

REACTIVATION EFFECTS INTERACT WITH EXPECTATION STRENGTH

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Vasishth and Lewis (2006) have proposed that reactivation of upcoming VPs by adjuncts, and/or reactivation of arguments by intervening adjuncts might account for anti-locality effects: facilitation at the verb with increasing distance. An alternative explanation for anti-locality effects is that the expectation of upcoming verb is sharpened as distance increases (Levy, 2008). Two Hindi self-paced reading studies (n=82 in each) show that expectation and reactivation effects interact.

Expt 1 manipulated whether an NP (the subject of a matrix verb) is reactivated, by either making this NP a subject of an embedded nonfinite clause or not:

(1) *NP [... nonfinite-verb] ... matrix-verb...*

Under the reactivation account, when there is a dependency between the NP and the nonfinite verb, the NP is reactivated, leading to faster access of the NP at the matrix verb. This two-level *NP-reactivation factor* was crossed with a *VP-reactivation factor*: additional adverbials were either present or absent before the matrix verb that reactivated the matrix verb. This 2x2 factorial design was further crossed with a *context factor* (prediction context vs no-prediction context) that makes the critical matrix-verb (and the NP subject) either completely predictable or not. This gives us a 2x2x2 design, crossing NP-reactivation, VP-reactivation, and predictability of the matrix verb/NP subject. Results show a significant interaction ($t=2.14$) between the three factors, such that NP- and VP-reactivation jointly lead to a facilitation at the matrix verb in the no-prediction context condition only; in the prediction condition, no facilitation is seen at the matrix verb. This experiment points to a model of processing where memory activation and expectation are not mutually exclusive factors but closely interact.

Expt 2 replicated the results of Expt 1; here, activation of the critical nonfinite verb was manipulated by placing an adjunct that either modified (i.e., reactivated) the nonfinite verb (NFV-reactivation) or the matrix verb (MV-reactivation):

(2) *[NP adjunct ... nonfinite-verb] ... matrix-verb...*

Like in Expt 1, this two-level reactivation factor was crossed with distance (long vs short); long distance conditions had additional adverbials before the nonfinite verb that, by assumption, further reactivate the nonfinite verb in the course of modifying it. This 2x2 factorial design was crossed with a context factor as in Expt 1 to yield a 2x2x2 design; the context ensured that the nonfinite verb was either predictable (prediction context condition) or not predictable (no-prediction context condition). Results show a significant interaction ($t=-2.04$) between the three factors, such that there is facilitation at the nonfinite verb due to increased distance in the NFV-reactivation, no-prediction conditions; but no facilitation at the nonfinite verb in the prediction conditions. This replicates Expt 1's findings.

This is, to our knowledge, the first set of studies to show the interaction between activation and expectation strength. Experiments 1 and 2 show that when a weak expectation is raised (i.e., when a verb is predicted but its exact identity is not predictable), reactivation effects are seen, and when a strong expectation is raised (i.e., when the exact identity of a verb is predictable), reactivation effects disappear. We propose that the effect of strong vs weak expectation should lead to relatively high vs low activation of the the NP-subject and the upcoming VP; when activation is high (i.e., in strong expectation conditions), reactivation does not have any effect; when activation is low (i.e., in weak expectation conditions), reactivation shows a facilitatory effect.