

Background

• Processing cost is known to increase with dependency distance (Gibson 2000)

• On the other hand, The expectation-based account (Hale,2001; Levy 2008) predicts that delaying the appearance of a verb renders it more predictable and therefore easier to process.

• Complex Predicates are interesting constructions to study locality and expectation effects as we can sometimes (if separable) delay the occurrence of the light verb. They generally consist of a preverbal element and a light verb to form a single syntactic predicate

• In Persian, there is a strong preference for using multiword verbal expressions over simple verbs. In fact, only around 150 simple verbs exist in spoken & written Persian.

• In the current study, we separate complex predicates based on two features of the preverbal noun (Karimidoostan, 2011) :

- (1) whether it has an argument structure
- (2) whether it has full noun features

Goals

- We investigate the competing predictions of the locality and expectation accounts. Locality accounts such as Gibson (2000) predict a slowdown at the verb (real verb) due to increased Noun-Verb distance, whereas expectation accounts predict that distance should not adversely affect the processing time at the verb.
- We are interested in understanding the nature of integration or prediction involved in sentence processing.
- The reason behind conducting experiment 2 is to understand the effect of the intervener type.

Procedure and Method

- Two self-paced reading studies were conducted on Persian Separable complex predicates, and in each experiment 36 target sentences plus 100 fillers in 4 Latin square lists were presented word-by-word.
- There were 43 participants in Experiment 1 and 42 participants in Experiment 2.
- Comprehension questions were asked targeting different parts to ensure participants pay attention to the complete sentence.

Design and Materials

	2 X 2 design	Predictable light verb	Unpredictable heavy verb
Short intervener (PP in Expt. 1 & 2)		a	c
Long intervener (PP+RC in Expt.1 & PP in Expt 2)		b	d

Green : complex predicates
Pink : intervener
(Glossing is left to right)

Experiment 1

عظی	آرزویی	برای	من	کرد	و
Proper name (subject)	A wish – noun (object)	For (prep.)	Me (object of prep.)	Did (light verb)	And (coordinator)
خیلی	زود	برآورده	شد		
very (quantifier)	soon (adverb)	to reality (perfective adjective)	Came (verb)		

Experiment 2

عظی	آرزویی	برای	دوست	خواهر	من
proper name (subject)	a wish- noun (object)	for (prep.)	Friend- of (noun + possessive)	Sister- of (noun + possessive)	me (obj. pronoun)
کرد	و	خیلی	زود	برآورده	شد
did (light verb)	and (coordinator)	very (quantifier)	soon (adverb)	to reality (perfective adjective)	came (verb)

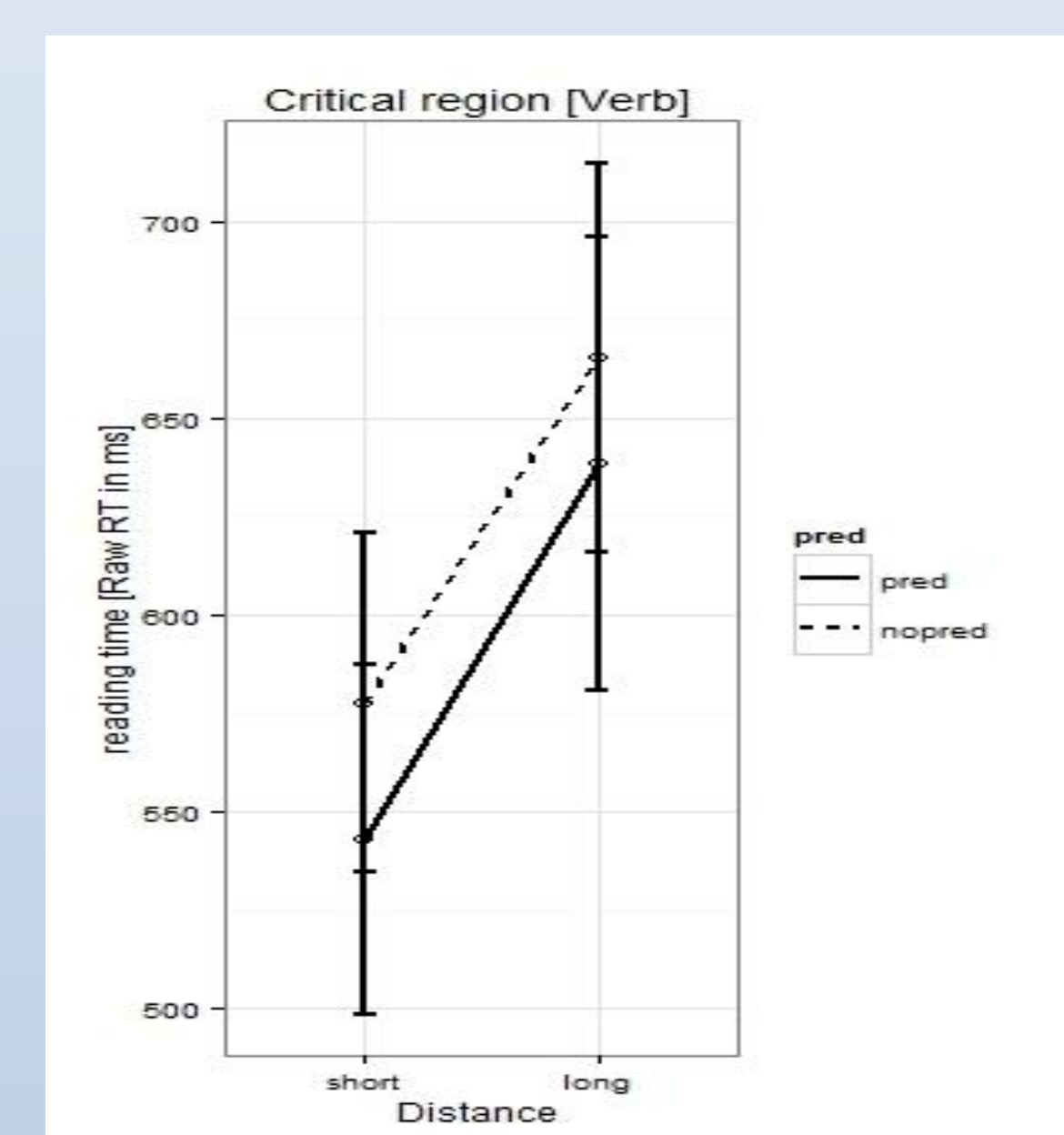
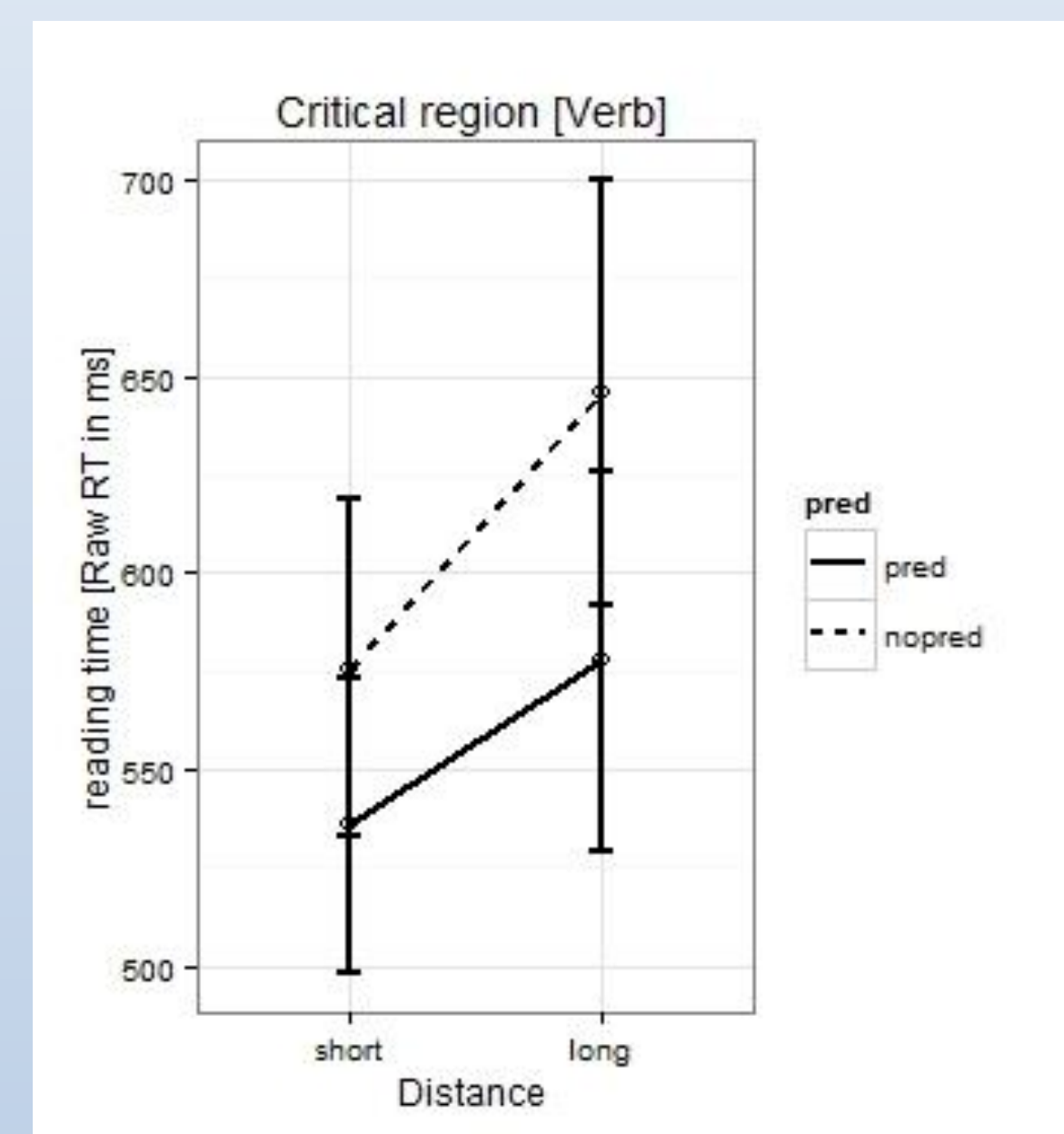
Experiment 1

عظی	شکلاتی	برای	من	خرید	اما
proper name (subject)	a chocolate (object)	for (prep.)	me (object of prep.)	bought (heavy verb)	but (coordinator)
آن	را	نخوردم			
that (demonstrative pronoun)	accusative case-marker	didn't eat – I (negative verb)			

Experiment 2

عظی	شکلاتی	برای	دوست	خواهر	من
proper name (subject)	a chocolate (object)	for (prep.)	friend of (noun + possessive)	sister of (noun + possessive)	me (obj. pronoun)
خرید	اما	آن	را	نخورد	
bought (heavy verb)	but (coordinator)	that (demonstrative pronoun)	accusative case marker	didn't eat (negative verb)	

* Pre-tests (sentence completion and rating) were conducted to check for the predictability of the light / heavy verbs as well as the acceptability of the separable complex predicates. The complexity of the interveners were matched according to the number of discourse referents. The intervening material is kept the same across conditions.



Analysis and Results

Linear mixed-effects models were used to analyze the reading time data which was log transformed.

Experiment 1 :

- Main effect of distance in unpredictable conditions (**t=4.34**)
- Main effect of distance (**t=4.24**), such that RT (b & d) > RT (a & c)
- Both predictable conditions were read faster than unpredictable conditions (**t=3.49**). The nested analysis shows that it comes from unpredictable conditions.

Experiment 2 :

- Main effect of distance in both predictable (**t=3.69**) and unpredictable (**t=4.84**) conditions.
- Main effect of distance (**t=6.04**), such that RT (b & d) > RT (a & c) Even stronger than experiment 1
- Both the high-predictable conditions were read faster than the low-predictable conditions (**t=2.28**). The nested analysis doesn't show that this effect derives from any other specific condition which means the effects were equally strong in both predictable & unpredictable conditions.

Combined analysis :

- Main effect of distance (t=4.30)
- Main effect of prediction (t=3.55)
- Marginal 3-way interaction (t=-1.94)

Discussion

- We find clear effects of locality in both experiments, and we also find evidence for expectation effects: the high-predictable verbs are read faster than the low-predictable verbs.
- The fact that we don't see facilitation with increased distance at the verb in spite of high predictability might be due to increased difficulty in prediction maintenance due to processing load. Recall that the locality effect in Experiment 1 is driven only by low-predictable condition, while in Experiment 2 both high and low are affected.
- In Experiment 2, the intervener is a long, uninterrupted phrase whereas in Experiment 1, the intervener consists of a short RC followed by a PP. Processing a single long intervening phrase may be harder than processing two different phrases, reminiscent of the sausage machine proposal of Frazier and Fodor (1978).
- The results suggest that complexity of intervening material is critical for prediction maintenance. Although we found evidence for both locality and expectation effects, a key prediction of the expectation account was not validated: delaying the appearance of a verb (predictable or not) did not facilitate processing.