Degrees and manners as quantifying over kinds: Evidence from Dutch equatives

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We provide a quantificational and compositional semantics to Dutch equatives formed with the parameter marker (PM) *zo* and the standard marker (SM) *als*, which are used for both gradable adjectives and verbs (cf. Haspelmath and Buchholz, 1998). Specifically, we propose that *zo* makes reference to kinds in the sense of Anderson and Morzycki (2015), while the SM *als* encodes quantificational semantics and the equative relation between two sets of kinds (cf. Alrenga et al., 2012; Alrenga and Kennedy, 2014). We show that this accounts for the fact that *zo* is a cross-categorial element making reference to either degrees or manners even in non-equative constructions, while attributing quantificational semantics to *als* accounts for the fact that Dutch equatives show scope ambiguities in a fashion familiar in comparative constructions (e.g., Heim, 1985, 2000). We also situate Dutch in a cross-Germanic typology by comparing it to English and German, showing that extant analyses in these languages (e.g., Rett, 2013; Hohaus and Zimmermann, 2021) will not suffice to account for the Dutch facts and vice versa. This therefore argues for a non-uniform conception of the notions of degrees and manners, where they can be semantic primitives that the grammar manipulates directly or as emergent properties based on other primitives like events and states, both across and within languages.

Keywords: equatives, degrees, manners, kinds, Germanic

1 Introduction

In a typological survey of 47 languages, the bulk of which European, Haspelmath and Buchholz (1998) identify a typological trend regarding the morphosyntax of equative constructions, whereby two objects or events are compared along some dimension or property. The main observation concerns morphosyntactic marking of the parameter of comparison, the linguistic element representing the object being compared; when the parameter is a gradable adjective that lexicalizes the gradable dimension being compared, it tends to be overtly marked with another linguistic element (parameter marker PM) whereas if

the parameter is a verb which represents the object itself that is being compared along some dimension, it is not overtly marked (in fact overt marking is ruled out). On the other hand, the standard of comparison is typically marked overtly, with the same marker (standard marker SM) often being used across gradable adjectives and verbs. English is a representative example of such morphosyntactic marking, as illustrated in (1)-(2).

(1) John is ***as*** tall ***as*** Sue (is).
comparee copula **PM** parameter **SM** standard copula

(2) John (****as***) ran ***as*** Sue ran/did.
comparee **PM** parameter **SM** standard parameter

(Haspelmath and Buchholz, 1998)

As Rett (2013) notes, this difference in the morphosyntax of equatives cross-categorially corresponds with an interpretive difference. The equative in (1) with a gradable adjective parameter uncontroversially compares and equates two individuals' measures of height; that is, their heights can be conceived as points on a height scale and John and Sue's individual points fall on the same location on the scale. Within the semantic literature, this is often described as John and Sue sharing the same *degrees* of height (Cresswell, 1976; von Stechow, 1984; Heim, 2006; Kennedy, 1997, 2007, *a.m.o.*); this will henceforth be referred to as a *degree reading*. On the other hand, (2) can never have such a degree reading. Even if two running events can conceivably be compared and equated along gradable scales like distance, time ran, or speed of running, (2) can never be interpreted as such. Rather, the only reading it receives is one in which John and Sue ran *in the same way*, what we will henceforth refer to as a *manner reading*. Based on these observations, Rett (2013) ties the availability of a degree reading and therefore, the ability to make reference to degrees in English equatives, to the presence of a PM, whereby the PM is analyzed as a degree quantifier on a par with more familiar degree quantifiers like the comparative suffix *-er* (Heim, 2000, 2006). In the absence of such a quantifier, reference to degrees is impossible and only manner readings emerge.

This paper aims to show that this typological trend of a correlation between morphosyntactic marking with a PM and degree readings does not hold up by examining a type of equative construction in Dutch, formed using a pro-form *zo* 'so' that morphosyntactically serves as a PM, and the SM *als* 'as'. We note that this is just one of several strategies for forming an equative construction. For example, speakers from the Netherlands prefer *net zo* 'just so' as opposed to simply *zo* as a PM, whereas Belgian speakers are more accepting of simply *zo*. Furthermore, speakers who prefer *net zo* (regardless of region) get an 'exactly' reading with these equatives, whereas an 'at least' reading is available for Belgian speakers without *net*, with the stronger 'exactly' reading being a cancellable implicature (Rett, 2013). For our purposes, we focus on equatives without *net* and the judgments of Belgian speakers, though speakers who prefer *net zo* should be able to replace *zo* with *net zo* in all the examples without significantly affecting the argumentation. Furthermore,

we know of at least one other strategy for forming equatives, namely by marking the parameter with *even veel* 'as much'. As far as we can tell, native speakers consulted noted that this also has the 'at least' interpretation observed with *zo* but can only modify nominals and verbs. Finally, we note as well that *even veel* is transparently compositional in that *veel* is straightforwardly translatable as 'much', and that it also combines freely with *zo* to form a separate PM *zoveel* 'so much' that combines with verbs, which is essential to derive degree readings with verbal equatives. We focus solely on equatives formed with *zo*, setting aside these other strategies and PMs aside for future detailed investigation.

The main analysis advanced here is that equatives formed with *zo* are *kind-referring* in the sense of Anderson and Morzycki (2015); that is, Dutch equative constructions formed with *zo* are quantificational structures, whereby what is being quantified over are eventuality kinds in a way familiar from the comparatives literature, where, for example, the English comparative suffix *-er* quantifies over degrees, conceived of as a semantic primitive that the grammar manipulates and quantifies over (Heim, 2000, 2006; Bhatt and Pancheva, 2004, *a.o.*). Specifically, *zo* is a kind-introducer, introducing kind variables that serve as input to a quantifier over kinds, which we attribute to the SM *als* (see e.g., Alrenga et al. 2012; Alrenga and Kennedy 2014 for a similar intuition regarding the SM in English comparatives). The analysis is motivated by two main empirical observations. First, the PM *zo* turns out to have non-comparison uses in other linguistic contexts, notably behaving as a pro-form anaphoric to either degrees or manners when modifying gradable adjectives and verbs respectively. This naturally connects with the fact that Dutch equatives formed with *zo* as a PM also exhibits the same properties as pro-form *zo*, whereby it equates degrees in adjectival equatives and equates manners in verbal equatives, motivating an analysis that postulates a single *zo*, such as the one advocated by Anderson and Morzycki (2015) for a similar phenomenon in Polish, which makes reference to kinds. Degree readings arise through making reference to *state kinds*, based on an analysis of gradable adjectives as denoting predicates of states (Wellwood, 2015), and manner readings arise through making reference to *event kinds*, since verbs are canonically analyzed as predicates of events in the Davidsonian tradition (Castañeda, 1967; Davidson, 1967). Second, even though equatives built with *zo* refer to kinds, it exhibits the same kind of scope ambiguities as the more well-studied comparative (of superiority), where the scope of comparison is observed to vary with respect to a matrix modal verb. This motivates an analysis whereby the PM *zo* introduces kinds, but a separate element introduces quantificational semantics, which we propose is the contribution of the SM *als*. The proposed analysis has several theoretical implications. First, it argues for a non-unified way of referring to degrees, with degrees being referred to either directly as a semantic primitive or as a derived semantic object that emerges through eventuality (events and states) kinds. Our cross-Germanic comparison of equative constructions provide further support for such a view across languages. Furthermore, an examination of comparison constructions, specifically between comparatives and equatives of degree achievement verbs in Dutch, commonly analyzed as referring directly to degrees as a semantic primitive (Kennedy and Levin, 2008), demonstrate

two further issues of significance: first, a more adequate analysis degree achievements should not make reference to degrees directly and degrees are either accessed through kinds or compositionally introduced by individual degree morphemes (Wellwood, 2015) and second, that even within a single language, degrees can either be a primitive within the grammar or accessed through eventuality kinds (see Zhang 2020; Sun 2021 for evidence from the unrelated language Mandarin Chinese).

We proceed as follows. §2 provides an overview of the Dutch data, demonstrating with various diagnostics that Dutch adjectival equatives only have degree readings while verbal equatives only have manner readings. It also shows further that regardless of syntactic category, both types of equatives demonstrate scope ambiguity when embedded under particular matrix modal verbs. We also compare verbal equatives built specifically out of degree achievement verbs with their comparative (of superiority) counterparts, concluding that this particular verb class cannot be analyzed as making reference to degrees directly. §3 provides an analysis of the Dutch facts in terms of eventuality kinds in the fashion of Anderson and Morzycki (2015), with a major modification in that the analysis is quantificational in nature, which accounts not just for the fact that the interpretive properties are dependent on the syntactic category of the parameter of comparison but also for the scope ambiguity facts. §4 compares Dutch equatives with their counterparts in two other Germanic languages, English and German, which further underscores the need for various ways to make reference to degrees and manners. §5 concludes.

2 Dutch adjectival and verbal equatives

2.1 Syntactic category and degree and manner readings

As mentioned previously, one strategy for forming equatives in Dutch is the use of the pro-form *zo* as a PM. Examples (3)-(4) demonstrate the use of *zo* as a pro-form in non-equative contexts; (3) refers to a contextually specified measure of height (i.e., degree), whereas (4) refers to a particular manner of behavior, again specified by context. Intuitively, it is difficult to conceive of any other interpretation of (3)-(4); (3) has no intuitive non-degree 'manner' reading, though we confirm this with specific diagnostics in relation to adjectival equatives, whereas the verb *behave* in (4) does not have a canonical gradable scale associated with it (behaviors can be good, bad, clumsy, etc. all at the same time) and only has a manner reading.

(3) ***zo*** groot
so tall
'that tall'

(4) zich ***zo*** gedragen
REFL so behave
'behave that way'

One kind of Dutch equative construction similarly uses *zo*, specifically as a PM that marks the parameter of comparison. The standard of comparison is marked with the SM

als 'as'. (5) illustrates with the gradable adjective *tall*, while (6) illustrates with a canonical activity verb *run*.

(5) Jan is ***zo*** groot ***als*** Sue.
John is **so** tall **as** Sue
'John is as tall as Sue.'

(6) Nadine had ***zo*** gerend ***als*** Sigrid.
Nadine has **so** ran **as** Sigrid
'Nadine ran as Sigrid ran.'

Additionally, in verbal equatives, the PM *zo* and the SM *als* can also be adjacent, such as in (6). No such linear order flexibility is available for adjectival equatives (Corver, 1997, 2018).

(7) Nadine had ***zoals*** Sigrid gerend.
Nadine has **so.as** Sigrid ran
'Nadine ran as Sigrid ran.'

Speakers generally prefer one of the linear orders over the other, but all Belgian speakers find the order in (6) acceptable. We return to an account of the linear order flexibility later in §3. As with (3)-(4), (5)-(7) intuitively receive degree and manner readings respectively (regardless of linear order in the verbal equative cases). (5) intuitively compares and equates John and Sue's measures of height, whereas (6) and (7) intuitively compare and equate the manners in which Nadine and Sigrid ran. How can we be sure that (5) does not have a non-degree 'manner' reading and (6) and and (7) do not have a degree reading? While it is intuitively clearer that (5) equates degrees of height since it is unclear what a 'manner' of being tall is, this is much less intuitive for (6). A running event can conceivably be measured along multiple gradable scales that have conventional measurement systems, such as speed, distance, time the event persisted etc. One straightforward way of illustrating that verbal equatives are only ever interpreted as equating manners therefore is to test for (in)felicitous continuations that specify what exactly is being compared and equated. As shown in (8), a continuation specifying that a gradable dimension such as time ran is being compared and equated in (8b) is infelicitous, and only a continuation comparing and equating manners in which the running event was carried out in (8a) is felicitous.

(8) Nadine had ***zo*** <***als*** Sigrid> gerend <***als*** Sigrid>.
Nadine has so as Sigrid ran as Sigrid
'Nadine ran as Sigrid did.'

a. Namelijk in cirkels.
namely in circles
'Namely in circles.' (manner)

b. #Namelijk, gedurende 2 uur
namely during 2 hour
'Namely for 2 hours.' (degree)

On the other hand, demonstrating that adjectival equatives like (6) do not have non-

degree 'manner' readings is less straightforward. Rett (2013) proposes two diagnostics for non-degree readings of equatives: the possibility of non-gradable adjectives in equatives and evaluativity entailments. Since equatives require as input two degrees on some gradable property scale and equates them, non-gradable adjectives, which do not denote scales that can have multiple points on them, should either be infelicitous or be coerced into denoting a gradable property. This is indeed what is observed in Dutch. With a non-gradable adjective like *dood* 'dead', native speakers consulted suggest that the available reading is one where the property of being dead is not being compared; rather, it is two measures of *severity* of (fatal) injuries, a gradable property, that are being compared and equated.

(9) Die vlieg is ***zo*** dood ***als*** die mug.
that fly is so dead as that mosquito
'The fly looks just as dead as the mosquito (they sustained the same degree of fatal injuries).'

The second diagnostic for identifying a non-degree reading is *evaluativity*, namely, that an object possesses some degree of a property P that reaches or exceeds some contextual norm to be considered P. As Rett (2013), if an object is considered P with respect to some contextual norm, then P in this case is no longer a gradable property since with a contextual norm in play, an object is either P or not P, i.e., it is now simply a two-point rather than multi-point scale. Canonical predicative uses of gradable adjectives in English entail evaluativity (more commonly called the positive use), frequently attributed to the presence of a null morpheme that introduces some contextual standard of comparison (e.g., Kennedy 2007, though see Rett 2015 for a different view on deriving evaluativity).

(10) Mary is tall. $\rightsquigarrow$ Mary possesses some degree of height that exceeds some norm to be considered tall

Since evaluative readings entail some indeterminate degree of a property so long as that degree reaches or exceeds a certain norm degree, Rett (2013) suggests that this can be used as a diagnostic for a 'manner', non-degree reading of gradable adjectives in equatives. Returning to Dutch equatives built with *zo* and gradable adjectives, we can confirm that no evaluative reading is ever possible. The continuations in (11) set up such a context, assuming that the contextual norm for being tall is set at a height like 1.8 meters. The continuation in (11a) sets up a context where both John and Sue can be considered tall, though not to the same degree, while (11b) sets up a context where neither of them is considered conventionally tall but they have the same heights. Note further that (11a) sets up a context where John is in fact *shorter* than Sue even if he is considered tall; this is to control for the 'at least' interpretation, since if John is taller at 1.85m and Sue is 1.8m then (11) is intuitively true given that this satisfies the 'at least' interpretation of the equative independently of evaluativity. Therefore, making John shorter than Sue but with both

of them being considered tall would test for the non-degree evaluative interpretation of (11).[1] As demonstrated here, only (11b) is felicitous, confirming that no non-degree evaluative reading is available when the PM *zo* marks gradable adjectives as the parameter of comparison.

(11) Jan is ***zo*** groot ***als*** Sue.
John is so tall as Sue
'John is as tall as Sue.'

a. #Jan is 1m80 en Sue 1m85.
John is 1m80 and Sue 1m85
'John's height is 1m80 and Sue's is 1m85.' (evaluative)

b. Jan is 1m60 en Sue ook.
John is 1m60 and Sue too
'John's height is 1m60 and Sue is 1m60 too.' (non-evaluative degree)

The overall generalization that emerges with equatives built with *zo* therefore is that the availability of degree versus manner readings is dependent on the syntactic category of the parameter of comparison. Degree readings are only ever available with gradable adjectives, whereas manner readings are only ever present with verbs. This therefore suggests that however *zo* is analyzed, it must make reference to degrees and manners indirectly, namely through the syntactic category of the parameter of comparison. Consequently, it must be that degrees are somehow a part of the meaning of a gradable adjective, as argued for by previous research (e.g., Heim, 2000, 2006; Kennedy, 2007, *a.m.o.*) and manners are somehow a part of the meaning of verbs. We re-examine, in particular, this conception of the meanings of gradable adjectives and verbs in the next section by looking at a particular class of verbs argued to have degrees as part of their meanings and their behavior across comparison constructions (specifically comparatives) in general, arguing instead that degrees and manners must be encoded by particular morphemes that mark comparison constructions such as *zo*, essentially the same conclusion as arrived at by Wellwood (2015).

2.2 Degrees in verbs and across comparison constructions

If the availability of degree versus manner readings of Dutch equatives built with *zo* is dependent on the syntactic category of the parameter of comparison, specifically on whether they make degree arguments available for comparison in their meanings (Rett, 2013), then

[1] This context is felicitous with English equatives built with the SM *like*, which requires the obligatory absence of a PM, but crucially, not with the equative built with the PM and SM *as*, i.e., *John is tall **like** Sue; John is 1.8m and Sue is 1.85m* is felicitous but *John is **as** tall **as** Sue; John is 1.8m and Sue is 1.85m* is infelicitous. That the evaluative, non-degree 'manner' reading is morphosyntactically marked quite differently from regular degree-equating equatives with gradable adjectives in English confirms the continuations in (11) are indeed testing for degree versus manner readings and consequently, that Dutch adjectival equatives built with *zo* only ever have degree readings.

we expect this correlation to break down if, for example, there are classes of verbs that make degree arguments available for comparison. There is indeed such a class of verbs, namely *degree achievement verbs*, which describe an object undergoing some change in the measure of a gradable property held between the start and end of an event (Dowty, 1979). Canonical examples of such verbs in English include *warm*, *cool*, *widen*, *darken*, etc. One influential analysis of such verbs is proposed by Kennedy and Levin (2008), whereby these verbs are derived from and share a core semantics with their underlying adjectives (see also Pedersen 2015). The proposal builds on the analysis of gradable adjectives espoused in Kennedy (1997, 2007), whereby gradable adjectives are analyzed as denoting *measure functions* semantically. Type-theoretically, they are therefore functions from individuals to degrees, which like individuals are conceived of as a distinct semantic type in the grammar, i.e., gradable adjectives are of semantic type $<e,d>$.[2] (12) shows as an example the semantics of a gradable adjective like English *warm*, which maps an individual to the degree of warmth it possesses.[3]

(12) $[\![warm]\!]$: λx.WARMTH(x) $<e,d>$

Note that because a gradable adjective is of type $<e,d>$, it is not a property of an individual and not straightforwardly truth-evaluable, i.e., it does not result in a formula of type t after all other arguments have been saturated. Kennedy (1997, 2007) proposes this to be the semantic contribution of degree morphemes, such as the null POS(ITIVE) morpheme responsible for introducing a contextual norm and therefore evaluativity in examples like (10) and also other degree morphemes like the comparative suffix *-er*. We set aside the precise formulations of the semantics of these morphemes. Returning to degree achievements, Kennedy and Levin (2008) assume they are derived from the measure functions of their underlying gradable adjectives. Specifically, a verb like *warm* denotes a *measure of change function* derived from the underlying measure function denoted by adjectival *warm*. A measure of change function is just like a measure function except it is relativized to an event. That is, it is a function of semantic type $<e,<v,d>>$, returning a *degree of change* in the measure of a gradable property held between the start and end of an event by an object. A measure of change function is notated as $\mathrm{m}^{\uparrow}_{m(x)(init(e))}$(x)(*fin*(e)), which is a function that takes an individual and *init*(e) and *fin*(e) (which return the initial and final temporal intervals of an event) as arguments, and returns a degree of difference of an object holding the property denoted by the initial measure function m in (13). Verbal *warm* then will have a denotation as in (14).

[2]We adopt a standard type-driven compositional semantics of the sort in, e.g., Heim and Kratzer (1998), where e is the type of individuals, v the type of events, s the type of states, d the type of degrees, and t the type of truth values. Functions are therefore complex types recursively built out of the basic types. Sepcifically, if α is a type and β is a type, then $< \alpha, \beta >$ is a type and so on.

[3]More precisely, gradable adjectives should be functions from individuals to functions from times to degrees, since an object can hold different measures of the same property at different times (Kennedy and Levin, 2008). We suppress time variables here for brevity.

(13) Measure of change:
For any measure function **m**, $\mathbf{m}_{\triangle} = \lambda x.\lambda e.\mathrm{m}^{\uparrow}_{m(x)(init(e))}(x)(\mathit{fin}(e))$
(Kennedy and Levin, 2008)

(14) $[\![warm_v]\!]$: $\lambda x.\lambda e.\textsc{warmth}^{\uparrow}_{warmth(x)(init(e))}(x)(\mathit{fin}(e))$

As with gradable adjectives, a measure of change function does not return a property of events and therefore, has to compose with degree morphemes that ultimately return a property of events that is truth-evaluable, which include again comparative or equative morphemes that operate in the verbal domain. Again, we put aside the precise formulation of the semantics of these morphemes for now and focus on one prediction of such an account of degree achievement verbs. Focusing specifically on Dutch *zo*, if degree readings of adjectival equatives are due to the fact that gradable adjectives make available a degree argument that *zo* manipulates and compares (as suggested by Rett 2013 for the English equative PM *as*), then the empirical prediction is that verbal equatives involving degree achievement verbs should at least have a degree reading available, whereby two degrees of change are being compared and equated. This empirical prediction, however, is not borne out. Even with a degree achievement verb like *opwarmen* 'to warm', only a manner reading is available and degree readings remain unavailable as in (15).[4]

(15) We hebben de pizza ***zo*** opgewarmd ***als*** de lasagne
we have the pizza so warmed as the lasagna
'We warmed the pizza like the lasagna.'

a. Namelijk in de oven.
namely in the oven
'Namely by putting them in the oven.'

b. #Namelijk met 10 graden.
namely by 10 degrees
'Namely by 10 degrees.'

That degree readings remain unavailable in verbal equatives even with degree achievement verbs, which should make a degree argument available, is complicated further by the fact that a degree reading *is* available and, in fact, is the *only* reading available with the comparative, which utilizes a different degree morpheme *meer* 'more' and a different SM *dan* 'than'. No intuitive manner reading is available with the comparative of a degree achievement verb.

(16) We hebben de pizza ***meer*** opgewarmd ***dan*** de lasagne, namelijk met 10 graden.
we have the pizza more warmed than the lasagna namely by 10 degrees

[4]We illustrate here with the *zo...als...* word order for brevity, though the same observation holds for the *zoals...* word order.

'We warmed the pizza more than the lasagna, namely by 10 degrees.'

This state of affairs, namely the asymmetry between the comparative and equative with regard to degree readings with degree achievement verbs, implies two things. First, the correct analysis of degree achievement verbs should not involve degree arguments, a conclusion already reached by Rett (2013) and Wellwood (2015). If degree achievement verbs make a degree argument available and comparison constructions manipulate and compare degree arguments, as is commonly assumed for the comparative, then the Dutch facts regarding verbal equatives with degree achievement verbs will seem to necessitate separate analyses of the semantics of degree achievement verbs. Specifically, if *zo* access degrees made available by gradable adjectives in adjectival equatives, then one would have to analyze degree achievement verbs as not making degree arguments available *only in verbal equatives* but not for verbal comparatives. That the same class of verbs should have vastly different semantics across two different comparison constructions seems highly implausible and would likely be stipulative and not explanatory.

Second, and related to the first issue, is that the asymmetry between verbal equatives and verbal comparatives with regard to degree achievement verbs suggest that degree readings and therefore, degree arguments, are tied to individual degree morphology like comparative *meer* and equative *zo* rather than the verbs themselves. For comparative *meer*, one might follow Wellwood (2015) and suggest that it compositionally introduces degree arguments in a decompositional analysis, much like how it is proposed English *more* can be decomposed into comparative *-er* and a degree-introducing operator MUCH (see also Bresnan, 1973). This is, in fact, transparent in English, where verbal equatives comparing degrees require the overt presence of *much* with the PM *as* regardless of verb class, suggesting that it is an abstract MUCH that introduces degrees across the board in comparison constructions.

(17) a. Nadine ran *(as ***much***) as Sigrid did, that is, they both ran 4km. (activity verb)

b. Nadine warmed the pizza *(as ***much***) as the lasagna, that is, by 10 degrees celsius. (degree achievement verb)

If English *more* and Dutch *meer* can really be decomposed into a comparative operator and an abstract MUCH that provides degree arguments, the implication for equative *zo* in Dutch then is that it does not contain such an operator that directly introduces a degree argument. This is because if it does, then we expect degree readings with verbal equatives in general regardless of verb class, just as with comparatives of verbs involving *meer*, which we have already observed to not be the case. This further implies that if we take a unified approach to *zo* in both adjectival and verbal equatives, then the degree readings observed with gradable adjectives in adjectival equatives built with *zo* must come neither from *zo* nor from the gradable adjective itself. Rather, the degree readings must somehow arise via other means if one is to account for the full range of observations regarding

adjectival and verbal equatives. We will propose such an analysis in §3, building off the proposal of Anderson and Morzycki (2015), whereby degrees and manners are derived from other kinds of semantics objects that are inherently tied to the syntactic categories of gradable adjectives and verbs.

2.3 Scope ambiguities

It is well-known that in comparatives (of superiority) that the scope of comparison can vary with respect to other scope-taking elements like modal auxiliaries when the comparison clause is embedded under such verbs (Heim, 2000, 2006; Bhatt and Pancheva, 2004; Beck et al., 2009). Consider the following Dutch example involving a comparative clause embedded under the modal auxiliary *mag* 'may'. Two readings are available, as brought out by the continuations in (18a)-(18b). The first is when comparison takes narrow scope underneath the modal auxiliary (18a); here, the relevant reading is that 25 pages constitutes a *minimum* length for the final paper, therefore allowing it to be more than 25 pages long. On the other hand, the wide scope reading (18b) makes 25 pages the *maximum* length the final paper can be.[5]

(18) **Context: My draft is 20 pages long.**

De definitieve versie mag [exact vijf pagina's langer zijn dan de kladversie].
the final version may exactly five pages longer be than the draft
'The final paper is allowed to be exactly five pages longer than this draft.'

a. Maar zelfs tien pagina's meer dan wat je nu hebt is nog oké.
but even ten pages more than what you now have is still okay
'But even ten pages more than what you have now will still be okay.'
Modal ≫ Comparison

b. Maar in geen geval langer.
but in no case longer
'But definitely not longer!' Comparison ≫ Modal

This therefore motivates an analysis where comparison is treated as a quantificational structure, where there is a quantifier that can take scope at different points within the structure, as pioneered by Heim (2000, 2006) (though see Kennedy 1997 for a different view). Quantifcational analyses like Heim's posits that comparative morphology, such as the English comparative suffix *-er*, is a *degree quantifier*; that is, it takes as input two sets of degrees and asserts that the maximum degree of one set of ordered degrees, returned

[5] As noted by Heim (2000, 2006) and Beck et al. (2009) (amongst others), the scope ambiguity observed here is subject to two factors. First, the modal auxiliaries that comparison interacts with is limited to a particular subset within English and is likely to vary across languages. Second, in order to bring out truth-conditional differences between the narrow and wide scope readings, it is necessary to make the differential exact, as shown by the modifier *exactly* in the Dutch example (and also English), and that the standard of comparison must be a definite degree description, explaining why a context specifying the length of the draft to be 20 pages is required.

by the operator MAX, is greater than the maximum of another set of ordered degrees. Similar to more familiar quantifiers over individuals, the semantic type of the comparative operator is therefore $<<d,t>,<<d,t>,t>>$.

(19) $[\![\textit{-er}]\!]$: $\lambda D'_{dt} \lambda D_{dt}.\text{MAX}(D) > \text{MAX}(D')$
where $\text{MAX}(D) = \iota d[d \in D \wedge \forall d'[d' \in D \rightarrow d' \leq d]]$

The two sets of degrees are assumed to be provided by the matrix and standard clauses; here, gradable adjectives are analyzed as relations between individuals and degrees, i.e., type $<<d,<e,t>>>$ (cf. Kennedy 1997), with a covert degree variable saturating the degree argument of the gradable adjective in the standard clause (which is assumed to be clausal subject to COMPARATIVE DELETETION) and subsequent abstraction of this variable to produce a set of degrees (Chomsky, 1977). This is then taken as an argument by the comparative suffix, producing a generalized quantifier over degrees. Assuming the comparative suffix and the standard clause is sister to the gradable adjective in the matrix clause, this is a familiar type mismatch between types $<<d,<e,t>>>$ and type $<<d,t>,t>$ constituents, triggering the familiar rule of QUANTIFIER RAISING (QR). A sample derivation of a simple English comparative is shown below.

(20) Kim is taller than Susan.
[*Kim is* [~~*Kim*~~ [*-er* [*Susan* ~~*is d-tall*~~]]*-tall*]]

a. $[\![\textit{Susan } \sout{\textit{is d-tall}}]\!]$: $\lambda d.\text{HEIGHT}(\textit{susan}) \geqslant d$ (LAMBDA ABSTRACTION)

b. $[\![\textit{-er}]\!]$: $\lambda D'_{dt} \lambda D_{dt}.\text{MAX}(D) > \text{MAX}(D')$

c. $[\![\textit{-er}\ [\ \textit{Susan } \sout{\textit{is d-tall}}\ ]]\!]$: $\lambda D_{dt}.\text{MAX}(D) > \text{MAX}(\lambda d.\text{HEIGHT}(\textit{susan}) \geqslant d)$

d. $[\![\ [\ \sout{\textit{Kim}}\ d_1\textit{-tall}\ ]\ ]\!]$: $\text{HEIGHT}(\textit{kim}) \geqslant d$
(QR with type d trace, FUNCTION APPLICATION)

e. $[\![\ [\textit{-er}\ [\ \textit{Susan } \sout{\textit{is d-tall}}\ ]\ ]_1\ \lambda d_1\ [\ \textit{Kim is}\ [\ \sout{\textit{Kim}}\ d_1\textit{-tall}\ ]\ ]\ ]\!]$:
$\text{MAX}(\lambda d.\text{HEIGHT}(\textit{kim}) \geqslant d) > \text{MAX}(\lambda d.\text{HEIGHT}(\textit{susan}) \geqslant d)$

Against this backdrop, we can now analyze scope ambiguities of the sort observed in (18) as a matter of whether QR attaches the generalized quantifier above or below the modal auxiliary. We illustrate below with the English counterpart of (18), setting aside the compositional steps for brevity. As with standard modal logic, we analyze the modal auxiliary *may* as an existential quantifier over possible worlds *w'*, and *w'Rw* encodes an accessibility relation whereby *w'* is accessible from the world of evaluation *w* based on the modal base encoded by the relevant modal auxiliary (which we set aside).

(21) **Context: My draft is 20 pages long.**
The final paper may be exactly 5 pages longer than the draft.

a. [*The final paper may* [*exactly 5 pages -er than the draft*]$_1$ [λd_1 [*be* [d_1*-long*]]]]
$\exists w'[w'Rw \wedge \text{MAX}(\lambda d.\text{LENGTH}(\textit{final paper}) \text{ in } w' \geqslant d) = \textit{25-pages}]$
there is some accessible possible world whereby the maximum of the set of

degrees that the final paper reaches or exceeds in length is 25 pages, i.e., in other words the maximum can be different in other worlds!

Modal ≫ Comparison, min. reading

b. [[*exactly 5 pages -er than the draft*]$_1$ [λd_1 [*The final paper may* [*be* [d_1*-long*]]]]]

MAX(λd.$\exists$w'[w'Rw $\wedge$ LENGTH(*final paper*) in w' $\geqslant$ d) = *25-pages*

the maximum of the set of degrees such that for each degree in this set, there is an accessible possible world in which the final paper reaches or exceeds that degree, is 25 pages, i.e., there is no world in which the length of the final paper is greater than 25 pages!

Comparison ≫ Modal, max. reading

If scope ambiguity of the standard clause in comparatives is indicative of a quantificational structure, then a similar ambiguity in equatives should also indicate that we are dealing with a scopally mobile equative quantifier. Indeed, the same sort of scope ambiguity is observed with adjectival equatives in Dutch, with the same minimum and maximum reading based on whether comparison is interpreted above or below a matrix modal auxiliary, as demonstrated in (22).

(22) **Context: You just submitted your B.A. thesis and proudly show it to me. I inquire after its length and you tell me that it's 60 pages. I'm currently writing my master's thesis and I tell you...**

Mijn master thesis mag net ***zo*** lang zijn ***als*** jouw bachelor paper.
my master's thesis may exactly so long be as your bachelor paper
'My master's thesis is allowed to be exactly as long as your B.A. thesis.'

a. Maar vijf pagina's korter dan wat je nu ingediend hebt zou ook
but 5 pages shorter than what you now submitted have would also
al oké zijn en tot 70 pagina's is ook nog toegelaten.
already okay be and until 70 pages is also still allowed
'But even 5 pages shorter would be okay and 70 pages is allowed as well.'

Modal ≫ Comparison, min. reading

b. En geen pagina meer!
and no page more
'And not a single page more!'

Comparison ≫ Modal, max. reading

(based on Hohaus and Zimmermann, 2021)

Since equatives built out of gradable adjectives compare and equate degrees much like comparatives, it is perhaps unsurprising that they too show the same sort of scope ambiguity as their comparative counterparts. Indeed, Rett (2013) analyzes the English PM *as* as a degree quantifier on par with comparative *-er*, with the only difference being the exact relation it encodes. While comparative *-er* encodes a strictly greater-than relation, equa-

tive *as* encodes a greater-than-or-equal-to relation between two degrees, as shown below.[6] If Dutch *zo* is analyzed just like English *as*, namely as a degree quantifier, then the scope ambiguity in (22) should be unsurprising.

(23) a. $[\![\text{-}er]\!]$: $\lambda D'_{dt}\lambda D_{dt}.\text{MAX}(D) > \text{MAX}(D')$
b. $[\![as]\!]$: $\lambda D'_{dt}\lambda D_{dt}.\text{MAX}(D) \geqslant \text{MAX}(D')$

What is perhaps surprising is that the same sort of scope ambiguity is observed with verbal equatives built with *zo* (regardless of linear order of the *als*-clause), which does not have degree readings. The relevant reading in (24a) is that of a minimum reading, whereby the ways in which the colleague spends her funds constitute just some possible ways in which I can spend my funds that does not rule out other possible ways. On the other hand, (24b) imposes a maximum reading, where the ways in which my colleague can spend funds is an exhaustive list of ways in which I may spend my funds and no other ways are possible. This ambiguity is therefore completely parallel with the readings available in (22), which can be analyzed in terms of where comparison takes scope with respect to the modal auxiliary.

(24) **Context: A foreign colleague can spend their research funds on equipment, books, and conference travel. She asks about how I may spend my funds and I reply...**
Ik mag mijn beurs exact ***zo*** <***als*** jij> gebruiken <***als*** jij>.
I may my funding exactly so as you use as you
'I may spend my funds in exactly the same way as you.'
a. Maar ik mag ze ook gebruiken om sprekers uit te nodigen.
but I may her also use to speakers PRT PRT invite
'But I may also spend it on inviting speakers.' Modal ≫ Comparison
b. En voor niets anders!
and for nothing else
'And nothing else!' Comparison ≫ Modal
(based on Hohaus and Zimmermann, 2021)

The observations regarding scope ambiguities with both adjectival and verbal equatives built with *zo* imply two things. First, equatives built with *zo* involve quantificational structures and the presence of a scopally mobile quantifier, regardless of whether the parameter of comparison is a gradable adjective or a verb and consequently, whether degrees or manners are being compared. Second, it is clear that *zo* cannot simply be a quantifier over degrees as has been proposed for the English equative PM *as*, since verbal equatives likewise exhibit scope ambiguities. In fact, analyzing *zo* as a quantifier at all would mean that there is no unified analysis for its use in other non-comparison contexts as illustrated in

[6]This therefore explains why adjectival equatives comparing and equating degrees have an 'at least' interpretation, with the stronger 'exactly' interpretation derived pragmatically through competition with the logically stronger comparative (Rett, 2013).

(3)-(4). These observations, coupled with the observations regarding the asymmetry in the availability of degree readings with degree achievement verbs across comparatives and equatives, strongly suggest that the correct analysis of Dutch equatives formed with *zo* must be quantificational in nature, but not with degrees or manners being directly quantified over. Rather, as previously noted, degree and manner readings in equatives built with *zo* must arise via some other means in order to account for the observations in degree achievement verbs across equatives and comparatives as well as the sensitivity of degree versus manner readings to the syntactic category of the parameter of comparison. We turn next to providing such an analysis.

3 Analysis

The preceding discussion made clear two desiderata for an analysis of Dutch equatives formed with the PM *zo* and the SM *als*. First, both gradable adjective and verbal parameters of comparison are marked with the same PM *zo*, the same pro-form used in non-comparison contexts, and produces degree and manner readings with gradable adjectives and verbs respectively. An analysis should therefore explain why the same pro-form is used across these contexts and how it produces exclusive degree and manner readings. Second, regardless of how degree and manner readings emerge, they should be quantified over by an equative quantifier in order to account for the fact that Dutch equatives formed with *zo* exhibit scope ambiguities with matrix modal auxiliaries similar to the more well-studied comparative construction. We proceed to address each of these desiderata next.

3.1 Degrees and manners as kinds

The starting point for the analysis lies in the observation that the pattern in Dutch is not an isolated one. Rather, it fits squarely into observations by Anderson and Morzycki (2015) that many languages tend to use the same pro-form for anaphoric reference to either degrees or manners with gradable adjectives and verbs respectively. Polish is a representative example; as shown below in (26)-(27), the same pro-form *tak* 'such' is used as an adjectival and verbal modifier to refer to some contextually specified degree or manner. Tellingly, the same pro-form *tak* also modifies nouns, returning a nominal kind reading (*that kind of dog*) familiar from works like Chierchia (1998).

(25) ***tak-i*** pies
such-MASC dog
'a dog of that kind'

(26) ***tak*** wysoki
such tall
'that tall'

(27) ***tak*** się
such REFL
zachowywać
behave
'behave that way'

(Anderson and Morzycki, 2015, p. 793)

The parallels, in fact, run even deeper than the use of pro-forms with nominals, gradable adjectives, and verbs. Just as with Dutch, Polish uses the same pro-form *tak* 'such' to mark parameters of comparison in equatives, while marking standards with *jak*, assumed to be a sort of *wh-* expression. Unsurprising by now, just as with its use in non-comparison contexts, adjectival equatives formed with *tak* in Polish compare degrees while verbal equatives formed with *tak* compare manners.

(28) Floyd jest ***tak*** wysoki ***jak*** Clyde.
Floyd is such tall WH Clyde
'Floyd is as tall as Clyde.'

(29) Floyd śpiewal ***tak*** ***jak*** Clyde śpiewał.
Floyd sang such WH Clyde sang
'Floyd sang as Clyde sang.'

(Anderson and Morzycki, 2015, p. 815-816)

Anderson and Morzycki (2015) argue that this recurring pattern of using the same pro-form to anaphorically refer to both degrees and manners with gradable adjectives and verbs respectively should not be treated as an accident. Furthermore, the parallel between degrees and manners and nominal kinds should also be taken seriously. Just as how a nominal kind, such as English bare plurals like *dogs*) being the totality of all instances of individuals with dog-like properties across worlds (i.e., intentionalized), we may collect all instances of events and states across worlds which share some relevant coherent property that may correspond to some intuitive 'name' of a kind. Degrees and manners, as Anderson and Morzycki (2015) argue, are precisely the relevant kinds of 'names' for such pluralities of events and states; in some sense, degrees and manners are *distinguished properties* of events and states respectively. This has some conceptual real-world motivation, as they write:

> 'There is a sense that, in the case of states associated with gradable predicates, **degrees are a central part of what states are for**. The principal reason we talk about such states is to **compare them in a scalar fashion to others, or to a standard**. ... ... Nevertheless, it seems reasonable to suppose that a core part of what it is to be an event is to be realized in a certain manner. To be sure, for some events, we care a great deal about their temporal extent, and for others, about their spacial extent. But for virtually any event, **we care about how it took place**. We don't talk about events chiefly to measure them. We talk about them chiefly **to characterize or explain them**.'
>
> (Anderson and Morzycki, 2015, p. 815-816, emphasis ours)

As they observe, not any random collection of events and states will correspond to an intuitive, coherent notion. To be of a certain height, say 6 feet, for example, can be thought of as a state; measuring a state of having some height and determining that it

is 6 feet therefore reduces to saying an individual's state of having 6-feet of height is *a part of the plurality of states that reaches at most 6 feet*.[7] This plurality or a state-kind can be given a kind-name, essentially a degree 6-FEET. This intuitively reproduces the ordering of degrees in a degree-based framework. The set of states of heights that reaches at most 3 feet is going to be included in the set of states that reaches 6 feet, and so does the set of states of heights that reaches 4 feet, and so does the set of states of heights that reaches 5 feet and so on, just as the set of degrees a 6-foot individual reaches or exceeds is going to include the degrees 3-feet, 4-feet, and 5-feet. In the same vein, one can collect all the events that are performed clumsily and this collection of events can be characterized by an event-kind name, namely CLUMSY. The underlying intuition is therefore going to be identical with state kinds; for an event to be carried out in a certain manner is to say that an event is included in the plurality of events that share a way in which they are all carried out in a particular world. It is in this sense that degrees and manners are distinguished properties of states and events respectively.

Against this backdrop, Anderson and Morzycki (2015) provide a fairly straightforward way to introduce kinds into the semantic composition, which is to take them as a distinct semantic type, which we can simply label as π. Since *zo* is the morphosyntactic element that is interpreted either as degrees or manners, we take *zo* to be the element that compositionally introduces kinds, just as how Anderson and Morzycki (2015) analyze Polish *tak*. In (30), *k* is a variable over kinds whereas *o* is a partially type-neutral variable over either events or states. The pro-form *zo* therefore presupposes that *k* must be among the distinguished properties of the object *o*, and asserts that the semantic object *o* is included in the plurality of objects of the same type sharing some property describable by *k* (instantiates a kind), notated as $^{\cup}k(o)$ utilizing Chierchia's (1998) $^{\cup}$ operator. In other words, the semantic type of *zo* is $<\pi,<\alpha,t>>$, a function from kinds to predicates of α, itself a variable over the semantic types of events and states (v and s). Formally, $^{\cup}$ takes a kind argument and returns the set of objects that are part of that kind, i.e., it is predicativizing. (31) demonstrates using the degree state-kind 6-FEET and manner event-kind ELEGANT.

(30) $[\![zo]\!]$: λk.λo:DIST (o,$^{\cup}$k).$^{\cup}$k(o) $<\pi,<\alpha,t>>$
where DIST(o,P) is true iff P is among the distinguished properties of o.

(31) a. $[\![$*Kim is 6 feet tall*$]\!]$: λs.TALL(s,*kim*) $\wedge$ $^{\cup}$SIX-FEET(s)
where $^{\cup}$SIX-FEET(s) is equivalent to s $\leq$ SIX-FEET, i.e., s is a subpart of the plurality of states named by SIX-FEET at a world w

b. $[\![$*Kim danced elegantly*$]\!]$: λe.DANCE(e,*kim*) $\wedge$ $^{\cup}$ELEGANT(e)
where $^{\cup}$ELEGANT(e) is equivalent to e $\leq$ ELEGANT, i.e., e is a subpart of the plurality of events named by ELEGANT at a world w

[7] Note that this is different from the analysis in Anderson and Morzycki (2015), who take a 6-FEET state-kind to be the plurality of states of individuals who are *exactly* 6-feet tall. Our analytical approach as compared to Anderson and Morzycki (2015) will be crucial in building a quantificational analysis to account for the scope ambiguity facts, which we provide shortly.

With the semantics of *zo* in (30), we can now account for how it is used in non-comparison contexts, where it serves as a pro-form over degrees and manners. Specifically, we may assume that *zo*'s first kind argument is saturated by a free kind variable, which produces a predicate over type-neutral objects. This then combines with the verb or gradable adjective (assuming their arguments are introduced by functional heads) via PREDICATE MODIFICATION to produce a predicate of events or states, asserting that the event or state instantiates an event- or state-kind *k*, the reference of which is retrieved anaphorically from context or given by the assignment function *g*.

(32) a. $[\![$*zich zo gedragen*$]\!]^g$: λe.BEHAVE(e) $\wedge$ $^{\cup}$k(e)
b. $[\![$*zo groot*$]\!]^g$: λs.TALL(s) $\wedge$ $^{\cup}$k(s)

3.2 Comparison in standard markers

We may now turn to the use of *zo* in equatives, taking seriously the null hypothesis that the exact same *zo* is involved in building equatives as that in non-comparison contexts. Note now that unlike standard analyses of comparative morphology as degree quantifiers like English *-er*, nothing about the semantics of *zo* in (30) provides comparison semantics. Anderson and Morzycki (2015) assume equative semantics to be derived through type-shifting operations. Specifically, assuming that the standard clause is complement to a kind-introducer like *zo*, then type-shifting is required to produce a constituent of the right semantic type to serve as argument to *zo*. Two types of type-shifitng operations are well-attested, namely IOTA SHIFT or EXISTENTIAL SHIFT, defined below.

(33) a. Iota Shift (from $<\tau,t>$ to τ, where τ is any atomic type): shift P to ιx_τ[P(x)]
b. Existential Closure Shift: (from $<\tau,t>$ to $<<\tau,t>,t>$, where τ is any atomic type): shift P to $\lambda Q_{\tau,t}.\exists x_\tau$[P(x) $\wedge$ Q(x)]

(Anderson and Morzycki, 2015, p. 814)

Starting with adjectival equatives formed with *zo*, the standard *als*-clause contains a copy of *zo groot*, which undergoes comparative deletion. The first argument of *zo* in the standard clause is saturated by a free kind variable, after which it is abstracted over once the state variable is existentially closed (cf. Chomsky 1977). This is complement to the copy of *zo* in the matrix clause. However, this produces a type-mismatch, since *zo* in the standard clause requires a kind as its first argument. Assuming that there is always a unique degree of height that an individual instantiates, Anderson and Morzycki (2015) assume that IOTA SHIFT applies to the *als*-clause, turning a predicate of kinds into a unique kind, i.e., type $<k,t>$ to type k, which can then serve as argument to the matrix copy of *zo*.[8] The

[8]This is due to the fact that Anderson and Morzycki (2015) assume a degree state-kind like 6-FEET is a plurality of states of an individual being *exactly* 6-feet tall, which excludes individuals that are 5-feet tall or 7-feet tall and so on. As noted previously, we do not follow this assumption, instead assuming that a state-kind like 6-FEET is the plurality of states of individuals holding heights of *at-most* 6 feet, which will

full composition proceeds as below; most notably, the standard clause, which denotes a definite kind description, is interpreted *in-situ* as an argument to *zo*.

(34) [Jan is [~~Jan~~ ***zo*** [Iota Shift λk [***als*** Sue ~~is [***zo k***] groot~~]]] groot]]
John is John so as Sue is so tall tall

a. $[\![\lambda k$ [***als*** Sue ~~is [***zo k***] groot~~] $]\!]$: λk.$\exists$s[TALL(s,*sue*) $\wedge$ $^{\cup}$k(s)]
(set of kinds (degrees) Sue's tallness state instantiates)

b. $[\![$ Iota Shift λk [***als*** Sue ~~is [***zo k***] groot~~]$]\!]$: ιk.$\exists$s[TALL(s,*sue*) $\wedge$ $^{\cup}$k(s)]
(the unique kind (degree) Sue's tallness state instantiates)

c. $[\![$ ***zo*** [Iota Shift λk [***als*** Sue ~~is [***zo k***] groot~~]] groot]] $]\!]$: λo.$^{\cup}\iota$k.$\exists$s[TALL(s,*sue*) $\wedge$ $^{\cup}$k(s)](o)

d. $[\![$ [Jan is [~~Jan~~ ***zo*** [Iota Shift λk [***als*** Sue ~~is [***zo k***] groot~~]]] groot]]$]\!]$:
λs'.TALL(s',*jan*) $\wedge$ $^{\cup}\iota$k.$\exists$s[TALL(s,*sue*) $\wedge$ $^{\cup}$k(s)](s') (PREDICATE MODIFICATION)
'John's state of tallness instantiates the unique kind that Sue's state of tallness instantiates, i.e., they have the same degree of height'

As for verbal equatives, the assumption is that unlike degree state kinds, whereby an individual always holds a unique degree state-kind, no such unique manner event-kind exists. The intuition is simple: if an individual is exactly 6-feet tall, then the individual cannot be said to be exactly 7-feet tall and similarly, cannot be exactly 5-tall. On the other hand, if an event is carried out clumsily, this does not rule out the event also being carried out funnily, since there is no intrinsic ordering on manners as there is with degrees. IOTA SHIFT is therefore undefined with event kinds and EXISTENTIAL SHIFT applies instead. As with adjectival equatives, the *als*-clause of verbal equatives is assumed to be clausal and complement to *zo*. The same type mismatch occurs but this time, EXISTENTIAL SHIFT applies to turn the *als*-clause into a genralized quantifier over kinds, triggering the familar rule of QR, leaving behind a kind trace that saturates the kind argument of matrix *zo*. The composition is illustrated below.

(35) [[Nadine had λk_i [~~Nadine had~~ [***zo*** t_i] gerend]] [Existential Shift λk [***als*** Sigrid
Nadine has Nadine has so run as Sigrid
~~had ***[zo k]*** gerend~~]]$_i$]
has so run

a. $[\![\lambda k$ [***als*** Sigrid ~~had ***[zo k]*** gerend~~]$]\!]$: λk.$\exists$e[RUN(e,*sigrid*) $\wedge$ $^{\cup}$k(s)]]
(set of kinds (manners) Sigrid's running instantiates)

b. $[\![$ Existential Shift λk [***als*** Sigrid ~~had ***[zo k]*** gerend~~]$]\!]$:
λQ.$\exists$k[$\exists$e[RUN(e,*sigrid*) $\wedge$ $^{\cup}$k(e)] $\wedge$Q(k)]] (generalized quantifier over kinds)

c. $[\![$[Nadine had λk_i [~~Nadine had~~ [***zo*** t_i]] gerend]]$]\!]$:
$\lambda k_i.\exists$e'[RUN(e',*nadine*) $\wedge$ $^{\cup}$k$_i$(e')] (QR of *als*-clause with a kinds trace)

d. $[\![$[[Nadine had λk_i [~~Nadine had~~ [***zo*** t_i] gerend]] [Existential Shift λk [***als***
Sigrid ~~had ***[zo k]*** gerend~~]]$_i$]$]\!]$:

include 5-feet tall states, 4-feet tall states etc.

$\exists$k[$\exists$e[RUN(e,*sigrid*) $\wedge$ $^{\cup}$k(e)] $\wedge$ $\exists$e'[RUN(e',*nadine*) $\wedge$ $^{\cup}$k(e')]]
'Sigrid's running instantiates a kind that Nadine's running also instantiates, i.e., there is a manner in which they both ran'

While the approach of Anderson and Morzycki ensures that the standard *als*-clause can compose with *zo* either directly or indirectly via QR, it makes one crucial prediction. Since QR applies only with verbal equatives and not adjectival ones, they should predict scope ambiguities only with verbal and not adjectival equatives. This is counterintuitive, since we expect scope ambiguities with adjectival equatives comparing degrees on par with their comparative counterpart rather than verbal equatives comparing manners (which are not inherently ordered like degrees are). It is also empirically inaccurate; as already shown in §2.3, *both* adjectival and verbal equatives exhibit scope ambiguities in Dutch. Given these considerations, we depart from Anderson and Morzycki (2015) in giving a full quantificational analysis to Dutch equatives whether the parameter of comparison is a gradable adjective or verb.

The first step is to remind ourselves that if the standard *als*-clause denotes a set of kinds as in Anderson and Morzycki (2015), then we have a type-mismatch problem that motivates their analysis of type-shifting. This is, however, not a necessary assumption. As argued by at length by Alrenga et al. (2012), sentence-level comparative semantics can be introduced by the SM instead of comparative morphology on gradable adjectives (or verbs).[9] We follow this general line of reasoning and propose that equative semantics is introduced by the SM *als* itself. Specifically, we take the SM *als* to be a quantifier over kinds in (36); it takes two sets of kinds as arguments (*K* and *K'*) and asserts that one is a subset of another.[10]

(36) $[\![als]\!]$: $\lambda K_{\pi t}.\lambda K'_{\pi t}.\{k{:}K(k) = 1\} \subseteq \{k'{:}K'(k') = 1\}$

As with quantificational analyses of comparatives, we assume the two sets of kinds to be provided by the standard and matrix clause. Here *als* would uniformly take the standard

[9] Alrenga et al. (2012) make three observations that provide support for such an analysis. First, not all languages have comparative morphology on gradable adjectives and many languages use the bare adjectival form together with an SM to build comparatives, suggesting comparative semantics come from the SM. Second, the semantic scope of the comparative clause always corresponds one-to-one with its syntactic position whereas comparative morphology remains on the gradable adjective, which is unexpected if comparative morphology is the degree quantifier in question. Finally, the difference between clausal and phrasal standards of comparison is cross-linguistically marked on the SM and never on the PM, suggesting it is the SM that is a degree quantifier that varies in what it takes as it arguments. We will not reproduce the detailed argumentation here for reasons of space; the reader should consult Alrenga et al. (2012) for a detailed exposition.

[10] We switch to a subset-based semantics here to accommodate the fact that manners are not inherently ordered like degrees are and a MAX-based semantics would be undefined for verbal equatives. As noted by many (e.g., Rett 2013), a subset-based semantics is equivalent with a MAX-based one in the domain of degrees and have often been used interchangeably. Comparatives under a subset-based semantics would simply assert that one set of degrees is a *strict subset* of another, as compared to the subset relation for equatives.

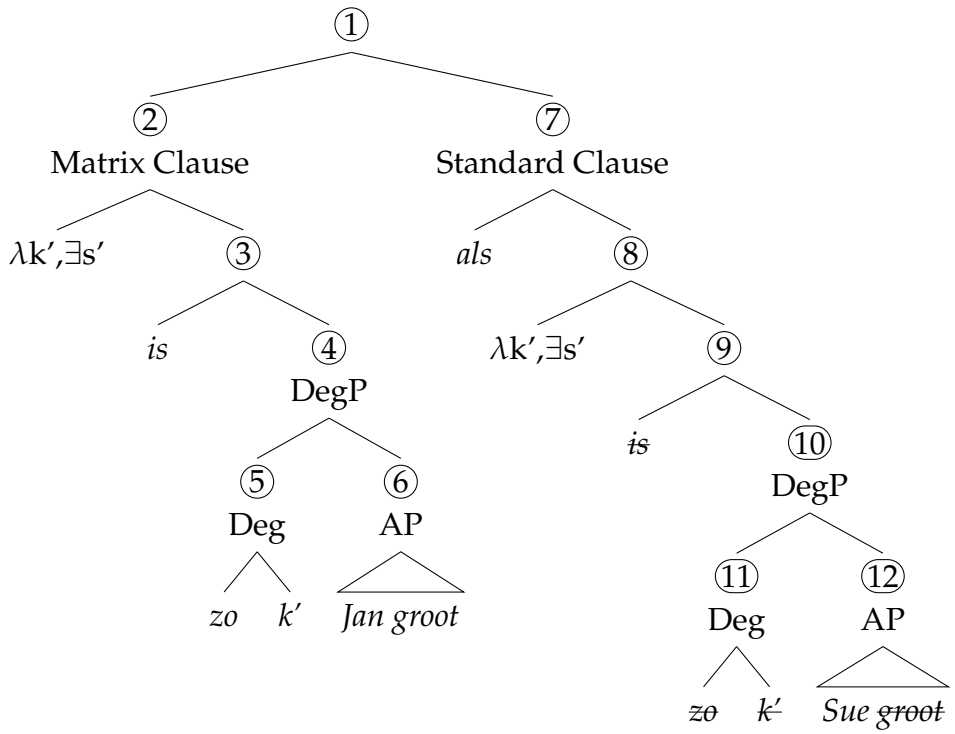
clause, assumed to be a set of kinds, as its first argument to produce a generalized quantifier. This analysis has one added advantage for Dutch; recall now that with adjectival equatives, there is no word-order flexibility with regard to the *als*-clause, which must be on the right periphery and cannot remain adjacent to *zo*, as shown again below.

(37) Jan is ***zo*** *<***als*** Sue> groot <***als*** Sue>.
John is so as Sue tall as Sue
'John is as tall as Sue.'

This therefore means that with adjectival equatives, the standard *als*-clause attaches exactly where the semantic scope of comparison is, instead of being the complement of a head realized by degree morphology and requiring QR (cf. Alrenga et al. 2012 for a similar analysis in English comparatives). In other words, with adjectival equatives, the standard *als*-clause is not the complement of the PM *zo*. This is, in fact, consistent with independent work on the syntax of adjectival phrases in Dutch; as Corver (1997, 2018) argues, 'degree' morphology like *zo* in the adjectival domain are functional heads within the extended projection of the lexical adjective and cannot take phrasal complements.[11] A full illustration of the structure of an adjectival equative built with *zo* and *als* is shown below, with movement of the subject for case reasons omitted for brevity, the copula assumed to be semantically vacuous, and a free kind variable saturates the kind argument of *zo* in both the matrix and standard clauses before being subsequently abstracted over (cf. Chomsky, 1977). The final denotation of the adjectival equative is as desired; since state kinds are essentially degrees, the final interpretation is that the set of degrees Sue's height reaches or exceeds is a subset of those that John's height reaches or exceeds, exactly as in a degree-based analysis.

(38) Jan is ***zo*** groot ***als*** Sue.
John is so tall as Sue
'John is as tall as Sue.'

[11] Corver's claim is supported by a similar asymmetry in word order between different classes of gradable adjectives. Specifically, he notes that adjectives that are derived out of verbs show the same flexibility with regard to the placement of the *als*-clause (and also the standard *dan*-clause with *minder* 'less' comparatives) as verbal equatives, whereby the *als*-clause can appear immediately adjacent to *zo*. On the other hand, true lexical gradable adjectives require obligatory right extraposition of the *als*-clause. This supports an analysis of degree elements like *zo* as functional heads with true lexical gradable adjectives, with the *als*-clause attached outside of *zo*. Deverbal adjectives, on the other hand, have *zo* and the *als*-clause attached as VP-level modifiers which are subsequently adjectivized by derivational morphology, which renders right extraposition optional. We will not reproduce the full argumentation here; the reader may consult Corver (2018, p.154-158) for a full discussion.



(39) Matrix clause:

a. ⟦⑤⟧: $\lambda o.^{\cup}k'(o)$

b. ⟦⑥⟧: $\lambda s'.\textsc{tall}(s',\textit{jan})$

c. ⟦③⟧: $\lambda s'.\textsc{tall}(s',\textit{jan}) \wedge {}^{\cup}k'(s')$ (identical to ④, PM)

d. ⟦②⟧: $\lambda k'.\exists s'[\textsc{tall}(s',\textit{jan}) \wedge {}^{\cup}k'(s')]$

(40) Standard clause:

a. ⟦⑪⟧: $\lambda o.^{\cup}k(o)$

b. ⟦⑫⟧: $\lambda s.\textsc{tall}(s,\textit{sue})$

c. ⟦⑨⟧: $\lambda s.\textsc{tall}(s,\textit{sue}) \wedge {}^{\cup}k(s)$ (identical to ⑩, PM)

d. ⟦⑧⟧: $\lambda k.\exists s[\textsc{tall}(s,\textit{sue}) \wedge {}^{\cup}k(s)]$

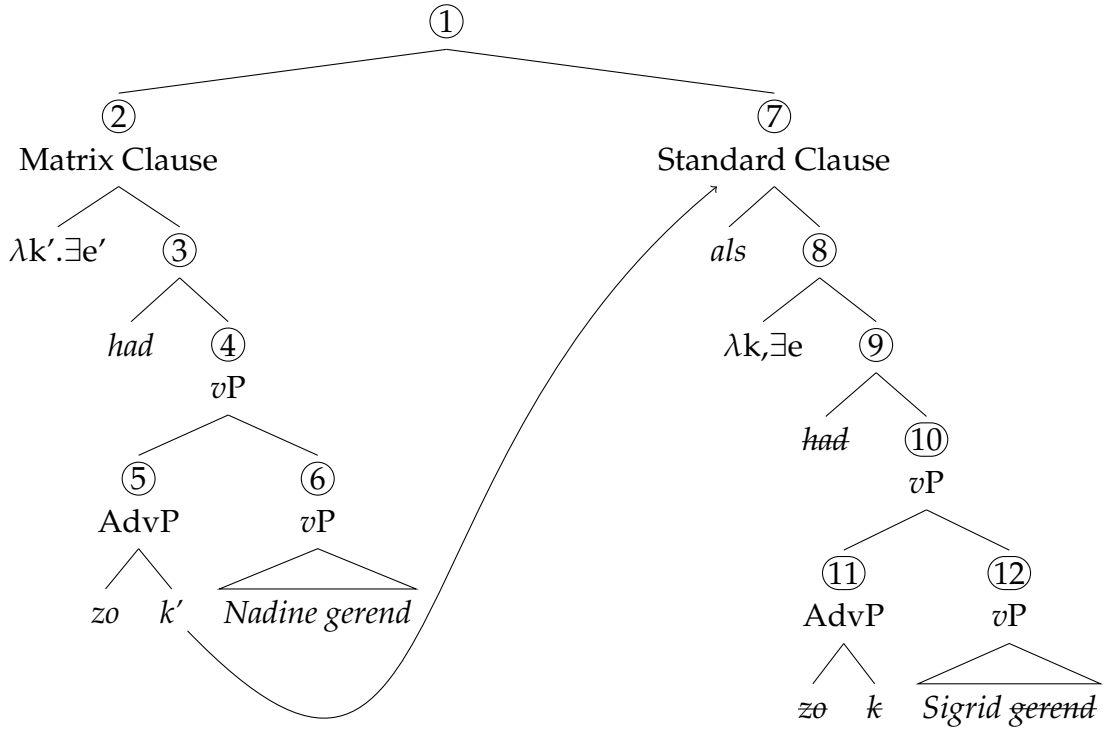
(41) a. ⟦⑦⟧: $\lambda K'_{\pi t}.\{k{:}\exists s[\textsc{tall}(s,\textit{sue}) \wedge {}^{\cup}k(s)] = 1\} \subseteq \{k'{:}K'(k') = 1\}$

b. ⟦①⟧: $\{k{:}\exists s[\textsc{tall}(s,\textit{sue}) \wedge {}^{\cup}k(s)] = 1\} \subseteq \{k'{:}\exists s'[\textsc{tall}(s', \textit{jan}) \wedge {}^{\cup}k'(s')] = 1\}$
'the set of state kinds Sue's height instantiates is a subset of the set of state kinds John's height instantiates'

Moving on to verbal equatives, we see that there is word-order flexibility in terms of where the *als*-clause is. This can be accounted for if we assume QR does occur in verbal equatives as compared to adjectival equatives, where the *als*-clause is rigidly right-peripheral. Again, this makes intuitive sense; in its pro-form use outside comparison constructions, *zo* refers to a manner in which an event was carried out, standardly analyzed as adjuncts. We may therefore assume *zo* in verbal equatives heads an adjunct, meaning it can take clausal complements like the *als*-clause (cf. Corver, 2018). This therefore triggers a type-mismatch that we can resolve through standard QR. In other words,

zo is syntactically a *cross-categorial* element, consistent with its differing semantic interpretations. Assuming that *zo* takes the standard clause as its complement that subsequently undergoes QR affords another advantage; assuming overt QR is rightward movement (Fox and Nissenbaum, 1999), we may explain the linear order flexibility observed with verbal equatives as a choice between overt and covert QR. Overt QR results in a surface linear order whereby the standard clause is in a right peripheral position, whereas covert QR takes place at the level of Logical Form and the standard clause is spelled out in its base-generated position instead. In either case, QR *must* occur for interpretive reasons, explaining, for example, why scope ambiguities are observed *regardless of linear order*, as was previously illustrated in (24). A full derivation is illustrated below; assuming events kinds are basically named by manners, the interpretation is therefore that the manner(s) in which Sigrid ran is a subset of the manner(s) in which Nadine ran.

(42) Nadine had ***zo*** <***als*** Sigrid> gerend <***als*** Sigrid>.
Nadine has so as Sigrid run as Sigrid
'Nadine ran as Sigrid ran.'



(43) Matrix clause:

a. ⟦⑤⟧: λo.$^{\cup}$k'(o) (trace of QR of standard clause provides *k'*)
b. ⟦⑥⟧: λe'.RUN(e',*nadine*)
c. ⟦③⟧: λe'.RUN(e',*nadine*) ∧ $^{\cup}$k'(e') (identical to ④, PM)
d. ⟦②⟧: λk'.∃e'.RUN(e',*nadine*) ∧ $^{\cup}$k'(e')

(44) Standard clause:

a. ⟦⑪⟧: λo.$^{\cup}$k(o)

b. ⟦⑫⟧: λe.RUN(e,*sigrid*)

c. ⟦⑨⟧: λe.RUN(e,*sigrid*) $\wedge$ $^{\cup}$k(e) (identical to ⑩, PM)

d. ⟦⑧⟧: λk.$\exists$e.RUN(e,*sigrid*) $\wedge$ $^{\cup}$k(e)

(45) a. ⟦⑦⟧: $\lambda K'_{\pi t}$.{k:$\exists$e.RUN(e,*sigrid*) $\wedge$ $^{\cup}$k(e) = 1} $\subseteq$ {k':K'(k') = 1}

b. ⟦①⟧: {k:$\exists$e.RUN(e,*sigrid*) $\wedge$ $^{\cup}$k(e) = 1} $\subseteq$ {k':$\exists$e'.RUN(e',*nadine*) $\wedge$ $^{\cup}$k'(e') }
'the set of event kinds Sigrid's running instantiates is a subset of the the set of event kinds Nadines's running instantiates'

The analysis above therefore combines a novel view of how degrees and manners arise, namely via referring to eventuality kinds, with a standard quantificational analysis commonly employed in analyses of the comparative using degrees as a semantic primitive. This therefore explains the availability of degree versus manner readings as dependent on the syntactic category of the parameter of comparison, given that gradable adjectives and verbs can be analyzed within a Davidsonian event semantics as corresponding to states and events, and also gives a unified semantics to the PM *zo* that takes into account its use as a pro-form in non-comparison contexts. We furthermore attributed quantificational semantics to the SM *als*, in line with work arguing that sentence-level comparison semantics should be encoded in SMs generally. This means that the *als*-clause in Dutch equatives is a scopally-mobile generalized quantifier over kinds, therefore explaining why Dutch equatives show scope ambiguities when embedded under (certain) modal auxiliaries.

3.3 On stative verbs

We proposed an analysis of the Dutch equative PM *zo* in which it makes reference to degrees and manners indirectly, namely through state and event kinds. This hinged on the standard assumption that verbs denote predicates of events whereas gradable adjectives denote simple predicates of states in contrast to recent degree-based analyses. Such an account would seem to make a crucial prediction; should there be cases where the syntax-semantics mapping from gradable adjectives and verbs to states and events to not be perfect, then we expect the correlation with degree and manner readings to also be imperfect. One such case might involve stative verbs of emotion like *love*, *hate*, etc. or stative verbs of knowledge like *know*. Intuitively, these seem to describe emotional or mental states and have therefore, been analyzed as predicates of states in prior literature (e.g., Rothmayr, 2009). If so, we might expect that verbal equatives built with *zo* that involve these stative verbs should return degree readings rather than manner readings on a kinds-based analysis. As it turns out, it is not clear that this prediction is straightforwardly testable, since it seems native speakers generally strongly disprefer the use of *zo* as a PM with stative verbs and utilize other PMs like *even veel* 'as much', or must resort to the addition of adverbs that lexicalize gradable scales in order to use *zo* to produce degree readings. The

(particle) verb *houden van* 'to love' and verb of knowledge *weten* 'to know', for example, require the former strategy and speakers consulted strongly prefer the use of *even veel*, which produces a degree reading.

(46) Mary houdt ***even veel*** van John ***als*** van haar broer.
Mary keeps so much of John as of her brother
'Mary loves John as much as her brother.'

(47) Ik weet ***even veel*** van dit boek ***als*** jij.
I know so much of this book as you
'I know as much about this book as you do.'

The verb *haten* 'to hate', on the other hand, prefers the latter strategy where comparison with *zo* is marked explicitly on an adverb *erg* 'badly'; directly marking the verb itself with *zo* is deemed unacceptable. Again, this results in a degree reading comparing the amount of hate.

(48) Mary haat John ***net zo*** **erg** ***als*** haar broer.
Mary hates John just so badly as her brother
'Mary hates John as much as her brother.'

In the same vein, speakers also show variation in how to produce manner readings with in verbal equatives with stative verbs. Some have noted that it is possible to use *zo* to mark the entire transitive VP formed by stative verbs like *houdt van* in an equative, but only in a particular linear word order when *zo* appears together with the SM *als* in a right peripheral position.[12]

[12]There is a separate use of *zoals* in a right-peripheral position where it has an additive flavor similar to *also*. This often requires the presence of a pronounced intonational pause before *zoals*. This use is attested with both gradable adjectives and verbs and has neither a degree nor manner comparison meaning, as indicated by the interpretations according to native speakers.

(i) Context: John is an elderly person who walks bended.

Jan is ooit groot geweest, ***zoals*** Sue.
John is once tall been so.as Sue
'John was tall, just like Sue is also tall (but they were not of the same height).'

(ii) Context: Nadine and Sigrid typically play after school. Nadine's mother arrived earlier to pick up Nadine than Sigrid's mother one day, and Nadine tells Sigrid's mother that both of them have finished playing.

Nadine had gespeeld, ***zoals*** Sigrid.
Nadine had played, so.as Sigrid
'Nadine played, and Sigrid also played (though they played different games).'

Since this is not a comparison use of both *zo* and *als*, we leave the precise analysis of the interpretation and how it is related to the equative use for future investigation.

(49) Marie houdt van Jan ***zoals*** ze van haar broer houdt.
Marie keeps of Jan so.as she of her brother keeps
'Mary loves John (in the same way) as she loves her brother (namely, by buying them lots of things).'

Not all speakers, however, find this use of *zo* in a verbal equative comparing manners completely natural. Two speakers consulted noted that while (49) is certainly interpretable as an equative, it sounds highly unnatural and one is unlikely to encounter it in everyday speech. Instead, these speakers simply prefer a paraphrase of the verbal equative that involves an explicit *in the same way* phrasal adjunct.

(50) Marie houdt van Jan ***op dezelfde manier*** als ze van haar broer houdt.
Marie keeps of Jan in the.same way as she of her brother keeps
'Mary loves John (in the same way) as she loves her brother (namely, by buying them lots of things).'

If one takes the use of *zoals* in (49) producing a manner reading rather than a degree reading, then we might conclude that either the generalization regarding state and event kinds mapping to degrees and manners respectively is incorrect if stative verbs are predicates of states, or that the assumption that stative verbs are predicates of states itself to be incorrect. There is, in fact, some credence to the latter idea. For example, even though Rothmayr (2009) takes stative verbs like *love* and *hate* to be truly stative, she argues that they are ontologically a different kind of state from the regular Davidsonian state, since the states denoted by stative verbs can only be located in time but not in space as Davidsonian eventualities can. On the other hand, analyses such as those in Hale and Keyser (2002) take stative verbs like *love* and *hate* to be inherently possessive structures where the roots of such verbs behave like nominals and the intuitive paraphrase of a verb like *to love* is that *x has love for y*. Either of these approaches could explain why an example like (49) receives a manner rather than degree reading; it is simply a kind of state that differs from the states denoted by gradable adjectives. What we also do seem to need to understand better is the fact that the kind-referring PM *zo* seems generally dispreferred with stative verbs whereas other verb classes like activity verbs or degree achievement verbs readily take *zo* as a PM in equatives, for which judgments are consistent and robust. Furthermore, a more detailed survey of different classes of stative verbs in terms of what strategies are preferred in building the same meaning as one would in a verbal equative, regardless of degree or manner readings, is also needed in order to understand the potential differences between different PMs and their distributional restrictions with verbs. We might only pursue the prediction of the analysis of *zo* proposed here if we have a better understanding of the entire class of stative verbs as a whole as well as the precise differences between equative *zo* and other PMs used to build equatives in Dutch, which is beyond the scope of what we can achieve here and must therefore leave as a future endeavor.

3.4 Back to the comparative and degree achievement verbs

The previous discussion argued that equatives provide a piece of empirical evidence that we need to conceive of degrees, in particular, in a different way in that they can arise via reference to other kinds of semantic objects like states. Specifically, the fact that verbal equatives always compare and equate manners, even with verbs that describe a change in a measure of a gradable property held by an object, i.e., degree achievement verbs, motivated this view of degrees. Recall, however, that once we look beyond verbal equatives toward verbal comparatives, only degree readings are available and no intuitive manner readings are possible regardless of verb class. That is, degree achievement verbs like *opwarmen* 'to warm' intuitvely compares degrees with comparatives as demonstrated in (16) and repeated below, which is unsurprising if they do describe a change between two degrees of a gradable property held by an object at different times. Activity verbs, which show only manner readings in the equative as previously noted, are however obligatorily interpreted as comparing degrees in the comparative as shown in (52). Again, this is significant because activity verbs are not typically analyzed as making any sort of degree argument available for measurement and comparison (Rett, 2013); nonetheless, if we take this to be the reason they do not have degree readings in equatives, then the obligatory degree readings with comparatives become mysterious.

(51) We hebben de pizza ***meer*** opgewarmd ***dan*** de lasagne, namelijk met 10 graden.
we have the pizza more warmed than the lasagna namely by 10 degrees
'We warmed the pizza more than the lasagna, namely by 10 degrees.'

(52) Jan liep ***meer dan*** Marie.
John ran more than Mary
'John ran more than Mary did (John ran 2 hours and Mary for 1 hour, John for 2km and Mary for 1km ...).'

The main issue, therefore, is with assuming that degrees are introduced lexically by particular syntactic categories like gradable adjectives or with classes of verbs like degree achievement verbs. To explain the the aforementioned difference between equatives and comparatives, one would seemingly need an account of *the differences between different degree morphemes* instead. We have already provided an analysis of equative *zo* whereby it never references degrees directly, affording an account of its behavior with verbs where it only ever returns manner readings. While comparatives and degree achievement verbs are not the main empirical focus here, we briefly sketch an account of their syntax and semantics below.

The starting point of an analysis of comparatives is to assume that gradable adjectives never reference degrees and therefore, never introduce degree variables in their semantics at any point (cf. Cresswell 1976; von Stechow 1984; Heim 2000, 2006; Kennedy 1997,

a.m.o.). That is, following Wellwood (2015), gradable adjectives are simply states. The measure function which actually returns degrees is introduced as a component of the comparative morpheme, such as *-er* in English and *meer* in Dutch, rather than being part of the lexical semantics of gradable adjectives. The comparative morpheme, which we henceforth refer to abstractly as MORE, therefore consists of two components: a measure function notated as μ and a comparative relation.[13] In prose, the comparative morpheme takes a gradable adjective denoting a predicate of states as argument and returns a function from degrees to individuals to predicates of states, such that the measure of the state held by the individual strictly exceeds the degree that MORE introduces. Degree variables are therefore introduced exclusively by MORE.

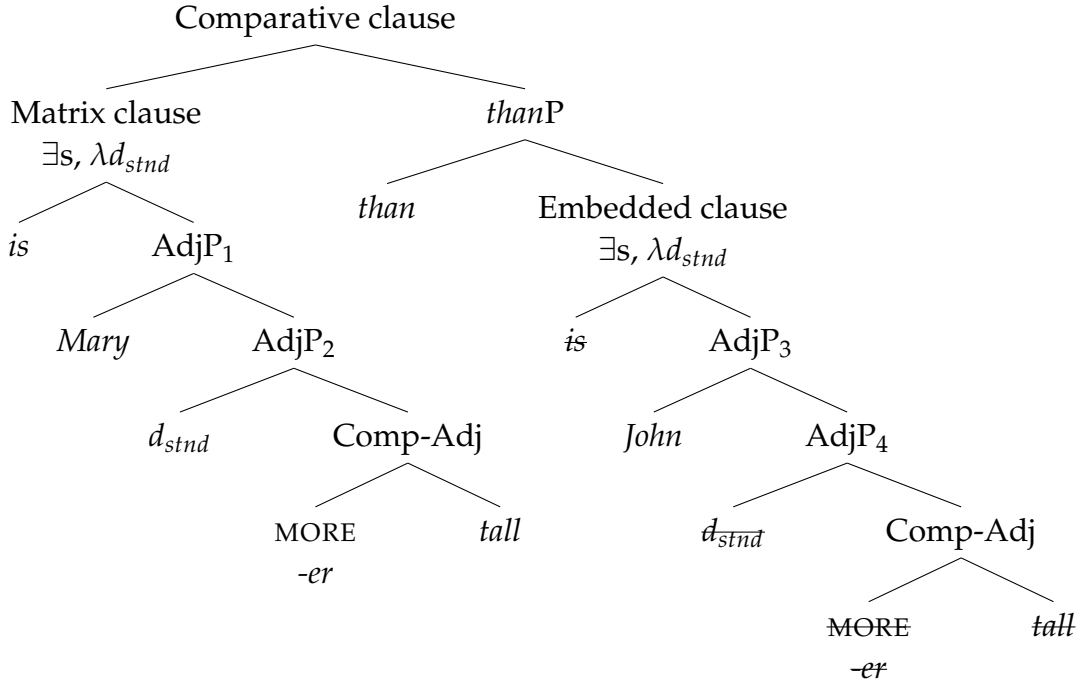
(53) $[\![\text{MORE}]\!]$: $\lambda \mathrm{P}_{vt}.\lambda \mathrm{d}_{d}.\lambda \mathrm{x}_{e}.\lambda \mathrm{s}_{v}.\mathrm{P}(\mathrm{s},\mathrm{x}) \wedge \mu(\mathrm{s}) > \mathrm{d}$

A key insight here is that without degree morphemes like MORE, no degrees can be accessed and therefore compared. In a comparative construction where there are two copies of the gradable adjective, one in the matrix clause and one in the comparative standard clause which undergoes COMPARATIVE DELETION, we will therefore need two copies of of MORE. This is therefore consistent with the analysis in Alrenga et al. (2012), who argue that both matrix and embedded adjectives in a comparative clause are comparative in the sense that they involve comparative morphemes.[14] We may further follow them in assuming that sentence-level comparative semantics is introduced by the SM, which takes two sets of degrees and asserts that one is a subset of the other as standardly assumed (e.g., English *than* in (57a)). We illustrate an example derivation with English for simplicity; a covert degree variable representing the standard which the individuals reach or exceed is assumed to saturate the comparative adjective's first degree argument, the copula is semantically vacuous, and LAMBDA ABSTRACTION produces sets of degrees that serve as inputs to the SM *than*. The final interpretation in (57c) asserts that the set of degrees John's state of having some height exceeds is a subset of the set of degrees Mary's state of having some height exceeds, i.e., Mary is taller than John, as desired.

[13] In a tradition dating back to Bresnan (1973), MORE can be syntactically decomposed into the measure function-introducing MUCH and, e.g., comparative *-er* in English (see Wellwood 2015). We eschew this decomposition here for simplicity.

[14] We are, therefore, combining the proposals of Wellwood (2015) regarding how degrees are accessed, with that of Alrenga et al. (2012) with regard to the syntax and semantics of comparative clauses and where sentence-level comparative semantics come from. We differ from Wellwood (2015) in assuming that the standard *than*-clause is not the complement of MORE and is instead in itself a generalized quantifier over degrees, and from Alrenga and Kennedy (2014) in where degree variables are first introduced, which for us is introduced exclusively by MORE as in Wellwood (2015), whereas Alrenga et al. (2012) assume gradable adjectives directly lexicalize measure functions mapping an individual to a degree, i.e., of type $<e,d>$.

(54) Mary is taller than John.



(55) Matrix clause:

a. ⟦*tall*⟧: $\lambda x.\lambda s.\text{TALL}(s,x)$
b. ⟦MORE⟧: $\lambda P_{e,vt}.\lambda d_d.\lambda x_e.\lambda s_v.P(s,x) \wedge \mu(s) > d$
c. ⟦Comp-Adj⟧: $\lambda d_d.\lambda x_e.\lambda s_v.\text{TALL}(s,x) \wedge \mu(s) > d$
d. ⟦AdjP$_2$⟧: $\lambda x_e.\lambda s_v.\text{TALL}(s,x) \wedge \mu(s) > d_{stnd}$
e. ⟦AdjP$_1$⟧: $\lambda s_v.\text{TALL}(s,\textit{mary}) \wedge \mu(s) > d_{stnd}$
f. ⟦Matrix clause⟧: $\lambda d_{stnd}.\exists s_v[\text{TALL}(s,\textit{mary}) \wedge \mu(s) > d_{stnd}]$

(56) Embedded clause:

a. ⟦*tall*⟧: $\lambda x.\lambda s.\text{TALL}(s,x)$
b. ⟦MORE⟧: $\lambda P_{e,vt}.\lambda d_d.\lambda x_e.\lambda s_v.P(s,x) \wedge \mu(s) > d$
c. ⟦Comp-Adj⟧: $\lambda d_d.\lambda x_e.\lambda s_v.\text{TALL}(s,x) \wedge \mu(s) > d$
d. ⟦AdjP$_4$⟧: $\lambda x_e.\lambda s_v.\text{TALL}(s,x) \wedge \mu(s) > d_{stnd}$
e. ⟦AdjP$_3$⟧: $\lambda s_v.\text{TALL}(s,\textit{john}) \wedge \mu(s) > d_{stnd}$
f. ⟦Embedded clause⟧: $\lambda d_{stnd}.\exists s_v[\text{TALL}(s,\textit{john}) \wedge \mu(s) > d_{stnd}]$

(57) Comparative clause:

a. ⟦*than*⟧: $\lambda D'_{dt}.\lambda D_{dt}.\{d\text{: } D'(d) = 1\} \subseteq \{d\text{: } D(d) = 1\}$
b. ⟦*than*P⟧: $\lambda D_{dt}.\{d\text{: } \exists s_v[\text{TALL}(s,\textit{john}) \wedge \mu(s) > d = 1\} \subseteq \{d\text{: } D(d) = 1\}$
c. ⟦Comparative clause⟧:
$\{d\text{: } \exists s_v[\text{TALL}(s,\textit{john}) \wedge \mu(s) > d] = 1\} \subseteq \{d\text{: } \exists s_v[\text{TALL}(s,\textit{mary}) \wedge \mu(s) > d] = 1\}$

With the above assumptions in place, it is now easy to understand why activity verbs give rise to strictly degree readings even if they do not intuitively have a gradable scale

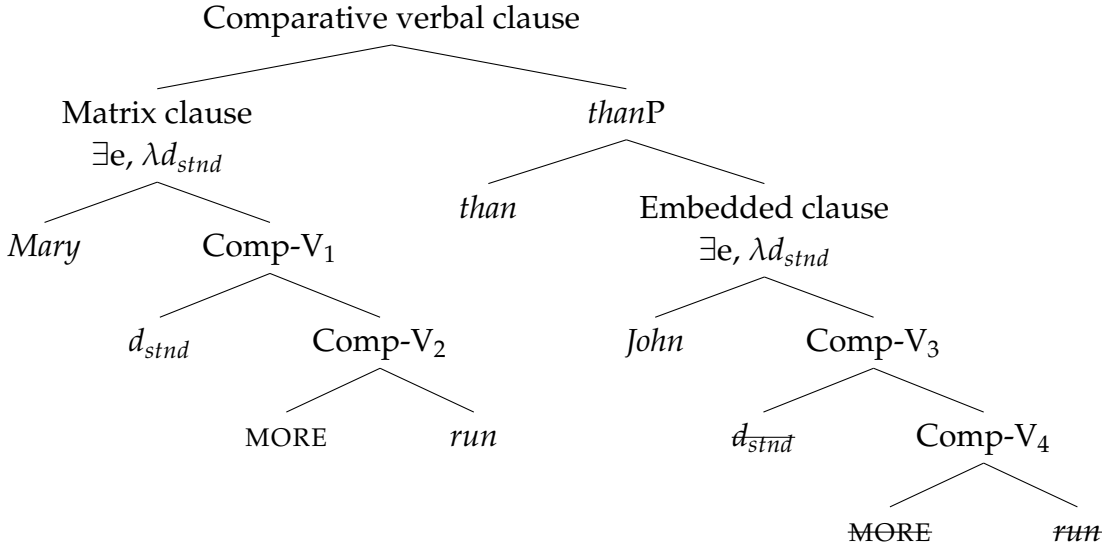
associated with them: it is simply because comparative MORE introduces a measure function that measures the event denoted by the activity verb along some gradable dimension. The only caveat here is that there are certain restrictions on what can be measured. Unlike gradable adjectives, which directly describe the property scale on which an individual holds some measure of and therefore the measure function μ straightforwardly returns a degree on this scale, activity verbs do not inherently have a single scale associated with them. A running event, for example, can intuitively be measured along gradable dimensions with conventional measurement systems, such as distance ran, time ran, speed of running, etc. Schwarzchild (2006) proposes a monotonicity condition on measurement constructions and therefore on measure functions. Intuitively, a measure function can only invoke degrees along some gradable dimension if the ordering of degrees along this dimension corresponds to some part-whole ordering relation from the source domain. That is, if x and y are part of some domain D and x is part of y, then whatever dimensions x and y are measured on, the measure of y must be greater than the measure of x. This is stated formally in (58).

(58) **Monotonocity**
A measure function μ: $D_{\preccurlyeq part} \mapsto D_{\leqslant deg}$ is **monotonic** iff for all x, $y \in D_{\preccurlyeq part}$, if $x \prec_{part}$ y, then μ(x) $<_{deg}$ μ(y).

(Wellwood, 2015, p.71)

Returning to running events, a running event e_1 that includes a smaller sub-part e_2 must necessarily be longer than e_2 in terms of time, or larger than e_2 in terms of distance. Yet e_1 need not necessarily be faster than e_2 in terms of speed, since the runner can be running at the same speed in both sub-events. This therefore explains why the comparative in, e.g. (52), can only be comparing distance or time ran and not speed. This restriction aside, the composition of a verbal comparative will proceed in a similar fashion as adjectival comparatives with MORE introducing measurement and degrees, and with the usual differences in syntactic categories. A derivation is illustrated below for English; as desired, the relevant interpretation in (62c) is that the set of degrees on some monotonic dimension that the event of John running exceeds is a subset of the set of degrees on some monotonic dimension the event of Mary running exceeds, i.e., Mary ran a bigger distance than John or Mary ran a longer time than John etc.

(59) Mary ran more than John.



(60) Matrix clause:

a. ⟦*run*⟧: λx.λe.RUN(e,x)
b. ⟦MORE⟧: $\lambda P_{e,vt}.\lambda d_d.\lambda x_e.\lambda e_v.P(e,x) \wedge \mu(e) > d$
c. ⟦Comp-V$_2$⟧: $\lambda d_d.\lambda x_e.\lambda e_v.$RUN(e,x) $\wedge \mu(e) > d$
d. ⟦Comp-V$_1$⟧: $\lambda x_e.\lambda e_v.$RUN(e,x) $\wedge \mu(e) > d_{stnd}$
e. ⟦Matrix clause⟧: $\lambda d_{stnd}.\exists e_v$[RUN(e,*mary*) $\wedge \mu(e) > d_{stnd}$]

(61) Embedded clause:

a. ⟦*run*⟧: λx.λe.RUN(e,x)
b. ⟦MORE⟧: $\lambda P_{e,vt}.\lambda d_d.\lambda x_e.\lambda e_v.P(e,x) \wedge \mu(e) > d$
c. ⟦Comp-V$_4$⟧: $\lambda d_d.\lambda x_e.\lambda e_v.$RUN(e,x) $\wedge \mu(e) > d$
d. ⟦Comp-V$_3$⟧: $\lambda x_e.\lambda e_v.$RUN(e,x) $\wedge \mu(e) > d_{stnd}$
e. ⟦Embedded clause⟧: $\lambda d_{stnd}.\exists e_v$[RUN(e,*john*) $\wedge \mu(e) > d_{stnd}$]

(62) Comparative verbal clause:

a. ⟦*than*⟧: $\lambda D'_{dt}.\lambda D_{dt}.\{d: D'(d) = 1\} \subseteq \{d: D(d) = 1\}$
b. ⟦*than*P⟧: $\lambda D_{dt}.\{d: \exists e_v$[RUN(e,*john*) $\wedge \mu(e) > d = 1\} \subseteq \{d: D(d) = 1\}$
c. ⟦Comparative verbal clause⟧:
$\{d: \exists e_v$[RUN(e,*john*) $\wedge \mu(e) > d] = 1\} \subseteq \{d: \exists e_v$[RUN(e,*mary*) $\wedge \mu(e) > d] = 1\}$

We may now return to the analysis of degree achievement verbs. Moving the introduction of degrees being compared to specific degree morphemes, such as comparative *-er* in English or *meer* but not *zo* in Dutch, paves the way to an analysis of degree achievement verbs purely as event predicates, contra scalar analyses like Kennedy and Levin (2008) and Pedersen (2015). This is, in fact, not a new approach and has precedents before scalar analyses of recent years. As early as von Stechow (1996), it has been proposed that degree achievement verbs can be decomposed into an eventive and stative component, much like

how typical result verbs like *open*, *kill* etc. are decomposed in the tradition of GENERATIVE SEMANTICS (McCawley, 1968; Morgan, 1969; Dowty, 1979, *a.o.*). von Stechow's key insight, however, is that the stative component of degree achievement verbs is inherently *comparative*, which enables a decompositional treatment of this verb class as being embedded under familiar eventive operators like CAUSE and BECOME (Dowty, 1979; Kratzer, 2005). Key pieces of independent evidence for requiring such a decompositional analysis that has a stative component comes from sub-lexical modifiers that target this stative component like *again* and *too* (Spathas and Michelioudakis 2021; Smith and Yu, to appear) as well as the interpretation of source and goal measure phrases (Baron, 2020), though space constraints prevent a full discussion of those facts here. We take these pieces of evidence to be well-motivated; eschewing the compositional details for reasons of space, the semantics of a degree achievement verb might be given the following logical form as gleaned from von Stechow (1996).[15] [16]

(63) The river widened.
λe.BECOME(λs(MORE(λd.d-WIDE$_s$(*the river*),λd.d-WIDE$_{\text{INIT}(e)}$(*the river*))))(e)

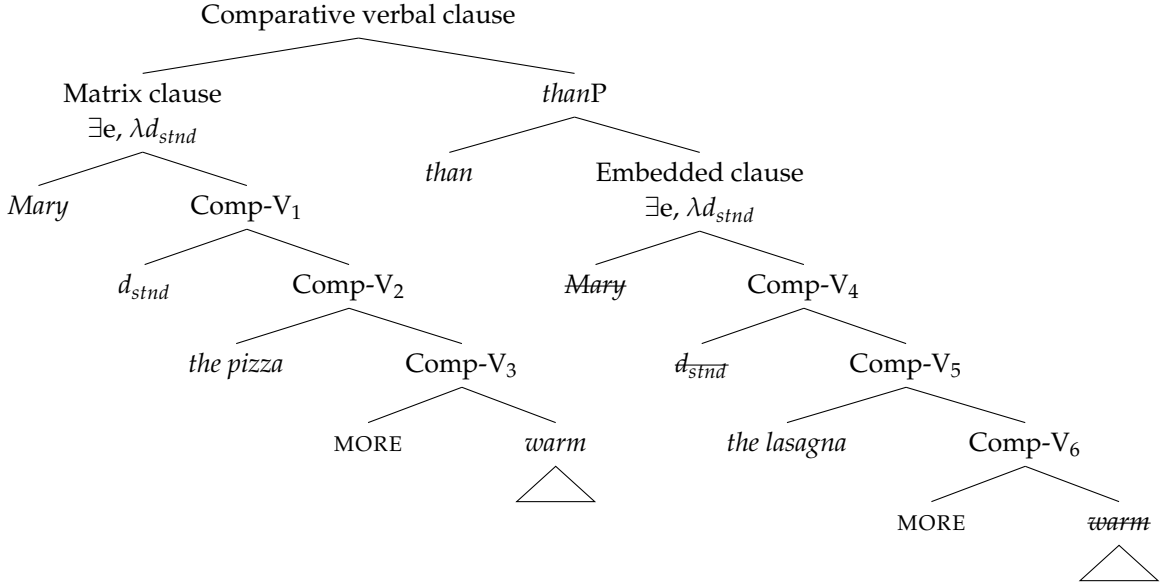
What matters for our purposes is that there is now an eventive predicate on which we can attach degree morphemes like *more* in English or *zo* in Dutch, with similar syntax as in regular verbal comparatives. For example, we might assign a structure like below for a verbal comparative involving a degree achievement verb like *warm* in English; we omit the structure that leads to the overall degree achievement verb, assuming that there are operators like MORE that derive the surface verb as in von Stechow's analysis.[17]

[15] See Baron (2020), Spathas and Michelioudakis (2021), and Smith and Yu (to appear) for possible compositional analyses.

[16] In fact, one might argue that the scalar analysis of Kennedy and Levin (2008) is also sufficient to capture the facts with degree achievement verbs once we make the move of *moving degrees being compared to degree morphemes in general*. This is because a scalar analysis based on measure of change functions of semantic type $<e,d>$ will eventually be turned into a property of individuals and events of type $<e,<v,t>>$ even in Kennedy and Levin's analysis, on top of which we can build a regular comparative using MORE that measures out the event and returns a degree, or an equative in Dutch using *zo* that introduces a kind that the event instantiates, which will return the relevant degree and manner readings as desired. We assume a decompositional analysis in light of the independent evidence arguing for a stative component in degree achievement verbs as already noted in Baron (2020), Spathas and Michelioudakis (2021), and Smith and Yu (to appear). On the other hand, Kennedy and Levin (2008) assume the comparative *-er* is a degree morpheme that takes a *measure function*, the denotation of a gradable adjective, as argument and turns it into a *difference function*. In other words, their analysis of the comparative does not straightforwardly extend to verbal comparatives, since not all verbs can be analyzed as measure of change functions (e.g., activity verbs). They would effectively require a separate measure function that applies to verbal predicates that do not underlyingly denote measure of change functions in order to retrieve degrees along which an activity verb can be measured, which amounts to the same analysis here. Furthermore, their analysis would undergenerate, not predicting certain readings of verbal comparatives involving degree achievement verbs to be discussed shortly. These considerations motivate an analysis where measure functions are generally severed from the semantics of specific lexical items and located in degree morphemes as proposed here and in Wellwood (2015).

[17] This version of MORE would presumably be a different one from the one being proposed here since it

(64) Mary warmed the pizza more than the lasagna.



It should be clear now then that barring the specific semantics of *warm*, the interpretation of a verbal comparative involving a degree achievement verb (and also the equative in English) is, as expected, highly similar to the verbal comparative with activity verbs. Compositional details aside, the comparative in (64) should mean that the set of degrees on some monotonic dimension that the event of Mary warming the pizza exceeds is a subset of the set of degrees on some monotonic dimension that the event of Mary warming the lasagna exceeds, i.e., some measure of Mary warming the pizza is greater than some measure of Mary warming the lasagna. It would be useful now to pause and consider what measures those could possibly be given the monotonocity constraint on measure functions (Schwarzchild, 2006; Wellwood, 2015). Intuitively, given that the degree achievement verb describes an *event of change*, specifically one of the pizza and lasagna becoming *warmer than they were at the start of an event*, then as the event progresses, the *degree of change in temperature* is naturally going to increase. This therefore explains the canonical reading of such verbal comparatives such that the degree of change in temperature of the pizza is greater than the degree of change in temperature of the lasagna. However, recall that this is not the only dimension which would be monotonic to the part-whole structure of an event. For example, any event is situated in time such that as the event progresses, the measure of the amount of time that passed as the event transpired also increases. As Wellwood (2015) notes, this correctly predicts that there is a reading of (64) where Mary warmed the pizza for 5 minutes while she warmed the lasagna for 2 minutes, such that it is the amount of time rather than any change in temperature being measured and compared.

would need to be inherently 'reflexive' in that it compares measures along a gradable dimension a single object holds at different times, as compared to the MORE proposed here which measures an object along a gradable dimension and compares it to a degree it introduces. See for example Baron (2020) and Smith and Yu (to appear) for possible ways of compositionally implementing this intuition.

That this attested reading is indeed predicted with a generalized measure function introduced by degree morphemes is significant; under Kennedy and Levin's analysis where the comparative takes a measure function denoted by a gradable adjective or a measure of change function denoted by a degree achievement verb as input to produce a difference function, the dimension along which objects are being compared must therefore be *tied to the gradable dimension encoded by the specific lexical item*, which would seemingly rule out the temporal reading of verbal comparatives with degree achievement verbs as noted by Wellwood (2015).[18] [19] On the other hand, severing the measure function from specific lexical items and locating it in degree morphemes would correctly predict such readings to exist and therefore, seems more empirically adequate.

4 Previous analyses across Germanic

The key theoretical insight from the proposed analysis of Dutch equatives formed with *zo* is that they must be kind-referring and that degree and manner readings arise from the assumption that degrees and manners name state and event kinds respectively. Nonetheless, examining the comparative in Dutch showed the necessity of postulating degrees independently of state kinds, albeit with them being introduced compositionally via particular degree morphemes rather than classes of lexical items. We move on in this section to examine how equatives are built across two other Germanic languages, namely English and German. This cross-Germanic investigation will reveal that there are arguments for degrees and manners in equatives to be treated as semantic primitives in their own right within equative constructions, further bolstering the claim that there needs to be diverse ways of referring to degrees and manners both within languages across comparison constructions as in Dutch, and also across languages with respect to the same comparison construction.

4.1 English equatives

As extensively discussed by Rett (2013), English equatives across gradable adjectives and verbs exemplify the generalization of Haspelmath and Buchholz (1998). When the parameter of comparison is a gradable adjective, it is obligatorily marked with the PM

[18] See Baron (2020) for a discussion of the flip side of this problem; with measure phrases specifying the source and goal measures of the event of change denoted by a degree achievement verb (e.g., *from 10 degrees to 20 degrees*), Kennedy and Levin's analysis has no way of enforcing that the degrees introduced by these measure phrases be on the same gradable dimension as described by the degree achievement verbs, which is the only reading possible with these measure phrases.

[19] Wellwood (2015) suggests that the reading whereby the degrees along the gradable dimension denoted by the degree achievement verb is due to MORE attaching at the stative level while temporal readings emerge from attaching it at the eventive level, which in turn presupposes a decompositional analysis. We differ from Wellwood (2015) here, noting that the monotonocity constraint should suffice to produce the attested readings if the measure function of MORE is simply measuring the entire verbal event.

as, whereas with verbal parameters of comparison, *as* must be obligatorily absent. In both cases, the standard of comparison is introduced by the SM *as*, though there is some speaker variation regarding the choice of the SM with verbal equatives with certain speakers preferring *like* to *as*.

(65) a. John is ****(as)*** tall ***as*** Sue (is).
b. John ***(*as)*** ran ***as / like*** Mary Sue ran / did.

As Rett (2013) demonstrates with the various diagnostics used previously for the Dutch counterparts, adjectival equatives marked with the PM *as* only has a degree reading. First, non-gradable adjectives are highly marked in the equative or received coerced readings along an imposed gradable scale such as prototypicality or temporal extent. This applies equally to both the comparative and the equative.

(66) *Fred the frog is ***more / as*** amphibian ***than / as*** Todd the toad.

Second, recall the notion of evaluativity, which is an indication of a non-degree reading since being considered P, where P is some gradable property, with respect to some threshold in a given context is no longer a gradable property. Comparison constructions which are comparing degrees of a gradable property should therefore not entail evaluativity; as expected, adjectival equatives marked with the PM *as* are not interpreted evaluatively. Neither John nor Sue need to be conventionally tall so long as John is at least the same height as Sue.

(67) John is ***as*** tall ***as*** Sue. $\nrightarrow$ John is tall and Sue is tall.

Moving on to the verbal equative, it is also plain to see that it is comparing and equating only manners and not degrees. First, only continuations explicitly specifying the manner of running being equated is felicitious; any continuation specifying a gradable dimension with a conventional measurement system is infelicitous. Equating such gradable dimensions requires the overt appearance of the amount adjective *much*, assumed to be the overt lexicalization of a general measure function (Wellwood, 2015), in which case the manner reading is in turn ruled out.

(68) John ***(*as)*** ran ***as*** Sue did / ran.
a. That is, they both ran really clumsily.
b. #That is, they both ran 2km / for 2 hours.

(69) John ran ***as <u>much</u> as*** Sue did / ran.
a. #That is, they both ran really clumsily.
b. That is, they both ran 2km / for 2 hours.

Second, as already noted in the previous section, degree achievement verbs which should describe some degree of change an object held of some gradable property nevertheless

behave exactly as with activity verbs like *run* in requiring the obligatory absence of the PM *as* and returning only manner readings. Explicit comparison of degrees again requires the presence of *much* combined with the PM *as*.

(70) John ***(*as)*** cooled the pie ***as*** he did the lasagna.

a. That is, he put both of them in the refrigerator.
b. #He cooled them both by 10 degrees.

(71) John cooled the pie ***as <u>much</u> as*** he did the lasagna.

a. #That is, he put both of them in the refrigerator.
b. He cooled them both by 10 degrees.

Since the key interpretive difference between an adjectival equative and verbal equative comes down to the obligatory presence/absence of the PM *as* (putting aside the insertion of *much*), Rett (2013) suggests that it is itself degree-referring, specifically being a quantifier over degrees just like comparative *-er* as in the analyses of, e.g., Heim (2006) and others. Additional evidence for such a quantificational analysis of adjectival equatives on par with comparatives in English comes from the fact that negative polarity items, which are licensed in downward entailing environments, are licensed in the standard clause of adjectival equatives as they are in comparatives.[20]

(72) a. She is happier now than ever before.
b. He would rather die than lift a finger.
c. Cockroaches and leaky faucets would annoy him less than even the slightest noise from the neighbors.

(73) a. She is as happy now as ever before.
b. He would just as much die as lift a finger.
c. Cockroaches and leaky faucets would annoy him as much as even the slightest noise from the neighbors.

(Rett, 2013, p.1110)

Rett (2013) therefore analyzes the PM *as* in English as a degree quantifier on par with comparative-*er*, differing only in how specific the comparison relation is, as already noted previously in (23) and repeated below.

(74) a. $[\![\text{-}er]\!]$: $\lambda D'_{dt} \lambda D_{dt}.\text{MAX}(D) > \text{MAX}(D')$

[20] Rett (2013) takes the licensing of negative polarity items to be indicative of an equative quantifier whose nuclear scope is a downward entailing environment without considering scope ambiguities. We have so far in this paper taken scope ambiguities to be the main piece of evidence for a scopally mobile quantifier rather than the licensing of negative polarity items; this is because the distribution of negative polarity items in standard clauses is complex in Dutch and not all such items are licensed (see also Penka 2016 and Hohaus and Zimmermann 2021 for similar complexities in German). See also Schwarzchild and Wilkinson (2002) for further discussion about the problems with assuming that the standard clause of a comparative is downward entailing.

b. $[\![as]\!]$: $\lambda D'_{dt} \lambda D_{dt}$.MAX(D) $\geqslant$ MAX(D')

The composition of an English adjectival equative marked with the PM *as* is therefore straightforwardly on par with that of a comparative, assuming that the SM *as* is similar to a *wh*-operator in that it lambda abstracts over a degree free variable (Chomsky, 1977). A full composition is illustrated below; note that under this analysis, the gradable adjective is indeed directly referencing degrees, i.e., of type $<d,<e,t>>$ (Heim, 2006), in contrast to what we have argued for in the previous section.

(75) John is as tall as Sue.

a. $[\![tall]\!]$: λd.λx.x is *d*-tall
b. $[\![as]\!]$: $\lambda D'.\lambda D$. MAX(D) $\geqslant$ MAX(D')
c. $[\![John\ is\ d\ tall]\!]$: λd. John is *d*-tall
(set of degrees to which John's height reaches)
d. $[\![as\ Sue\ \sout{is\ d\ tall}]\!]$: λd. Sue is *d*-tall
(set of degrees to which Sue's height reaches)
e. $[\![John\ is\ as\ tall\ as\ Sue\ \sout{is\ tall}]\!]$: MAX($\lambda$d. John is *d*-tall) $\geqslant$ MAX(λd. Sue is *d*-tall)

The key difference between adjectival and verbal equatives in English lies in the absence of a PM in verbal equatives. Rett (2013) argues that this naturally falls out if the PM *as* is indeed the degree quantifier and since verbal equatives lack marking by the PM *as*, the only interpretation available is therefore non-degree referring, namely manners, which is therefore assumed to be a semantic primitive. Rett (2013) assumes the presence of a covert operator (notated here as ρ^m) relating manners to events (notated as a relation *R*) and that equative semantics is achieved via generalized PREDICATE MODIFICATION between two sets of manners rather than through a quantifier. As with adjectival equatives, this analysis postulates free manner variables which are abstracted over by the SM *as*, assumed to be a type-neutral lambda abstractor, and the empty manner operator.

(76) John danced as Sue danced / did.

a. $[\![John\ danced]\!] = [\![OP_m\ John\ danced\ \rho^m]\!]$: λm.$\exists$e[DANCED(e,*john*) $\wedge$ R(e,m)]
b. $[\![as\ Sue\ danced]\!] = [\![as\ Sue\ danced\ \rho^{m'}]\!]$: λm'.$\exists$e'[DANCED(e',*sue*) $\wedge$ R(e',m')]
c. $[\![John\ danced\ as\ Sue\ danced]\!]$: $\exists$m,e,e'[DANCED(e,*john*) $\wedge$ R(e,m) $\wedge$ DANCED(e',*sue*) $\wedge$ R(e',m')] (PREDICATE MODIFICATION, EXISTENTIAL CLOSURE)
(Rett, 2013, p. 1122-1123)

There are several key features of Rett's analysis worth highlighting. First, the grammar must be able to make reference to degrees and manners independently as semantic primitives rather than arising from other primitives. Second, degrees are indeed referenced to by specific degree morphemes but lexical gradable adjectives also independently introduce them while other syntactic categories like verbs, regardless of verb class, do not. Finally, only adjectival equatives contain a potentially scopally mobile quantifier whereas

verbal equatives do not.

Given these key features, it is immediately apparent how the main tenets of such an analysis cannot be applied to Dutch equatives formed with *zo*. As already argued for extensively, one cannot tie the introduction of degrees to either the PM *zo* or the lexical gradable adjective. While degree readings with English equatives correlate with the presence of the PM *as*, both adjectival and verbal equatives can be marked with *zo* in Dutch and degree and manner readings are nonetheless tied to the syntactic category of the parameter of comparison. Furthermore, comparing equatives to comparatives revealed that regardless of verb class, verbal comparatives simply must compare degrees and cannot compare manners. One cannot appeal to an analysis whereby the degree argument that is being compared is directly supplied by the gradable adjective or degree achievement verb then; since degree achievement verbs in Dutch are similarly marked with *zo* and nonetheless only has manner and not degree readings, it suggests that even the degree readings with gradable adjectives should not be tied to them providing degree arguments that *zo* can manipulate and compare or the observation with degree achievement verbs would go unexplained. In fact, even English provides a similar argument to that effect; to compare degrees with degree achievement verbs or indeed, any verb class for that matter, requires not just the degree quantifier *as* but crucially, the presence of the quantity adjective *much*, without which *as* cannot appear. Finally, the analysis of verbal equatives here crucially involves PREDICATE MODIFICATION, meaning that there is no scopally mobile quantifier. This therefore predicts that verbal equatives should not, for example, license negative polarity items in the standard clause, which does seem to be correct for English (e.g., **John dances as anyone else danced*). However, verbal equatives marked with *zo* in Dutch does seem to show the same scope ambiguity as adjectival equatives with respect to a matrix modal verb, arguing for the same quantificational analysis as adjectival equatives. Therefore, while there seems to be an argument for the English PM *as* to be a degree quantifier, chiefly because it cannot appear with verbal equatives in the absence of *much*, it would present multiple problems if *zo* in Dutch equatives is treated solely as a degree quantifier and these facts therefore argue for a kinds-based analysis advocated here.

4.2 German equatives

Another possible analysis regarding the Dutch PM *zo* can be gleaned from comparing its interpretive properties with its German counterpart. As with Dutch, German parameters of comparison, whether gradable adjectives or verbs, are uniformly marked with the PM *so* 'so', with the standard of comparison being introduced by the *wh*-element *wie* 'how' (Hohaus and Zimmermann, 2021; Umbach et al., 2022).

(77) Nadine ist ***so*** groβ ***wie*** Anna.
Nadine is so tall how Anna
'Nadine is as tall as Anna.'

(78) Johannes hat auch ***so*** getanzt ***wie*** Susanne.
John has also so danced how Susan.
'John danced as Susan did.'

Unlike Dutch, however, Hohaus and Zimmermann (2021) observe that German eqautives marked with *so* are genuinely ambiguous between degree and manner readings. For example, non-gradable adjectives readily appear in adjectival equatives marked with *so* and the relevant reading here is seemingly one of 'manner'; in (79) below, the equative asserts that both Freddie the frog and Moritz the newt are amphibian in the same ways, i.e., that they are both amphibian, reminiscent of an evaluative reading with gradable adjectives, not that they are amphibian to the same degree.

(79) Freddie der Frosch ist ***so*** amphibisch ***wie*** Moritz der Molch.
Freddie the frog is so amphibian how Moritz the newt
'Fred the frog is **amphibian in the same way** Moritz the newt is; they **share all relevant amphibian properties**.'

(Hohaus and Zimmermann, 2021, p. 100-101)

Moving on to verbs, Hohaus and Zimmermann (2021) note further that when the parameter of comparison is a degree achievement verb, there is a genuine degree reading in addition to a manner reading when marked with the PM *so*. As indicated in the continuations in (80), it is possible to specify both a manner of warming or the degree of change in the pizza and lasagna's temperature.

(80) Wir haben die pizza ***so*** abgekühlt ***wie*** die lasagn.
we have the pizza so cooled how the lasagne
'We cooled the pizza as we cooled the lasagna.'

a. Nämlich durch Pusten.
namely through blow
'Namely through blowing on it.'

b. Nämlich auf 21 grad raumtemperatur.
namely to 21 degrees room.temperature
'Namely to 21 degrees.'[21]

(Hohaus and Zimmermann, 2021, p. 101-102)

Based on these observations, Hohaus and Zimmermann (2021) conclude that the PM *so* must be genuinely ambiguous between a degree-referring and manner-referring variant.

[21]Note that under Kennedy and Levin's (2008) analysis of degree achievement verbs, a continuation using *by* referring to differential degrees would be a more appropriate way of detecting a degree reading, as we have done with Dutch in (15). We reproduce the data in Hohaus and Zimmermann (2021) here; native speakers consulted varied in accepting measure phrases with *auf* 'to' and the German equivalent of *by*. Some speakers only accepted *by*-phrases, while other speakers found both *to*-phrases and *by*-phrases acceptable. It is unclear to us without more careful investigation what the source of this variation is and we set it aside here.

They therefore propose that the PM *so* is an equative quantifier over either degrees or manners; evidence for such a quantifier in German equatives again comes from familiar scope ambiguity facts, which Dutch also exhibited as discussed previously. (81), for example, demonstrates a scope ambiguity with an adjectival equative with the degree reading, which Dutch also shows.

(81) **Context: You just submitted your B.A. thesis and proudly show it to me. I inquire after its length and you tell me that it's 60 pages. I'm currently writing my master's thesis and I tell you...**

Dass meine Zulassungsarbeit genau***so*** lang sein darf ***wie*** es deine
that my B.Ed.thesis exactly.so long be may how it your
Bachelorarbeit ist.
B.A.thesis is

'That my B.Ed. thesis is allowed to be exactly as long as your B.A. thesis.'

a. Aber fünf Seiten kürzer (als was du eingreicht hast) wären auch
but five pages shorter than what you submitted have would.be also
schon okay (und bis zu 70 Seiten sind auch noch erlaubt).
already okay and up to seventy pages are also still permitted
'But five pages less (than what you submitted) would also already be enough (and up to ten pages more would also still be permitted).'
Modal ≫ Comparison

b. Und keine Seite weniger oder mehr!
and no page less or more
'But also not a single page less or more!' Comparison ≫ Modal

(Hohaus and Zimmermann, 2021, pp. 109-110)

A verbal equative with a manner reading shows similar scope ambiguities. Here, the relevant verb is an activity verb, which presumably rules out a degree reading if such verbs do not lexicalize a degree argument (Rett, 2013).

(82) **Context: A colleague from a university from outside the country tells me about the restrictions there are for spending a certain type of funding. The restrictions are as follows: She's okay to buy books, computer hardware and lab equipment. I reply...**

Dass ich meine Mittel genau***so*** verwenden darf ***wie*** du.
that I my funds exactly.so use may how you

'That I may use my funds in the same way like you.'

a. Aber ich kann auch andere dinge wie zum beispiel möbel kaufen.
but I can also other things like for example furniture buy
'But I can also buy other things like furniture.' Modal ≫ Comparison

b. Und nicht anders.
and not otherwise

'And not otherwise.' Comparison ≫ Modal
(Hohaus and Zimmermann, 2021, pp. 126-127)

Hohaus and Zimmermann (2021) propose therefore that the PM *so* is an equative quantifier that can quantify over either degrees, again thought of as primitives within the grammar that *so* can directly access and quantify over, or manners. Note that they assume manners to be derived from the type of eventualities, namely as type $<v,t>$ which presumably modifies a predicate of events of the same type $<v,t>$ via PREDICATE MODIFICATION. Specifically, in (83b), the inputs to the equative quantifier are sets of manners of type $<<v,t>,t>$, created by abstracting over variables of type $<v,t>$. Apart from a manner variable being of a higher type (e.g., Heim and Kratzer 1998), for our purposes we may take the approach toward manner here to be roughly equivalent to the approach of Rett (2013), who takes manner to be a separate semantic type of its own.

(83) a. $[\![so_{degree}]\!]$: $\lambda D_{dt}.\lambda D'_{dt}.\{d: D(d) = 1\} \subseteq \{d': D'(d') = 1\}$
b. $[\![so_{event-property}]\!]$: $\lambda R_{vt,t}.\lambda R'_{vt,t}.\{f: R(f) = 1\} \subseteq \{f': R'(f') = 1\}$
(Hohaus and Zimmermann, 2021, p. 122-125)

It is clear now how German equatives, regardless of the syntactic category of the parameter of comparison, should always be ambiguous so long as the parameter of comparison makes available either a degree or manner argument that can be abstracted over and serve as input to either the degree or manner quantifier. Eschewing the specific compositional details for reasons of space, we illustrate here with the final logical forms of verbal equatives with a degree or manner reading for exposition's sake.

(84) Wir haben die pizza ***so*** abgekühlt ***wie*** die lasagn.
we have the pizza so cooled how the lasagne
'We cooled the pizza to the same temperature as we cooled the lasagne.'
a. $[\![so_{degree}]\!]$: $\lambda D_{dt}.\lambda D'_{dt}.\{d: D(d) = 1\} \subseteq \{d': D'(d') = 1\}$
b. $[\![(84)]\!]$: {d: we cooled the lasagna by at least d-temperature} ⊆ {d': we cooled the pizza by at least d'-temperature}

(85) Beckedahl spricht ***so wie*** er immer spricht.
Beckedahl talks so how he always talks
'Beckedahl talks just like he always does.'
a. $[\![so_{event-property}]\!]$: $\lambda R_{vt,t}.\lambda R'_{vt,t}.\{f: R(f) = 1\} \subseteq \{f': R'(f') = 1\}$
b. $[\![(85)]\!]$: $\exists e[\{f': \forall e'[e' \text{ is an event of B. talking} \rightarrow f'(e')]\} \subseteq \{f: f(e) \,\&\, e \text{ is an event of B. talking}\}]$
(Hohaus and Zimmermann, 2021, pp. 125)

Given the observations in German where the PM *so* is genuinely ambiguous, one route to take for the facts in Dutch regarding the PM *zo* is also to assume there are two such PMs, one which quantifies over degrees and the other which quantifies over manners. Such an

analysis, of course, bears the burden of explaining why exactly the degree quantifier version of *zo* is ruled out with verbs and the manner quantifier version of *zo* is ruled out with gradable adjectives. Recall that a non-degree 'manner' interpretation of adjectival equatives, diagnosed by evaluativity, is never possible with Dutch equatives demonstrated in (11), whereas a degree reading is never available with verbs as shown in (8) and (15). Again, one cannot appeal to the fact that activity verbs do not have degree arguments and therefore do not have degree readings since degree achievement verbs similarly do not have degree readings. This is further complicated by the fact that regardless of verb class, the comparative has an obligatory degree reading and lacks manner readings as discussed extensively before. Finally, analyzing *zo* as a quantifier, whether over degrees or manners, leaves unexplained its use as a pro-form over degrees and manners in non-comparison contexts, a use which the German PM *so* also shares (Hohaus and Zimmermann, 2021; Umbach et al., 2022). We conclude therefore that an ambiguity analysis faces difficult empirical challenges not just for Dutch equatives built with *zo* but also across comparison constructions like the comparative and is hence untenable for the Dutch facts.

5 Conclusion

We examined in this paper an equative construction in Dutch formed with the PM *zo*, which marks the parameter of comparison together with the SM *als*. The main empirical observation is that what can be compared in this construction depends on the syntactic category of the parameter of comparison: gradable adjectives return degree readings where two degrees of holding a gradable property are being compared, whereas with verbs two manners of carrying out a verbal event are being compared, regardless of whether the verb in question describes a change along some gradable dimension or not. We proposed an analysis whereby the PM *zo* is kind-referring, with equative and quantificational semantics attributed to the SM *als*. This allowed us to capture the availability of degree and manner readings as being dependent on the syntactic category of the parameter of comparison under the assumption that state kinds and event kinds are named by degrees and manners respectively, as well as the fact that equatives built with *zo* show the hallmark of a scopally mobile quantifier just as with its comparative counterpart.

Several theoretical consequences arise from the analysis as well as the cross-linguistic comparison of equative constructions across Germanic. First, the Dutch equative facts suggest that degrees and manners can be referred to using eventuality kinds, but that there is nonetheless a place for degrees in the grammar when comparing the equative to the comparative, albeit with degrees being introduced exclusively by degree morphemes rather than particular lexical categories. In particular, it also demonstrated that degree arguments should not be present in the lexical semantics of degree achievement verbs or the asymmetry in degree readings across the comparative and the equative would remain unexplained. We proceeded to sketch a possible analysis of both the comparative and de-

gree acheivement verbs in Dutch and beyond; nothing of course hinges on the particular implementation here so long as it is degree morphemes that introduce degree arguments and the means to compare them. Second, a cross-Germanic comparison of equatives also revealed that there is a place for degrees and manners as semantic primitives in their own right based on the differences their equative constructions exhibited in contrast to Dutch, indicating that there must also be diverse ways of referring to degrees and manners across languages.

We left one major prediction of the proposed analysis open, namely that of stative verbs. The proposed analysis predicts that if stative verbs are analyzed as predicates of states in the Davidsonian sense, then equatives formed with *zo* in Dutch involving stative verbs should always have degree and not manner readings. As detailed here, it is unclear that there is a way to robustly test this prediction given that stative verbs in Dutch show a preference for PMs other than *zo* or employ adverbs together with *zo* to express degree readings, whereas some speakers prefer manner readings when particular stative verbs are marked directly by *zo*. Future work will have to carefully examine the distribution of the different PMs in Dutch with particular classes of stative verbs to not only properly test the prediction of a kinds-based analysis, but also potentially shed more light on the lexical semantics and syntax of stative verbs in general with respect to their ontological status and whether they are more properly analyzed as predicates of states or as predicates of events.

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