

Amplifying event representation: morphosyntax and the graded accessibility of initial and end states during sentence processing.

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There is increasing interest in the representation of object *state* as central to event representation (e.g., Altmann & Ekves, 2019; Misersky, et al., 2021; Solomon et al., 2015). Altmann & Ekves (2019) propose that event comprehension involves tracking *object histories*, with event representations reflecting objects' changes in state across time, and minimally, their initial and end states. To understand '*The clown will inflate the shiny balloon*' thus entails representing the change in state of the balloon from uninflated at one time to inflated at a subsequent time, the assumption being that both states must be accessible to comprehend the event. Here, we focus on whether and how modifiers modulate activation of the initial and/or end state features of an object by comparing the comprehension of change of state events after verbs (*inflate the balloon*), adjectival passives (*the inflated balloon*), and adjectival passives modified by degree adverbs (*the completely inflated balloon*).

Experiment 1 contrasted (1) '*The clown will choose the shiny balloon*' vs. (2) '*The clown will inflate the shiny balloon*' vs. (3) '*The clown will choose the inflated balloon*'. We anticipated that after (1) the more accessible state would reflect the more typical state, which norming established as the inflated rather than the deflated state. After (2) we anticipated accessibility of both the inflated and uninflated states, notwithstanding the atypicality of the uninflated (initial) state (see Kang et al., 2019). After (3) we anticipated preferential activation/accessibility of the inflated state. In the literature, there is an eventive/stative distinction applied to past participles in this position (see Kaup et al., 2010, for an eventive account; see Kratzer, 1994 for a stative account). At issue is whether (3) patterns like (1) or (2); in each case some representation of the balloon in an uninflated state is activated even though it is the balloon in its inflated state that tends to be "carried forward" subsequently. Alternatively, the English past participle in prenominal position might actively suppress the activation of the initial (uninflated) state of the balloon. We used the sentence picture verification task to assess accessibility (see Kang et al., 2019; Misersky et al., 2021). Participants had to judge whether the object depicted in the picture had been mentioned in the prior sentence. We collected responses and response RTs online with Gorilla, with participants (N=300) recruited through Prolific. Table 1 shows proportion of trials with responses to a picture of the target object in its initial (and, by design, atypical) state, presented 1,000 ms. after participants had read each of 48 experimental sentences (subject-paced); other trials included end-state or mis-matching targets. We found significantly more 'YES' responses after (2) than (1). However, there was a dramatic drop in 'YES' responses after (3), suggesting that a verb in participle form in a prenominal environment actively suppresses activation of the object's initial state in a change of state event.

Experiment 2 replicated the crucial conditions from Experiment 1: (2) and (3) with the addition of amplifier adverbs as in "... will completely inflate ..." and "... the completely inflated ...". The rationale was to establish the sensitivity of the task to subtle changes in object state, as well as to the pragmatics of participial modification: Whereas in (3) the *inflated balloon* potentially contrasts with (a different) one that is uninflated, the *completely inflated balloon* contrasts with one that is at least partially inflated. We replicated the pattern in (2) and (3) but found even fewer 'YES' responses with the intensifier adverbs (see Table 2: Data collected from 211 participants across 32 items), suggesting either greater mismatch between the accommodated contrast (a partially inflated balloon) and the picture-to-be-verified (a completely uninflated balloon), or greater suppression of the entailed initial state (given the increased contrast between the focal end state and the initial state), or both. This raises the questions: If prenominal past participles in English suppress the initial state of the object referenced by the head noun, is that suppression restricted only to initial-state representations of that *same* token, leaving the contrasting token unaffected? And to what degree, relative to the intended object, is the contrasting one activated? These are questions for future research.

Table 1. Experiment 1 Results.

| Condition | Sentence Example | Proportion of 'YES' Responses |
|--|--|-------------------------------|
| Minimal change of state verb | <i>The clown will choose the shiny balloon.</i> | .87 |
| Substantial change of state verb | <i>The clown will inflate the shiny balloon.</i> | .91 |
| Past participle in prenominal position | <i>The clown will choose the inflated balloon.</i> | .63 |

**all pair-wise comparisons significant, $p < .001$

Table 2. Experiment 2 Results.

| Condition | Sentence Example | Proportion of 'YES' Responses |
|----------------------------------|---|-------------------------------|
| Bare change of state verb | <i>The clown will inflate the shiny balloon.</i> | .87 |
| Amplifier + change of state verb | <i>The clown will completely inflate the shiny balloon.</i> | .83 |
| Bare past participle | <i>The clown will choose the inflated balloon.</i> | .62 |
| Amplifier + past participle | <i>The clown will choose the completely inflated balloon.</i> | .56 |

**both main effects (bare vs. amplifier, verb vs. past participle) significant, $p < .0001$. no interaction. Post-hoc pair-wise comparisons significant $p < .003$

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