E Representing Templates, Number, and Gender: Self-Paced Reading Evidence from Modern Standard Arabic

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One of the fundamental questions for linguistic theory is whether the representations utilized by the grammar are the same as the representations utilized by the language processing mechanism. Here we examine three aspects of Modern Standard Arabic (MSA) agreement which bear on this question: 1) do MSA nominals involve a representational level involving discontinuous and/or abstract morphemic elements and 2) do the famously unpredictable ablauting plurals in MSA represent number in the same way as concatenative plurals do?, 3) does the large number of grammatical features involved in MSA agreement mean that errors in agreement in MSA are processed differently than in Germanic or Romance languages? We examine these questions with both self-paced reading data and computational modeling, arguing that abstract morphemes are relevant for MSA nominals and that gender and number features interfere with each other in similar ways in MSA as they do in Germanic or Romance.

The phenomenon examined is the so-called AGREEMENT ATTRACTION effect (Bock & Miller, 1991). Agreement attraction is the erroneous agreement of a verb with a structurally unavailable controller, such as in The key to the cabinets are on the table. This phenomenon, to our knowledge, has not been investigated in MSA, so we tested the attraction in three self-paced reading experiments involving subject relative clauses in MSA (1) by manipulating the number and/or gender of a local non-subject noun and verb:

المترجم الذي ساعد الرؤساء أحياناً يتكلمون خمسة لغات بفضاحة.

the-president COMP helped the-presidents often
ja-takallam-uun xamsata luyaat bi-fasˤaahatin.
3M-speak-PL five languages with-fluency
“The translator who helped the presidents often speaks five languages fluently.”

In this paper we present three distinct experiments in this paradigm differing by the kind of manipulation occurring on the attractor noun/verb agreement. The first examined whether readers ever fail to notice the erroneous verb in (1) and also examined the differential behavior of attractors with sound and broken plurals. The second (currently underway) examines whether plurals with a CV-template which is ambiguous for number (such as fuʕul) has any effect on the attraction effect. Finally, the third experiment (starting soon) examines whether gender attracts in the same way as plural number.

Our results suggest many things about the importance of MSA to sentence-processing work. Firstly, we show that self-paced reading can detect errors in MSA, an important result given the high number of featural cues available to readers (person, number, gender, and the inflection of the complementizer). We also show that broken and sound plurals in Arabic behave differently in this paradigm, with broken plurals showing much smaller rates of attraction than sound plurals. We discuss the possible interpretation of this result by examining data from our latter two experiments, suggesting that CV-template ambiguity could play a role.

In addition to the experimental results, we also present ACT-R modeling data (Lewis & Vasishth, 2005) which support an underspecification approach to broken plurality in MSA wherein the parser does not have access to a number cue on broken plurals in all cases. The results of our studies inform linguistic theory insofar as they provide more evidence for the abstractness of the CV-template in Arabic and the theoretical notion of underspecification. Our results also inform processing theories by strengthening those which allow these theoretical concepts to play important roles in generating reaction time predictions.