

Non-culminating telic path descriptions
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1. Introduction. Dynamic prepositional phrases (PPs) referring to paths are generally divided into three groups according to whether they have telic (e.g., *(up) to*), atelic (e.g., *towards*) or (a)-telic (e.g., *around*) reference (Piñón 1993, Zwarts 2005 a.m.o), see (1a/b).

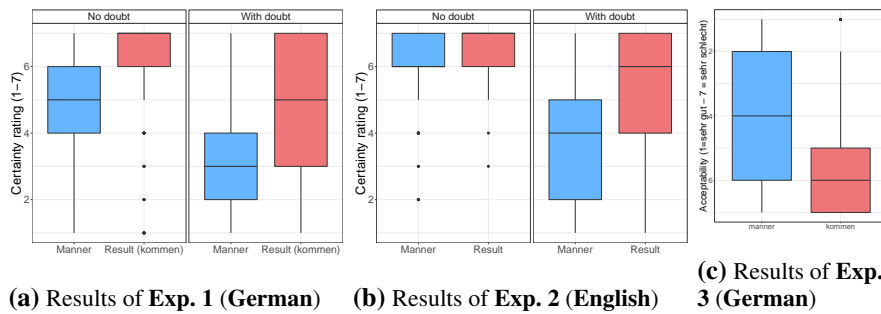
- (1) a. Mary walked **towards/#to/around** the library **for ten minutes**.
b. Mary walked **#towards/to/around** the library **in ten minutes**.

PPs restrict the denotation of a motion verb (a set of events) to those events whose spatial trace is a path in the PP denotation. Telic PPs denote paths with an endpoint, generally assumed to correspond to the location of the DP's referent in the PP (henceforth GOAL). For instance, Piñón 1993 analyses the PP *to the library* as denoting a set of paths which extend between some implicit starting point l' and the location of the library, see (2a). Thus, a VP such as *run to the library* is taken to denote a set of running events e mapped into some path which ends to the location of the library; see (2b). (Non-progressive) sentences built with such VPs are therefore expected to entail that the subject's referent reaches the goal (the library in 2b) at the end of the motion event. Such an entailment is generally taken to hold; see, e.g., (2c). We call the inference that the goal is reached by the subject's referent at the end of the motion event the '**culmination inference**' (CI).

- (2) a. $\llbracket \text{to the library} \rrbracket = \lambda p [\text{End}(p) = l \wedge l = \text{Loc}(tu[\text{library}(u)], t) \wedge \exists l' [\text{Beg}(p) = l']]$
b. $\llbracket \text{run to the library} \rrbracket = \lambda e \exists p [\text{run}(e) \wedge \text{Loc}(e, \tau(e)) = p \wedge \text{End}(p) = l \wedge l = \text{Loc}(tu[\text{library}(u)], t) \wedge \exists l' [\text{Beg}(p) = l']]$ 'The set of running events e which are mapped (relative to their temporal trace $\tau(e)$) into some path p that extends between some implicit starting point and the location of the library.' (Piñón 1993)
c. Mary walked to [the] school, #but she didn't actually get there. (Smith 1991: 64)
d. $\llbracket \text{to the library} \rrbracket (\text{revised}) = \lambda p' \exists p [p' \leq p \wedge \text{End}(p) = l \wedge l = \text{Loc}(tu[\text{library}(u)], t) \wedge \exists l' [\text{Beg}(p) = l'] \wedge (\text{End}(p') = l \vee \exists l'' [\text{End}(p') = l''])]$ 'The set of initial partial paths p' of a path p which extends between some implicit point l' and the loc. of the library, and whose endpoint is either the loc. of the library, or some implicit endpoint l'' '

We aim to argue that a semantics along the lines of (2a/b) is too strong for what we call *weakly* telic PPs, of which English *to*-PPs and German *zu*-PPs are examples. We propose that the endpoint of paths denoted by weakly telic PPs is not necessarily the goal, but can also be some location before that; see our analysis of *to/zu*-PPs in (2d). Relatedly, we argue that sentences such as the first clause of (2c) *defeasibly implicate* rather than entail the CI (if the VP denotes non-punctual events). By contrast, the CI is *entailed* with *strongly* telic PPs such as Eng. *up to* and Ger. *bis zu*. We focus on weakly telic PPs. §2/3 present experimental data, and §4 the analysis.

2. Experiments 1/2. Experiments 1 (German) and 2 (English) were run to assess the strength of the CI (i.e., the inference that Mary reached the school in (2c)). The questionnaires probed participants' level of certainty that the goal had been achieved. We manipulated two variables. These were 1) VERB TYPE: manner (*laufen* 'walk') vs. directed motion (in English, 'come' was used and in German, *kommen* 'come'), and 2) presence or absence of a clause introducing an event that could introduce DOUBT that the goal was reached. DOUBT was manipulated between participants. 14 experimental items such as (3) were created for each questionnaire (two were excluded from analyses in German because of coding errors). The simple past was used in English, and the present perfect in German. Participants rated how safely they could conclude that the subject had reached the goal on a scale from 1 (not at all safely) to 7 (very safely). Reliability of differences was assessed with cumulative-link mixed models (using the *ordinal* package in R). Each experiment included filler items, including some meant to anchor the endpoints of the scale and to highlight any differences in bias between groups of participants. In Experiment 2, additional control items using causatives (e.g., *burn*) were added, probing participants' level of certainty that a result of the type encoded by the verb occurs, to assess the impact of the *but*-clause when the inference probed is entailed.



- (3) Yesterday Paul had a math test, but wasn't well prepared. He biked/went to the school{, but on the way he ran into a couple of friends who were going to the swimming pool.} QUESTION: *How safely can you conclude that Paul reached the school?*

Experiment 1 (**Fig. (a)**) (71 native German speakers, via Prolific Academic) showed that the participants shown examples with doubt could conclude less safely that the goal was reached than participants who were shown examples without doubt. There was also an effect of VERB TYPE such that ratings were lower with manner of motion verbs than with result verbs. However, there was no interaction between factors. Experiment 2 (**Fig (b)**) (31 native English speakers, limited to US residents via Prolific Academic) showed also a difference in ratings such that participants could conclude less safely when an item included doubt than when it did not. However, in English, an effect of VERB TYPE could only be observed in the DOUBT condition. The control items showed that adding a doubt clause was associated with a decrease in certainty, but these control items were rated with numerically more certainty (5.76 on average) than the experimental items with a doubt clause (3.94).

3. Experiment 3 tested for acceptability of our German verbs with *zu*-PPs when the CI is denied in a second clause, as in Smith's 1991 example (2c). Participants (N = 64) rated sentences on an acceptability scale from 1 (very good) to 7 (very bad). On average, participants rated sentences with *kommen* as less acceptable (5.7) than sentences with manner of motion verbs (3.9).

4. Analysis. In English and German, **prepositional aspect** is the main locus of non-culmination: *to/zu*-PPs receive a meaning along the lines of (2d) rather than (2a). However, event culmination (with $\text{End}(p') = \text{End}(p) = l$ in (2d)) is assumed in absence of information to the contrary, for (i) the goal l is explicitly named (while the alternative endpoint l'' is not) and (ii) the CI is the inference to the best explanation (see Gyarmathy & Altshuler 2019 on the CI of non-culminating accomplishments). **Lexical aspect** also has an impact on the CI. Verbs such as *kommen/come* are achievements denoting punctual events. The path p into which punctual events are mapped is punctual, too, and has no other part than itself. Event culmination is thus forced with these verbs at the VP-level. But above this level, **outer aspect** is a source of non-culmination in German, but not in English: the German present perfect can not only be interpreted as a perfective, but also as an imperfective, see, Schaden 2011 a.m.o. For instance, *Als der Hans zu Besuch war, hat die Ana gesungen* is ambiguous between *When Hans visited us, Ana sang/was singing*. Since imperfective achievements do not necessarily culminate, the CI is weaker with these verbs in German than in English (where the simple past is invariably perfective with eventive predicates). However, the imperfective meaning of the German present perfect is possible only if a surrounding clause provides an explicit reference time (RT) for the test sentence. Without such a clause, RT is given by PAST and corresponds to the whole past interval before UT, which makes the imperfective configuration $\text{RT} \subseteq \text{ET}$ impossible to obtain (cf. Grønn 2008 on the Russian imperfective). The doubt clause in Exp. 1 provides an explicit RT, but not the denial clause we find in (2c) and in Exp. 3. Hence why in German, the CI is stronger in Exp. 3 than in Exp. 1 with achievements: the single source of non-culmination with these verbs, namely imperfectivity, is not available when RT is given by PAST.

5. Conclusions. Weakly telic PPs are the counterpart in the domain of prepositional aspect of non-completive perfective operators (e.g., the Hindi perfective, Altshuler 2014) in the domain of outer aspect: they encode an endpoint; however, this endpoint is not necessarily the telos, but can be some location before that.