Non-canonical measurement in verbal comparatives: Implications for the morpho-syntax of directed-motion

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Comparatives

Comparatives express a relation between two measurements.

(1) Gasol es más alto que Messi.
Gasol is more tall that Messi
'Gasol is taller than Messi is'

(2) schema for comparatives
más (comparative morpheme) Gasol es alto (Measurement 1) Messi es alto (Measurement 2)

Adjectival comparatives

The lexical semantics of the adjective determines the dimension of measurement.

(3) Gasol es más **alto** que Messi.
Gasol is more tall that Messi
'Gasol is **tall**er than Messi is'

alto 'tall' ⇝ HEIGHT

(Cresswell 1976; von Stechow 1984; Heim 2001)

Verbal comparatives

The dimension of measurement is not lexically determined.

(4) Cooper runs more than Harry does.
a. 'Cooper runs longer than Harry does.' DURATION
b. 'Cooper runs further than Harry does.' DISTANCE
c. 'Cooper runs more times than Harry does.' CARDINALITY
d. # 'Cooper runs faster than Harry does.' SPEED

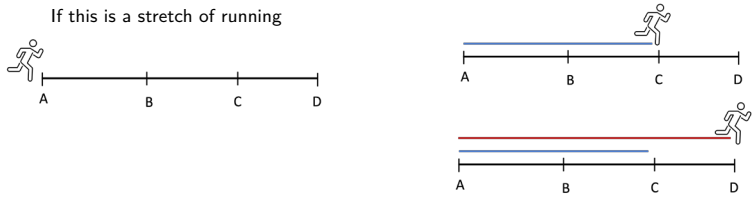
Verbal comparatives and monotonicity

The interpretation of certain nominal and verbal comparatives has been argued to be limited to extensive measurements. (Schwarzschild 2006; Wellwood et al. 2012)

At least for those NPs and VPs that semantically introduce part-whole structures, the resolution of the dimension of measurement in these environments is an instance of the constraint in (5). (Schwarzschild 2006)

(5) **Monotonicity Constraint (MC)**
If two objects/events stand in a proper subpart-superpart relation, the measure of the subpart must be smaller than that of the superpart.

The MC is a likely semantic universal.



The duration or distance increase: A to D > A to C > A to B. But the speed need not.

Challenges to the MC

(6) Rubén **corre más** que Bruno
Rubén runs more that Bruno
'Rubén **runs more** than Bruno does'
(Iberian Spanish)

(7) O Rubén **corre mais** que O Bruno
the Rubén runs more that the Bruno
'Rubén **runs more** than Bruno does'
(European Portuguese, J. Costa p.c.)

a. 'Rubén runs longer than Bruno does.' DURATION
b. 'Rubén runs further than Bruno does.' DISTANCE
c. 'Rubén runs more times than Bruno does.' CARDINALITY
d. **'Rubén runs faster than Bruno does.'** SPEED

Puzzle
Why is the SPEED-reading available in Iberian Spanish (and European Portuguese) but not in English and other Romance languages (e.g. Italian)?

Questions and Answers

Q1: How is the dimension of measurement determined in VP comparatives?

The dimension of measurement is determined by the syntactic position of the measure word (in concert with formal semantic features of the target VP).

Q2: What is universal about how dimensions are selected and what constrains variation?

How measurements are determined is universal; fine-grained syntactic differences between languages in the argument structure of motion verbs support different target positions for measure words.

CORRER and BAILAR predicates

The SPEED interpretation arises with atelic manner-of-directed-motion verbs. Call these CORRER-predicates.

(8) Examples of CORRER-predicates

a. *correr* 'run'	c. *caminar* 'walk'	e. *pedalear* 'pedal'
b. *nadar* 'swim'	d. *gatear* 'crawl'	f. *remar* 'row'

Manner-of-non-directed-motion verbs are incompatible with the SPEED interpretation, regardless of telicity. Call these BAILAR-predicates.

(9) Examples of BAILAR-predicates.

a. *bailar* 'dance'	c. *temblar* 'tremble'	e. *regatear* 'dribble'
b. *flotar* 'float'	d. *jugar* 'play'	

Telicity makes a difference

The PP *al parque* 'to the park' makes the predicate telic

(10) *Hablando de velocidad...* 'in terms of speed'

a. Mario { corrió/ caminó/ gateó} **al** **parque** más que Inés
Mario ran walked crawled to.the park more than Inés
'Mario {ran/ walked/ crawled} **to the park** more than Inés' #SPEED

b. Mario { corrió/ caminó/ gateó} (**por el** **parque**) más que Inés
Mario ran walked crawled by the park more than Inés
'Mario {ran/ walked/ crawled} (**around the park**) more than Inés' SPEED

BAILAR-predicates do not accept goal PPs, but even when they are atelic, SPEED is not available.

(11) *Hablando de velocidad...* 'in terms of speed'

a. * Mario { bailó/ jugó/ flotó} **al** **parque** más que Inés
Mario danced played floated to.the park more than Inés
'Mario {danced/ played/ floated} **to the park** more than Inés' #SPEED

b. Mario { bailó/ jugó/ flotó} (**por el** **parque**) más que Inés
Mario danced played floated by the park more than Inés
'Mario {danced/ played/ floated} (**around the park**) more than Inés' #SPEED

The CORRER-SPEED Generalization

The CORRER-SPEED Generalization

(12) Only atelic CORRER-predicates are compatible with a SPEED interpretation.

The syntax of event structure

English and Spanish differ with respect to whether a directed-motion verb can express a manner of motion.

(13) The boat floated into the cave. 'The boat floated until it went inside the cave´

(14) a. * El barco flotó a la cueva
the boat floated to the cave
'The boat floated into the cave'

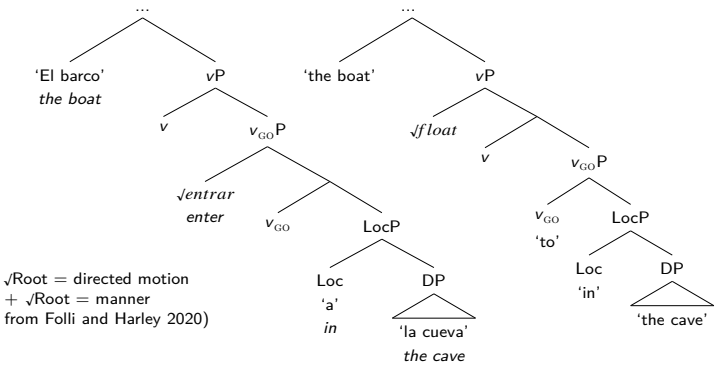
b. El barco entró a la cueva flotando
the boat entered to the cave floating
'The boat entered into the cave floating'

English: the verb encodes manner but not motion (or result).
Spanish: the verb encodes motion (and may encode result), but not manner.

(Levin and Rappaport Hovav 1992, 1995, 2013; Folli 2002; Folli and Harley 2005, 2016, 2020)

Motion vs. Manner roots

(15) Spanish: $\sqrt{V}$ adjoins to v_{GO}

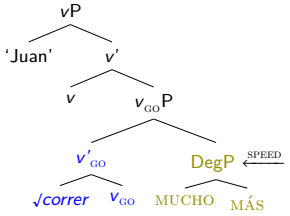


(16) English: $\sqrt{V}$ adjoins directly to v

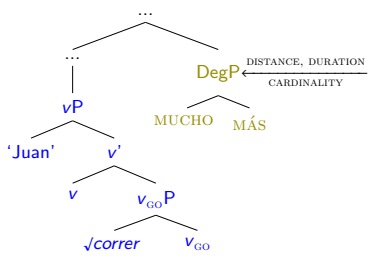
v_{GO} + √Root = directed motion
v + √Root = manner
(Adapted from Folli and Harley 2020)

Analysis: Proposal for Spanish

(17) DegP as a v_{GO}P modifier



(18) DegP as a high modifier



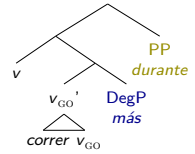
SPEED is constrained by syntax

When a high vP adverbial intervenes, the speed reading is unavailable.
Durative *for*-adverbials occupy the periphery of the vP area. (Alexiadou 1997; Cinque 1999)

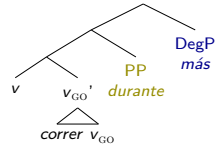
(19) a. Aure corre más que Inés durante 1h
Aure runs more that Inés for 1h
'Aure runs more than Inés for 1h' SPEED, #DISTANCE, #CARDINALITY

b. Aure corre durante 1h más que Inés
Aure runs for 1h more that Inés
'Aure runs more than Inés for 1h' #SPEED, DISTANCE, CARDINALITY

structure of (19a)



structure of (19b)

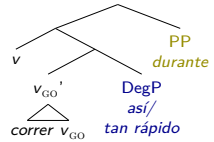


Anaphoric manner expressions can resume a SPEED interpretation only when preceding the *for*-adverbial.

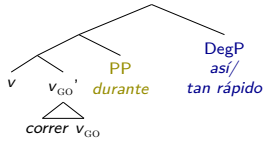
(20) a. Aure corre más que Inés pero Juan no corre { así/ tan rápido} durante 1h
Aure runs more that Inés but Juan NEG runs thus that fast for 1h
'Aure runs more than Inés but Juan does not run {like that/ that fast} for 1h'
SPEED, #DISTANCE, #CARDINALITY

b. * Aure corre más que Inés pero Juan no corre durante 1h { así/ tan rápido}
Aure runs more that Inés but Juan NEG runs for 1h thus that fast
'Aure runs more than Inés but Juan does not run for 1h {like that/ that fast}.'

structure of (20a)



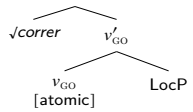
*structure of (20b)



Precluding SPEED with telic predicates

[atomic] on v_{GO} makes the predicate telic.

(21) $[\![v'_{GO}]\!] = \lambda e.\text{run}(e) \wedge \text{Atom}(e) \wedge \text{path-traversal}(e) \wedge \text{goal}(e, g)$



(21) denotes a set of singleton events: $\{e_1, e_2, e_3\}$.
Singletons lack the relevant mereological structure. Thus, modification by MUCH is precluded.
(Krifka 1989; Chierchia 1998; Rothstein 2004)

Analysis: summary

The directed-motion component of the CORRER-class is encoded by a functional head v_{GO}.
(Cuervo 2003; Folli and Harley 2005, 2016, 2020)

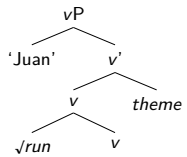
When the root adjoins to v_{GO} it is interpreted as encoding something about the traversal of the path, namely that it happened rapidly. (e.g. Levin and Rappaport Hovav 2013; Folli and Harley 2020)

When the DegP modifies v_{GO}P, the dimension of measurement is resolved as SPEED.

Cross-linguistic variation

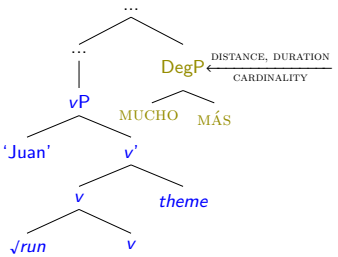
English and Italian do not project v_{GO}P with atelic manner-of-directed-motion verbs.
v_{GO}P is only projected in telic contexts, e.g. (16) and (15).

(22) No v_{GO}P



These activities are true 'manner' verbs, i.e. they lack motion or path-traversal.

(23) DegP as a high modifier



Italian and English pattern alike

Folli (2002) and Folli and Harley (2020, p.459: ex.52) show that when a path or directed motion is syntactically available, the verb can license inferences about the traversal of the path.

(24) a. Gianni {* è/ ha} corso → # Ha preso la maccchina
Gianni is/ has run has taken the car
'Gianni ran. #He took the car'

b. Gianni { è/* ha} corso al supermercato. → Ha preso la maccchina
Gianni is/ has run to.the supermarket has taken the car
'Gianni ran to the supermarket. He took the car'

(25) a. Juan ran. → #He took the car.

b. Juan ran to the supermarket. → He took the car.

In Italian, the form of the auxilary is sensitive to lexical aspect: 'be' → telic; 'have' → atelic.

Spanish is different

In Spanish there is no such asymmetry: the sentence without an overt path can still license the inference, i.e. Juan traveled rapidly along the path.

(26) a. Juan corrió → Cogió el coche
Juan ran took the car
'Juan ran. He took the car'

b. Juan corrió al supermercado → Cogió el coche
Juan ran to.the supermarket took the car
'Juan ran to the supermarket. He took the car'

v_{GO}P, which introduces the traversal of the path, must always be part of directed-motion verbs in Spanish.

Obligatory displacement

Verbs that encode v_{GO} resist modification by adjuncts that entail no displacement.
(Fábregas 2007; Bassa Vanrell 2013)

In English manner(-of-directed-motion) verbs do not resist 'in place' modification.

(27) a. John ran in place.

b. * John ran to the supermarket in place.

c. John danced in place.

This is consistent with Levin and Rappaport Hovav's (2013, p.52) observation about this class of verbs for English: "they describe manners of motion that might, but need not be used to bring about displacement in a particular direction."

Italian

Italian manner(-of-directed-motion) verbs pattern like English.
Atelic manner(-of-directed-motion) verbs do not resist 'in place' modification. BAILAR-verbs do not resist 'in place' modification either.

(28) a. Gianni {* è/ ha} corso sul posto
Gianni is/ has run on.the place
'Gianni ran in place'

b. * Gianni è corso sul posto al supermercato
Gianni is run on.the place to.the supermarket
'Gianni ran in place to the supermarket'

c. Gianni {* è/ ha} ballato sul posto
Gianni is/ has danced on.the place
'Gianni danced in place'

Spanish is different again

In Spanish, CORRER-verbs resist modification by PPs like *sin desplazarse* 'without moving' or *en el sitio* 'in place' regardless of telicity.
This contrasts with the BAILAR-class.

(29) a. ?? Juan corrió { sin desplazarse/ en el sitio}
Juan ran without to.displace.REFLX/ in the spot
'Juan ran in place'

b. * Juan corrió { sin desplazarse/ en el sitio} al supermercado
Juan ran without to.displace.REFLX/ in the spot to.the supermarket
'Juan ran in place to the supermarket'

c. Juan bailó { sin desplazarse/ en el sitio}
Juan danced without to.displace.REFLX/ in the spot
'Juan danced in place'

Summary of diagnostics

Diagnostics for the presence/absence of v_{GO}

	CORRER				BAILAR	
	atelic		telic			
	path inferences	'in place' modification	path inferences	'in place' modification	path inferences	'in place' modification
Spanish	✓	*	✓	*	*	✓
Italian	*	✓	✓	*	*	✓
English	*	✓	✓	*	*	✓

Cross-linguistic variation: summary

Spanish: in manner-of-directed-motion verbs, v_{GO} must always be syntactically present and the *√Root* adjoins to it.

English: v_{GO} is not projected in atelic contexts. The *√Root* directly adjoins to *v*.

Italian: Like English, v_{GO} is only projected with telics. But like Spanish telics, if v_{GO} is projected, the *√Root* adjoins to it.

Projecting v_{GO} and DegP modification (summary)

	atelic			telic		
	v_{GO}	v_{GO} + √Root	DegP in spec,v_{GO}P	v_{GO} [atomic]	v_{GO} + √Root	DegP in spec,v_{GO}P
SP	✓	✓	✓	✓	✓	*
IT	*	*	*	✓	✓	*
EN	*	*	*	✓	*	*

Conclusion

Q1: How is the dimension of measurement determined in VP comparatives?

The dimension of measurement is determined by the syntactic position of the measure word (in concert with formal semantic features of the target VP)

Q2: What is universal about how dimensions are selected and what constrains variation?

Syntax links the MC to certain structural configurations (both at the NP and VP levels), variation reflects which of these structures are available

The close study of the syntax of measure expressions enables us to ...

1. maintain robust cross-linguistic semantic generalizations;
2. pin down cross-linguistic variation in the relevant pieces of morpho-syntax.

Acknowledgments

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Appendix A: Acceptability judgment task

Acceptability judgment task: Design and participants

Participants were asked to judge the acceptability of sentences in context.
Design: 2x2 (24 targets & 36 fillers & 4 catch trials)
(a) context (SPEED vs. DISTANCE) and
(b) comparative (*más rápido* 'faster' vs. *más distancia* 'more distance')

Figure 1: Latin square

	Context SPEED	**Context** DISTANCE
más SPEED	6	6
más DISTANCE	6	6

Participants: 50 self-reported native speakers of Peninsular Spanish.
12/50 were excluded because they failed catch trials.
Total: 38/50

Acceptability judgment task: Materials

An example target item

Figure 2: Context SPEED x Interpretation SPEED

Context biasing SPEED/DISTANCE: [Contexto:] Miguel y Joana participan en carreras de marcha deportiva. En este deporte, correr no está permitido, pero caminar al trote sí. Miguel queda primero y Joana última.

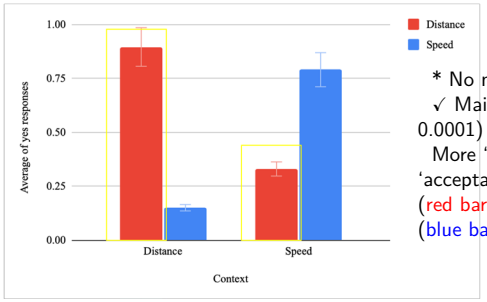
Target sentence: *Miguel marcha más que Joana.*

Yes/No question probing SPEED/DISTANCE: ¿Puede esta oración significar en este contexto que "Miguel marcha más rápido que Joana"?

Sí ○ No ○

Acceptability judgment task: Results (main effect)

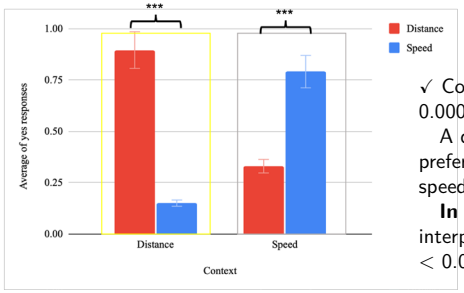
Figure 3: Interpretation in terms of SPEED & DISTANCE with respect to the context



* No main effect of context
✓ Main effect of interpretation ($p < 0.0001$)
More "yes" responses (i.e. more 'acceptances') with distance interpretations (red bars) than with speed interpretations (blue bars)

Acceptability judgment task: Results (interactions)

Figure 3: Interpretation in terms of SPEED & DISTANCE with respect to the context



✓ Context-by-interpretation interaction ($p < 0.0001$).
A distance contexts yields a bigger preference for distance interpretations than a speed context does for speed interpretations.
In the speed context, speed interpretations > distance interpretations ($p < 0.0001$)

Appendix B: The dimension of measurement is syntactically determined

Sensitivity to *wh*-substitution

SPEED is only compatible with manner *wh*-proform *cómo* 'how'.
DISTANCE, DURATION and CARDINALITY are only compatible with the degree *wh*-proform *cuánto* 'how much'.

(30) a. {* Cuánto/ Cómo} corre Juan durante 1?
how.much/ how runs Juan for 1h
'{How much/ How} does Juan run for 1h?'

b. Corre más que Inés durante 1h
runs more that Inés for 1h
'Juan runs more than Inés for 1h' SPEED, #DISTANCE, #CARDINALITY

(31) a. { Cuánto/* Cómo} corre Juan durante 1?
how.much/ how runs Juan for 1h
'{How much/ How} does Juan run for 1h?'

b. Corre durante 1h más que Inés
runs for 1h more that Inés
'Juan runs for 1h more than Inés' #SPEED, DISTANCE, CARDINALITY

The same word order patterns and interpretive possibilities are replicated with *in-situ* *wh*-phrases.

(32) a. Quién corre ⟨ cómo⟩ durante 1h *⟨ cómo⟩?
who runs how for 1h how
'Who runs how for 1h?'

b. Juan más que Inés, María más que Luis ...
Juan more that Inés, Marí more that Luis
'Juan more than Inés, María more than Luis ...' SPEED, #DISTANCE, #CARDINALITY

(33) a. Quién corre *⟨ cuánto⟩ durante 1h ⟨ cuánto⟩?
who runs how.much for 1h how.much
'Who runs how much for 1h?'

b. Juan más que Inés, María más que Luis ...
Juan more that Inés, Marí more that Luis
'Juan more than Inés, María more than Luis ...' #SPEED, DISTANCE, CARDINALITY

DISTANCE & DURATION are higher than SPEED

for-adverbials can be either temporal (e.g. *1h*) or spatial (e.g. *10km*). (Moltmann 1991)
These two types of adverbials must follow low speed adverbials, but they may precede or follow each other. (Folli and Harley 2005)

(34) Juan corrió ⟨ tan rápido⟩ durante 1h *⟨ tan rápido⟩ durante 10km *⟨ tan rápido⟩
Juan ran that fast for 1h that fast for 10km that fast
'Juan ran that fast for 1h for 10km' (speed > temporal/spatial, *temporal/spatial > speed)

(35) a. Juan corrió tan rápido durante 1h durante 10km
Juan ran that fast for 1h for 10km
'Juan ran that fast for 1h for 10km' (speed > temporal > spatial)

b. Juan corrió tan rápido durante 10km durante 1h
Juan ran that fast for 10km for 1h
'Juan ran that fast for 10km for 1h' (speed > spatial > temporal)

These facts follow if temporal/spatial modifiers are adjoined higher than speed ones.

Appendix C: Semantic composition

Some assumptions

Atelic VP ≈ mass NP; Telic VP ≈ count NP (Mourelatos 1978; Bach 1986; Krifka 1989; Borer 2005a,b)

√Roots are inherently cumulative. (Link 1983; Kratzer 2005; Borer 2005a,b)

Being a (singular) telic predicate means having only atoms in one's extension. (Process) atelic (and (substance) mass) predicates lack atoms. (Krifka 1989; Gillon 1992; Rothstein 2004).

Decompositional approach to degree expressions.
(Bresnan 1973; Hackl 2000; Bobaljik 2012; Wellwood 2015)

(36) a. $[\![\text{MÁS}]\!] = [\![\text{-ER}]\!] = \lambda P_{\langle d,t\rangle}.\lambda Q_{\langle d,t\rangle}.\text{MAX}(Q) > \text{MAX}(P)$ (Heim 2001)
b. $[\![\text{MUCHO}]\!] = [\![\text{MUCH}]\!] = \lambda d.\lambda \alpha.\mu(\alpha) \geq d$ (Hackl 2000)

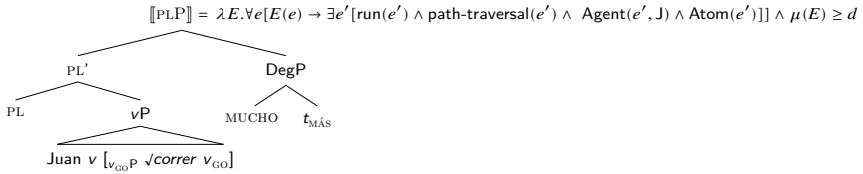
The value of μ is underspecified for the dimension of measurement. (Solt 2015)

Cardinality

The resolution of the dimension of measurement as CARDINALITY requires a plural denotation.
(Ferreira 2005; Bale and Barner 2009; Wellwood 2018, 2019)

(37) is based on Wellwood (2019): E is a plural variable and the notation '$E(e)$' expresses that 'e is among the Es'.

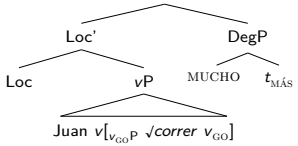
(37) $[\![\text{PL}]\!] = \lambda V_{\langle v,t\rangle}.\lambda E_{\langle v,t\rangle}.\forall e[E(e) \rightarrow \exists e'[V(e') \wedge \text{Atom}(e')]]$



DURATION/DISTANCE with atelic predicates

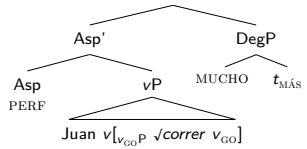
Given the syntactic facts about the position of durative and spatial adverbials, i.e. high in the *v*P, we can hypothesize that we need Aspect and a Locative projection introducing the spatial beginning and endpoint of the event.
End and Beg are functions from paths to locations on the path. (Piñón 1993)

$[\![\text{LocP}]\!] = \lambda l.\lambda e.\exists path[[\![v\text{P}]\!] \wedge \text{End}(path) = l \wedge \exists l'[\text{Beg}(path) = l']] \wedge \mu(l) \geq d$



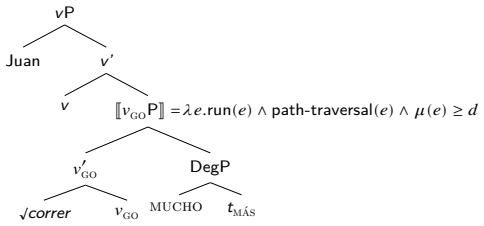
Aspect will bind the event of path-traversal and will introduce temporal location.
(Piñón 1993; Smith 1997; Ferreira 2005)

$[\![\text{AspP}]\!] = \lambda t.\exists e[\tau(e) \subseteq t \wedge \text{run}(e) \wedge \text{path-traversal}(e) \wedge \text{Agent}(e, \text{J})] \wedge \mu(t) \geq d$



Deriving SPEED: The structure

SPEED does not strictly follow just from DegP modifying [√*correr* v_{GO}]. Something else needs to be said (see options in the next slide).



Deriving SPEED: options

Option 1: There is a linking rule that maps syntactic position to (monotonic or non-monotonic) semantic interpretation. See for example Schwarzschild (2006) for the difference between Measure Phrases in pseudo-partitives (e.g. *2 pounds of cherries*) and prenominal attributive position (e.g. *2-pound cherries*).

(38) When a measuring construction is combined with a process atelic verb very low in the structure, the interpretation is one in which the dimension is non-monotonic on the relevant part-whole relation in the domain given by the verb.

What is being measured is something like "quantity of path-traversing movement"

Option 2: v_{GO} is mapped to a state. SPEED involves measurement of a state to which the running activity is thematically related.