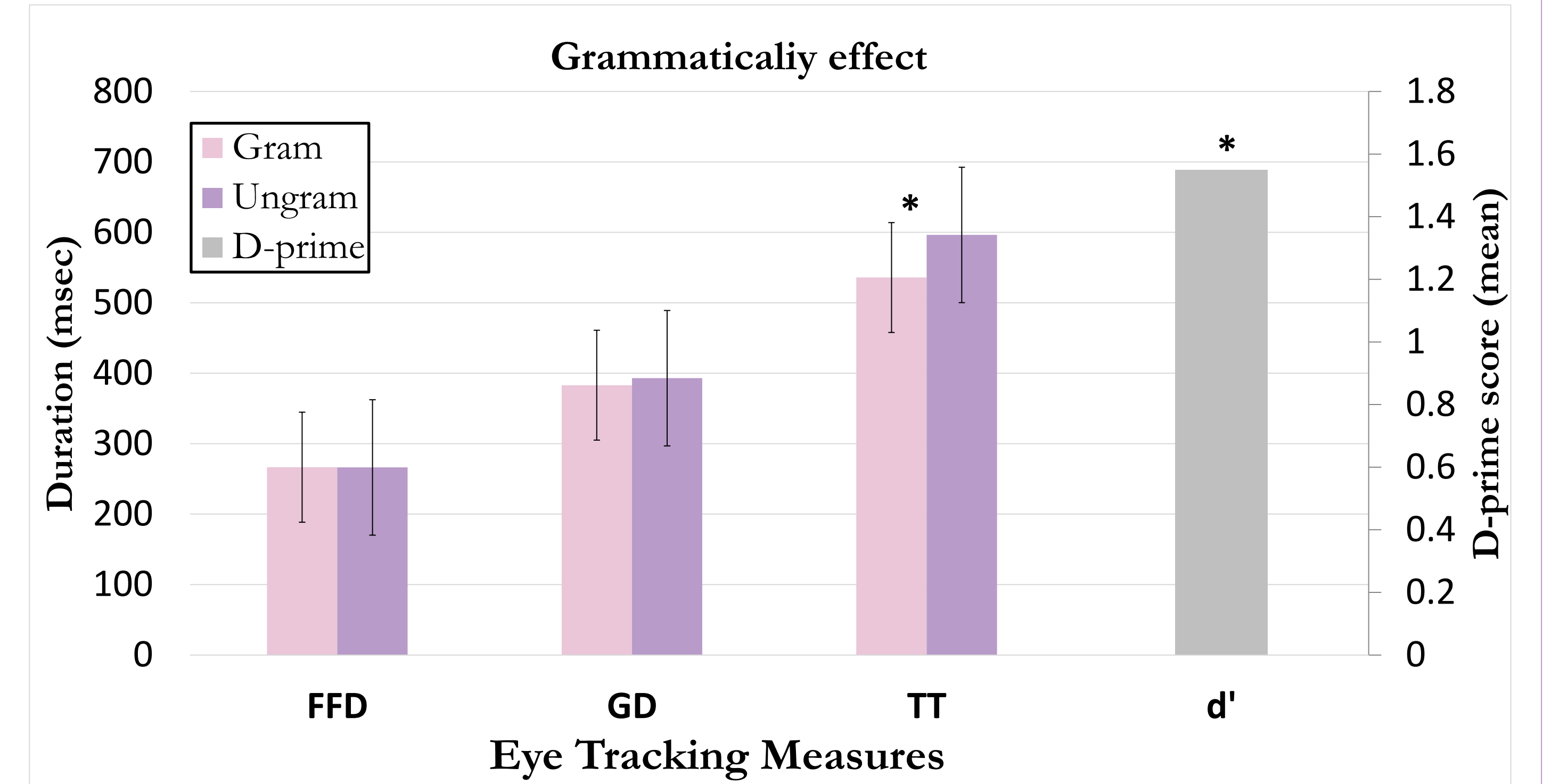
Analyses

- Analyses using lme4 (Baayen, Davidson, & Bates, 2008) in R. Random: Participant and Item (intercepts); Fixed: Grammaticality Control: Critical word length and frequency.
- Examined modulations by proficiency (grammaticality*proficiency interaction).

References

- Abbas, N., Degani, T., & Prior, A. (2021) Equal Opportunity Interference: Both L1 and L2 Influence L3 Morpho-Syntactic Processing. *Front. Psychol.* 12:673535. doi: 10.3389/fpsyg.2021.673535
- Garcia, D. L., & Gollan, T. H. (2022). The MINT sprint: exploring a fast administration procedure with an expanded multilingual naming test. *Journal of the International Neuropsychological Society*, 28(8), 845-861.
- Marian, V., Blumenfeld, H. K., & Kaushanskaya, M. (2007). The language experience and proficiency questionnaire (LEAP-Q): Assessing language profiles in bilinguals and multilinguals. *Journal of Speech, Language, and Hearing Research*, 50, 940-967. DOI: 10.1044/1092-4388(2007)067
- Marinis, T. (2010). *Using on-line processing methods in language acquisition research*. In E. Blom & S. Unsworth (Eds.), *Language learning & language teaching: Vol. 27. Experimental methods in language acquisition research* (p. 139–162). John Benjamins Publishing Company. <https://doi.org/10.1075/llt.27.09mar>
- Tokowicz, N., & MacWhinney, B. (2005). Implicit and explicit measures of sensitivity to violations in second language grammar: An event-related potential investigation. *Studies in Second Language Acquisition*, 27(2), 173-204. <http://doi.org/10.1017/S0272263105050102>
- Tokowicz, N., & Warren, T. (2010). Beginning adult L2 learners' sensitivity to morphosyntactic violations: A self-paced reading study. *European Journal of Cognitive Psychology*, 22, 1092–1106.

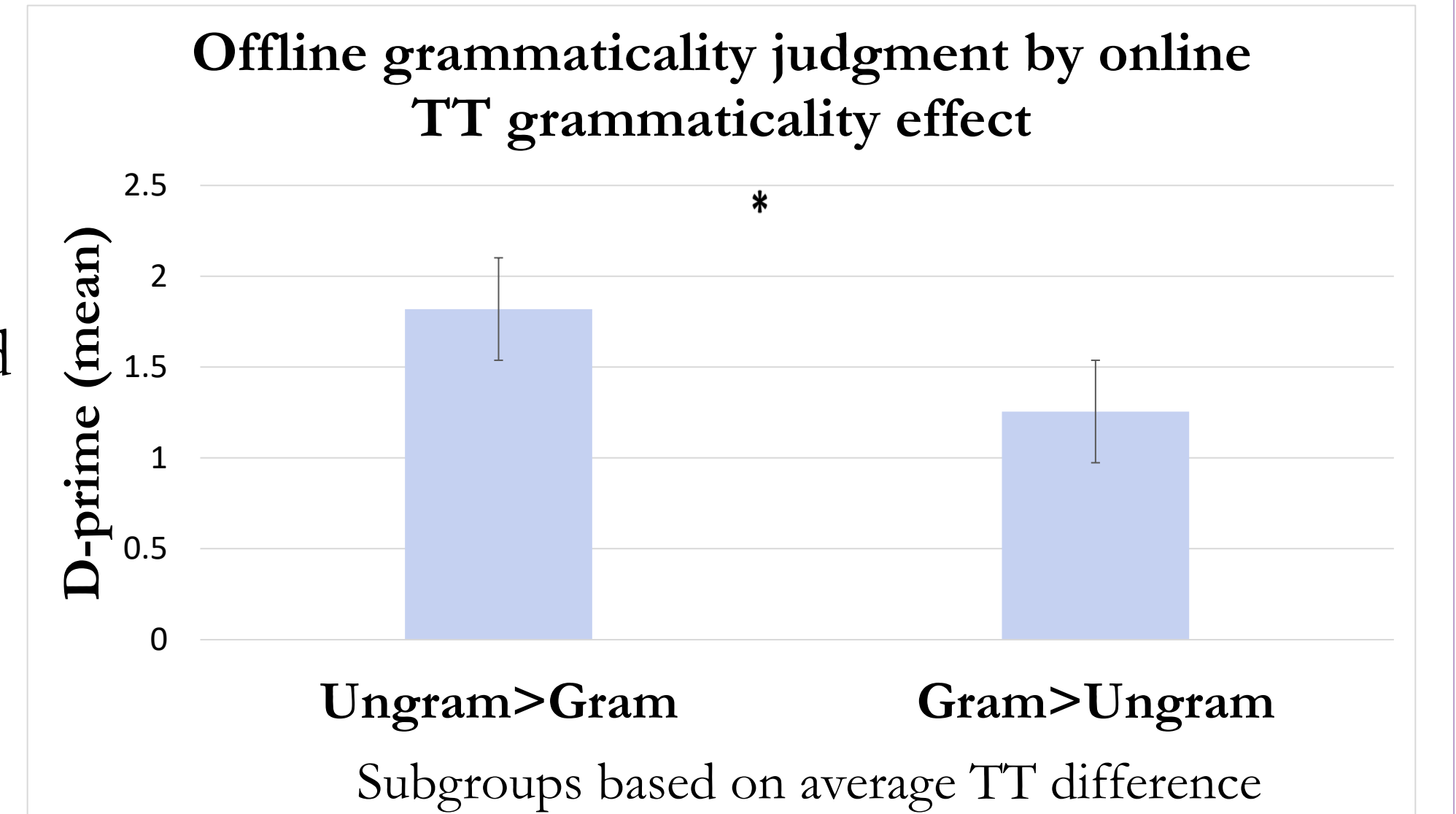
Results – Morphosyntactic Sensitivity as a Function of Task



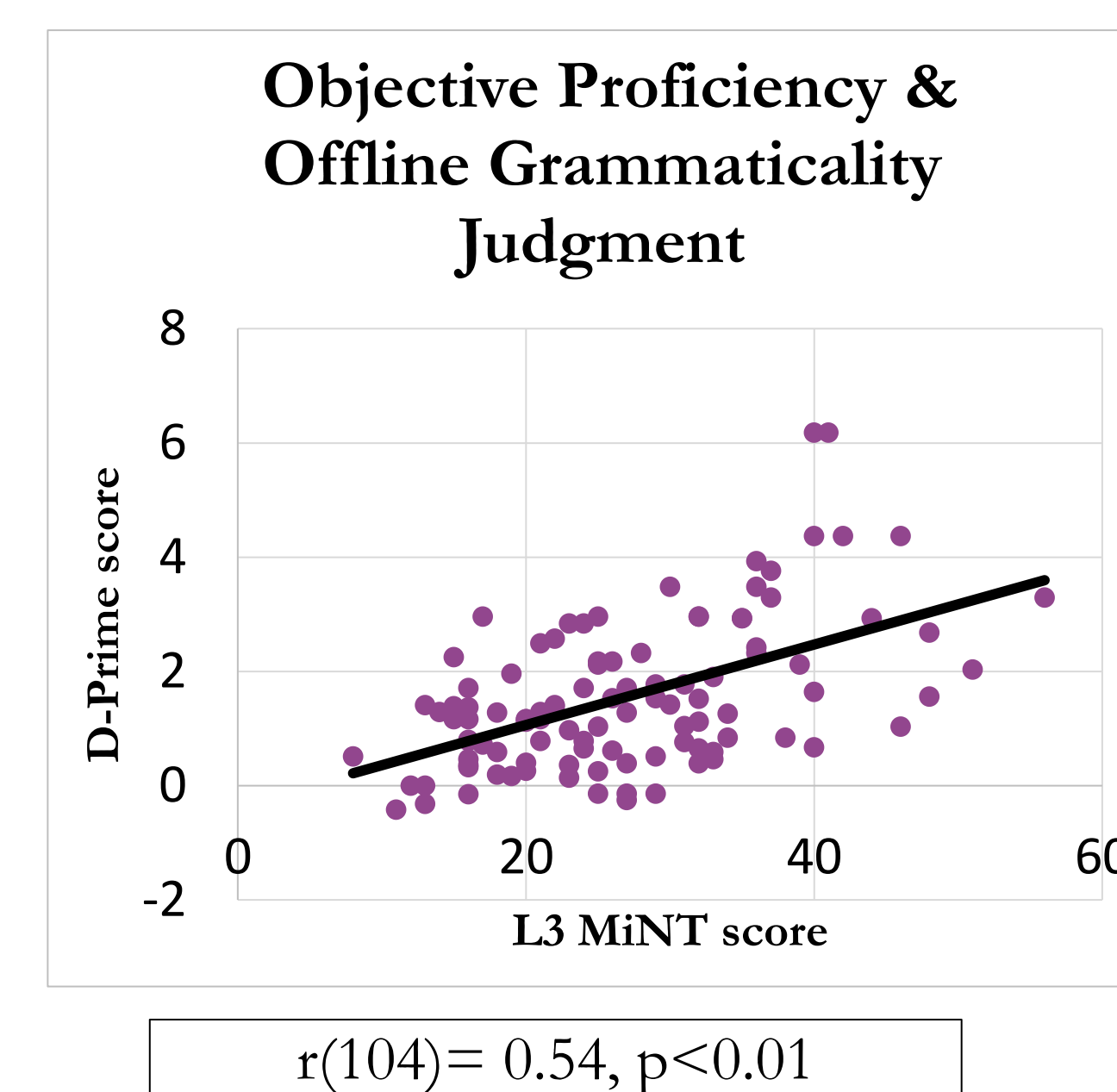
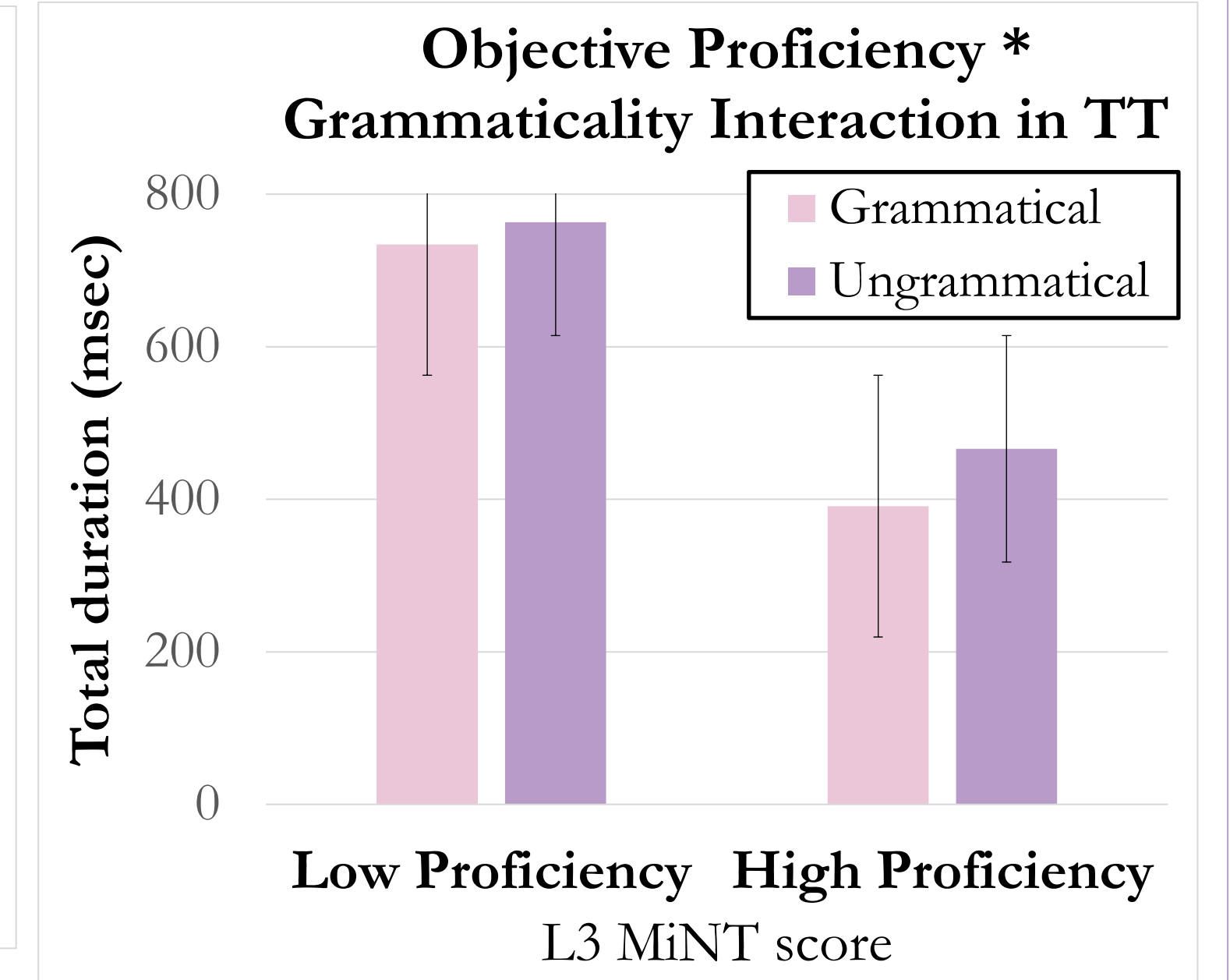
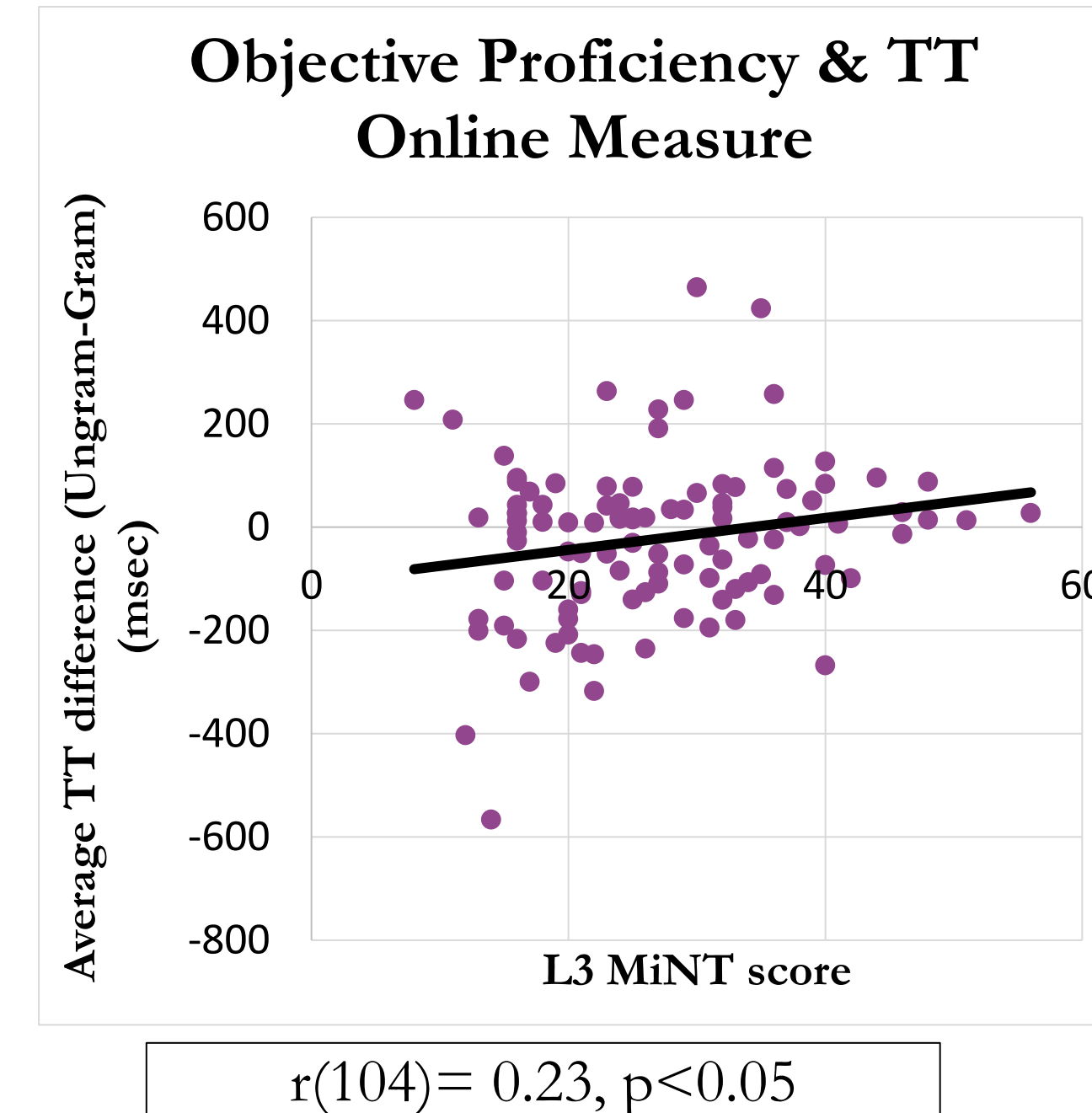
Results – Relation between Online & Metalinguistic Measures

- No correlation between TT online grammaticality effect and D-prime, $r(104)=0.13$, $p=0.16$.

- But individuals who exhibited morphosyntactic sensitivity in TT had higher d-prime.



Results – Proficiency Modulations



- Subjective proficiency correlated with the offline measure, $r(104)=0.38$, $p<0.01$, but not with TT online grammaticality effect, $r(104)=0.02$, $p=0.79$.

- Correlation between subjective and objective proficiency measures, $r(104)= 0.59$, $p<0.01$.

Discussion

- Late eye tracking measures patterned with grammaticality judgments, as in Abbas et al. (2021) even when online and offline tasks were separate. This suggests that both measures capture similar processes, most likely reflecting metalinguistic and strategic processing.
- Early eye tracking measures dissociated from late eye tracking measures and grammaticality judgements, and were not sensitive to grammaticality, suggesting reduced sensitivity during the initial stages of automatic morphosyntactic processing.
- Higher proficiency was associated with greater morphosyntactic sensitivity especially in the measure that reflects conscious and metalinguistic processing. Objective proficiency measures better captured this variability.

This work was funded by ISF grant 340/18 to AP and TD.

abbasnawras@gmail.com