Similatives and the argument structure of verbs

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Abstract I begin with the observation in Haspelmath and Buchholz ([1998](#)) that languages tend to use the same morpheme to mark the standard of comparison across equation constructions. In English, it is the morpheme *as*, in similatives like *John danced **as** Sue* (*did*) and equatives like *John is as tall **as** Sue* (*is*). The first goal of this paper is to provide an analysis of *as* that accounts for its distribution across these constructions. The second goal of this paper is to provide an account of Haspelmath and Buccholz's second observation, which is that while languages can form equatives with parameter markers (PMs; the first *as* in *John is **as** tall as Sue* (*is*)), languages generally do not form similatives with parameter markers. I suggest that equation constructions are a test for lexicalized argumenthood, i.e. that the equation of a non-lexicalized argument prohibits the presence of a PM, and, for English, vice-versa. This leads to the conclusion that, contrary to recent claims (Piñón [2008](#); Bochnak [2013](#)), verbs, unlike adjectives, generally do not lexicalize degree arguments.

Keywords Equatives · Similatives · Comparatives · Manners · Gradable adjectives · Lexical semantics · Degree semantics · Verb scales · Relative clauses

1 Introduction

This paper has a narrow empirical goal and a broader theoretical goal. The former has to do with several constructions that form a natural morphological and semantic class across languages: equation constructions, exemplified in (1) and (2) in English.

(1) a. John read <u>the same</u> book **as** Sue. *same/different construction*
     b. John is <u>as</u> tall **as** Sue. *equative*

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(2) a. John danced **as** Sue did.   (*manner*) *similative*
   b. John danced **as** Sue sang.   (*temporal*) *similative*
   c. John's hands were cold **as** ice.   *generic equative*
   d. Bill is a liar, **as** Mary already knows.   *accord construction*

Haspelmath and Buchholz (1998) ('HB') classify the morphology of equation constructions as follows:

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

They observe a strong tendency across languages to use the same morpheme to mark the standard (the standard marker, SM) in all of these constructions. This is illustrated for several European languages in Table 1. As a result they conclude that equation constructions warrant a compositional semantic analysis which attributes their common meaning to their common morphology. The narrow goal of this paper is to propose such an analysis.

The broader goal of the present paper has to do with the difference between the equation constructions in (1) and those in (2). HB's second observation is that, while languages can form equatives with a parameter marker (PM, the first *as* in (1b) and (3)), languages generally cannot form similatives with one.[1] The contrast between the equative in (1b) and the generic equative in (2c) shows that not all equatives are formed with a PM either.

To address HB's first observation, I propose an analysis of *as* as a relativizer with an unspecified domain. This is relatively uncontroversial, given that many languages

Table 1 Standard markers across European languages

	EQUATIVE PM	EQUATIVE SM	SIMILATIVE SM
Bulgarian	Ø	*kato*	*kato*
Czech	*tak*	*yako*	*yako*
Finnish	*yhtä*	*kuin*	*kuin*
Lithuanian	*taip*	*kaip*	*kaip*
Norwegian	*like*	*som*	*som*
Portuguese	*tão*	*como*	*como*

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[1] I could find only one counterexample to this second generalization, the Hungarian similative in (i).

(i) **Úgy** teniszezik, **mint** egy hivatásos.
  so(PM) play.tennis:3SG as(SM) a professional
  'He plays tennis like a professional.'   *Hungarian*; HB (p. 314)

HB present (i) without discussing the etymology of the relevant morphemes so I unfortunately cannot offer speculation about why or how it is that Hungarian is exceptional in this respect. Because of (i), and knowing that there are likely other counterexamples, I have characterized this generalization of HB as a strong cross-linguistic tendency, rather than a universal.

use *wh*-phrases as both SMs and relativizers. Most of the argumentation of this paper centers around a question prompted by HB's second observation: what is it about similatives, but not equatives, that makes them generally incompatible with PMs?

I will propose that the answer involves two considerations: first, the lexical category of the parameter; and second, whether or not the entity being equated is a lexicalized argument of the parameter. I consider lexicalized arguments to be those encoded in a morpheme's lexical entry, and non-lexicalized arguments (what others might refer to as 'adjuncts') to be those associated with a morpheme via other means, perhaps by a modifier. In particular, I will argue that the equation constructions in (1) are formed with PMs because they involve the equation of lexicalized arguments (individuals in the case of (1a) and degrees in the case of (1b)) and that the equation constructions in (2) are not formed with PMs because they involve the equation of non-lexicalized arguments (e.g. manners in (2a) and times in (2b)).

Although some recent studies have shown that verbs can be associated with degrees, the nature of this association has remained controversial. Some have suggested that a verb can be associated with a degree argument only via a semantic operator (Piñón 2000, 2005; Caudal and Nichols 2005), while others have suggested that verbs can lexicalize a degree argument (Piñón 2008; Rappaport-Hovav 2008; Rappaport-Hovav and Levin 2010; Bochnak 2013). If the above proposal is correct, then equation constructions could function as a test for lexicalized argumenthood, in which case the morphology of similatives would suggest that, while verbs can be associated with a degree argument, they generally do not lexicalize them.

I will begin by outlining my assumptions about the semantics of adjectives and equatives, which will lead to a formulation of the semantics of the SM *as*. I will then turn in Sect. 3 to discuss similatives, which will in turn warrant an examination of equation constructions generally (Sect. 4).

2 Adjectives and equatives

The goal of this section is to present a relatively uncontroversial and simplified degree semantics for gradable adjectives and comparison constructions as a jumping-off point for a semantic theory of equation constructions.

2.1 Gradable adjectives and degree lexicalization

A typical degree-semantic account of the difference between gradable adjectives (like *tall*) and non-gradable adjectives (like *freckled*) is one in which the former denote relations between degrees and individuals (type $\langle d, \langle e, t \rangle \rangle$) and the latter denote individual properties (type $\langle e, t \rangle$). In other words: while non-gradable adjectives lexicalize an individual argument (the bearer of the property), gradable adjectives lexicalize both an individual argument and a degree argument. (4) and (5) give sample lexical entries of these adjectives and denotations of sentences which include them.

(4) a. $[\![\text{freckled}]\!] = \lambda x . \text{freckled}(x)$
     b. $[\![\text{John is freckled}]\!] = \text{freckled}(\text{john})$

(5) a. $[\![\text{tall}]\!] = \lambda d \lambda x .\text{tall}(x, d)$
     b. $[\![\text{John is tall}]\!] = \exists d[\text{tall}(\text{john}, d) \wedge d > s]$ for some contextually valued standard s

The inclusion of the contextual standard s in (5b) is necessary to account for the fact that positive constructions like *John is tall*—constructions with gradable adjectives with no accompanying overt degree morphology—are evaluative, which is to say that they refer to a degree which exceeds a contextual standard. Evaluativity is often analyzed as the contribution of a null quantifier or modifier because it seems tied to particular degree constructions rather than particular gradable adjectives; while positive constructions like *John is tall* are evaluative, the equative *John is as tall as Sue* is not, as it can be true of John and Sue even if they qualify as short in the context of utterance. I will refer back to this property occasionally throughout the paper; see Rett (2007, 2008) for a more in-depth description of evaluativity.

2.2 Equatives, a morphological overview

A given language is likely to have a number of different comparative strategies and a number of different equative strategies. (6) gives examples of the former for English (see Ultan 1972; Stassen 1985); (7) gives examples of the latter (see Haspelmath and Buchholz 1998; Henkelmann 2006).

(6) a. John is taller than Sue.
     b. John's height is more than Sue's height.
     c. John is tall relative to Sue.
     d. John is tall; Sue isn't.

(7) a. John is as tall as Sue.
     b. John's height is Sue's height.
     c. John and Sue are equally tall.
     d. John and Sue have the same height.

Just as semantic analyses of the comparative are centered around the comparative strategy in (6a), I will focus on the equative strategy in (7a). (Haspelmath and Buchholz 1998 and Henkelmann 2006 also treat these equative strategies as distinct from the others.) I will follow Henkelmann in referring to equatives like (7a) as "extent equatives". Extent equatives are characterized by the presence of an adjective like *tall* and the absence of both (a) an equality predicate, like *equal to*, *equally* or *same*; and (b) possessive or partitive morphemes to mark the relationship between the comparee/standard and the parameter of measurement (contra (7b)). It is extent equatives which I described in (1) as being morphologically parallel to similatives.

Broadly speaking, a language will have one of two types of extent equatives: those whose standard marker is a preposition-like element (as in English) or those whose standard marker is a *wh*-phrase (or relative pronoun). The first sort, the 'preposition equative,' is illustrated in (8), the second sort, the '*wh*-equative', is in (9).[2]

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[2]Examples from Haspelmath and Buchholz (1998) and Henkelmann (2006) will be annotated with 'HB' and 'H', respectively, followed by the page number on which they occur in the original text.

(8) a. ax-ī   kabīr-u-n   **ka/miṯla** uxt-ī
         brother-POSS:1.SG old-NOM-INDET like(SM) sister-POSS:1.SG
         'My brother is as old as my sister.'   *Arabic*; H (p. 382)[3]

     b. Fransisku-ka Juzi-**shna**   jatun-mi ka-rka.
         Francisco-TOP José-like(SM) big-EV be-PST:3
         'Francisco was as big as José.'   *Imbabura Quechua*; ibid.[4]

     c. Tá Máire **chomh** cliste **le**   Liam.
         is Máire as(PM) clever with(SM) Liam
         'Máire is as clever as Liam.'   *Modern Irish*; HB (p. 285)

(9) a. Mia sorella è carina **come**   te.
         my sister is pretty how(SM) you
         'My sister is as pretty as you.'   *Italian*; HB (p. 291)

     b. La meva germana és **tan**   bonica **com**   tú.
         the my sister   is so(PM) pretty how(SM) you
         'My sister is as pretty as you.'   *Catalan*; ibid.

     c. Naš dom **takoj**   že vysokij **kak**   vaš.
         our house such(PM) PTL high   how(SM) yours
         'Our house is as tall as yours.'   *Russian*; HB (p. 293)

The equative PM is generally characterized in the degree-semantic literature as denoting a degree quantifier, a relation between sets of degrees. The reasons for doing so are generally derived from semantic analyses of comparatives (like *John is taller than Sue*) which display obvious morphosyntactic parallels but have received more attention in the literature. The goal of the next section is to present a degree-semantic account of equatives; in order to do so, I begin with a degree-semantic approach to comparatives (based on analyses in von Stechow 1984; Rullmann 1995; Heim 2000).

2.3 A syntax and semantics for equatives and comparatives

2.3.1 Comparatives

Following Bresnan (1973), and many others after, I consider the subordinate clause in (10a) (the one introducing the standard) to be an elided version of the clause *Sue is tall* in (10b), with the parameter deleted under identity.[5]

(10) a. John is taller than Sue is.
      b. John is taller than Sue is ~~tall~~.

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[3]Henkelmann cites Fischer (1987) in identifying *ka* and *miṯla* as prepositions.

[4]Henkelmann cites Cole (1982) in identifying *-shna* as a case suffix; EV marks the first-hand or direct evidential.

[5]This identity restriction seems particularly important when we consider that indirect comparatives like *This board is longer than that board is wide* cannot undergo elision of the parameter (Bartsch and Venneman 1972; McCawley 1988; Kennedy 1999). See Lechner (2001, 2004) for relevant discussion. Of course, this is only true of clausal comparatives; see e.g. Pancheva (2006) or Bhatt and Takahashi (2007) for syntactic and semantic analyses of phrasal comparatives.

The comparative morpheme *-er* thus appears to take two clauses as its syntactic arguments (Heim 1985).

I assume that the matrix and subordinate clauses in the comparative denote sets of degrees, and that this is the result of the presence and movement of a null *wh*-operator which ranges over degrees. In some languages, this *wh*-operator is overt in the subordinate clause; (11) is acceptable in some dialects of English (hence the % mark).

(11)   %John is taller than what you are.

I therefore take the underlying form of (10a) to be (12a) (with the semantic argument structure in (12b); see Bresnan 1973; Chomsky 1977; Williams 1977; Heim 1985, 2006 and many others).

(12)   John is taller than Sue is.
    a.   syntax: -er([$_{\mathrm{CP}}$ OP$_d$ Sue is d-tall]) ([$_{\mathrm{CP}}$ OP$_{d'}$ John is d'-tall])
    b.   semantics: $[\![$-er$]\!](\lambda d.\mathsf{tall}(\mathsf{sue},d))(\lambda d'.\mathsf{tall}(\mathsf{john},d'))$

This analysis characterizes the comparative morpheme as a degree quantifier: a relation between sets of degrees (type $\langle\langle d, t\rangle, \langle\langle d, t\rangle, t\rangle\rangle$). I will present one formulation here; see Schwarzschild (2008) for others.

(13) $[\![$-er$]\!] = \lambda D \lambda D'.\mathrm{MAX}(D') > \mathrm{MAX}(D)$, where
    $\mathrm{MAX}(D) = \iota d[d \in D \wedge \forall d' \neq d \in D[d' < d]]$

The compositional semantics for (10a) is in (14). It predicts the sentence to be true in any context in which John's height—the maximum degree to which John is tall—exceeds Sue's height.

(14)   John is taller than Sue is.
    a. $[\![$-er$]\!](\lambda d.\mathsf{tall}(\mathsf{sue},d))(\lambda d'.\mathsf{tall}(\mathsf{john},d'))$
    b. $= \mathrm{MAX}(\lambda d'.\mathsf{tall}(\mathsf{john},d')) > \mathrm{MAX}(\lambda d.\mathsf{tall}(\mathsf{sue},d))$

Before I move on to provide an analysis of the equative PM, I need to address one component of the analysis above. While there is some evidence for the presence of a null *wh*-operator in the subordinate clauses of comparatives, there is no parallel evidence for such an operator the matrix clauses. That is, I am aware of no language or dialect in which the equivalent of *What John is taller than (what) you are* is grammatical. This means that a semantic analysis which characterizes the comparative morpheme (and, as I will show, the equative morpheme) as a degree quantifier is committed to the denotations of the matrix and subordinate clauses being similar despite a morphological asymmetry.

It is possible that this difference between the matrix and subordinate clauses of comparatives and equatives can be explained by appealing to general syntactic restrictions on matrix versus subordinate clauses, for instance the relative markedness of overt complementizers in matrix clauses. I will follow many others in assuming that the denotation of the matrix clause in the comparative and in equation constructions generally comes about via a null *wh*-operator, although it is just as likely from

my perspective that the relevant λ-abstraction could arise via a null relativizer or a type shifter.

2.3.2 Equatives

A number of theorists have adapted the formalism in (13) (or some variant of it) straightforwardly to equatives (Horn 1972; Seuren 1984; von Stechow 1984; Schwarzschild and Wilkinson 2002). The idea is that, while the comparative invokes a strict linear ordering, the equative invokes a weak linear ordering, as demonstrated in (15) for the equative morpheme (=the equative parameter marker).

(15) $[\![\text{as}_{PM}]\!] = \lambda D \lambda D.\text{MAX}(D) \geq \text{MAX}(D)$

This formulation of the denotation of the equative morpheme will serve our purposes here; see Rett (2010, 2013) for a more explicit version of this account. (16) shows the compositional semantics for a specific extent equative based on (15).

(16)   John is as tall as Sue is.
    a. $[\![\text{as}]\!](\lambda d.\text{tall(sue}, d))(\lambda d'.\text{tall(john},d'))$
    b. $= \text{MAX}(\lambda d'.\text{tall(john}, d')) \geq \text{MAX}(\lambda d.\text{tall(sue},d))$

We have seen that in *wh*-equative languages, just like with some comparatives, the *wh*-operator is overt and is used to mark the standard. The Catalan example below is modified slightly from (9).

(17)   La Joana és **tan**   bonica **com**   la Maria.
       the Joana is so(PM) pretty how(SM) the Maria
       'Joana is as pretty as Maria.'   *Catalan*

In parallel to the assumptions made above for comparatives, I analyze the SM in *wh*-equatives to be an overt instance of a *wh*-operator, as in (18a) (see Borsley 1981 for a similar proposal for Polish). This allows the subordinate clause to denote a set of degrees, as in (18b). I assume that a null operator performs this function in the matrix clause.

(18)   La Joana és tan bonica com la Maria.
    a.   syntax: $\tan_{PM}$ ([$_{CP}$ com$_d$ Maria is ~~d-tall~~]) ([$_{CP}$ Op$_{d'}$ Juanita is d'-tall])
    b.   semantics: $[\![\text{as}_{PM}]\!](\lambda d.\text{tall(maria},d))(\lambda d'.\text{tall(juanita},d'))$

In contrast, languages with preposition equatives appear to prohibit overt *wh*-phrases in either the matrix or subordinate clauses, as (19) shows.

(19)   John is as tall as (*what) Mary is.

It thus seems reasonable to assume that, in the subordinate clauses of preposition equatives, prepositions perform the function of a *wh*-operator. (This is also in accordance with the proposal in Borsley 1981.) From this perspective, *wh*-equatives and preposition equatives have in common that their matrix clause is associated with a set of degrees via a null *wh*-operator, but they differ in that their subordinate clause is associated with a set of degrees via an overt *wh*-phrase and a preposition, respectively.

I will pursue an analysis in which the preposition functions as a relativizer; which means that it plays the same semantic role as a *wh*-phrase—i.e. it λ-abstracts over a variable, resulting in a set—but it is not syntactically associated with that variable via movement.

The perspective that preposition SMs are semantically meaningful in preposition equatives is supported by Haspelmath and Buchholz's (1998) observation that the morpheme plays the same roles across constructions and across languages. An alternative analysis of preposition equatives in which the subordinate clauses are formed via a null *wh*-operator and the preposition does not contribute semantically to the construction would have a hard time accounting for this distribution.

Additional evidence that *as* is a relativizer (but not a moved *wh*-operator) comes from Stowell (1987). According to Stowell, (20) suggests that both *as* and *so* can function as set-abstractors at the CP level, but (21) suggests that only *so*, not *as*, can be interpreted in what would be its base position (the gaps in (20)), suggesting that *so* moves to the higher position, while *as* is base-generated there.

(20)   a.   Bill is a liar, as Mary already knows ___.
        b.   Bill is a liar, and so he has claimed ___ himself.

(21)   a.   *Bill is a liar, Mary already knows as.
        b.   Bill is a liar, and he has claimed so himself.

Others have independently characterized *as* in these constructions is a relativizer of sorts (Potts 2002a, 2002b; Lee-Goldman 2012).

To implement this characterization of SM *as* semantically, I assume that, in the course of the derivation, the degree argument of the gradable adjective gets valued by a free variable in the absence of a syntactically encoded value or overt binder. The SM *as* then binds that free variable at the edge of the subordinated clause, resulting in a set of degrees (just as with a *wh*-operator).

I will use 'S^δ' to range over sentences or clauses denoting propositions with instances of the free variable δ (e.g., omitting world variables, *John is δ-tall* denotes the proposition tall(john,δ)). $[d/\delta]$ is an operation which replaces all incidents of the variable δ with the variable d. (22) demonstrates the result of applying the standard marker *as* to a sentence S^δ with a free variable d.

(22) $[\![\text{as}_{SM}\ S^\delta]\!] = \lambda d.[\![S^\delta]\!][d/\delta]$

That is, the standard marker *as* denotes a function from a proposition with a free variable of type $\langle\sigma\rangle$ to a function $\langle\sigma, t\rangle$.

(23) shows the assumed underlying form for the English equative. As with comparative and *wh*-equative equatives, both the matrix and subordinate clauses denote sets of degrees. They differ in that the former is formed via a null *wh*-operator, while the latter results from the meaning of the relativizer *as*.

(23)   John is as tall as Mary is.

     a.   syntax: $\text{as}_{PM}([_{CP}\ \text{as}_{SM}^{\delta}\ \text{Mary is } \cancel{\delta\text{-tall}}])([_{CP}\ \text{Op}_{d'}\ \text{John is } d'\text{-tall}])$

     b.   semantics: $[\![\text{as}_{PM}]\!](\lambda d.\text{tall}(\text{mary},d))(\lambda d'.\text{tall}(\text{john},d'))$

These assumptions will result in the same compositional semantics as in (16).

    Because I have analyzed *as* as a relativizer, the difference between *wh*-equatives and preposition equatives is semantically trivial. But it has given us an idea of the meaning of *as* in equation constructions, and this will be important when we turn to the semantics of similatives. Before I do so, however, I will say something about supporting evidence that equatives equate degrees. This too will be relevant when we turn to similatives.

2.3.3 Supporting evidence that specific equatives equate degrees

Some evidence that equatives equate degrees (as opposed to, say, properties) is their ability to differentiate between gradable and non-gradable adjectives. Non-gradable adjectives in comparison constructions like the equative are either unacceptable (24a) or receive a distinct interpretation in which gradability seems coerced. One possible such coercion is along a time scale; (24b) compares how long Mary and Sue have been pregnant. Another common coercion is along a scale of prototypicality; (24c) can mean that seven is a more typical or prototypical prime than two (Armstrong et al. 1983).

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

     b.   Mary is more/as pregnant than/as Sue.

     c.   Seven is more prime than two.

    Recall the phenomenon of evaluativity: in positive constructions like (25a), gradable predicates like *tall* can mean something like 'counts as tall in the context of utterance', which is a non-gradable property. Despite this, equatives with gradable predicates cannot be used to equate two non-gradable properties. In other words, (25b) cannot mean something like, 'John is tall and Sue is tall'.[6]

(25)   a.   John is tall.

     b.   John is as tall as Sue.   *#John is tall and Sue is tall*

It instead means something like 'John is tall to (at least) the same degree that Sue is tall,' which requires that their height be the comparable regardless of context or comparison class.

    In addition to its ability to capture the degree interpretation demonstrated in (24), the degree-quantifier analysis can account for the fact that NPIs are licensed in the subordinate clauses of comparatives and equatives. The comparative examples come from Heim (2006), the equative examples from Rett (2010).

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[6]Interestingly, this interpretation is possible when the PM is removed, as in *John is tall, as Sue is*. I will discuss these constructions (called "generic equatives") in Sect. 4.2.

(26) 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.

(27) 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.

Assuming Ladusaw's (1979) observation that NPIs seem to be licensed in downward-entailing environments and Seuren's (1973, 1984) assumption that downward-entailingness is a property of the degree domain as well as the domain of individuals (see also Heim 2000, whose definition is reproduced in (28)), we can predict the licensing of NPIs in the subordinate clauses of comparatives and equatives.

(28) A function f of type $\langle e, \langle d, t \rangle \rangle$ is **downward-monotonic** iff
      $\forall x, d, d'[f(x)(d) \wedge d' < d \rightarrow f(x)(d')]$

(29) Context: John is 5ft tall, Sue is 4ft tall.
      a. Mary is taller than John. $\rightarrow$ Mary is taller than Sue.
      b. Mary is taller than Sue. $\nrightarrow$ Mary is taller than John.

(30) Context: John is 5ft tall, Sue is 4ft tall.
      a. Mary is as tall as John $\rightarrow$ Mary is as tall as Sue.
      b. Mary is as tall as Sue. $\nrightarrow$ Mary is as tall as John.

That the definitions in (13) and (15) predict the entailment patterns in (29a) and (30a) is demonstrated in (31) and (32).

(31) Context: Mary is 6ft tall, John is 5ft tall, Sue is 4ft tall.
      a. ⟦Mary is taller than John⟧ = $\text{MAX}(\lambda d.\text{tall}(\text{mary}, d))$
          $> \text{MAX}(\lambda d'.\text{tall}(\text{john}, d'))$
      b. ⟦Mary is taller than Sue⟧ =
          $\text{MAX}(\lambda d.\text{tall}(\text{mary}, d)) > \text{MAX}(\lambda d'.\text{tall}(\text{sue}, d'))$
      c. ⟦(31a)⟧ $\rightarrow$ ⟦(31b)⟧ = $\text{MAX}((0, 6]) > \text{MAX}((0, 5])$
          $\rightarrow \text{MAX}((0,6]) > \text{MAX}((0,4])$

(32) Context: Mary is 5ft tall, John is 5ft tall, Sue is 4ft tall.
      a. ⟦Mary is as tall as John⟧ =
          $\text{MAX}(\lambda d.\text{tall}(\text{mary}, d)) \geq \text{MAX}(\lambda d'.\text{tall}(\text{john}, d'))$
      b. ⟦Mary is as tall as Sue⟧ =
          $\text{MAX}(\lambda d.\text{tall}(\text{mary}, d)) \geq \text{MAX}(\lambda d'.\text{tall}(\text{sue}, d'))$
      c. ⟦(32a)⟧ $\rightarrow$ ⟦(32b)⟧ = $\text{MAX}((0, 5]) \geq \text{MAX}((0, 5])$
          $\rightarrow \text{MAX}((0,5]) \geq \text{MAX}((0,4])$

2.4 Summary

I have presented a degree-semantic analysis of equatives in which the PM is a degree quantifier. I have assumed that the matrix clause of an equative, the one involving the comparee, denotes a set of degrees via a null *wh*-operator (as in comparatives). In languages with *wh*-phrase SMs, I have analyzed the SM as an overt instance of this same *wh*-operator. And in languages with preposition SMs, I have analyzed the preposition as a relativizer.

I have presented several reasons to think that, as this analysis assumes, equatives equate degrees (in particular, the degree argument of the adjective). *John is as tall as Sue* requires not just that John and Sue be tall, but that they be tall to the same degree. This account of equatives also correctly predicts the licensing of NPIs in their subordinate clause.

This discussion of equatives and the semantic role of SMs raises at least two questions: in what other constructions can SMs range over degrees? And what other entities can SMs range over (that is, what other sorts of things can equation constructions equate)? In the next section, I extend the notion of the English SM *as* as a relativizer to similative constructions, and argue that similatives show that SMs can range over a variety of entities, but that similatives nevertheless do not generally equate degrees, like equatives do. In Sect. 4 I will argue that this is due in part to their lacking PMs.

3 Verbs and similatives

A straightforward extension of the analysis above to similatives will not correctly predict the possible interpretations of similatives. Specifically, the fact that some verbs can be associated with degrees and the fact that SMs can range over degrees are together not sufficient conditions for similatives to receive a degree interpretation (i.e. one in which degrees are equated). I will use this observation to argue that the presence of a PM in equatives and the absence of a PM in similatives has a particular semantic significance.

Recall that Haspelmath and Buchholz (1998) show there are two types of languages: those whose equatives require a PM but whose similatives prohibit a PM (like English); and those for which neither equatives nor similatives are formed with PMs (like Bulgarian). The judgments discussed here pertain to languages like the former; I will argue that they are relevant for accounting for HB's observation that there are no languages in which similatives are formed with PMs. I will return to discuss other types of languages in Sect. 4.4.

3.1 Verbs and degree arguments

A great deal of research suggests not only that verbs can be associated with degrees, but that they can be associated with degrees on a variety of different scales, i.e. measuring a variety of different dimensions. These include degrees of gradability (for degree-achievement verbs); degrees of quantity (for telic verbs that can be 'measured out' on their object); degrees of prototypicality (measuring the degree to which an

event is prototypical, brought out by modifiers like *half*); and intensity (for verbs that can occur with degree morphology). In the end, I will argue that the ability of these verbs to be associated with some degrees does not in general result in the ability for SMs in similatives to range over degrees (i.e. for similatives to equate the degrees associated with verbs). This will lead to an account of HB's second observation in Sect. 4. I will start by reviewing the arguments for these associations with degrees.

3.1.1 Scales of gradability

Degree achievements (DAs) are the most compelling example of a verb type that can be associated with a scale. DAs are verbs which are morphologically derived from gradable adjectives, as in (33).

(33) a. Robin lengthened the pants.
      b. The boy straightened the rope.
      c. The soup cooled.

DAs have been known as 'scalar verbs' since at least Dowty (1979) based on their relationships to adjectives. Two papers have made that association even more apparent. First, Hay et al. (1999) address the fact that DAs—unlike most verbs or verb phrases—can receive either a telic or atelic reading, as demonstrated in (34).

(34) a. The soup cooled in 10 minutes.
      b. The soup cooled for 10 minutes.

The telic version in (34a) is true only if the soup became cool relative to some contextually valued standard s, familiar from positive constructions like *The soup is cool*. On the other hand, the atelic version in (34b) does not require that the soup became cool; it is true in a scenario in which John waited 10 minutes and then ate the soup while it was still quite hot.

Hay et al. (1999) provide an analysis of this ambiguity based on the assumption that DAs lexicalize a degree argument. They connect the two possible interpretations for sentences like *The soup cooled* to the presence or absence of a null morpheme which a) requires that the degree argument (e.g. the degree to which the soup cooled) exceed a contextual standard; and b) existentially binds the degree argument. Context—including conversational implicature—affects which interpretation is available at any given point. The authors propose a construction-specific null morpheme to do this but later work (Rett 2007; Kennedy and Levin 2008) gets the same result using null morphemes proposed for dealing with the positive construction (e.g. *pos* or EVAL).

In a second paper, Kennedy and Levin (2008) show that the relationship between a gradable adjective and its derived DA is closer still: the scales each is associated with seem to have the same structure. Previously, Kennedy and McNally (2005) had established that, just as gradable adjectives differ in polarity (*short* vs. *tall*), they also differ in scale structure. Adjectives can be associated with different types of scales: those which do not include their bounds ('open scale'), those which include lower bounds, those which include upper bounds, and those which include both upper and lower bounds ('closed scale'). The distribution of modifiers like *completely* is a good diagnostic for scale structure, as (35) demonstrates.

(35)   a.   Her brother is completely ??tall/??short.   *open scale*
       b.   The treatment is completely safe/??dangerous.   *partially closed scale*
       c.   The figure was completely visible/invisible.   *closed scale*

Kennedy and Levin's contribution was to show that the scales associated with DAs have the same structure as those associated with their related gradable adjectives. That is, DAs derived from open-scale adjectives (e.g. *cool, lengthen*) also seem to be associated with (partially) open scales, DAs derived from closed-scale adjectives (e.g. *dry, empty*) also seem to be associated with closed scales, etc. The difference between these types of DAs is evident in the type of contextual standard they invoke (an observation emphasized by Kearns 2007): while the telic interpretations of open-scale DAs require that the subject exceed a non-maximal standard, the telic interpretations of closed-scale DAs invoke a maximum as a standard. This difference is illustrated in (36).

(36)   a.   The soup cooled in 10 minutes. $\nrightarrow$ The soup became completely/ maximimally cool in 10 minutes.
       b.   The room emptied in 10 minutes. $\rightarrow$ The room became completely/ maximally empty in 10 minutes.

In sum, verbs derived from gradable adjectives are associated with degree scales, and the scale associated with a particular adjective has the same structure as the scale associated with its derived DA. Many of these accounts formalize this similarity by characterizing DAs as lexicalizing a degree argument (just as their adjectival counterparts). Later work on DAs (Kennedy 2012) argued that some verbs, unlike gradable adjectives, *do not* lexicalize the degrees they are associated with. I will discuss and defend this alternative approach in Sect. 4.3. Before that, I will discuss some other ways in which some other verbs have been argued to be associated with degrees.

3.1.2 Scales of quantity

In a series of papers (Krifka 1989, 1990, 1992; Verkuyl 1993; Tenny 1994), several authors explore a view of telicity wherein the event described by the verb was 'measured out' on a quantized direct object ('incremental themes'). Krifka formalizes an incremental theme role as a homomorphism from (sub-)events to the objects' (sub-)parts: *John ate an apple* describes a situation wherein each subevent of apple-eating corresponds to a sub-part of the apple, and the maximal event of eating an apple corresponds to an event of eating an entire apple. The influence of a quantity (or amount) scale seems particularly useful for treatment of the verbal modifier *half*, as demonstrated in (37):[7]

(37)   John half washed the dishes.

       a.   John washed half of the dishes.   *collective*
       b.   John washed all of the dishes halfway.   *distributive*

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[7]While the distributive interpretation is generally available, the collective reading of (37) is unavailable to some speakers.

In a measuring-out theory of incremental-theme verbs, the difference between the two readings in (37) depends on whether the halving operation is measured out collectively or distributively on the plural object.

This perspective brought scales of quantity into the discussion: if incremental-theme verbs invoke scales of quantity, then they can plausibly be more closely associated with degree achievements, which invoke scales of gradability. This is the goal of some recent work (Caudal and Nichols 2005; Piñón 2000, 2005, 2008). Caudal and Nichols suggest that "[a] predicate is telic iff (i) it has an associated set of degrees with (ii) a specified maximal degree and (iii) its verbal predicate satisfies BECOME [an operator which requires a strict mapping between degrees of quantity and events]." An example is in (38) (Caudal and Nicolas' (60) and (61)):

(38)   Yannig cooked the chicken.
        $\exists x \exists y \exists e \exists d[\text{cook}(d, e) \land \text{BECOME}(\text{cook}) \land \text{Agent}(e, x) \land \text{Patient}(e, y) \land$
        $\text{Yannig}(x) \land \text{the-chicken}(y)]$

In an independent proposal, Piñón (2005) characterizes incremental-theme verbs like *eat* as lexicalizing a degree argument, as in (39):

(39)   a. $\text{eat}_\delta(x)(O)(e)$ "the degree to which x qua type O is eaten in e"
        b. $[\![\text{eat}]\!] = \lambda x \lambda O \lambda d \lambda e.\text{eat}_\delta(x)(O)(e) = d$

He characterizes (39) as an analysis of *eat* as follows: "[W]e are not measuring quantities of applesauce that are eaten—we are measuring the degree to which the event type "eat applesauce" is realized" (Piñón 2005:205–206). The sentence denotes a proposition after the event argument is existentially bound and the degree argument is either existentially bound or valued at 1, the maximum value.

Thus, the quantity readings of sentences with *half* like (37) suggest that verbs are associated with quantity scales, and incorporating these scales into the semantics of incremental-theme verbs seems to have the potential to (a) account for these facts and (b) find a theoretical treatment of incremental-theme verbs wherein they behave in a manner parallel to DAs. Piñón (2008) follows DA accounts in assuming that an association to a quantity scale comes about because incremental-theme verbs lexicalize a degree argument. Piñón (2000, 2005) and Caudal and Nichols (2005), on the other hand, assume that the degree argument is not lexicalized but made available when necessary via a type shifter in contexts like (37) in which a modifier requires it.

3.1.3 Scales of prototypicality and result

As others have observed, there is a third reading available to sentences containing *half* as a verbal modifier: a prototypicality reading.[8]

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[8]Tenny (2000) refers to them as 'messing around' readings; and Bochnak (2011, 2013) calls them 'evaluative' readings. When the modifier *half* is involved (as opposed to other modifiers that can have a prototypical reading, like *completely*), the prototypical reading translates precisely as *in a half-assed way* or *did a half-assed job of* in colloquial English.

(40)   John half washed the dishes.
   a.   John washed half of the dishes.   *quantity: collective*
   b.   John washed all of the dishes halfway.   *quantity: distributive*
   c.   John washed all of the dishes halfway prototypically.   *prototypical*

Bochnak (2011, 2013) argues that it is important to differentiate between types of scales: he suggests, following Schwarzschild (2006) and others, that the quantity scale is made available via a measure operator μ. On the other hand, the prototypicality reading seems lexically constrained: a halfway prototypical event of dish-washing can refer to the amount of soap used, the amount of scrubbing, but not, for instance, the use of half a sponge. And some verbs, like *open*, cannot receive a prototypicality interpretation at all. Bochnak argues therefore that however a verb is associated with a quantity scale and a scale of prototypicality, the nature of these associations must be different.

The idea that verbs can be associated with scales has also been extended to non-scalar result verbs. In recent work (Rappaport-Hovav 2008; Rappaport-Hovav and Levin 2010), Levin and Rappaport-Hovav argue that verbs can only lexicalize either a manner (e.g. *wipe* or *swim*) or a result (e.g. *break* or *fill*). They refer to this as 'manner/result complementarity' (although see Koontz-Garboden and Beavers 2012 and Husband 2013 for counterclaims). They account for this by juxtaposing manner verbs on the one hand and result verbs, incremental-theme verbs and DAs on the other hand. The idea underlying this assimilation of result and incremental-theme verbs is that "the semantic notion which unifies directed motion and change of state is scalar change" (Levin and Rappaport-Hovav 2013). They argue that the similarity of result and incremental-theme verbs and their contrasts with manner verbs is best characterized as a difference in the lexicalization of a degree argument. Result verbs, incremental-theme verbs and DAs all lexicalize a scale (gradable or otherwise) but not a manner; and manner verbs lexicalize a manner but not a scale.

3.1.4 Scales of intensity

In a recent paper, Umbach (2011) observes that, in German, some verbs can be intensified by *so* (41). Her claims hold for the English translations of these verbs, as shown in (42) and (42) (although the relative placement of *so* differs from German to English).

(41)   a.   Oh Schatz, du hättest   das Essen gestern   nicht so
             Oh dear   you have-2sg-PST the mean yesterday not   PM *so*
             sclingen sollen.
             gorged   should
             'Oh dear, you shouldn't have gorged so yesterday.'
        b.   Es ist billiger, wenn man auf der Autobahn nicht so rast.
             It is cheaper when one on the autobahn not   *so* race-3sg-PRESS
             'It will be cheaper not to race so on the highway.'

(42) a. You shouldn't have gorged so yesterday.
      b. It's best if you don't race so on the highway.
      c. I can't imagine why she stinks so.

Umbach argues that, while the degree associated with DAs is tied to the event (or the event time), the degree associated with verbs like *race* is more like an adjective's degree argument in that it seems to be measuring the degree to which the predicate is instantiated.

3.2 Semantic restrictions on the interpretation of similatives

Despite clear evidence that verbs can be semantically associated with a number of different types of degree scales in a number of different constructions, similatives generally cannot receive degree interpretations. I will illustrate this first with those verbs which have been argued to lexicalize a degree argument; then I will present some more general arguments.

Recall that HB observed that languages fall into three different classes with respect to the morphology of equation constructions: those whose equatives require a PM, those whose equatives are formed with optional PMs, and those whose equatives are not formed with PMs. They claim that languages generally do not form similatives with PMs. It is my goal to identify a semantic correlate of this fact, and I base my claims about this correlation on the semantic differences between equatives and similatives in English. In doing so, I do not intend to make universal claims about the interpretation of all similatives; I will discuss these constructions in other classes of languages, especially those whose equatives are not formed with PMs, in Sect. 4.4.

3.2.1 Similatives and DAs

Imagine a scenario in which John baked a pie and a lasagna, both came out of the oven 350 °F warm and both needed to cool to 90 °F before they could be eaten. Imagine further that John cooled both by putting them in the refrigerator. In this case, the similatives in (43) are felicitous, and they mean that the pie and the lasagna cooled in the same manner, e.g. in the refrigerator or quickly.

(43) a. John cooled the pie as he did the lasagna.
      b. The pie cooled as the lasagna did.

Now imagine still that they were both cooled to 90 °F, but that while the lasagna was cooled in the refrigerator, John chose to cool the pie on the window sill with a fan blowing on it. In this scenario, the similatives in (43) are false. This suggests that the similative cannot be used to express that the pie and the lasagna cooled to the same temperature, only that they were cooled in the same manner.

The same can be said about the degree-achievement similatives in (44).

(44) a. John lengthened the pants as he did the skirt.
      b. The pants were lengthened as the skirt was.

These are only true in scenarios in which the pants and skirt were lengthened in the same manner—by letting out the hem, for instance, instead of sewing on additional material—but not in scenarios in which they were lengthened in different manners but from and to the same length.

Recall that the telic interpretation of DAs are evaluative, which means that they require that the gradable property be instantiated above a contextually valued standard. So the sentences in (43) and (44) have a reading compatible with the pie and lasagna both being cooled to a high degree and the pants and the skirt both being lengthened to a high degree. This interpretation could be paraphrased as, 'John lengthened the pants to a significant length for pants, and he also lengthened the skirt to a significant length for skirts.' This interpretation requires that John lengthened both, but crucially does not require that they be lengthened either to the same length or the same amount, which is what we would expect if the truth conditions of these sentences involved the equation of degree arguments (rather than properties or manners).

In order for an equation construction with a DA to receive a degree interpretation, it seems, it must include a PM and the quantity adjective *much*.

(45)   a. *The pants were as lengthened as the skirt was.
        b. The pants were lengthened as much as the skirt was.

This suggests that equation constructions with verbs as parameters—even verbs formed from gradable adjectives—cannot receive a degree interpretation. In contrast, equation constructions with adjectives as parameters (and with PMs) can…even adjectives formed from verbs, like *blackened*.

(46), suggested to me by a reviewer, shows a three-way contrast; in (46a), which lacks a PM, the parameter is a VP *got blackened*, and the sentence does not require that the tomatoes were blackened to the same degree as the peppers. In (46b), the deverbal adjective is the parameter, it contains a PM, and requires that the tomatoes and the peppers were blackened to the same degree. (46c) shows that the phrasal category of the parameter is important; having a VP parameter is enough to make an equation construction with a PM ungrammatical (as in (45a)).

(46)   a. The tomatoes got blackened as the peppers.
        b. The tomatoes got as blackened as the peppers.
        c. *The tomatoes as got blackened as the peppers.

3.2.2 Similaties and degrees of quantity or prototypicality

Similarly, the quantity reading brought out by modifiers like *half* cannot be targeted by similaties; (47) cannot mean that John and Mary washed the same amount of dishes.

(47)   John washed the dishes as Mary did.

Instead of equating degrees, similaties equate manners; (47) means 'John and Mary washed the dishes in the same manner.' This is especially clear in a scenario in which there are salient and varied manners. Imagine that John and Mary wash dishes in the same restaurant, where there are two ways of washing dishes: by hand, and through a

conveyer washer. In this scenario, with these salient manners, (47) means that either John and Mary both washed dishes by hand or by using the conveyer.

The salient manners in a context might be gradable—(47) could mean that John and Mary both washed the dishes gracefully—but in this case, what is being equated is not the degree to which John and Mary washed the dishes gracefully, but rather their manners of dish-washing (a non-gradable property, arguably of events). In a scenario in which Mary washed the dishes in a way that halfway approximates a prototypical dish-washing event (say, with half the enthusiasm she should have), (47) can mean that John did, too.

3.2.3 Similatives and result verbs

Despite Levin and Rappaport-Hovav's conclusions about result verbs (as opposed to manner verbs), similatives with result verbs also cannot receive degree interpretations. (48a) means something like, 'The table broke in the same manner as the chair did,' which imposes stricter truth conditions than would a sentence which equates the results of two breaking events (but is nevertheless compatible with a situation in which the results of the two events are the same).

(48)   a.   The table broke as the chair did.
        b.   The book fell as the lamp did.

And, similarly, (48b) means something like, 'The book fell in the same manner as the lamp did,' which is different from requiring that both events of falling have the same result. Both can additionally receive a temporal interpretation, meaning something like, 'The table broke at the same time as the chair did.'

3.2.4 Similatives and intensifier verbs

There is reason to believe that the same generalization applies to similatives with intensifier-verb parameters—at least those in English—but there are some ways in which the data are less clear. I will first illustrate why these similatives, too, seem to be equating something other than degrees; I will then discuss the complications.

The sentences in (49) are compatible with scenarios in which John and Mary drove quickly or stink to the same degree, but they do not require it.

(49)   a.   John raced as Mary did.
        b.   John stinks as Mary does.

This is perhaps particularly clear with (49a), in which the parameter is an eventive verb. (49a) can receive a manner interpretation, one which can be naturally followed by . . . *that is, in a boat* or . . . *that is, recklessly*. In these scenarios, as in the scenarios for the other similatives above, it is sufficient for the sentence to be true that John and Mary race in the same manner, regardless of whether they are driving the same speed.

In English, (49b) also does not require that John and Mary stink to the same degree. But it is harder to determine what is being equated in (49b) because the parameter is a stative verb, and stative verbs may not be associated with manners. One

interpretation of (49b) is that John and Mary stink for the same reason, or as the result of the same smell, which can be independent of the degree to which they stink, as (50) suggests.

(50)   Because he visited the same cathedral as she did, John stinks as Mary does: of incense. But since he spent more time there, John stinks more than Mary.

But a reviewer reports that this is not a possible interpretation for the Portuguese equivalent of (49a) (*O John tresanda como a Mary*), a cross-linguistic difference I cannot explain.

This same reviewer mentions the sentence in (51a) and its Portuguese counterpart in (51b).

(51)   a.   John accelerated as Mary (did).
        b.   O John acelerou como a Mary.

How many different manners of accelerating are there? In automatic transmission cars, the driver can only put her foot on the gas pedal, and this action can vary only with the force with which this action is made. Since the amount of pressure one places on the gas pedal is directly correlated with one's velocity, it is hard to separate the manner reading from the degree one. However, in a manual transmission car, things can be a little more interesting. One could grind the clutch clumsily from gear to gear, or shift gracefully and silently from one gear to the next. In a context in which John and Mary both ground the clutch, (51a) is true, whether or not they matched in velocity. It is not clear to me if the Portuguese version in (51b) is merely more natural with a degree interpretation or if it requires it.

There is a second complication: it is possible to utter the sentences in (52) (and all of the English similatives discussed) with an intonation break before the standard marker *as*, and these constructions have subtly different interpretations. I will use the term 'pause similatives' for lack of a better description; it seems likely that the pause in these constructions is related in a significant way to the comma intonation of *as* parentheticals (Potts 2002a, 2002b), but I will not explore that connection here.

(52)   a.   John danced, as Mary did.   *pause + event verb*
        b.   John raced, as Mary did.   *pause + intensifier verb*
        c.   John is tall, as Mary is.   *pause + gradable adjective*

These pause similatives receive an interpretation wherein they equate properties. They are semantically equivalent to a sentence of the form 'John is/did *P* and so is/did Mary.' (52a) requires of a situation only that John and Mary danced. (52b) requires of a situation only that John and Mary raced (not necessarily each other). Because racing requires driving fast, (52b) is synonymous to the sentence 'John drove fast, as Mary did,' which involves the gradable adverb *fast*, and so might appear to have a degree interpretation.

But the meaning of (52b) is importantly different from the meaning of (53a) (in just the same way as the meaning of (52c) is different from the meaning of (53b)): while the equatives in (53) equate degrees of speed and tallness, those in (52b) and (52c) equate evaluative properties, the properties of driving fast and being tall.

(53)   a.   John drove as fast as Mary did.
        b.   John is as tall as Mary did.

Imagine that John is driving a car and Mary a boat. Imagine further that John is driving 100 miles an hour, which qualifies in the context of evaluation as fast-for-a-car (which in turn qualifies as racing). And Mary is driving 60 miles an hour, which qualifies in the context of evaluation as fast-for-a-boat (which also qualifies as racing). In this context, (52b) (but not (53a)) is felicitous despite the fact that John and Mary are driving different speeds, i.e. are driving fast to different degrees.

Third, similatives with intensifier-verb parameters can receive a degree interpretation in NPI-licensing environments (in particular, under negation).

(54)   a.   You shouldn't have gorged as you did.
        b.   It's best if you don't race as you usually do.
        c.   I can't imagine why he stinks as he does.

In these environments (in contrast to those in (49)), the similatives receive an interpretation similar to that of an equative, e.g. *gorged as much as you did* or *raced as fast as you do*.

So, it is clear that verbs in general do not receive a degree interpretation in similatives. This also seems true for similatives formed with intensifier verbs, at least in English, although it is hard in some intensifier-verb similatives to pull apart the degree and manner interpretation, and the negated similatives in (54) raise some additional questions. In the next section, I will argue that an English equation construction can receive a degree interpretation only if contains a PM and its parameter lexicalizes a degree argument. Depending on one's interpretation of the facts discussed here, this theory suggests that Umbach's (2011) intensifier verbs might be an exception to the claim advanced here that verbs do not lexicalize degree arguments.

3.3 Summary

Section 2 posited a theory of SMs as set abstractors; in particular of the English SM *as* is a relativizer. Evidence from equatives shows that *as* can range over degrees. A number of different phenomena suggest that (some) verbs can be associated with (some) degrees, so since verbs can be parameters of equation constructions, it was an open question whether or not SMs can range over degrees in similatives.

The discussion above has shown that they generally cannot: the truth conditions of similatives do not require that the individuals denoted by the comparee and standard instantiate a gradable predicate to the same degree. Similatives formed with Umbach's (2011) intensifier verbs are a possible exception (I return to them briefly in Sect. 4.2).

There is one other source of evidence for the claim that similatives do not involve the equation of degrees. Earlier, I argued that comparatives and equatives license NPIs in their subordinate clauses, and this fact is naturally accounted for by a characterization of these constructions as degree quantifiers whose internal argument is downward-entailing. Unlike equatives, NPIs are not licensed in similatives:

(55)   a.   *John danced as he has ever danced (before).
       b.   *John danced as anyone else danced.

If the equative and similative constructions both involved the equation of degrees, we would expect them to exhibit the same semantic properties and, in this case, to pattern the same way in terms of the licensing of NPIs.

At this point, extending the analysis of the SM *as* as a relativizer to similatives seems less than straightforward. While it is easy enough to account for *as* ranging over entities other than degrees—it was defined to do so in (22)—a semantic account of equation constructions will need to account for the inability of similatives to receive a degree interpretation (and their ability to receive manner and time interpretations).

4 PMs as quantifiers

In the analysis that follows, I will extend the theory of SMs presented in Sect. 2.3.2 to similatives in several steps. I will first propose a null modifier to associate the event argument of verbs with time and manner arguments that are available for the interpretation of similatives (Sect. 4.1). I will then argue that the ability of an equation construction to receive a certain reading depends on its parameter and the arguments lexicalized by that parameter (Sect. 4.2). In Sect. 4.3, I will return to similatives and degree achievements in particular, explaining how we can account for the data discussed above while maintaining the claim that verbs do not lexicalize degrees.

4.1 How non-lexicalized arguments come to be

It is clear from the discussion in the previous section that similatives can equate manners. I have assumed above that degrees are primitives, part of the ontology of our semantic theory, but I will remain agnostic on whether or not manners are. It is certainly clear that e.g. the *wh*-phrase *how* can range over manners in questions and relative clauses, as can proforms like *thus* and *that* in (56) (Landman and Morzycki 2003; Landman 2006).

(56)   a.   John danced thus, impressing Mary.
       b.   John danced like that, impressing Mary.

Landman and Morzycki (2003) build on early accounts in Barwise and Perry (1983) and Hinrichs (1985) to characterize manners as contextually supplied event kinds. But this characterization is too broad, picking out e.g. picnic-events as well as slowly executed ones (Landman 2006). I will employ a simple type ($\langle m \rangle$) and a variable, m, for manners, but I will remain agnostic on the question of what sort of semantic objects manners are.

I assume a neo-Davidsonian event semantics in which verbs lexicalize event arguments, but I do not assume that verbs lexicalize manner arguments. Instead, I will suggest that a verb and its corresponding event can be associated with a manner via a relation $\mathbb{R}$ provided by context, and that $\mathbb{R}$ introduces a free manner variable into the

derivation. (The null syntactic modifier that represents this association will be called ρ, and will be superscripted with the variable it associates with the event.)

In this case, a sentence like *John danced*, instead of denoting a proposition like (58a), can denote a proposition with a free manner variable m, as in (58b).

(57) $[\![\rho]\!] = \lambda E_{\langle v,t \rangle} \lambda e.\ E(e) \wedge \mathbb{R}(e, m)$

(58)   a. $[\![\text{John danced}]\!] = \exists e[\text{dance}(e) \wedge \text{agent}(\text{john}, e)]$
         b. $[\![\text{John danced } \rho^m]\!] = \exists e[\text{dance}(e) \wedge \text{agent}(\text{john}, e) \wedge \mathbb{R}(e, m)]$

The relation $\mathbb{R}$ is a relation between an event to a manner m in which the event was conducted. In a context in which John is dancing gracefully and barefoot, m will range over the manners 'gracefully' and 'barefoot'. A similar treatment is implicit in neo-Davidsonian formalisms like Landman (2000).

This relationship between an event and its manner argument, as it is construed in (58), is parallel to that between an event and its time. In Davidson's (1969) event semantics, an event e is related to its time t via a relation IN; in modern adaptations of the semantics, this relation is encoded in the operator τ. In the case of times—useful for the analysis of temporal equatives, as in *John gasped as Mary tripped*—we can use $\mathbb{R}$ to relate an event to its time.

(59)   a. $[\![\text{John danced}]\!] = \exists e[\text{dance}(e) \wedge \text{agent}(\text{john}, e)]$
         b. $[\![\text{John danced } \rho^t]\!] = \exists e[\text{dance}(e) \wedge \text{agent}(\text{john}, e) \wedge \mathbb{R}(e, t)]$

In (59b), the free variable t ranges over the time at which John danced.

The postulation of ρ, alongside the characterization of the SM *as* as a relativizer with an unspecified domain, is enough to account for the fact that similatives can receive a manner or temporal interpretation (equating two manners or times). The result is that, in similatives, *as* clauses can denote sets of manners as the result of a free manner variable m introduced by a contextually valued relation $\mathbb{R}$, as well as the meaning of *as*, just as *how* clauses can denote manners by binding a trace created by movement.

(60)   a.   John danced as Sue danced.
         b.   John danced how Sue danced.

My semantic treatment of the similative relies on the assumption that the matrix clause—the comparee and its parameter, here *John danced*—also denotes a set of manners (or times, etc.), perhaps via a null *wh*-operator OP (see (13)). As I discussed in the context of comparatives and equatives, this seems to be a general assumption, required in the parallel manner relative clauses like (60b).

If the matrix and subordinate clauses in a similative both denote manners, then the two properties can be equated via Predicate Modification, as (61) demonstrates.

(61)   John danced as Sue danced.
         a. $[\![\text{John danced}]\!] = [\![\text{OP}_m \text{ John danced } \rho^m]\!] = \lambda m \exists e[\text{danced}(\text{john}, e) \wedge \mathbb{R}(e, m)]$

b. $[\![$as Sue danced$]\!] = [\![$as Sue danced $\rho^{m'}]\!] = \lambda m' \exists e'[\mathsf{danced}(\mathsf{sue}, e') \wedge \mathbb{R}(e', m')]$

c.   *Predicate Modification*: $\lambda m \exists e, e'[\mathsf{danced}(\mathsf{john}, e) \wedge \mathbb{R}(e, m) \wedge \mathsf{danced}(\mathsf{sue}, e') \wedge \mathbb{R}(e', m)]$

d.   *Existential Closure*: $\exists m, e, e'[\mathsf{danced}(\mathsf{john}, e) \wedge \mathbb{R}(e, m) \wedge \mathsf{danced}(\mathsf{sue}, e') \wedge \mathbb{R}(e', m)]$

Predicate Modification effectively equates the two variables m and m', resulting in a set of manners m such that there is an event of John dancing in manner m and an event of Sue dancing in manner m. The result, after the manner variable is bound via existential closure, is a proposition which is true iff there is a manner m which both John and Sue danced in.

Importantly, this characterization of the standard marker *as* predicts that it does not license NPIs any more than *wh*-operators do. The set denoted by the subordinate clause in (61b) is not a downward-monotonic function; the various manners in the set are not linearly ordered. This analysis attributes the creation of a downward-monotonic context to the degree quantifier—the parameter marker *as*—and correctly predicts that NPIs are not licensed in the *as*-clauses of similatives.

Assimilating similatives and relative clauses makes it easy to account for the fact that extent equatives (and, correspondingly, similatives) can be formed with SMs that are either prepositions or *wh*-phrases. It also predicts that preposition similatives will behave semantically just like manner free relatives (FRs). There is at least one important respect in which this is true. It has been observed that free relatives can receive either a universal or an existential interpretation (Jacobson 1995; Caponigro 2002, 2003, 2004). So the manner FR in (60b)—*John danced how Sue danced*— can be true in a situation in which John and Sue's dancing only had one manner in common (e.g. they both danced the fox-trot but John danced clumsily while Sue danced beautifully). This is the existential interpretation. In other contexts, the FR can take on a stronger reading, requiring that John and Sue's dancing have *every* manner in common. Such a reading might come out in a competitive situation in which judges are deliberating over a tie-breaker.

Similatives are ambiguous in just the same way. Imagine a scenario in which John washes the dishes slowly, carefully and with a sponge, and Sue washes dishes quickly, clumsily and with a sponge. (62) requires only that the two events have one manner in common, while (63) requires that the two events have all relevant manners in common.

(62)   A: I told Sue to use the same products as John when she washed the dishes. Did she?

       B: Yes, Sue washed the dishes (just) as John did. (They both used a sponge.)

(63)   A: I told Sue to mimic John's dish-washing method down to the letter. Did she?

       B: No, Sue didn't wash the dishes as John did. (She worked too quickly.)

And, interestingly, temporal similatives are subject to the same contextual variance as corresponding *when* relatives (Lascarides and Asher 1993).

The existential reading of FRs and *as*-clauses come about as shown in (61) via existential closure. Caponigro derives the universal or definite reading using an optional iota-operator which picks out the maximum of a set or a unique relevant plural entity. Brasoveanu (2009) modifies this analysis slightly by attributing the maximality component to topichood. Either solution will extend just as easily to *as*-clauses. I will return to some other parallels between equation constructions and FRs in Sect. 5.1.

The analysis of the SM *as* as a relativizer, combined with the postulation of ρ, allowing an event to be associated with its manners or times, accounts for the possible interpretations of similatives. But I still have not provided an explanation for the fact that similatives cannot receive degree interpretations. In what follows, I will do so by arguing for a correlation between the presence of PMs in an equation construction and the equation of lexicalized arguments.

4.2 A correlation between lexicalization and PMs

In this section, I will argue for the following conditional: if an equation construction has a PM, it can equate lexicalized arguments. (This, as I will argue, is because PMs are quantifiers.) For English, whose equatives require PMs, the conclusion is the stronger biconditional: *if and only if* an equation construction has a PM can it equate lexicalized arguments. I will begin by discussing this claim in the context of English; I will then turn to languages whose equatives involve optional or no PMs in Sect. 4.4.

The data in (64) and (65) are repeated from the introduction of this paper. They represent the variety of equation constructions which seem to be morphologically related in English and across languages.

(64)   a.   John read <u>the same</u> book **as** Sue.   *same/different construction*
       b.   John is <u>as</u> tall **as** Sue.   *equative*

(65)   a.   John danced **as** Sue did.   (*manner*) *similative*
       b.   John danced **as** Sue sang.   (*temporal*) *similative*
       c.   John's hands were cold **as** ice.   *generic equative*
       d.   Bill is a liar, **as** Mary already knows.   *accord construction*

The constructions in (64) have (obligatory) PMs; those in (65) do not. As a group, they demonstrate the correlation between PMs and lexicalized arguments. The equation construction in (64a) equates individuals—the object arguments of each clause—and obligatorily require the individual quantifiers *the same* or *different* (for specific proposals see Alrenga 2007; Barker 2007; Brasoveanu 2008). And, as we have seen, the PMs of equatives are degree quantifiers.

Another way of wording my claim, for English, is that the interpretation of an equation construction relies on the lexical category of the parameter and the presence or absence of a PM. I have so far compared equatives and similatives—two equation constructions with different parameters—so I have not provided the best support for this claim. To do that, I will compare the equatives we have been discussing—those

with specifically interpreted standards—to generic equatives as in (66b), those with generically interpreted standards.

Many languages, including English, differentiate morphologically between specific and generic equatives. A generic equative is an adjectival equation construction in which the subordinate clause (the one introducing the standard) has a generic or habitual aspect. In English, generic equatives lack a PM.

(66) a. John is *(as) tall as Sue/his doctor/many linguists. *specific*
      b. John's toes are (*as) cold as ice. *generic*

In Turkish, specific and generic equatives differ in their SMs. The SM used in specific equatives, *kadar*, has its origins in the Arabic noun meaning 'quantity' (Haspelmath and Buchholz 1998:286) while *gibi*, the generic equative SM, is a case-marker translated as 'like' or 'as' (p. 316). In French, there are two differences between the specific and generic equatives: the latter lacks a PM, as in English, and they have different SMs, as in Turkish.

(67) specific equatives

  a. This fly is as big as an olive.
  b. zeytin **kadar** kûçûk
      big   as(SM) olive
      'as big as an olive' *Turkish*; HB (p. 316)
  c. Ma sœur est **aussi** grande **que**   moi.
      my sister is so(PM) big   as(SM) me
      'My sister is as tall as me.' *French*; HB (p. 311)

(68) generic equatives

  a. That chair is light as a feather.
  b. kar **gibi**   beyaz
      white as(SM) snow
      'as white as snow' *Turkish*; HB (p. 316)
  c. La tomate est petite **comme** une olive.
      the tomato is   small like(SM) an olive
      'The tomato is (as) small as an olive.' *French*; HB (p. 311)

As HB note, each language that differentiates morphologically between specific and generic equatives uses the morphology of the generic equative to construct a similative. In particular, English similatives are like English generic equatives in not allowing a PM (69a); Turkish similatives are like Turkish generic equatives in having *gibi* as a SM (69b); and French similatives are like French generic equatives in not allowing a PM and in having *comme* as the SM (69c).

(69) a. John (*as) danced as Sue danced.
      b. Ali Hasan gibi   yaz-Iyor.
          Ali Hasan as(SM) write:PRS2
          'Ali writes like Hasan.' *Turkish*; van Schaaik (1998:433)
      c. John a   dansé comme elle a   dansé.
          John has danced like(SM) she has danced
          'John danced as she danced.' *French*; HB (p. 323)

Specific equatives, as we have seen, equate two degrees, and so (67a) means something like, 'This fly and an olive are big to the same degree' (i.e. are the same size). But generic equatives cannot be interpreted as equating two degrees; they have an absolute reading. (68a) does not require of a situation that the relevant chair be light to the same degree as feathers tend to be. Its truth conditions are much less strict: it means something like, 'That chair is light in the same way as a feather is light'.[9] It requires that the chair and feather each be light relative to their contextually valued comparison class; this means that generic equatives are evaluative. And it is compatible with the implausible situation in which the chair and the feather weigh the same, the degree interpretation. But (68a) crucially does not require that the chair and feather be light to the same degree, which it would if it required that two degrees be equal.

In sum: specific and generic equatives both have adjectives as parameters, but generic equatives pattern morphologically with similatives across languages. This morphological difference—in English, the presence or absence of a PM—is what appears to condition the difference in interpretation between specific and generic equatives. In particular, specific equatives equate degrees, while generic equatives seem to equate something else.

It seems reasonable to extend the syntax and semantics of $\mathbb{R}$ and ρ, respectively, to generic equatives. But exactly how this is done—i.e., exactly what sort of entity ρ associates these properties with—depends on what we believe the stative correlate of an event's manners to be. My intuition is that the generic equatives above mean something like, 'A instantiates P in the same way as B does,' which suggests that an individual can instantiate a state in a particular way, in parallel with an individual's ability to perform an action in a particular manner. As I discussed in Sect. 3.2.4, the same issue arises for a semantic account of similatives with stative verbs as parameters, as in, *John knows French as Mary does*. These are most naturally interpreted as equating a reason or the way in which the knowledge of French came about, but there is much more to investigate here.

I will present one more bit of evidence that there is a correlation between PMs and the equation of lexicalized arguments. Stowell (1987) compares the syntactic behavior of CP-*as* (in accord constructions, like (65d)), and CP-*so*. He observes that the distribution of *as* is restricted in an interesting and relevant way:

(70) a. John is a liar, as t considered obvious by everyone.
      b. *John is a liar, as unknown t by his mother.

While *as* can be associated with the propositional argument of a verbal passive, as in (70a), it cannot be associated with the propositional argument of an adjectival passive, as (70b) shows. In Stowell's theory, the difference seems directly tied to the fact that verbal passives θ-mark these arguments, while adjectival passives do not. In

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[9]With an intonation break before the SM, generic equatives, like similatives, receive an interpretation like, 'That chair is light, just like a feather is light.' As I discussed earlier, these 'pause similatives' seem to be related, but I will not provide a complete semantics for them here. Perhaps, with the incorporation of something like a comma intonation, we could analyze them as an equation of propositions or possible worlds, which could account for their truth conditions.

terms of my claim about the correlation between PMs and lexicalized arguments, the difference could be construed in terms of whether or not the proposition argument is lexicalized by the verbal and adjectival parameter.

In Sect. 2.3.2 I analyzed the equative PM *as* as a degree quantifier. In this section, I have discussed the difference between English equatives and similatives and between English specific and generic equatives. I have argued that the English SM *as* can only range over degrees if (a) the parameter is an adjective and (b) the equation construction has a PM.

To explain this specific restriction, I have suggested that the availability of a particular interpretation of an equative construction is a factor of which types of arguments are lexicalized by the parameter and whether or not the equated argument is bound overtly by a quantifier. This predicts the morphology and possible interpretations of the equation constructions in (64) and (65), and suggests that equation constructions are a novel test for lexicalized argumenthood. In the case of similatives, it suggests that many if not all of the cases in which verbs have been observed to be associated with degrees are cases in which that degree is not an argument of the verb, but associated with it via some other means, as suggested in e.g. Piñón (2005) and Caudal and Nichols (2005).

4.3 Verbs and specialized degree modifiers

In this section I discuss the final step of the proposal. So far I have argued for a correlation between PMs and lexicalized arguments, but, given the proposal of the null modifier ρ, that is not enough to account for the fact that similatives cannot receive a degree interpretation. In particular, if equation constructions require a PM to equate lexicalized arguments, and if verbs do not lexicalize degree arguments, why can't similatives equate degree arguments that have been associated with a verb's event argument via the null operator ρ?

The answer to this question might have to do with the nature of the association between an event and a scale. There seems to be a one-to-one mapping between an event and its time, or an event and its (plurality of) manner(s). But there are a variety of different sorts of scales that events can be (and, as we have seen, are) associated with: scales of gradability, intensity, prototypicality, quantity, etc. It seems likely that the relationship between an event and some particular scale is too complicated to be provided by the null modifier ρ and its two-place relation $\mathbb{R}$. At the very least, a modifier which associates an event with a scale must relate an event-dimension pair to a degree or set of degrees. But it is also possible that each dimension of measurement could have a dedicated modifier. It is reasonable to assume that a modifier or modifiers distinct from ρ would have a distribution different from that of ρ, which would account for the inability of similatives to receive a degree interpretation from ρ.

I will discuss one recent proposal for this very sort of dedicated degree modifier to illustrate my claim that associating an event with a degree on a particular scale seems more complicated than associating an event with its time or manner. It has been recently argued that degree-achievement verbs, for instance, are affiliated with a dedicated null modifier that associates an event with a particular sort of degree (Kennedy and Levin 2008; Kennedy 2012). As I discussed in Sect. 3.1.1, DAs appear to be associated with the same sort of degree as their gradable adjective counterparts.

But Kennedy and Levin have recently argued that the relationship between an adjective and its derived DA cannot be a straightforward correspondence. They claim that, despite appearances, we see stark and systematic semantic differences between an adjective and its DA, and that this is plausibly because DAs (being verbs) rely on the role of the event argument in a way that the adjective does not.

The most notable difference is that modified DA constructions (71) receive the same interpretation as modified adjectival comparatives (72), not as modified adjectival positive constructions (cf. (73)). (These sentences are based on those in Kennedy 2012.)

(71)   *degree-achievement constructions*
   a.   She lengthened the pants 10 inches.
   b.   She warmed the soup so much that she can't eat it.

(72)   *adjectival comparatives*
   a.   The pants are 10 inches longer than they were.
   b.   The soup is so much warmer (than it was) that she can't eat it.

(73)   *adjectival positive constructions*
   a.   #The pants are 10 inches long.
   b.   #The soup is so warm that she can't eat it.

As Kennedy puts it, modifiers in DA constructions "impose constraints on differential degrees," the sort of degrees we associate with comparative constructions. In particular:

> "[T]he "adjectival" component of the meaning of a DA is not the meaning that is expressed by the predicative form of the corresponding adjective: *widen*, for example, does not include the property of being wide as a component of its meaning. Instead, the DA meaning is based on a more abstract conception of gradable adjective meanings as expressions that encode situation-dependent measure functions: relations between objects x and situations s to the degree d which represents the extent to which x manifests the property measured by the adjective in s." (Kennedy 2012:108)

To account for this differential reading of DAs, Kennedy and Levin propose that differential degrees are introduced in these constructions via a specialized measure-of-change function $\mathbf{m}_\Delta$ which "tracks change over the course of an event" and is not available to adjectives. $\mathbf{m}_\Delta$ is derived from a gradable verbal property $\mathbf{m}$ to measure the amount of change an individual exhibits along the scale associated with $\mathbf{m}$ during an event.

$\mathbf{m}_\Delta$ differs from ρ in several respects; while the domain of ρ is an event, the type shifter that creates an $\mathbf{m}_\Delta$ takes a verbal property as its argument. And while ρ is like a type shifter in that it is available in principle to any verb, $\mathbf{m}_\Delta$ is restricted only to incremental-theme verbs. Other scale-specific degree modifiers that have been proposed are different from ρ in these same respects; to account for the interpretations

of telic verbs with quantized objects, Caudal and Nichols (2005) and Piñón (2005) propose that modifiers like *half* select for a special modifier or type shifter which associates an event with a quantity scale.

So while there is reason to believe that events can be associated with degrees only by scale-specific modifiers whose distribution is restricted, or selection-based, manners and times seem to be freely associated with events and thus, arguably, introduced by a type shifter or modifier like ρ, which I suppose to have a free distribution. If this is right, then these differences are sufficient enough to warrant the adoption of the main innovations of the theory outlined above: the characterization of the SM *as* as a relativizer with an unspecified range; the postulation of a null operator ρ to associate an event with a time or manner argument; and the claim that, in English, the ability of a lexicalized argument to be equated in an equation construction requires the presence of a PM.

4.4 PMs in other languages

I have so far restricted my discussion of equation constructions and their semantic restrictions to English but, as I have argued, the claims in Haspelmath and Buchholz (1998) are intended to be much more broad, if not universal. HB classified languages into roughly three categories: those, like English, whose equatives required a PM; those whose equatives can optionally have PMs; and those whose equatives are not formed with PMs.

There is preliminary evidence that German, a language in the first class, behaves like English in that degree interpretations are restricted to equation constructions with PMs, but differently from English in the status of its intensifier verbs. A reviewer points out that, when intensifier verbs function as parameters in similatives—which lack PMs—they fail to receive a degree interpretation (74a). But, unlike English intensifier verbs, German intensifier verbs can also occur in equation constructions with PMs, as in (74b), where *so* is the same PM as is found in equatives. In these constructions, apparently, an intensifier-verb equation construction can receive a degree interpretation: one which is true iff John and Mary are driving the same (fast) speed.

(74)   a.   John ist gerast wie Maria.
              John has raced SM Mary
              'John raced as Mary did.'
        b.   John ist so   gerast wie Maria.
              John has PM raced SM Mary
              'John raced as fast as Mary did.'

These data, in addition to suggesting that intensifier verbs lexicalize a degree argument (at least in some languages), support the conclusion that the presence or absence of a degree interpretation is correlated with the presence of PMs in languages which use them to form equation constructions. If this is right, it poses a question about languages which HB characterize as having optional PMs (the second class of languages): perhaps, in these languages, the presence or absence of a PM conditions the interpretation of the equation construction.

Bulgarian appears to be an example of a language in which equatives are optionally formed with a PM. Two of HB's examples are in (75).

(75) a. Sestra mi e visoka kolkoto   mene.
          sister my is tall   how.much(SM) I
          'My sister is as tall as I.'   *Bulgarian*; HB (p. 291)

      b. Sestra mi bjaga tolkova bârzo kolkoto   ti/tebe.
          sister my runs PM   fast how.much you:SBJ/you:OBJ
          'My sister runs as fast as you.'   *Bulgarian*; HB (p. 309)

Haspelmath and Buchholz (1998) do not discuss the possible interpretations of each construction. But Pancheva (2006) reports that, in Bulgarian, while an equation construction without a PM (like (75a)) may receive something like a degree interpretation, it cannot be modified by an equative modifier like *twice* unless it has an overt PM (76).

(76) a. Ivan e (*dva pâti) visok kolkoto   e Maria.
          Ivan is two times tall how.much(SM) is Maria

      b. Ivan e dva pâti tolkova visok kolkoto   e Maria.
          Ivan is two times that(PM) tall how.much(SM) is Maria.
          'Ivan is twice as tall as Maria is.'   *Bulgarian*; Pancheva (2006)

If Bulgarian is a language, like English, in which the availability of a degree interpretation requires the presence of a PM, we could explain this contrast. Such an explanation would predict that the interpretations of equatives without PMs, like (75b) and (76), cannot involve the equation of degrees.

A final question deals with the range of interpretive possibilities for equatives in languages in the third class, in which equatives lack PMs. Two examples are below.

(77) a. Mia sorella è carina come/quanto   te.
          my sister   is pretty how(SM)/how.much(SM) you
          'My sister is as pretty as you.'   *Italian*; HB (p. 301)

      b. Arantxa, Itziar bezain polita da.
          Arantxa Itziar SM   pretty 3SG:be
          'Arantxa is as pretty as Itziar.'   *Basque*; HB (p. 287)

HB suggest that, for languages with a quantity-specific SM like the Italian *quanto*, the interpretation of equatives like (77a) differ based on which SM is present. It is unclear to me the extent to which there is in fact an interpretational difference, and the extent to which it varies with the different interpretations discussed above. Either way, languages like those in (77) raise the interesting question: what is the difference between languages that form equatives with PMs and languages that do not? Does the difference extend to equation constructions other than the equative and similative, for instance *same/different* constructions, or generic equatives? The account above characterizes equative PMs as degree quantifiers; can this difference in equative morphology be attributed to a broader difference between the use of quantifiers in e.g. English and Italian?

It should be clear that I do not have a complete picture of the morphologic and semantic differences between equatives and similatives in languages other than English. But I do believe that the correlation observed above between the degree interpretation and the presence of a PM raises intriguing questions for other languages, and so there

is lots of room for future work here. So while data like (77) demonstrate that it is impossible to straightforwardly extend my claim about English equation constructions to all languages, I remain optimistic that a unified account is possible once more work has been done tracking cross-linguistic semantic differences and comparing them to HB's observations of cross-linguistic morphological similarities.

5 Potential extensions

While the above constitutes an incomplete study of the semantics of equation constructions, the connections I have argued for above have the potential to inform the study of some phenomena generally believe to be distinct from equation constructions. I will end by discussing each in turn.

5.1 Free relatives

Although my discussion of the compositional semantics of equation constructions and similatives in particular focused on English, whose SM is a preposition, it should be clear that the analysis extends straightforwardly to languages (like those in the Romance family) whose SMs are *wh*-phrases. In particular, while I argue that the SM *as* is an unspecified relativizer, I take for granted that *wh*-phrase SMs function as *wh*-operators whose movement results semantically in the production of the same set of entities. For these languages, then, my proposal treats the standard clauses of equation constructions on par with free relatives, as discussed in Sect. 4. This perspective linking equation constructions and FRs has two interesting corollaries.

First, it highlights a general polysemy across languages between degrees and manners. In languages whose SMs are *wh*-phrases, HB's first observation still holds true: the same SM is generally used in equatives and similatives. This *wh*-phrase is usually translated as 'how'; in the Romance languages, generally a variant of the root *com*. In English, too, *how* can range over degrees or manners, as demonstrated in (78):

(78)   a.   How tall is John?   *degree question*
          b.   How does John drive?   *manner question*

Modifiers like *well*, too, seem to be able to range over both degrees and manners (McNally and Kennedy 2002). (79a) has a manner interpretation—*well* modifies the manner in which the car was loaded—or a degree interpretation, to do with the quantity of loading that was done. (79b) shows that word ordering is enough to isolate the manner interpretation.

(79)   a.   The car was well loaded.   *degree or manner reading*
          b.   The car was loaded well.   *manner reading only*

In my proposal above I have taken for granted that degrees are primitives in the ontology, arguments lexicalized by gradable adjectives, but I have been relatively non-committal about the ontological status of manners. This polysemy within English and across languages suggests that there is a non-trivial relationship between degrees and manners. This is was HB's explanation for their first observation:

"These paraphrases show that equatives express equal extent, and similatives express equal manner. Now extent is a simple one-dimensional notion, whereas manner is a complex multi-faceted notion, so in general only equatives really express equality, while similatives tend to express similarity." (Haspelmath and Buchholz 1998:278)

While I do not believe that HB's assumptions are fully explanatory, the data in (78) and (79a) show the need for a theory like the one proposed above to be supplemented with account of the relationship between degrees and manners.[10]

Second, the extension of the theory proposed above to languages whose SMs are *wh*-phrases (and whose equation constructions therefore look like free relatives) has the potential to address some issues in the study of free relatives generally. For instance, in English, free relatives cannot receive degree interpretations.

(80)   a.   I'll have [$_{CP}$ what he's having].
        b.   I invited [$_{CP}$ who he invited] to the party.
        c.   I'll leave [$_{CP}$ when he leaves].
        d.   I'll go [$_{CP}$ where he goes].
        e.   I'll talk [$_{CP}$ how he talks].   (*manner reading only*)
        f.   *I'm tall [$_{CP}$ how tall he is].
        g.   *I'll buy [$_{CP}$ how many he buys].

I have assumed above that the equation of lexicalized arguments in English equation constructions requires the presence of a PM, a quantifier binding that argument. It is possible that, while the *wh*-words *who, what, where* and *when* are quantifiers in English, the *wh*-word *how* is a (non-quantificational) relativizer, like *as*; this assumption could account for the contrast between (80e) and (80f)/(80g).

Such an explanation might also be extendable to the ability of *how* questions with DAs to receive a manner or degree interpretation, depending on the syntax of the question:

(81)   a.   How$_i$ [$_{VP}$ did the peppers end up being t_i blackened]?   *manner*
        b.   How$_i$ [$_{AP}$ t_i blackened]$_j$ did the peppers end up being t_j?   *degree*

Italian is not a language in which FRs cannot receive degree interpretations, but there are other restrictions on its degree FRs. In Italian, many FRs can receive existential interpretations, as illustrated in (82).

(82)   C'è   chi   sà   dire solo no.
        there's who can-3s say only no
        'There are people who say no all the time.'   *Italian*; Caponigro (2004)

However, in Italian (and possibly other existential FR languages), existential FRs cannot receive degree interpretations (Caponigro 2003). Perhaps, as I speculated above for English, this can be attributed either to a difference in the quantificational status of

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[10]A related wonder comes from Edit Doron (p.c.): If locations are ontological primitives, as times are, why can't similatives receive a reading in which they equate the location of two events? What sets times and manners apart from other domains?

how and its cross-linguistic counterparts or to some aspect of the difference between degrees and manners in terms of their status as lexicalized arguments.

5.2 Dummy *much*

The distinction made above between adjectives and verbs and the lexicalized status of their degree arguments could possibly be relevant to a long-standing issue in the study of comparatives and equatives, one that Corver (1997) has dubbed '*much*-support' (see also Bresnan 1973). In particular, it is not news that verbs cannot occur in comparatives and equatives, as (83a) and (84a) show.

(83)   a.   *John danced-er than Sue.
        b.   John danced more than Sue.

(84)   a.   *John danced as Sue.
        b.   John danced as much as Sue.

These data show that it is possible to use equation constructions to equate the degrees associated with verbs, but to do so the construction must involve a quantity adjective like *much, many, few* or *little* and a PM. (See Bresnan 1973 for arguments that *more* and *less* involve *much* and *little*, respectively; see Rett 2006 and Solt 2009 for arguments that these words are more adjective-like than quantifier-like.) Under the current theory, the need for the presence of a quantity adjective in these constructions could be driven by the difference defended here that adjectives but not verbs—and even quantity adjectives like *much*—lexicalize a degree argument.

It is also interesting to consider the interpretation of these (b) sentences: they require that the quantity of John-dancing events be at least as high as the quantity of Sue-dancing events. The quantity adjectives thus seem to behave like an overt modifier associating an event argument of the verb with a quantity degree (as in Svenonius and Kennedy 2006). And while the same quantity adjectives seem to be able to bring out the degree argument associated with degree achievements, as (85) shows, they do not seem to be able to bring out degrees of prototypicality; (84b) cannot receive a reading requiring John to dance more prototypically than Sue.

(85)   a.   John lengthened the pants more than (he lengthened) the skirt.
        b.   John cooled the lasagna more than (he cooled) the pie.

While many of Corver's (1997) assumptions differ from those made here—he assumes, for instance, that *much* is a quantifier—I believe that his theory in which *much* is inserted as a last resort, the adjectival version of *do*-support, can be easily and intuitively translated into the semantic account proposed in this paper.

6 Conclusion

HB's typological survey of the morphology of equation constructions strongly suggests that linguistic objects like the equative and the similative should be treated as

related within a semantic theory. There is independent reason to believe that PMs in equatives denote degree quantifiers, and therefore that the standard marker *as* in equatives is a relativizer ranging over degrees.

I have argued that this cannot be the whole story because, while the SM *as* can range over degrees in equatives, it seems to be generally unable to do so in similatives, despite independent claims that verbs can be associated with degrees on a variety of different scales in other constructions. (Similatives formed with intensifier verbs seem to be the exception in German and could potentially be an exception in English.)

To account for the possible interpretations of similatives—ones in which manners or times are equated—I have proposed that the SM *as* has an unrestricted domain, and that an event can be associated with a set of manners or times via a null modifier or type shifter ρ, which I have suggested is freely distributed. To account for the general inability of similatives to receive a degree interpretation—as well as the general divide between equation constructions with PMs in English and those without—I have proposed that PMs are quantifiers and are required (in English) to bind the lexicalized arguments of the parameter that are being equated. This means that verbs have a different relationship to the degrees with which they are associated than gradable adjectives do. And in particular, I have argued, this difference indicates that verbs are associated with a degree only via a specialized degree modifier or other mechanism, of which Kennedy's (2012) type shifter from a property $\mathbf{m}$ to $\mathbf{m}_{\Delta}$ is an example.

While this generalization also seems to hold for many other languages in HB's survey, languages whose equatives are not formed with PMs (or for which PMs are optional) require additional study. While these languages are part of an interesting and significant pattern—they do not, for instance, form similatives with PMs—they seem to suggest that it is not the case for every language that the equation of a lexicalized argument requires the presence of a PM, at least an overt one.

If what I have argued here is right, then equation constructions present a new and productive test for lexicalized argumenthood. While this is valuable for all lexical categories—Svenonius and Kennedy (2006) argue that even gradable adjectives are associated with their degree arguments via a null modifier—it seems especially valuable for verbs, whose relationship to arguments like manners, times and degrees has been a matter of recent debate.

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