A seeming violation to the monotonicity constraint in Spanish verbal comparatives[1]

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Abstract. Spanish verbal comparatives with (*correr más* 'run more') can be interpreted in terms of SPEED with a subset of manner of motion predicates. This fact poses a challenge to the monotonicity constraint (Schwarzschild, 2006) because SPEED is not a part-whole structure preserving dimension unlike DURATION. I argue that the data are best explained if *más* combines with an underspecified measure function that is not restricted to be only resolved by quantity part-whole tracking dimensions. I argue that the resolution of this null measure function is syntactically determined.

Keywords: syntax-semantics of measurement, comparatives, (non-)monotonicity, Spanish

1. Introduction

Schwarzschild (2006) observed that the syntax of adnominal modification and the semantics of measure expressions interact in a way that is sensitive to the part-whole structure of the NP domain. For example, when *more* in (1) is combined with mass NPs like *coffee* or plural count NPs like *coffees*, it can be interpreted in terms of VOL(UME), or CARD(INALITY), but crucially not TEMPERATURE.

(1) NP
more coffee(s) [VOL, (CARD), #TEMPERATURE]

The same observations hold for the VP domain (Nakanishi, 2004, 2007a; Wellwood et al., 2012): the dimension for the interpretation of *more* can be alongside a scale of DIS(TANCE), DUR(ATION) or CARD, but importantly not SPEED. In other words, (2) can be paraphrased as 'Hermes runs {further/more time/more times} than Apollo does', but it cannot be paraphrased as 'runs faster than'.

(2) VP
Hermes runs more than Apollo does. [DIS, DUR, CARD, #SPEED]

This constraint on the interpretation of the dimension of measurement is known as the *monotonicity constraint* (MC), defined in (3) (Schwarzschild, 2006; Nakanishi, 2007b; Wellwood et al., 2012; Wellwood, 2015).

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(3) **Monotonicity constraint (MC)**
A measurement μ is MONOTONIC relative to a domain D iff for all *x* and *y* in D, if *x* is a proper subpart of *y*, then $\mu(x) < \mu(y)$.

The MC prevents unattested readings in comparatives and other degree constructions. For example, in (2), proper subparts of a running event do not necessarily have lesser degrees of speed, so the comparison cannot be interpreted in terms of speed (Wellwood et al., 2012; Wellwood, 2019). (3) is not a constraint that is particular of English, but holds across different languages including, but not limited to, Japanese, German (Nakanishi, 2007a), Bulgarian, and Hindi (Wellwood et al., 2012). However, novel evidence from Iberian Spanish presents a challenge to the MC: verbal comparatives with *más* 'more' can also give rise to interpretations in terms of SPEED with a subset of predicates.[2] This interpretation is not available with the equative *tanto* 'as much', see (4).[3]

(4) a. Hermes {corre/ camina/ nada/ gatea} más que Apolo.
Hermes runs walks swims crawls more than Apollo
'Hermes {runs/ walks/ swims/ crawls} more than Apollo.' [CARD, DIS, SPEED]

b. Hermes {corre/ camina/ nada/ gatea} tanto como Apolo.
Hermes runs walks swims crawls as-much as Apollo
'Hermes {runs/ walks/ swims/ crawls} as much as Apollo.' [CARD, DIS, #SPEED]

The goals of this paper are (i) to identify what is behind the apparent violation of the MC in Spanish, (ii) to compare *más* to English *more*, which must generally obey the MC, and (iii) to compare *más* to *tanto*, which generally obeys the MC, too. To account for this puzzle, I propose that Spanish *más* combines with an underspecified null measure function that can be interpreted as quantity or not; on the contrary, the measure function that equative *tanto* and English *more* can be decomposed into is underspecified, too (Wellwood, 2015; Solt, 2015; Bale and Schwarz, 2019), but for quantity only. The resolution of the measure function will be determined by what is being measured, which itself is determined by the syntactic position occupied by the DegP.

[2] The data and judgments reported here come from Iberian Spanish. Whether these judgments also hold in non-Iberian Spanishes is an open research question that I do not attempt to answer here.

[3] The SPEED interpretation is also found in *menos* 'less' comparatives (i.a) and superlatives (i.b):

(i) a. Apolo {corre/ camina/ nada/ gatea} menos que Hermes.
Apolo runs walks swims crawls less than Hermes
'Apollo {runs/ walks/ swims/ crawls} less fast than Hermes.' *menos comparative*

b. Hermes es el dios que más {corre/ camina/ nada/ gatea} de todos.
Hermes is the god that more runs walks swims crawls of all
'Hermes {runs/ walks/ swims/ crawls} the fastest.' *superlative*

2. The new observations about Spanish verbal comparatives

2.1. The class of verbs that allow the SPEED interpretation

The SPEED interpretation occurs with a subset of manner of motion verbs: *correr* 'run', *nadar* 'swim', *caminar* 'walk', *cabalgar* 'horse-ride', *gatear* 'crawl', *pedalear* 'pedal', *remar* 'row' etc. I will refer to this class as CORRER *predicates*.[4] When we limit the context to a speed one by using the adverbial *in terms of speed*, *más* unambiguously gives rise to non-monotonic interpretations with these predicates. This is shown in (5a).[5] Other manner of motion verbs like *bailar* 'dance', *flotar* 'float', *temblar* 'shiver' are incompatible with the SPEED interpretation, as illustrated in (5b). The '#' in front of the sentence indicates that the sentence is infelicitous with the intended interpretation of SPEED. I will refer to these verbs as BAILAR *predicates*.[6]

(5) *Hablando de velocidad...* ('in terms of speed')
  a. Mario {corre/ camina/ gatea} más que Inés.
    Mario runs walks crawls more than Inés
    'Mario {runs/ walks/ crawls} faster Inés.' [#DIS, SPEED]
  b. # Juan {baila/ tiembla/ flota} más que Miguel.
    Juan dances shivers floats more than Miguel
    'Juan {dances/ shivers/ floats} faster than Miguel does.'

2.2. CORRER predicates and their interaction with telicity

In Peninsular Spanish, the SPEED interpretation is only possible with atelic CORRER verbs (6b), and not with telic ones (6a). This is shown in (6a) using the '{in/ for} an hour' test: 'in an hour' brings out a telic interpretation to these predicates, whereas 'for an hour' brings out an atelic interpretation (Vendler, 1967; Dowty, 1979; Rothstein, 2004; Marin and McNally, 2011).

(6) a. Mario corre más que Inés en una hora.
    Mario runs more than Inés in an hour
    'Mario runs more than Inés in an hour.' [CARD, DIS, DUR, #SPEED]
  b. Mario corre más que Inés durante una hora.
    Mario runs more than Inés for an hour
    'Mario runs more than Inés for an hour.' [CARD, DIS, DUR, SPEED]

We can also use the compatibility of predicates as complements of *dejar de* 'to stop' (lit. 'to stop of') vs. *terminar de* 'to finish' (lit. 'to finish of') to test for the SPEED-atelic correlation.

[4] The traditional name for this class of predicates is *directed manner of motion* because they imply that the syntactic subject has changed location or has moved along a path (Talmy, 1991, 2000; Rappaport Hovav and Levin, 1992; Levin and Hovav, 1995; Fábregas, 2007; Bassa-Vanrell, 2013).

[5] From here on, all the examples in the text make use of the verb *correr*. The SPEED interpretation is obtained with any other verb of this class. This observation has been verified with an acceptability study of sentences in context.

[6] This class of predicates is traditionally known as *internal bodily motion* (Aske, 1989; Morimoto, 2001) because physical displacement is not expected. See also references in fn.4.

Atelic predicates are more natural to appear as complements of the verbs *dejar/parar de* than with *terminar de* (De Miguel, 1999; Marin and McNally, 2011):

(7) a. Juan {#dejó de/ terminó de} correr la maratón.
Juan stopped of finished of to.run the marathon
'Juan {#stopped/ finished} running the marathon.'

b. Juan {dejó de/ #terminó de} correr.
Juan stopped of finished of to.run
'Juan {stopped/ #finished} running.'

The SPEED interpretation is only predicted to be possible when the comparative modifies the VP complement of *dejar de*. This prediction is borne out, as illustrated in (8):

(8) a. Juan dejó de correr más que Mario.
Juan stopped of to.run more than Mario
'Juan stopped running more than Mario.' [DIS, DUR, SPEED]

b. Juan terminó de correr más que Mario.
Juan finished of to.run more than Mario
'Juan finished running more than Mario.' [DIS, DUR, #SPEED]

2.3. The generalization

Given the data from the previous two subsections, I propose the novel generalization in (9).

(9) **The *atelic* CORRER-SPEED generalization**
Only atelic CORRER predicates are compatible with a SPEED interpretation for *más*.

This is a novel generalization, and it is in line with Schwarzschild's (2006) original observation about the MC in NPs and the parallel between mass/count and atelic/telic predicates (Mourelatos, 1978; Bach, 1986; Krifka, 1989; Borer, 2005; van Geenhoven, 2005; Wellwood et al., 2012). On the one hand, atelic parallels mass and telic count; on the other hand, number on NPs parallels grammatical aspect on VPs: perfective and progressive involve singular events whereas imperfective-habitual involves plural events. That said, the grammatical properties of the predicate NP/VP determine the scale of comparison. These properties are summarized in (10), but see Wellwood et al. (2012) for more details.

(10) MC and the the mass/count and atelic/telic parallel

Schwarzschild (2006) Wellwood et al. (2012)

$$\textit{more} + \begin{bmatrix} \textit{mass NP} & = \textsc{vol, length} \\ \textit{count NP}_{\textsc{pl}} & = \textsc{card} \\ \textit{count NP}_{\textsc{sg}} & = * \end{bmatrix} \qquad \textit{more} + \begin{bmatrix} \textit{atelic VP} & = \textsc{dur, dis} \\ \textit{telic VP}_{\textsc{impf}} & = \textsc{card} \\ \textit{telic VP}_{\textsc{perf}} & = * \end{bmatrix}$$

The interpretation of both object mass NPs and atelic predicates is in terms of non-cardinality quantity scales, and plural count NPs and atelic imperfective VPs are compared along a cardinality scale. However, just like comparative morphemes are unacceptable with singular count NPs, so are they with telic perfective VPs.

Peninsular Spanish atelic CORRER VPs behave as expected: they are interpreted (preferably) along non-cardinality scales. However, they also allow a non-monotonic quantity interpretation, namely SPEED.

3. Why do CORRER predicates but not BAILAR predicates allow SPEED?

One of the major questions that arises is why it is only a subset of manner of motion verbs – CORRER verbs but not BAILAR verbs – that give rise to the SPEED interpretation. There are some important differences between these two classes of manner of motion verbs. First, only CORRER verbs are acceptable with locative-directional *a* (roughly equivalent to English directional *to*). The *a*-PP is an argument in these constructions as it affects the telicity of the event (Fábregas, 2007; Bassa-Vanrell, 2013).[7] This is shown in (11).

(11) a. Juan {corre/ nada/ camina} **a** la orilla {*durante/ en} 1h.
Juan runs swims walks at the shore for in 1h
'Juan {runs/ swims/ walks} to the shore {for/ in} one hour.' CORRER + loc-dir *a*

b. * Juan {baila/ flota/ tiembla} **a** la orilla.
Juan dances floats shivers at the shore
'Juan {dances/ floats/ shivers} to the shore.' *BAILAR + loc-dir *a*

Second, the $\sqrt{\text{ROOTS}}$ that appear with the CORRER class are limited to those that imply directional movement along a path but are also "goal neutral" (Bassa-Vanrell, 2013).[8] A reliable test to diagnose such a directional movement is the unacceptability of these verbs with the adverbial *sin desplazarse* 'in place', lit. 'without displacing oneself' (ibid.): CORRER verbs are incompatible with the adverbial, while BAILAR verbs are compatible with it, (12). This entails that the former class but not the latter involves obligatory displacement along a path.

(12) a. * Juan {corre/ nada/ camina} sin desplazarse.
Juan runs swims walks without displacing.himself
'Juan {runs/ swims/ walks} in place.' *CORRER + *in place*

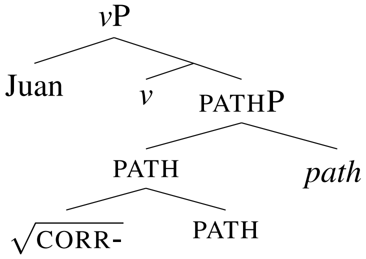
[7]The preposition *a* is a locative preposition heading a PLACE or LOCATION projection (Fábregas, 2007; Son and Svenonius, 2008; Real-Puigdollers, 2013; Folli and Harley, 2020). However with directed manner of motion verbs it has a directional meaning, presumably because it is embedded under a PATH projection. I will refer to this *a* as locative-directional.

[8]By *goal neutral* I mean that the verbs describe motion events with no particular goal in mind, i.e., the intention is to describe the manner component of the motion event. This contrasts with other verbs like *entrar* 'enter', *cruzar* 'cross', *ir* 'go', which entail arrival or a goal, and thus give rise to telic VPs (unless combining with bare plural internal arguments, e.g. *cruzar puentes* 'cross bridges').

b. Juan {baila/ flota/ tiembla} sin desplazarse.
Juan dances floats trembles without displacing.himself
'Juan {dances/ floats/ shivers} in place.' BAILAR + *in place*

We can take these differences as evidence that these two classes of manner of motion verbs underlyingly have different argument structures (Fábregas, 2007; Ramchand, 2008, 2014). In fact, CORRER predicates include a verbal predicate PATH. The PATH predicate introduces a *path* argument which indicates (i) an object that is measured, or (ii) a quantity traversed with the movement in an incremental fashion.[9] In contrast, BAILAR predicates lack a PATH predicate (Fábregas, 2007; Bassa-Vanrell, 2013).

We can represent the syntactic structure of CORRER verbs as in (13). The PATH head introduces a *path* argument, projects its own phrase – PATHP – and serves as complement of *v*. The root is introduced via adjunction in the syntax (Levinson, 2007, 2014; Folli and Harley, 2016, 2020) and then undergoes m(orphological) merger with an adjacent functional head at PF.[10]

(13)


A PATH is a relation between an entity, realized by *path*, and an event such as there being a monotonic relationship between measures of a property of the entity and parts of the event. The complement of PATH, i.e. *path*, can be realized by distinct syntactic categories. The dimensions to measure proper subparts of an event will depend on what that *path* is. In (14), I provide a (non-exhaustive) list of syntactic categories that can occupy the *path* position in (13).

(14) The syntactic realization of *paths*
  a. DP: mereological parts of the entity denoted by the nominal expression (*a race*)
  b. MP: the spatial or temporal dimension defined by the measure noun (*10 km*)
  c. PP: the spatial dimension manifested through P (*to the store*)
  d. *x*: a contextually filled variable not associated with a particular endpoint

I follow Ramchand (2008: 71) and assume that PATH heads can come in two different 'flavors': [±BOUND]. If the PATH head is [+BOUND], the predicate will come out as telic, i.e. an accomplishment; if the PATH head is [–BOUND], the predicate will come out as atelic, i.e. an activity. Considering the (un)boundedness of PATHs together with the generalization in (9) we can draw some important conclusions in Table 1.

[9] See Piñón (1993) and Krifka (1998) for details on the mereological structure of *paths*.
[10] This process of root adjunction is very similar to Matushansky's (2006) theory of head movement: head movement of X onto Y consists of the adjunction of X to Y's specifier followed by subsequent m-merger with Y.

Table 1: CORRER VS. BAILAR – major conclusions

	PATH	SPEED
CORRER$_{activity}$	−BOUND	✓
CORRER$_{accomplishment}$	+BOUND	*
BAILAR	*	*

Although both accomplishment and activity CORRER verbs contain a PATH, only the latter's PATH is unbounded resulting in an atelic event which is acceptable with the SPEED interpretation. BAILAR verbs lack a PATH, which presupposes no linear displacement and entails no SPEED interpretation.

4. The proposal

I propose that *más* is just *-er*, i.e. an ordering relation between degrees, whose denotation is in (15) (cf. Mendia, 2020; Toquero-Pérez, 2022). *más* is just a quantifier, and, by hypothesis, it should not be restricted to only combine with quantity-denoting measure functions, i.e. measure functions that introduce part-whole structure preserving dimensions. In fact, there is a null morpheme Ø introducing the measure function μ that *más* combines with; crucially this measure function is completely underspecified. I refer to this measure function as $\mu_{[\text{Q+}]}$, where the subscript [Q+] means 'quantity and beyond'.[11]

(15) $[\![\text{más}]\!] = [\![\textit{-er}]\!] = \lambda P_{\langle dt\rangle}.\lambda Q_{\langle dt\rangle}.[\text{MAX(Q)} > \text{MAX(P)}]$ (Heim, 2000)

(16) $[\![\mu_{[\text{Q+}]}]\!] = \lambda d.\lambda\alpha.\mu(\alpha) \geq d$

Given the underspecification of μ in (16), its value is resolved by the syntactic context. I propose an elaboration on where $\mu_{[\text{Q+}]}$ can be resolved as quantity, and where it cannot.

(17) **The syntax behind the MC**
The monotonic requirements are determined by the syntactic position that the comparative (i.e. MP) occupies in the VP.

(17) is in line with the spirit of Schwarzschild (2006), where the syntactic position of the measure phrase (MP) inside the NP corresponds to an interpretation in terms of (non-)monotonicity. In the rest of the paper, I argue that there are three different syntactic positions that the comparative can occupy: an argument position and two distinct adjunction sites. In other words, the (non-)monotonicity is determined structurally (cf. McKinney-Bock and Pancheva, 2019).[12]

[11] The entry for μ in (16) is based on Hackl (2000) and Wellwood et al. (2012), where α is a variable over types: *e* (individuals), *v* (events), *s* (states) etc. As a generalized quantifier over degrees, *más* undergoes quantifier raising to a higher position, resolving any potential type mismatch, and leaves a variable of type *d* in its base position. This variable will saturate $[\![\mu_{[\text{Q+}]}]\!]$'s degree argument. I assume that the standard of comparison is late-merged in the position *más* has raised to (Bhatt and Pancheva, 2004; Toquero-Pérez, 2022).

[12] Like Schwarzschild (2006), McKinney-Bock and Pancheva (2019) argue that a certain position is only associated with monotonicity, but unlike Schwarzschild (2006), they show that another position is not strictly associated with non-monotonicity.

4.1. A syntactic ambiguity: *Más* as a MP argument or adjunct

4.1.1. *Más* as an argument

CORRER predicates, like the measure verbs *weigh, measure, cost* or *last*, can take a measure phrase argument. When such a verbal predicate is combined with an MP, the aspect becomes telic, (18). Yet SPEED measuring MPs cannot be arguments, (19):

(18) a. Mary runs {**20 km/ this much**} {in an hour/ *for an hour}.
b. María corre {**20 km/ mucho/ una hora**} {en 1 h/ *durante 1 h }.
María runs 20km much one hour in 1 h during 1 h

(19) * María corre **20 km/h**.
María runs 20 km/h
'Mary runs 20 km/h.'

From this we can conclude that when a verbal predicate is combined with an overt MP argument, the MP can only be interpreted monotonically with respect to the part-whole structure of the event. Just like these MPs, the comparative phrase can be interpreted as the MP complement of an accomplishment predicate and thus be monotonic. As an argument, the comparative constituent can be pronominalized by an accusative clitic *lo* in (20b). Cliticization, at least in Spanish, is a process that applies to argument DPs and never to adjuncts.

(20) MP substitution with a clitic
a. Juan corre 20 km en 1 h. → Juan los corre en 1 h.
Juan runs 20 km in 1 h Juan CL.ACC.M.PL runs in 1 h
'Juan runs {20km/ them} in 1h.'
b. Juan corre más que Miguel en 1 h. → ?Juan lo corre en 1 h.
Juan runs more than Miguel in 1 h Juan CL.ACC.SG runs in 1 h
'Juan runs {more than Miguel/ it} in 1 h.' [DIS, #SPEED]

We can also test for the argumenthood of the MP by using different *wh*-pronouns to substitute the comparative constituent. Following Rizzi (1990), Smith (1992), and Real-Puigdollers (2013), argumental MPs can be asked for in a question with *qué* 'what' and *cuánto* 'how much', but they cannot be questioned by the manner *wh*-element *cómo* 'how'. Besides, the answer to A's question with the comparative (21) cannot be interpreted in terms of SPEED.[13]

[13] It is true that not only complements are questioned by *qué* 'what'. Nominal predicates in copular sentences can also pass this test:

(i) a. María es abogada.
María is lawyer
'María is a lawyer.'

b. Qué es María?
what is María
'What is María?'

(21) MP substitution with *wh*-pronoun

A: {Qué/ Cuánto/ *Cómo} corre Juan (en 1 h)?
what how.much how runs Juan in 1h
'{What/ How much/ *How} does Juan run (in 1 h)?'

B: {20 km/ Más que Miguel}.
20 km more than Miguel
'{20 km/ More than Miguel}.' [DIS, #SPEED]

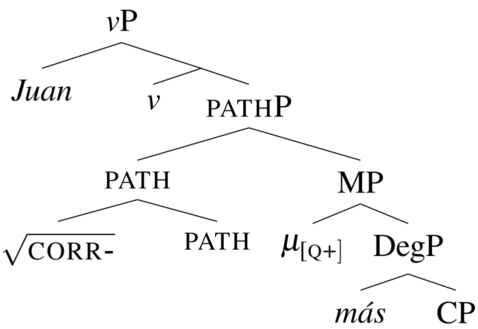
A classic test of argumenthood is the *do so* substitution. If the MP that contains *más* is an argument, *más* must be incompatible with *hacer-lo* 'do so'. This prediction is borne out as shown in (22): the ungrammaticality of the sentence entails that the complement of *hace* 'does' is the MP.

(22) *Context: Pedro runs 10 km; María 5 km; Miguel 20 km*

* Pedro corre más que María en una hora y Miguel lo hace más que ellos.
Pedro runs more than María in an hour and Miguel CL.ACC does more than them
'Pedro runs a longer distance than María in an hour and Miguel and Miguel does so more than them.'

All these tests indicate that the MP must be merged in the complement position of the PATH head, i.e. the MP syntactically represents the *path* in (13). The corresponding syntactic representation of argument *más* is provided in (23).[14]

(23) The syntactic position of argument *más*



From this position, what is being measured by $\mu_{[Q+]}$ is the PATH: the (adjacent) spatial points along a physical path incrementally traversed. Thus, the strictly monotonic interpretation is then enforced by the denotation that PATH imposes on its individual-type argument (24).

(24)
$$[\![\text{PATH}]\!] = \lambda x \lambda e. \forall e \forall y [R(e,x) \wedge y \leq x \rightarrow \exists e' [e' \subseteq e \wedge R(e',y)]] \wedge \forall e \forall e' [R(e,x) \wedge e' \subseteq e \rightarrow \exists y [y \leq x \wedge R(e',y)]]$$

(adapted from Ramchand, 2008)

To put it in Ramchand's words, PATH in (24) "is the relation that is held between an entity and an event, if a monotonic property of that entity is monotonic with respect to the part-whole

[14]The constituent is a MP because it is headed by μ and takes the DegP (*-er, as, más*, and its standard CP) as its complement.

structure of the event as well" (Ramchand, 2008: 50). PATH first takes its individual argument, which is the MP, via functional application (FA) (Heim and Kratzer, 1998) and it returns a predicate of events – $\langle vt \rangle$. I follow Parsons (1990), Kratzer (1996), Schein (2002) among others, and assume that verbs/ verbal roots are functions from events to truth values, (25). Moreover, given the assumption that roots enter the syntactic derivation via adjunction and then undergo m-merger with the closest adjacent head at PF (Levinson, 2007, 2014; Folli and Harley, 2020), the root is composed via predicate modification (PM) (Heim and Kratzer, 1998) with the $\langle vt \rangle$-type predicate that results from composing PATH with its individual argument.

(25) $[\![\sqrt{\text{V}}]\!] = \lambda e.\mathtt{V}(e)$

Before we get to the semantic composition, there is one more issue to be addressed: the MP after QR of *más* is a predicate of individuals, but PATH's first argument is an individual. In order to resolve this type mismatch I posit the presence of a null determiner ε (cf. Wellwood, 2019), i.e. 'little *d*': an indefinite operator ε that takes a predicate of individuals and returns an individual.[15] The presence of this determiner is also empirically appropriate as it would explain the DP-like properties of the MP in argument position, such as cliticization.

(26) a. $[\![\text{little } d]\!] = \lambda P_{\langle et \rangle}.\varepsilon x\, P(x)$ (Wellwood, 2019: 30: ex.77)
'some x such that $P(x)$'

b. $[\![\text{MP}]\!] = [\![\text{little } d \text{ MP}]\!] = [\![\text{little } d]\!]([\![\text{MP}]\!]) = \varepsilon x\, \mu(x) \geq d$ (by FA)
'some x whose measure is at least as big as d'

(27) a. $[\![\text{PATH MP}]\!] = [\![\text{PATH}]\!]([\![\text{MP}]\!]) =$ (by FA)
$= \lambda e.\forall e \forall y[R(e,(\varepsilon x\, \mu(x) \geq d)) \wedge y \leq (\varepsilon x\, \mu(x) \geq d) \rightarrow \exists e'[e' \subseteq e \wedge R(e',y)]] \wedge$
$\forall e \forall e'[R(e,(\varepsilon x\, \mu(x) \geq d)) \wedge e' \subseteq e \rightarrow \exists y[y \leq (\varepsilon x\, \mu(x) \geq d) \wedge R(e',y)]]$

b. $[\![\sqrt{\text{CORR-}} \text{ PATH MP}]\!] = [\![\sqrt{\text{CORR-}}]\!] \wedge [\![\text{PATH MP}]\!] =$ (by PM)
$= \lambda e.\mathtt{correr}(e) \wedge$
$\forall e \forall y[R(e,(\varepsilon x\, \mu(x) \geq d)) \wedge y \leq (\varepsilon x\, \mu(x) \geq d) \rightarrow \exists e'[e' \subseteq e \wedge R(e',y)]] \wedge$
$\forall e \forall e'[R(e,(\varepsilon x\, \mu(x) \geq d)) \wedge e' \subseteq e \rightarrow \exists y[y \leq (\varepsilon x\, \mu(x) \geq d) \wedge R(e',y)]]$

The resolution of the measure function in (27) can only be a dimension that satisfies the MC in Subsection 3. A (non-exhaustive) list of possible values assigned to μ is in (28):

(28) a. $\mu = \lambda d.\lambda x.\text{DURATION}(x) \geq d$
b. $\mu = \lambda d.\lambda x.\text{DISTANCE}(x) \geq d$

4.1.2. *Más* as an adjunct

We can use the same diagnostics that we did to test for the argumenthood of the MP in Subsection 4.1.1 to test for the adjuncthood of the MP in certain linguistic contexts, i.e. (atelic) activities. For example, when applying the *hacer-lo* substitution test to (29a) and (29b), the

[15] The same result could be obtained via existential closure of the individual argument in the presence of the measure expressions (Hackl, 2000).

MP can co-occur with the clitic, suggesting that what *lo* is resuming is not the DegP. In other words, as opposed to (22), the MP is not the verb's argument.

(29) a. *Context: Pedro runs at 10 km/h, María at 5 km/h, Miguel at 20 km/h*

Pedro corre más que María durante una hora y Miguel lo hace más
Pedro runs more than María for an hour and Miguel CL.ACC do more
que ellos.
than them
'Pedro runs faster than María for an hour and Miguel does so more than them.'

b. *Context: Pedro runs some laps (n=3), María (n=2), Miguel (n=6)*

Pedro corre unas vueltas más que María durante una hora y Miguel lo
Pedro runs some laps more than María for an hour and Miguel CL.ACC
hace más que ellos.
does more than them
'Pedro runs some laps more than María for an hour and Miguel does so more than them.'

This test simply identifies that there is an adjunct/argument distinction in the syntactic status of the MP containing *más*. However, it does not say anything at all about the distribution of the SPEED reading as opposed to the QUANT(ITY)[16] readings. Substituting the MP with a *wh*-pronoun allows us to probe this question deeper. When the MP is interpreted in terms of QUANT – i.e. subject to the MC – and is an adjunct, it can only be made into a question with the degree *wh*-form *cuánto*, but not with *qué* or *cómo*, (30a). In contrast, when the MP is interpreted in terms of SPEED, it can only be made into a question with the manner *wh*-form *cómo*, (30b).[17]

(30) *For an hour…*

a. {*Qué/ *Cómo/ Cuánto} corre Juan? ⇒ más que Al
what how how.much runs Juan more than Al
'{*What/ *How/ How much} does Juan run?' ⇒ more than Al [QUANT, #SPEED]

b. {Cómo/ *Qué/ *Cuánto} corre Juan? ⇒ más que Al
how what how.much runs Juan more than Al
'{How/ *What/ How much} does Juan run?' ⇒ more than Al [#QUANT, SPEED]

We can take (30a) and (30b) to show that there are (at least) two different syntactic positions where the MP can adjoin, and these two positions have an impact on the resolution of the measure function. In fact, I propose that the quantity interpretation comes about when the MP is a "high" *v*P adjunct, while the SPEED interpretation arises when the MP is a "low" *v*P adjunct.

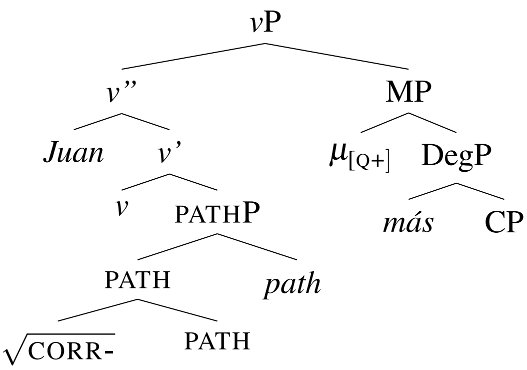
[16] I am using the label QUANT(ITY) as a shorthand for extensive measures such as CARD, DIS, DUR, etc.

[17] It is also possible to ask a degree question analogous to English using a *wh*-operator and *much*: *qué tanto* 'how much' (lit. 'what much'). This is a bit archaic in some varieties of Peninsular Spanish, and it is mostly found in rural areas or in the speech of elders. It is, however, common in American Spanishes. Note that this strategy employs the equative degree morpheme, which was noted in Section 1 to not be able to be interpreted along the SPEED scale.

4.1.3. High *v*P adjunct

I follow Wellwood et al. (2012), Pasternak (2018) and Wellwood (2019) and propose that as an adjunct that is interpreted monotonically, the MP adjoins high in the *v*P. From this position in (31), μ does not measure the *path*, but rather measures (a)telic events. As a result, μ ranges over events of type *v*.

(31) The syntactic postion of "high" adjunct *más*



Once PATH composes with its individual argument via FA and then with the root by PM (as in (27) in Subsection 4.1.1, it will return a predicate of events – $\langle vt \rangle$ – that will serve as the first argument of *v* in (32), cf. Kratzer (1996). Once the external argument has saturated *v*'s individual variable and maps it to a thematic relation, it returns a predicate of events, just like PATH before it. This predicate can compose with the MP of the same type via PM. A simplified derivation is provided in (33) where the monotonicity requirement of the complement of PATH has been omitted for simplicity.

(32) $[\![v]\!] = \lambda P_{\langle vt \rangle}.\lambda x.\lambda e.P(e) \wedge Agent(e)(x)$

(33) a. $[\![\text{PATHP}]\!] = \lambda e.\texttt{correr}(e) \wedge R(e, \texttt{path})$

b. $[\![v']\!] = [\![v]\!]([\![\text{PATHP}]\!]) = \lambda x.\lambda e.\texttt{correr}(e) \wedge R(e, \texttt{path}) \wedge Agent(e)(x)$ (by FA)

c. $[\![v'']\!] = [\![v']\!]([\![\text{Juan}]\!]) = \lambda e.\texttt{correr}(e) \wedge R(e, \texttt{path}) \wedge Agent(e)(\texttt{Juan})$ (by FA)

d. $[\![v\text{P}]\!] = \lambda e.\texttt{correr}(e) \wedge R(e, \texttt{path}) \wedge Agent(e)(\texttt{Juan}) \wedge \mu(e) \geq d$ (by PM)
$\exists e[\texttt{correr}(e) \wedge R(e, \texttt{path}) \wedge Agent(e)(\texttt{Juan}) \wedge \mu(e) \geq d]$ (by $\exists$-closure)

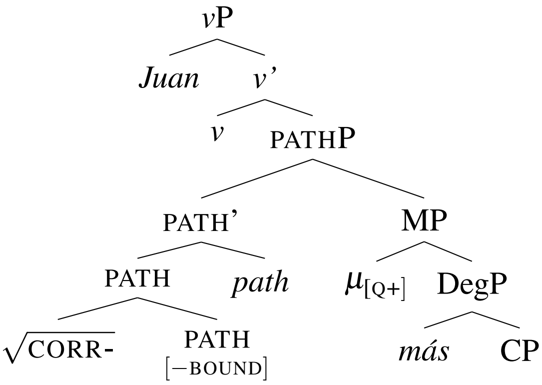
The values assigned for μ are QUANT-based, and subject to the MC. In fact, the relevant values are identical to the ones in (28) in Subsection 4.1.1. In addition to those, it is also possible that μ measures pluralities, in which case μ will be resolved with the value of CARD. For this to occur, the DegP must take scope over semantically interpretable number morphemes as in (34) (which might be null in some languages, cf. Wellwood et al. (2012), and Wellwood (2019)).

(34) $[_{vP}\ [_{v'}\ [_{v'}$ [correr] SG] PL] *más*]

4.1.4. Low *v*P adjunct

In addition to the high *v*P adjunction site, the data in (30b) in Subsection 4.1.2 indicate that the SPEED interpretation arises as a type of *manner* modification. We can take manner modifiers to occupy a low position in the *v*P domain (cf. Cinque, 1999; Ramchand and Svenonius, 2014). In fact, it has been recently argued by Folli and Harley (2020) that the manner component of directed manner of motion verbs – i.e. the CORRER class – is encoded by the PATH. That said, and given the proposed decomposition of the *v*P domain in (13), I propose that in order to obtain the non-monotonic interpretation of SPEED, the MP must be adjoined lower than the monotonically interpreted adjunct counterpart. In particular, the MP must adjoin to PATHP, as in (35).

(35) The syntactic postion of "low" adjunct *más*



An argument for this syntactic position comes from the presence of an overt PP headed by *a* 'at' which typically follows monotonic MP arguments and comes before high *v*P adjuncts. In (36) the 'for an hour' adverbial is (right-)adjoined high in the *v*P and is linearized to the right of the low *a*-PP adjunct that introduces the dimension of SPEED.[18]

(36) Juan [$_{vP}$ [corre [$_{\text{PATHP}}$[$_{\text{PATH}}$ [*path*]] [$_{\text{PP}}$ a 20 km/h]]] [$_{\text{PP}}$ durante 1 h.]]
Juan runs at 20 km/h for 1 h
'Juan runs at 20km/h for 1h.'

This *a*-PP is in complementary distribution with low-adjunct MP, i.e. they compete for the same position. As a result, the interpretation of the comparative in (37) cannot be in terms of SPEED. We can take this as a blocking effect in the form of the generalization in (38) whose understanding I leave for future research.[19]

[18]For simplicity I am ignoring the fact that the main verb raises to T in Spanish (Rivero, 1978; Torrego, 1984; Zubizarreta, 1997; Gallego, 2007).

[19]We should note that a high adverbial *at km/h* is fine with all motion verbs including telic ones like *run to the store* even in English, (i). It is the lower adjunct position which is in complementary distribution with *more/más*.

(i) John runs to the store at 10 km/h.

(37) *For an hour...*

Juan corre a 20 km/h más que Miguel.
Juan runs at 20 km/h more than Miguel
'(For an hour,) Juan runs at 20 km/h more than Miguel.' [QUANT, #SPEED]

(38) **The *más-a* generalization**
The measure introduced by comparative *más/menos* cannot be interpreted in terms of SPEED when a PP headed by *a* provides the proportional measure.

From this low position, the MP scopes over a non-specified traversed quantity, i.e. [–BOUND]. Just like the scale of comparison of mass NPs is determined by properties of the NP (Schwarzschild, 2006), the scale of comparison of atelic VPs is determined by properties of the VP (Wellwood et al., 2012). Thus, considering that a low MP modifier in the NP domain measures "attributes", a low MP adjunct measures "manner", except that the only manner is the one that is composed of two monotonic measures: SPEED is obtained via a fraction, (39).

(39) $\text{SPEED} = \dfrac{\text{DISTANCE}}{\text{TIME}}$

The input to the fraction in (39) is two dimensions for measurement that are themselves monotonic on the part-whole structure of the atelic predicate. But as the time and distance – both of which can be imposed by PATH in (28) – increase monotonically, the speed need not. The value assigned to μ is then as in (40):

(40) Possible value assigned to μ in (35).

$$\mu = \lambda d.\lambda \mathrm{e}_v.\frac{\text{DISTANCE}(e)}{\text{DURATION}(e)} = \text{SPEED}(e) \geq d$$

This analysis has two major consequences: (i) the MP interpreted non-monotonically is adjoined to a [–BOUND] PATH, we are thus restricting the subset of predicates to the atelic CORRER class only; (ii) PATH enables the measure function to take as input two monotonic dimensions for measurement and return a non-monotonic dimension.

5. Monotonicity, equative *tanto* and English *more*

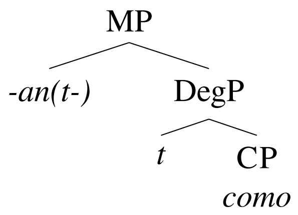
I noted in Section 1 that the SPEED interpretation was only available when the superiority/ inferiority degree morphemes were used. However, equatives with *tanto...como* do not give rise to such an interpretation, recall (4b). I propose that this asymmetry is due to the fact that, unlike *más* and its negative counterpart *menos*, equative *tan(t-{a/o})* is the spelling out of a degree head *t-* 'as' and a morpheme *-an*(*t-*) that provides the measure function (Zanuttini and Portner, 2003; Eguren, 2020), along with agreement {*-a(s)/o(s)*} 'F.(PL)/M.(PL)'.[20] This

[20]*tanto* is inflected for number and gender in the nominal domain: *tant-os chic-os* 'as.much-M.PL boy-M.PL'. The same happens with *cuanto* 'how much': *cuant-os chic-os* 'how.much-M.PL boy-M.PL'. Both forms appear truncated when modifying an adjective: *tan alt-o(s)* 'as.much tall-M(.PL)'.

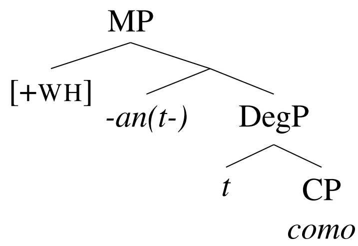
morpheme *-an(t-)* is also found in the *wh*-degree operator *cuánto*, which I showed in (30b) in Subsection 4.1.2 cannot probe for a SPEED interpretation of the comparative either.

I propose that the underlying syntax of equative and degree question morphemes is the one in (41). At PF, I assume that *-an(t-)* is lowered onto *t*-. When the MP contains a [+WH] feature, cf. Cable (2010), the degree morpheme *t*- undergoes suppletion: *t-* $\rightarrow$ *cu-*/[+WH]___.

(41) a. The syntax of *tanto*



b. The syntax of *cuánto*



The semantics of the complex equative morpheme is given in (42). Given that the measure function can denote different dimensions of measurements, it must be underspecified; despite this underspecification, it can only denote quantity, i.e. track the part-whole structure of what is being compared. This is what the subscript Q indicates — as opposed to Q+.

(42) a. $[\![\text{t-}]\!] = [\![\text{as}]\!] = \lambda P_{\langle dt \rangle}.\lambda Q_{\langle dt \rangle}.[\text{MAX(Q)} \geqslant \text{MAX(P)}]$

b. $[\![\text{-ANT-}_{\text{Q}}]\!] = \lambda d.\lambda \alpha.\mu_{\text{Q}}(\alpha) > d$

tanto already has the quantity measure built in, which requires satisfaction of the MC. Thus, for the sake of compositionality, *t-an(t)-* can only be merged in a position that ensures a monotonic interpretation such as (23) & (31). As a result, merger or adjunction of the equative to PATHP results in ungrammaticality.

Now we can explain the Spanish facts, but we are back to the question of why English – and many other languages – does not allow the SPEED interpretation just like *tanto*. The solution I advocate for is that the underlying measure function borne by *more* in English imposes an extensive measurement requirement. In fact, the complex morphosyntax of *t-ant-* parallels the decomposition of *more* into *-er* and *much* (Bresnan, 1973; Corver, 1997): the former is the ordering relation between degrees and the latter introduces the measure function. Besides, the measure function introduced by *much*, though underspecified (Wellwood, 2015; Solt, 2015; Bale and Schwarz, 2019), is not fully so because it can only denote a dimension that preserves the part-whole structure of what is being compared. Thus, we can assign *much* the same denotation as *-an(t)-*, e.g. (43).

(43) $[\![\text{-ANT-}_{\text{Q}}]\!] = [\![\text{MUCH}_{\text{Q}}]\!] = \lambda d.\lambda \alpha.\mu_{\text{Q}}(\alpha) \geq d$

Given (43), MUCH, and any of its morpho-syntactic variants, must always obey the MC. This explains why *John ran more than Mary for an hour* cannot mean 'John ran faster'.[21]

6. Conclusion

I have presented previously unnoticed evidence from verbal comparatives in Spanish. In particular, I showed that verbal comparatives with a subclass of manner of motion verbs, namely the directed manner of motion class, allowed interpretations along a scale of SPEED, posing a challenge to the MC. These data shed light on our understanding of dimensions for measurement. The MC, though apparently violated, is actually not violated: *más* composes with an underspecified measure function that allows for non-monotonic dimensions, and it is contained in a DegP that enables an additional adjunction site where a non-monotonic interpretation is composed. This entails that non-monotonicity is derived syntactically, rather than being a primitive grammatical constraint. This in turn supports (McKinney-Bock and Pancheva, 2019)'s hypothesis that there is no non-monotonicity constraint. That is, the domain of application of the MC is determined by the syntax. In fact, the MC applies only within a particular syntactic domain in the VP, much like Schwarzschild (2006) showed that the MC is syntactically constrained in the NP. This parallel is summarized in Table 2 and shown in (44) further below.

Table 2: Parallelism between NP and VP domains

	High		**Low**	
	Type	Interpretation	Type	Interpretation
NP	pseudo-partitive	monotonic	attributive	non-monotonic
VP	*v*P	monotonic	PATHP	non-monotonic

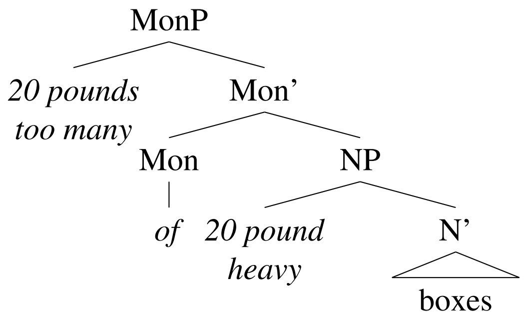
The locus of cross-linguistic variation seems to be the underspecification of the functional head doing the measurement. This is in turn cashed out in the syntax as a structural constraint on where the MP containing that functional head can be merged or adjoined in the derivation. However, I leave a deeper explanation for future research.

[21]The examples in (i) are not counterexamples. They are MP comparatives. MPs indicate degrees as ordered points on a scale with no reference to the particular dimension. The dimension is determined in the syntax (Schwarzschild, 2006). Examples like (i) are, thus, comparing such ordered points: the amount X is greater than the amount Y. The fact that it is quantities and not speed is then predicted by $[\![\text{MUCH}_{\text{Q}}]\!]$. The meaning of 'speed' only comes out as an inference.

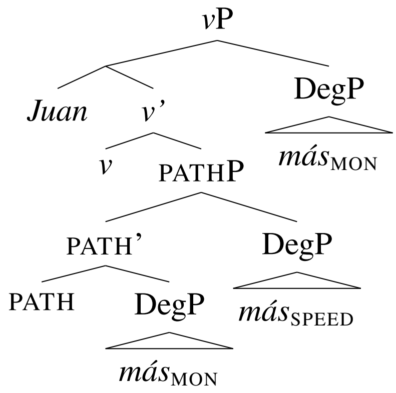
(i) a. John runs more than 10 miles/h for some time.

b. I drove more than 60 miles per hour for quite a long time in the morning.
(https://forums.edmunds.com/discussion/17163/toyota/x/toyota-sienna-clicking-sound-over-60-miles-hour)

(44) a. The syntax behind the MC: NP (Schwarzschild, 2006)



b. The syntax behind the MC: VP



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