A great deal of psycholinguistic work has examined questions relating to case in sentence processing. Case has been shown to influence thematic role assignment [1], affect the difficulty of processing scrambled sentences [2], and sharpen expectations about upcoming syntactic structure [3]. While interesting and informative, such work focuses largely on the impact of case on other aspects of syntactic processing (e.g. argument structure and movement), and relatively little work has addressed the online formation of case dependencies (cf. [4]-[5]). This contrasts with verb agreement, where a fairly large body of work ([6]-[8], inter alia) has focused on the implementation of feature-matching requirements on verbs. The present work pursues this latter line of inquiry for case, arguing that cue-based retrieval constitutes an integral part of case feature-checking in sentence processing.

In recent work, Wagers and colleagues [6] have argued on the basis of examples like (1) that cue-based retrieval underlies the formation of agreement dependencies.

(1) a. * The key to the cabinets definitely are on the table.
   b. * The key to the cabinet definitely are on the table.

Though both (1a) and (1b) are ungrammatical, the plural copula in (1a) is consistently read more quickly, and rejected less frequently, than its counterpart in (1b). This effect, commonly referred to as “Agreement Attraction”, can be explained as the result of interference in cue-based retrieval. Plural verbs like “are” use the morphosyntactic number cue [pl] to search for their subjects. This search is an error-prone process which activates every plural DP in memory [9]. In (1a) the cue [pl] finds a partial match in the intervening noun “cabinets”, leading to the temporary misperception of grammaticality [6]. Because the verb in (1b) finds no plural-matched DP, it is more difficult to process and more reliably rejected.

To demonstrate retrieval in action for case dependencies, I designed an experiment intended to replicate the agreement attraction findings for case. The experiment manipulated the factors Grammatical and Intrusive. Target items ended with a monotransitive verb-participle which idiosyncratically selected for dative case. In [+gram] conditions, the object correctly bore dative case. In [−gram] conditions, the object was marked with accusative case. Additionally, every sentence contained a prepositional phrase which intervened between the object and the verb participle. For [+intr] conditions, this PP selected a dative complement, while in [−intr] conditions it selected an accusative complement. Crossing these two factors yielded the four conditions shown below. 20 items patterned on (2) were constructed. 40 unrelated sentences, half of which were ungrammatical, were included as fillers.

(2) [gram, intr] Das Brautkleid hat dem Braut nach dem Bankett noch gepasst.
   The dress has the.DAT bride after the.DAT banquet still fit.

 [+gram, −intr] Das Brautkleid hat dem Braut bis letzte Woche noch gepasst.
   The dress has the.DAT bride until last.ACC week still fit.

[−gram, +intr] Das Brautkleid hat die Braut nach dem Bankett noch gepasst.
   The dress has the.ACC bride after the.DAT banquet still fit.

[−gram, −intr] Das Brautkleid hat die Braut bis letzte Woche noch gepasst.
   The dress has the.ACC bride until last.ACC week still fit.
The experiment used a speeded acceptability judgment paradigm. Participants read sentences presented word-by-word in the center of the screen, and were asked to provide a binary acceptability judgment upon sentence completion. The response screen timed out after two seconds, forcing participants to respond relatively quickly. Response accuracy (“yes” to [+gram] conditions, “no” to [−gram] conditions) was collected as the dependent variable. The experiment was hosted on the Ibex Farm web-server, and distributed to 24 native German speakers via Amazon Mechanical Turk and personal communication.

The data were analyzed using logistic mixed effects regression, taking accuracy as the dependent variable, Grammatical and Intrusive as fixed effects, and including a full complement of random effects for subjects and items. The model used for analysis is shown in (3).

\[
(3) \quad \text{acc} \sim \text{gram} \times \text{intr} + (1 + \text{gram} \times \text{intr}|\text{subj}) + (1 + \text{gram} \times \text{intr}|\text{item})
\]

Pairwise comparisons were conducted by nesting the factor Intrusive inside Grammatical. This nesting tested for an effect of intrusion within each grammaticality pair, allowing for the resolution of any interaction effect. A graphic summary of the results is given in Figure 1. The test statistics generated by the model in (3) are given in Table 1.

Table 1: Modeling Results

<table>
<thead>
<tr>
<th></th>
<th>β</th>
<th>z</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>gram</td>
<td>-1.71</td>
<td>-3.64</td>
<td>.001</td>
</tr>
<tr>
<td>intr</td>
<td>-0.89</td>
<td>-2.18</td>
<td>.05</td>
</tr>
<tr>
<td>gram×intr</td>
<td>1.33</td>
<td>3.35</td>
<td>.001</td>
</tr>
<tr>
<td>−gram:intr</td>
<td>0.43</td>
<td>1.98</td>
<td>.05</td>
</tr>
<tr>
<td>+gram:intr</td>
<td>-2.22</td>
<td>-2.86</td>
<td>.01</td>
</tr>
</tbody>
</table>

Logistic regression revealed significant main effects of both Grammatical (β = −1.71, p < .001) and Intrusive (β = −0.89, p < .05), as well as a significant interaction term (β = 1.33, z < .001). This interaction was resolved to show that the [−gram, +intr] condition (solid maroon in Figure 1) was significantly less accurate than any other condition.

These data display an attraction phenomenon similar to that observed for agreement. An ungrammatical dative-verb/accusative-object pair is less noticeable when the sentence contains a dative distractor, an illusion of grammaticality parallel to that observed in (1a). This effect is strong evidence in favor of the incorporation of cue-based retrieval as an element of on-line case processing, as retrieval readily explains the interference of the distractor dative. This result is important for two reasons: (i) it extends the relatively small list of retrieval-driven grammatical illusions to a new morphosyntactic dependency, and (ii) it lends credence to the notion that retrieval is a source of acceptability gradience [10]-[11]. Since acceptability judgments form the backbone of syntactic theorizing, results such as this inform the range of data to be accounted for by syntactic theory.