Quantifying over hidden (parts of) events

Introduction. In recent years, various ways in which adjectival modifiers can interact with event semantics have been explored (e.g., Zimmermann 2003, Schäfer 2007, Gehrke & McNally 2015). In this paper, I will examine two types of quantificational adjectives exemplified by English *two-time* and *double* (cf. Dočekal & Wągiel 2018, Wągiel 2020) which exhibit non-trivial quantificational behavior. While (1) and (3) simply denote pluralities of two individuals and events, respectively, (2) and (4) designate singular individuals/events with some intriguing properties. I will argue that (2) and (4) show that the internal structure of nominal expressions is richer than typically assumed and extending natural language ontology is needed.

(1) two champions
(2) two-time champion
(3) two murders
(4) double murder

Entailments. Let us consider the entailment patterns in (5)–(8). The fact that (5) entails (6) suggests that there is a hidden event of acquiring a property in play and that that event is introduced by the adjective *two-time*. On the other hand, the entailment in (7)–(8) indicates a particular complex structure of the events denoted by the entire NP, i.e., one infers from (7) that in the murdering event there were two victims. But this means that there were two parts of that event each of which could be described as a murder in its own right. Those parts can be defined temporally as subevents or spatially as regions of space occupied by the victims.

(5) Kim is a two-time champion.
(6) ⊨ Kim became a champion twice.
(7) That crime was a double murder.
(8) ⊨ That crime consisted of two parts.

Scopal properties. The quantificational effects of both *two-time* and *double* are anchored to a particular entity or event designated by the modified noun, and thus they cannot outscope the NP which results in a collective-like behavior. (9) and (11) can mean that Kim and Ida met two champions each and witnessed two murders each, respectively. This reading is unavailable for (10) and (12) which can only mean that Kim and Ida each met a champion with two titles and each witnessed a murder with two victims, respectively. This indicates that *two-time* and *double* quantify only within a part-whole structure of a singular entity or event.

(9) Kim and Ida met two champions.
(10) Kim and Ida met a two-time champion.
(11) Kim and Ida witnessed two murders.
(12) Kim and Ida witnessed a double murder.

Furthermore, unlike frequency adjectives such as *occasional* (but similarly to *frequent*), *two-time* does not give rise to adverbial interpretations. For instance, (13) cannot be understood as equivalent to (14). This is reminiscent of the fact that multiplicatives like *two times* differ from frequency adverbs such as *often* in that they lack relational readings (Doetjes 2007).

(13) A two-time senator strolled by.
(14) ≠ Two times, a senator strolled by.

Distribution. Based on a COCA corpus study, I conclude that *two-time* combines with nouns denoting award recipients (e.g., *winner*, *medalist*, *recipient*), competition participants (e.g., *qualifier*, *nominee*, *finalist*), positions with a term (e.g., *governor*, *senator*, *captain*) as well as other socially salient capacities (e.g., *husband*, *patient*, *felon*). All of those are conventionalized roles typically acquired during a codified ceremony, e.g., inauguration or wedding. Importantly, it must be possible to acquire such a role repetitively. Since the role of a champion is conceptualized as highly conventionalized and (15) is felicitous, (5) works fine. The reason why (17) and (18) are weird is

that being a person is not a property one can repetitively gain, see (16), whereas being a designated driver is not a role that is socially salient enough to be associated with a conventionalized ceremony.

(15) Kim became a champion again.
(16) #Kim became a person again.
(17) #Kim is a two-time person.
(18) ??Kim is a two-time designated driver.

On the other hand, *double* selects for nominals that can designate complex eventualities (or entities), e.g., actions affecting multiple objects (e.g., *homicide*, *date*, *play*), actions involving quick repetitions (e.g., *kick*, *jump*, *lesson*) as well as actions involving multiple aspects or consequences (e.g., *victory*, *defeat*, *whammy*). The role of *double* is, thus, to determine how complex the internal structure of an eventuality (or entity) is.

Analysis. I assume a standard neo-Davidsonian framework (e.g., Carlson 1984, Dowty 1989, Parsons 1990). As for numeric quantification, I adopt the main idea behind the theory of Krifka (1989). On the proposed account, numeral roots simply denote numbers (type $n \in D_n$; cf. Scha 1983) and counting is possible via different measure functions. In addition, following Zobel (2017) I assume an ontology with roles (type $r \in D_r$), see (19). As social constructs independent of their bearers, roles are conceptualized as capacities or functions of individuals (Sowa 1984, Steinmann 2000). Consequently, role nouns denote properties of roles (type $\langle r, t\rangle$), see (19). I propose that *two-time* quantifies over events of acquiring a socially salient, conventionalized role (the presupposition $\textsc{conv}(P)$) by an individual, see (20). The operator BC (for 'become') relates roles with eventualities (acts of acquiring a role) whereas the measure function $\#(\textsc{bc})$ yields a number of events of assigning a role to an individual. After (19) combines with (20), we get (21) as the representation of (5) (I assume the r variable gets existentially closed). In prose, (21) states that there were two events of assigning the role of a champion to the beneficiary of those events, i.e., Kim.

(19) $[\![\text{champion}]\!] = \lambda r_r[\textsc{champion}(r)]$
(20) $[\![\text{two-time}]\!] = \lambda P_{\langle r,t\rangle\,:\,\textsc{conv}(P)}\lambda x_e\lambda r_r\exists e_v[\textsc{bc}(e,r) \wedge \textsc{ben}(e) = x \wedge P(r) \wedge \#(\textsc{bc})(e) = 2]$
(21) $[\![(5)]\!] = \exists r_r\exists e_v[\textsc{bc}(e,r) \wedge \textsc{ben}(e) = k \wedge \textsc{champion}(r) \wedge \#(\textsc{bc})(e) = 2]$

On the other hand, *double* does not target wholes but rather quantifies over parts of an event (or entity) denoted by the modified noun. I assume a semantics for eventive nouns as in (22). I propose that *double* introduces the $\boxplus$ operation which selects a property *P* and yields a measure function that takes an event and returns a number of its essential parts, see (24). In most cases, such essential parts are parts that have themselves a property comparable to that of a whole. Hence, we get (25) as the interpretation of (7). In other words, if an event *e* is a double murder, then it is constituted by two parts *e'* and *e"* each of which can be considered a murder in its own right. Thus, (4) denotes a set of murdering events such that they consist of two murdering subevents (a set of double homicides).

(22) $[\![\text{murder}]\!] = \lambda e_v\exists x_e\exists y_e[\textsc{murder}(e) \wedge \textsc{agent}(e) = y \wedge \textsc{theme}(e) = x]$
(23) $[\![\text{double}]\!] = \lambda P_{\langle v,t\rangle}\lambda e_v[P(e) \wedge \boxplus(P)(e) = 2]$
(24) For an atomic event e that has a property P, e' is an essential part of e iff e' is a part of e and e' is conceptualized as being essential for e to be considered as having a property P.
(25) $[\![(7)]\!] = \exists x_e\exists y_e[\textsc{murder}(tc) \wedge \textsc{agent}(tc) = y \wedge \textsc{theme}(tc) = x \wedge \boxplus(\textsc{murder})(tc) = 2]$

Conclusion. This paper sheds new light on event quantification in the adjectival domain. The semantic behavior of the adjectives *two-time* and *double* shows that nominal semantics is more complex than typically assumed and calls for adopting a richer ontology and a more nuanced mechanisms of quantification.

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