

## Incremental theme verbs do not encode measures of change: experimental evidence from German-speaking adults

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This study investigates German-speaking adults' interpretation of incremental theme verbs such as *drink*, probing the role of the incremental theme argument and of adjectives with an upper closed scale (e.g., *empty*) regarding telicity. Our findings provide experimental evidence for the claim that incremental theme verbs do not lexicalize measure of change functions (see Kennedy, 2012). Moreover, our results indicate that the telic interpretation of incremental theme verbs is construed semantically when combined with an upper closed scale adjective, whereas it is construed pragmatically when it is combined with a quantized NP (Filip, 2008).

In some events an entity changes as a result of participating in this event; these events can be described *i.a.* by degree achievement verbs morphologically related to gradable adjectives (1) (taken from Kennedy, 2012: 107) and by incremental theme verbs (2).

(1a) The sink emptied.                    (1b) The sink emptied completely.                    (1c) ... but not entirely.

(2a) Maria drank the beer.                    (2b) Maria drank up.

In principle, (1a) and (2a) allow both telic and atelic readings, that is they can denote culminating or non-culminating events (Filip, 2008; Hay et al., 1999; Kennedy, 2012). For instance, continuation of (1a) and (2a) with (1c) is felicitous. Accordingly, it has been argued that the telic readings in (1a) and (2a) arise pragmatically via a generalized conversational implicature, which is cancellable (Filip, 2008). In contrast to (1a) and (2a), (1b) and (2b) only allow a telic reading. Continuation of (1b) and (2b) with (1c) is infelicitous (Hay et al., 1999; Schulz et al., 2001). These latter examples are instances of semantic telicity, i.e., the culmination point is entailed and this entailment is not cancellable. Following this line of reasoning, the degree modifier *completely* and the resultative particle *up* have been referred to as strong telicity markers (e.g., Schulz, 2018).

Kennedy (2012) analyzes both (1) and (2) as involving a measure of change function, i.e., a function that measures the degree to which an object changes as a result of its participation in an event. In degree achievements (ex. 1), this function is encoded by the verb. In the case of degree achievement verbs that are morphologically related to gradable adjectives, telicity properties are argued to be attributed to the scalar structure of the adjectival core (Deo et al., 2013; Hay et al., 2013; Kennedy/Levin, 2008; Winter, 2006). This adjectival base indicates the standard against which the change is measured, and if the scale has a maximal endpoint as with *empty*, the change should reach this endpoint. Accordingly, the default interpretation of the corresponding event is telic (e.g., Kennedy/Levin, 2008). In the case of incremental theme verbs (ex. 2), the measure of change function is not encoded by the verb but inherent to its argument (Kennedy, 2012). Telicity is related to the amount of incremental change required; if it is specified by a quantized NP (e.g., *the beer, ten cookies*), and its default interpretation is telic (Krifka, 1989).

Previous comprehension studies on incremental theme verbs found that adults treated resultative particles like *up* and quantized NPs differently, e.g., when added to verbs of consumption (see overview in van Hout 2018). While *eat/drink up* were restricted to telic interpretations, *eat the cheese/drink the tea* were allowed to denote events without event culmination in about half of the cases.

Building on these lines of theoretical and experimental research, our study investigates the scalar properties of adjectives in resultative constructions (ex. 3a) and contrasts them with ordinary incremental theme verb structures (ex. 3b).

(3a) Er trank den Saft leer.                    (3b) Er trank den Saft.  
'He drank the juice empty.'                    'He drank the juice.'

Adjectives with an upper closed scale such as *empty* have been argued to cause telicity via a homomorphism between the adjective's scale and the event (Wechsler, 2005), i.e., the endstate sub-event corresponds to the culmination point of the adjectival scale. Accordingly, adjectives with an upper closed scale should be strong telicity markers, as evidenced by the infelicitous continuation of (3a) with (1c). In contrast to a range of empirical studies of verb particles like *up*

(see van Hout, 2018) empirical research on resultative adjective structures is scarce. The existing data suggests that adults are sensitive to the lexical restrictions of the participating verbs (Richter/van Hout, 2013), leaving open how adults interpret resultative adjective constructions. Our study asked whether German-speaking adults (N = 21, mean age = 25 years) assign a semantically telic interpretation to sentences such as (3a) and a pragmatically telic interpretation to sentences such as (3b). A novel Truth Value Judgement task was developed with 4 conditions, varying event type (CULMINATING/NON-CULMINATING) and structure (ADJECTIVE/NO ADJECTIVE), with 4 items per condition. The incremental theme verbs *drink*, *wipe*, *blow-dry*, *iron* were combined with the adjectives *empty*, *clean*, *dry*, *flat*, respectively. All events were presented as animated paintings (see Fig. 1 for the stills) accompanied by prototypical sounds of the respective actions, e.g., slurping for (3a/b). In the CULMINATING condition, the boy drank the juice completely, in the NON-CULMINATING condition some juice was still in the glass after the drinking had stopped. After watching the video clips, participants answered yes/no questions (e.g., *Hat er den Saft (leer) getrunken?*, has he the juice (empty) drunk). If the adjective causes the shift from pragmatic to semantic telicity, non-culminating events should be consistently rejected in the ADJECTIVE but not in the NO ADJECTIVE condition.

The mean number of yes-answers per condition is given in Table 1. We fitted a generalized mixed effects model (*lme4*, Bates et al., 2021) to participants' answers with event type and structure and their interaction as fixed effects. Participants and item were entered into the model as random effects. There was a main effect of event type ( $\beta = -6.3428$ , SE = 1.2260,  $z = -5.174$ ,  $p < .001$ ), indicating that non-culminating events were more often rejected than culminating events, and a main effect of structure ( $\beta = -2.2104$ , SE = 1.0714,  $z = -2.063$ ,  $p < .05$ ), showing that adjective structures were less often accepted than structures without the adjective. The significant interaction between event type and structure ( $\beta = -4.4208$ , SE = 2.1428,  $z = -2.063$ ,  $p < .05$ ) was further inspected via pairwise comparisons (*emmeans*, Lenth et al., 2021), revealing a significant difference between structures with and without adjective for non-culminating events ( $p = .002$ ), but not for culminating events.

As expected, adults interpreted ordinary incremental theme verb structures as pragmatically telic, allowing the telicity implicature to be cancelled in 70% of the cases for non-culminating events. This result is in line with the analysis of quantized NPs as weak telicity markers. In contrast, resultative structures were interpreted as semantically telic, as evidenced by over 90% rejections of non-culminating events. This latter result provides first experimental evidence that upper closed scale adjectives like *empty* are strong telicity markers when combined with incremental theme verbs. Moreover, the interpretative contrast between structures with and without adjective supports Kennedy's (2012) theoretical analysis that incremental theme verbs do not introduce measure of change functions as part of their lexical meaning. With regard to resultatives, this finding suggests that two measure of change functions are available, provided by the adjective and by the quantized NP, but the adjectival one dominates the nominal one.

Table 1. Mean number of yes-answers per condition (max = 4).

Condition	Mean	SD	%
Culminating event, adjective	3.95	.21	98.8
Non-culminating event, adjective	0.38	.57	9.5
Culminating event, no adjective	3.95	.21	98.8
Non-culminating event, no adjective	2.81	.13	70.2

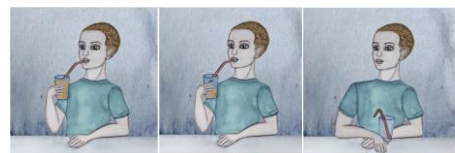


Fig. 1. Example culminating event.

### Selected references

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