

# Lake Pátzcuaro P’urhepecha and the Semantic Typology of Degree Constructions\*

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## 1 Introduction

- Degree constructions are an area of grammar characterized by considerable crosslinguistic variation (Reglero 2007, Kennedy 2007, Krasikova 2008, Beck *et al.* 2009, Bhatt & Takahashi 2011, Pearson 2011, Bochnak 2013, a.o.).
- To contribute to the project of describing and understanding the variation (and nonvariation) in this domain, I propose a semantic analysis of a number of degree constructions in P’urhepecha...
- ...an indigenous language of Mexico spoken by >120,000 people (INEGI 2010), primarily in the central-western state of Michoacán.
- P’urhepecha is a genetically isolated agglutinating language with fairly flexible constituent order (Capistrán 2002, Chamoreau 2007, Vázquez-Rojas Maldonado 2011).

Although P’urhepecha is both genetically unrelated to and typologically unlike Western European languages such as English, the degree system of the variety investigated here—Lake Pátzcuaro P’urhepecha—is very similar to that of English.

- Lake Pátzcuaro P’urhepecha therefore bucks the trend of understudied languages turning out to have rather “unfamiliar” degree systems (cf. Beck *et al.* 2009, §3.1.1, on Motu; Pearson 2011 on Fijian; and Bochnak 2013 on Washo).

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**Abbreviations used:** ACC = accusative; ADV = adverbializer; COND = conditional; COP = copula; DIST = distal (demonstrative); HAB = habitual; IND = indicative; INF = infinitive; INT = interrogative; LOC = locative; MED = medial (demonstrative); PFV = perfective; PL = plural; pO = plural object; PRS = present; REFL = reflexive; SJV = subjunctive; SUB = subordinator; 1 = first person; 1sS = first person singular subject; 3 = third person; 3pS = third person plural subject.

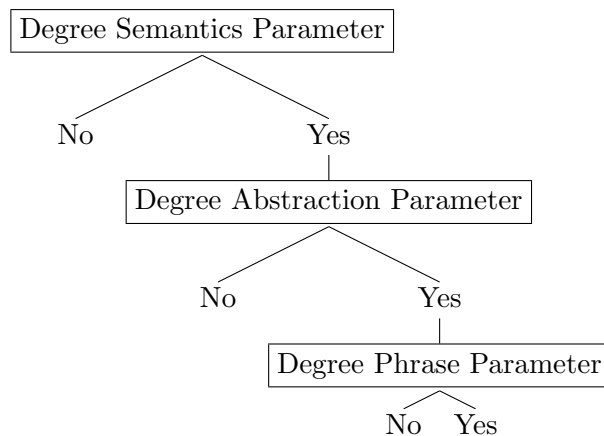
## 1.1 Roadmap

- Review the analysis of crosslinguistic variation in degree semantics put forth in Beck *et al.* (2009).
- Apply Beck *et al.*'s diagnostics to Lake Pátzcuaro P'urhepecha to determine how it fits into the typology of degree systems.
- Consider the theoretical and crosslinguistic implications of the results.

## 2 Beck *et al.*'s (2009) analysis of crosslinguistic variation in degree constructions

- Beck *et al.* (2009) analyze the degree constructions of 14 languages.
- On the basis of their results, they propose that languages' degree systems are regulated by three parameters, which form the following hierarchy:

(1) Beck *et al.* (2009) parameter hierarchy



- The content of the parameters is as follows:

(2) Degree parameters from Beck *et al.* (2009)

- Degree Semantics Parameter** A language {does/does not} have gradable predicates (type ⟨d,et⟩ and related), i.e., lexical items that introduce degree arguments.
- Degree Abstraction Parameter** A language {does/does not} have binding of degree variables in the syntax.
- Degree Phrase Parameter** The degree argument position of a gradable predicate {may/may not} be overtly filled.

### 3 How does Lake Pátzcuaro P’urhepecha fit into the typology of degree constructions?

#### 3.1 The Degree Semantics Parameter

- (3) *Effects of the Degree Semantics Parameter*: “Yes” → ...
- Leads us to expect **expressions that plausibly manipulate degree arguments**, such as comparative (*-er*), superlative (*-est*), equative (*as*), excessive (*too*), and sufficientive (*enough*) morphemes.
  - Enables **difference comparatives** (*Katie is two centimeters taller than Mike*).
  - Enables **comparison with a degree** (*Katie is taller than five feet*).

##### 3.1.1 Expressions that plausibly manipulate degree arguments

- Such expressions do indeed exist:

- (4) *Comparative degree word*: *sanderu/sanderhu/sandarhu* ‘-er’

María sanderu iótasti eski Ána. (SFL)

María **sanderu** ióta-s-Ø-ti eski Ána.

Mary **-er** be.tall-PFV-PRS-IND+3 SUB Anna

‘Mary is taller than Anna.’

- (5) *Equative degree word*: *xani* ‘as’

Juanu xani iostarasti eska Petu. (J)

Juanu **xani** iostara-s-Ø-ti eska Petu.

John **as** be.tall-PFV-PRS-IND+3 SUB Peter

‘John is as tall as Peter.’

- (6) *“Extreme degree” word*: *xani* ‘so’

¡I japonda **xani** jauamesti! (J)

¡I japonda **xani** jauame-s-Ø-ti!

this lake so be.deep-PFV-PRS-IND+3

‘This lake is so deep!’

##### 3.1.2 Difference comparatives

- Difference comparatives are possible in Lake Pátzcuaro P’urhepecha:

- (7) María tsimáni *centímetru* sanderu iótasti eski Ána. (SFL)

María **tsimáni centímetru sanderu** ióta-s-Ø-ti eski Ána.

Mary **two centimeter -er** be.tall-PFV-PRS-IND+3 SUB Anna

‘Mary is 2 centimeters taller than Anna.’

- (8) I tsintsikata kuimu metrhu sandarhu iosikasiti eska ima. (J)

I tsintsikata **kuimu metrhu sandarhu** iosika-si-Ø-ti eska ima.

this wall **six meter -er** be.long-PFV-PRS-IND+3 SUB that(DIST)

‘This wall is six meters longer than that one.’

- (9) I japonda ekuatse tembeni metrhu sandarhu jauamesiti eska ima. (J)

I japonda **ekuatse tembeni metrhu sandarhu** jauame-si-Ø-ti eska ima.

this lake **twenty ten meter -er** be.deep-PFV-PRS-IND+3 SUB that(DIST)

‘This lake is 30 meters deeper than that one.’

### 3.1.3 Comparison with a degree

- ...as is comparison with a degree:

(10) I s̄iruki sanderhu iosikas̄iti eska ma sentimetrhu. (J)

I s̄iruki sanderhu iosika-s̄i-∅-ti eska ma sentimetrhu.  
this ant -er be.long-PFV-PRS-IND+3 SUB one centimeter  
'This ant is longer than one centimeter.'

(11) Inde japonda sanderhu jauamesti eska tembeni metrhu. (J)

Inde japonda sanderhu jauame-s-∅-ti eska tembeni metrhu.  
that(MED) lake -er be.deep-PFV-PRS-IND+3 SUB ten meter  
'That lake is deeper than ten meters.'

- The degree-denoting phrase need not contain a unit-of-measurement word:

(12) Juanu sanderhu iostarasti esiki komutarakua puertarhu. (J)

Juanu sanderhu iostara-s-∅-ti esiki komutarakua puerta-rhu.  
John -er be.tall-PFV-PRS-IND+3 SUB width door-LOC  
semilit. 'John is taller than the width at the door.'  
id. 'John is taller than the door is wide.'

(13) Kachukutarakua sanderhu iosikasti eska jauanekua cajarhu. (J)

Kachukutarakua sanderhu iosika-s-∅-ti eska jauanekua caja-rhu.  
knife -er be.long-PFV-PRS-IND+3 SUB depth drawer-LOC  
semilit. 'The knife is longer than the depth in the drawer.'  
id. 'The knife is longer than the drawer is deep.'

## 3.2 The Degree Phrase Parameter

(14) *Effects of the Degree Phrase Parameter: "Yes" → ...*

- a. Enables **degree questions**: *How tall is Ashley?*
- b. Enables **measure phrase** constructions: *Ashley is four feet tall.*
- c. Enables **subcomparatives**: *Ashley is taller than that door is wide.*

### 3.2.1 Degree questions

- Lake Pátzcuaro P'urhepecha robustly allows degree questions:

(15) *Questioning the degree argument of a verb*

¿Naxani iostarasaki Maria? (J)  
¿Na-xani iostara-s̄i-∅-ki Maria?  
how-XANI be.tall-PFV-PRS-INT Mary  
'How tall is Mary?'

- (16) *Questioning the degree argument of an adjective*  
 ¿Naxani miritsiski Xumo? (J)  
 ¿Na-xani miritsi-i-s-Ø-ki Xumo?  
 how-XANI forgetful-COP-PFV-PRS-INT Xumo  
 ‘How forgetful is Xumo?’
- (17) *Questioning the degree argument of an adverb*  
 ¿Naxani uinani ua uiriani Maria? (J)  
 ¿Na-xani uina-ni u-a-Ø-Ø uiria-ni Maria?  
 how-XANI strong-ADV be.able-FUT-PRS-INT run-INF Mary  
 ‘How fast can Mary run?’
- (18) *Questioning the degree argument of a determiner*<sup>1</sup>  
 ¿Juánu na xani jauiri jukáski? (SFL)  
 ¿Juánu na xani jauiri juká-s-Ø-ki?  
 John how XANI hair wear-PFV-PRS-INT  
 ‘How much hair does John have?’

### 3.2.2 Measure phrase constructions

- Measure phrases are also available:

- (19) Kurucha tanimu sentimetrhu iosikasiti. (J)  
 Kurucha **tanimu sentimetrhu** iosika-si-Ø-ti.  
 fish **three centimeter** be.long-PFV-PRS-IND+3  
 ‘The fish is three centimeters long.’
- (20) Juánu tsimáni métru iótasti. (SFL)  
 Juánu **tsimáni métru** ióta-s-Ø-ti.  
 John **two meter** be.tall-PFV-PRS-IND+3  
 ‘John is 2 meters tall.’
- (21) Tanimu motsetarakua iondaskani nientani juchiti anchikuarekuarhu. (J)  
**Tanimu motsetarakua** ionda-s-Ø-ka=ni nienta-ni juchiti anchikuarekua-rhu.  
**three minute** be.late-PFV-PRS-IND+1=1sS arrive-INF my work-LOC  
 semilit. ‘I was three minutes late in arriving at my work.’  
 id. ‘I was three minutes late to work.’

<sup>1</sup>I assume that *na xani* ‘how much’ here is questioning the degree argument not of *jauiri* ‘hair’ (which presumably doesn’t have one) but rather of a silent version of the mass determiner *uanekua* ‘much’.

### 3.2.3 Subcomparatives

- ...as are subcomparatives:

(22) Japonda sanderhu jauamesti eska tsintsikata iosikaka. (J)

Japonda sanderhu jauame-s-Ø-ti eska tsintsikata iosika-Ø-Ø-ka.  
lake -er be.deep-PFV-PRS-IND+3 SUB wall be.long-PFV-PRS-SJV  
'The lake is deeper than the wall is long.'

(23) Luisi sanderhu iostarasiti eska koskaka kojtsitarakua. (J)

Luisi sanderhu iostara-si-Ø-ti eska koska-Ø-Ø-ka kojtsitarakua.  
Louis -er be.tall-PFV-PRS-IND+3 SUB be.wide-PFV-PRS-SJV table  
'Louis is taller than the table is wide.'

(24) I xanaru sanderhu iuakurasiti eska iorhekua jauameka. (J)

I xanaru sanderhu iuakura-si-Ø-ti eska iorhekua jauame-Ø-Ø-ka.  
this street -er be.long-PFV-PRS-IND+3 SUB river be.deep-PFV-PRS-SJV  
'This street is longer than the river is deep.'

### 3.2.4 Subequatives

- On a Beck *et al.* (2009)–style approach to degree constructions, subequatives (such as *The lake is as deep as the wall is long*) have exactly the same structure as subcomparatives.
- The semantic difference between the two constructions lies entirely in the lexical denotations of the degree morphemes involved (in English, *-er* and *as*).
- Lake Pátzcuaro P'urhepecha has an equative morpheme (*xani*), plausibly allows abstraction over degrees, and allows degree argument slots to be filled in overt syntax. All this leads us to expect that it should have not only subcomparatives but also subequatives, and it does:

(25) Japonda xani jauamesti eska tsintsikata iosikaka. (J)

Japonda xani jauame-s-Ø-ti eska tsintsikata iosika-Ø-Ø-ka.  
lake as be.deep-PFV-PRS-IND+3 SUB wall be.long-PFV-PRS-SJV  
'The lake is as deep as the wall is long.'

(26) Luisi xani iostarasiti eska koskaka kojtsitarakua. (J)

Luisi xani iostara-si-Ø-ti eska koska-Ø-Ø-ka kojtsitarakua.  
Louis as be.tall-PFV-PRS-IND+3 SUB be.wide-PFV-PRS-SJV table  
'Louis is as tall as the table is wide.'

(27) I xanaru xani iuakurasiti eska iorhekua jauameka. (J)

I xanaru xani iuakura-si-Ø-ti eska iorhekua jauame-Ø-Ø-ka.  
this street as be.long-PFV-PRS-IND+3 SUB river be.deep-PFV-PRS-SJV  
'This street is as long as the river is deep.'

### 3.3 The Degree Abstraction Parameter

(28) *Effects of the Degree Abstraction Parameter*: “Yes”  $\rightarrow$  ...

- a. Induces **negative island effects**: \**Katie bought a more expensive book than nobody did.*
- b. Allows a comparative operator to **outscope a modal** which is structurally higher than it in surface syntax:

(29) [Context: I hand you a 10-page paper. You say...]

Your paper has to be exactly 5 pages longer than this. (adapted from Heim 2001:224)

a)  $\forall w \in \text{ACC}$ : [[exactly 5 pages -er than 10 pages]<sub>1</sub>  $\lambda_1$  your paper is  $t_1$  long in  $w$ ]

$\rightarrow$  In every world in which the rules are followed, my paper is 15 pages long. A 20-page paper will not be accepted.

b) [exactly 5 pages -er than 10 pages]<sub>1</sub>  $\lambda_1$  [ $\forall w \in \text{ACC}$ : [your paper is  $t_1$  long in  $w$ ]]

$\rightarrow$  The maximum degree  $d$  such that, in every world in which the rules are followed, my paper is at least  $d$ -long is exactly 5 pages longer than 10 pages. In other words, a 20-page paper may be acceptable.

- I have not been able to reproduce the scope ambiguity in (29) in Lake Pátzcuaro P’urhepecha.
- However, this in itself does not indicate that Lake Pátzcuaro P’urhepecha has a negative setting for the Degree Abstraction Parameter. Even in English, the scope ambiguity only shows up with some modals. *Has to* allows it, but *should* doesn’t (Heim 2001).
- Therefore, the seeming unavailability of inverse scope in this configuration in Lake Pátzcuaro P’urhepecha may be due to a peculiarity of the modals involved—or to something else—rather than to a [–DAP] setting for the language as a whole.

### 3.4 Interim summary

- Let’s take stock of what we’ve learned about the Lake Pátzcuaro P’urhepecha degree system:

(30) *The Lake Pátzcuaro P’urhepecha degree system, as revealed by Beck et al.’s (2009) diagnostics*

Parameter	Consequences of “Yes” setting	LPP
Degree Semantics Parameter	a. expressions that plausibly manipulate degree arguments	✓
	b. difference comparatives	✓
	c. comparison with a degree	✓
Degree Abstraction Parameter	a. -ER able to outscope a surface-c-commanding modal	✗
	b. negative islands	?
Degree Phrase Parameter	a. degree questions	✓
	b. measure phrases	✓
	c. subcomparatives	✓
	d. subequatives	✓

- It might seem at first that Lake Pátzcuaro P’urhepecha is [+DSP, –DAP, +DegPP].
- According to Beck *et al.*, this is an impossible parameter setting. For them, a language can only be [+DegPP] if it is [+DAP]. Does Lake Pátzcuaro P’urhepecha challenge this view?

– No.

- Recall that the absence of inverse scope in the configuration  $\boxed{\square \dots \text{-ER}}$  does not entail that a language is [–DAP].

- As for negative islands, there is currently no clear evidence on this from Lake Pátzcuaro P’urhepecha.
- In a Beck *et al.* (2009) world, some of the constructions suggesting that Lake Pátzcuaro P’urhepecha is [+DegPP]—subcomparatives, subequatives, and degree questions—crucially involve abstraction over degrees.
- This suggests that Lake Pátzcuaro P’urhepecha is [+DSP, +DAP, +DegPP], exactly like English.
- If Lake Pátzcuaro P’urhepecha really is [+DAP], then we may expect at least *some* of its DegPs to participate in scope ambiguities—a prediction I’ll return to in §6.
- If [+DSP, +DAP, +DegPP] is the right parameter setting for Lake Pátzcuaro P’urhepecha, then analyses of English degree constructions such as that put forth in Heim (2001) should work well for Lake Pátzcuaro P’urhepecha too.

## 4 Heim’s (2001) analysis of degree constructions

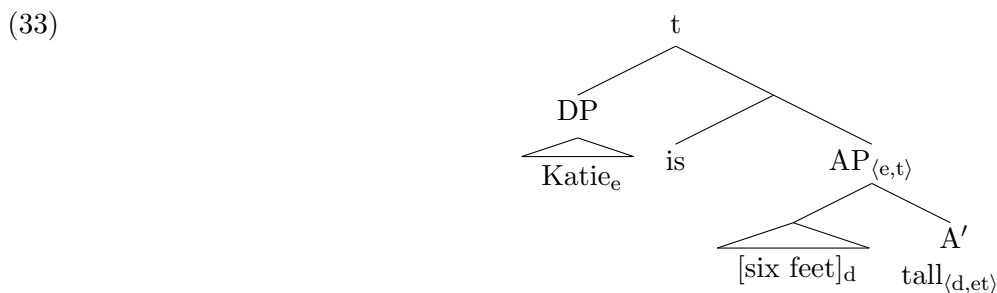
- Gradable predicates denote relations between degrees and individuals. They are of type  $\langle d, et \rangle$ , where  $d$  is the basic type of degrees. Hence in:

(31) Katie is six feet tall.

- ...the gradable predicate, *tall*, has the following denotation:

(32)  $\lambda d . \lambda x . x$  is tall to degree  $d$

- A sketch of the composition:



- At least in languages like English, it is possible to abstract over the degree argument slot of a gradable predicate, producing constituents with denotations like the following:

(34)  $\lambda d .$  Katie is tall to degree  $d$

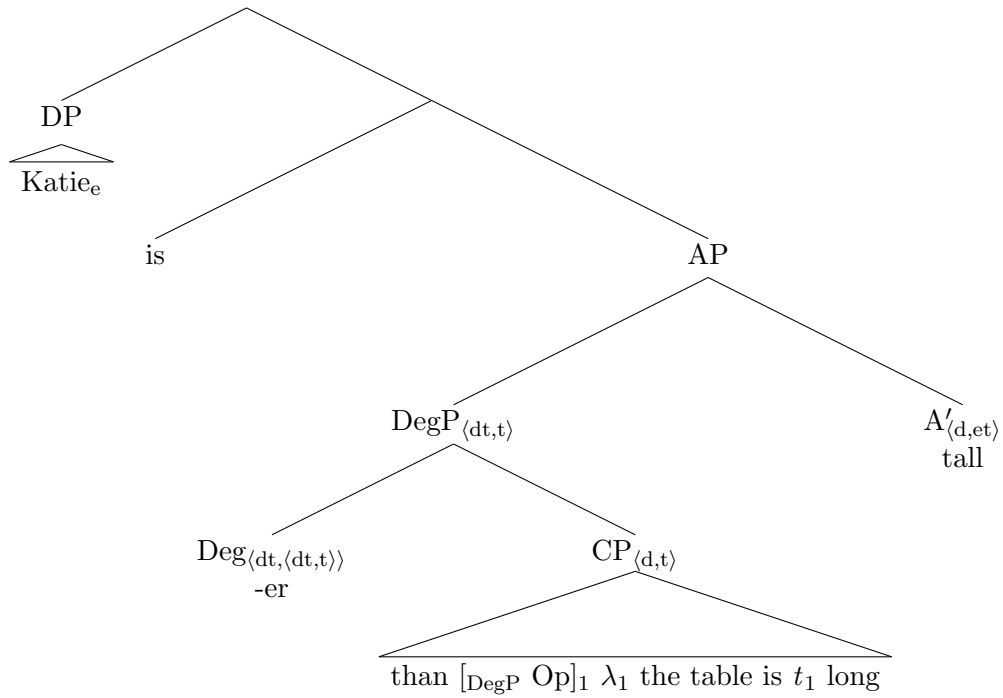
- Functions from degrees to truth values (type  $\langle d, t \rangle$ ) like (34) play a crucial role in a variety of degree constructions, since they serve as the arguments of degree morphemes (such as the comparative morpheme *-er*). Consider the following subcomparative:

(35) Katie is taller than the table is long.

- (35) is derived from a more remote structure something like the following:



(36)

(37) *Denotation of -er* (cf. Beck *et al.* 2009, (6b))

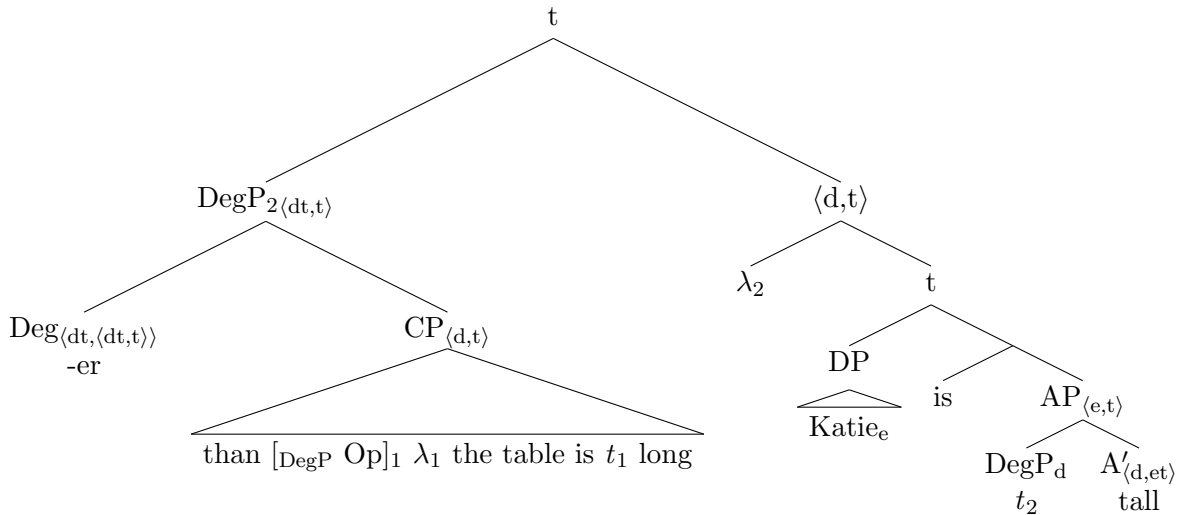
$$\llbracket \text{-er} \rrbracket = \lambda P_{\langle d,t \rangle} \cdot \lambda Q_{\langle d,t \rangle} \cdot \max(Q) > \max(P)$$

(38) *Definition of max* (Heim 2001:216)

$$\max(P) := \iota d \cdot P(d) = 1 \ \& \ \forall d' [P(d') \rightarrow d' \leq d]$$

- Because of the type mismatch between  $\llbracket \mathbf{DegP} \rrbracket$  ( $\langle dt,t \rangle$ ) and  $\llbracket \mathbf{A}' \rrbracket$  ( $\langle d,et \rangle$ ), DegP must QR:

(39)

(40) *Truth conditions:* (35)/(39) is true iff...

$$\max(\lambda d \cdot \text{Katie is } d\text{-tall}) > \max(\lambda d' \cdot \text{the table is } d'\text{-long})$$

- Other degree words, such as *less* and equative *as*, map their type- $\langle d,t \rangle$  arguments to 1 under different conditions:

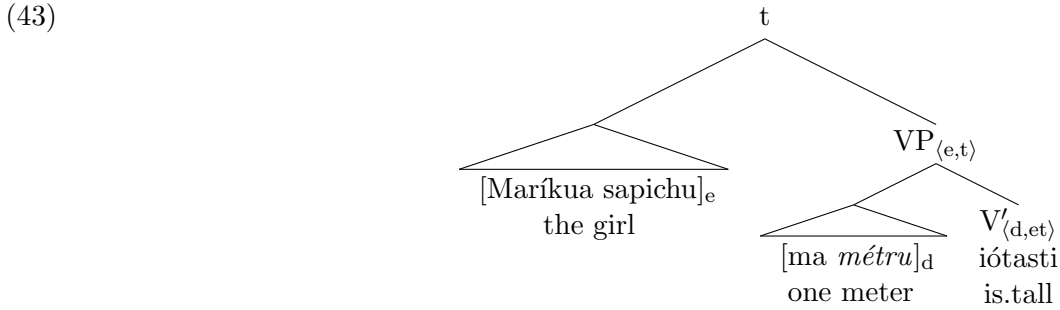
(41) *Denotations of less and equative as*

- $\llbracket \text{less} \rrbracket = \lambda P_{\langle d,t \rangle} \cdot \lambda Q_{\langle d,t \rangle} \cdot \max(Q) < \max(P)$
- $\llbracket \text{as} \rrbracket = \lambda P_{\langle d,t \rangle} \cdot \lambda Q_{\langle d,t \rangle} \cdot \max(Q) \geq \max(P)$

## 5 Extending Heim’s account to Lake Pátzcuaro P’urhepecha

### 5.1 Measure phrase constructions

- (42) Maríkua sapichu ma métru iótasti. (SFL)  
 Maríkua sapichu ma métru ióta-s-Ø-ti.  
 young.woman small one meter be.tall-PFV-PRS-IND+3  
 ‘The girl is one meter tall.’



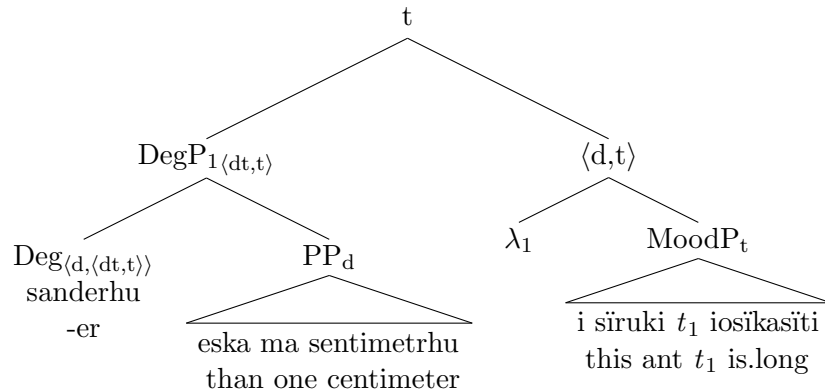
- (44) *Truth conditions:* (42)/(43) is true iff. . .  
 $\iota x$  [x is a girl] is tall to the degree 1 meter

### 5.2 Constructions involving abstraction over degrees

#### 5.2.1 Comparison with a degree

- (45) I siruki sanderhu iosikasiti eska ma sentimetrhu. (J)  
 I siruki sanderhu iosika-si-Ø-ti eska ma sentimetrhu.  
 this ant -er be.long-PFV-PRS-IND+3 SUB one centimeter  
 ‘This ant is longer than one centimeter.’

- (46) *LF of (45)*



- (47) *Denotation of sanderhu in (45)/(46)* (cf. Beck *et al.* 2009, (6a))<sup>2</sup>  
 $\llbracket \text{sanderhu} \rrbracket = \lambda d . \lambda Q_{\langle d,t \rangle} . \max(Q) > d$

- (48) *Truth conditions:* (45)/(46) is true iff. . .  
 $\max(\lambda d . \text{this ant is } d\text{-long}) > 1 \text{ cm}$

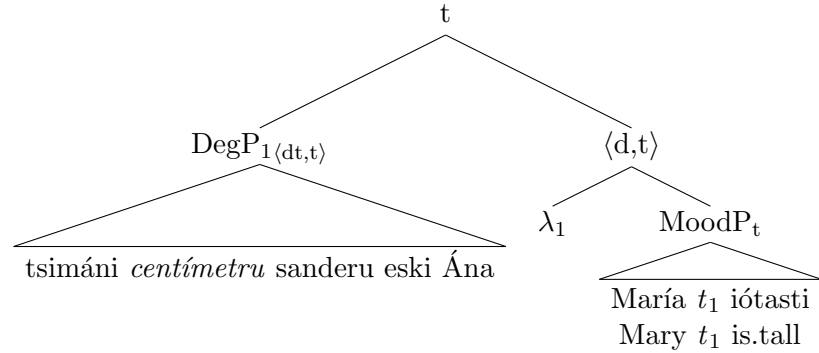
<sup>2</sup>Alternatively, as pointed out to me by Amy Rose Deal, it could be that this *sanderhu* is of type  $\langle dt, \langle dt, t \rangle \rangle$  (like the *sanderhu*, and English *-er*, in clausal comparatives), and the subordinator *eska* maps the denotation of its complement (which is a particular degree *d*) to some set of degrees of which *d* is the maximum.

### 5.2.2 Difference comparatives

(49) *María tsimáni centímetru sanderu iótasti eski Ána.* (SFL)

María **tsimáni centímetru sanderu** ióta-s-∅-ti eski Ána.  
 Mary **two centimeter -er** be.tall-PFV-PRS-IND+3 SUB Anna  
 ‘Mary is 2 centimeters taller than Anna.’

(50) *Possible LF for (49)*



(51) *Truth conditions:* (49) is true iff. . .

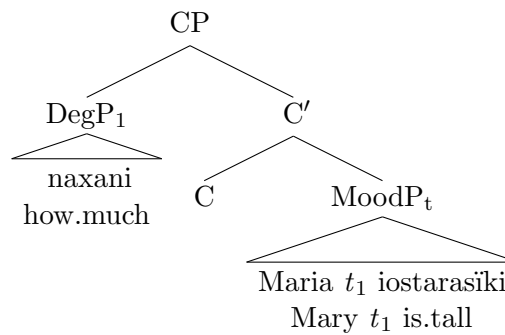
$\max(\lambda d . \text{Mary is } d\text{-tall}) = \max(\lambda d' . \text{Anna is } d'\text{-tall}) + 2 \text{ cm}$

### 5.2.3 Degree questions

(52) *¿Naxani iostarasiki Maria?* (J)

¿Na-xani iostara-si-∅-ki Maria?  
 how-XANI be.tall-PFV-PRS-INT Mary  
 ‘How tall is Mary?’

(53) *LF of (52)*

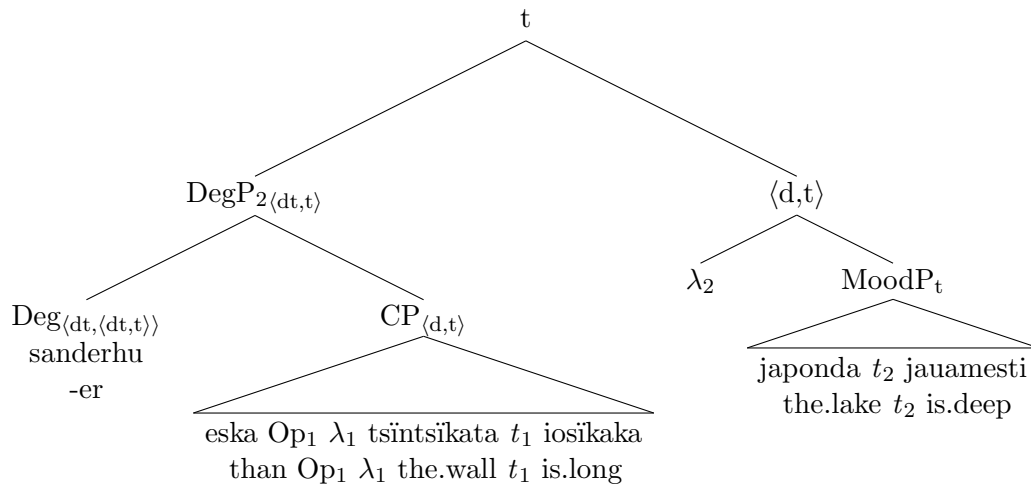


### 5.2.4 Subcomparatives

(54) *Japonda sanderhu jauamesti eska tsíntsikata iosikaka.* (J)

Japonda sanderhu jauame-s-∅-ti eska tsíntsikata iosika-∅-∅-ka.  
 lake -er be.deep-PFV-PRS-IND+3 SUB wall be.long-PFV-PRS-SJV  
 ‘The lake is deeper than the wall is long.’

(55) *LF of (54)*



(56) *Truth conditions: (54)/(55) is true iff. . .*

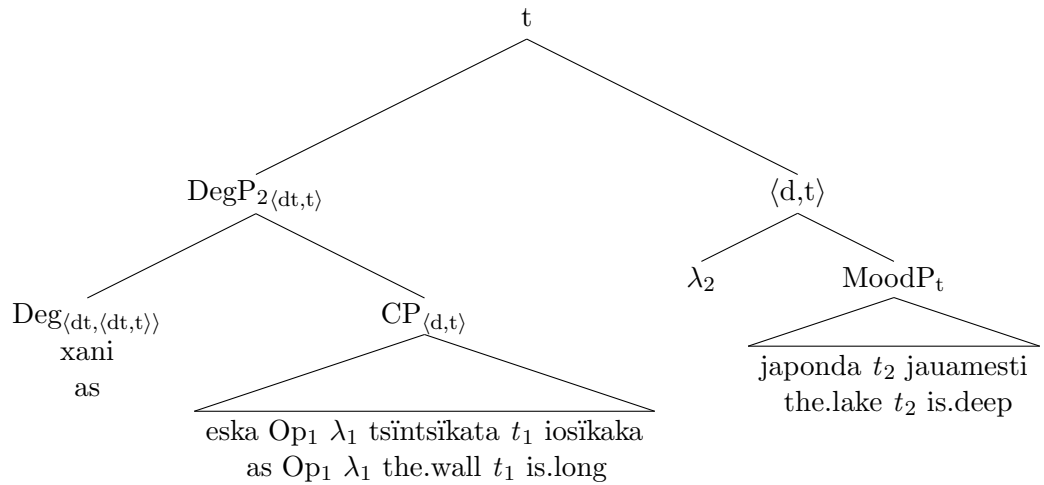
$\max(\lambda d . \text{the lake is } d\text{-deep}) > \max(\lambda d' . \text{the wall is } d'\text{-long})$

### 5.2.5 Subequatives

(57) Japonda xani jauamesti eska tsintsikata iosikaka. (J)

Japonda xani jauame-s-∅-ti eska tsintsikata iosika-∅-∅-ka.  
 lake as be.deep-PFV-PRS-IND+3 SUB wall be.long-PFV-PRS-SJV  
 ‘The lake is as deep as the wall is long.’

(58) *LF of (57)*



(59) *Truth conditions: (57)/(58) is true iff. . .*

$\max(\lambda d . \text{the lake is } d\text{-deep}) \geq \max(\lambda d' . \text{the wall is } d'\text{-long})$

## 6 Prediction: Scopally ambiguous DegPs

- On this analysis, the constituent (DegP) consisting of a degree word (Deg<sup>0</sup>) and its (frequently surface-extraposed) complement often has a denotation of type  $\langle dt, t \rangle$  (i.e., it is a generalized degree quantifier).
- Therefore, when it is merged in the degree argument slot of a gradable predicate (type  $\langle d, et \rangle$ ), it must QR for interpretability.
- All a phrase needs to be interpretable is access to a syntactic position where its denotation can compose with that of its sister.
- There will often be syntactic positions of this sort available both above and below other scope-bearing elements.
- Therefore, the DegPs-as-generalized-degree-quantifiers analysis predicts that DegPs should participate in scope ambiguities...
- ...just as generalized individual quantifiers (type  $\langle et, t \rangle$ ) do.
- This prediction is borne out in Lake Pátzcuaro P’urhepecha.

### 6.1 A *seeming* scope ambiguity: *uekasindi* ‘wants’ ... *sandarhu* ‘-er’

- The following data may seem like evidence of exactly the sort of scope ambiguity we’re looking for:

(60) Ana uekasindi jirinantani<sup>3</sup> sandarhu kuanasichani esika Maria. (J)

Ana **ueka-sĩn-Ø-ti** jirinanta-ni **sandarhu** kuanasĩ-cha-ni esika Maria.  
 Anna **want-HAB-PRS-IND+3** find-INF **-er** frog-PL-ACC SUB Mary  
 ‘Anna wants to find more frogs than Mary.’

[*Accepted in the following context:* Two girls, Anna and Mary, are playing a game: they’re competing to see who can find more frogs. Each one wants to win.]

[*Accepted in the following context:* Anna and Mary live in different towns and have never met. By coincidence, both of them are looking for frogs on the same day. Mary wants to find three frogs, and Anna wants to find five.]

(61) *Possible LF for (60) in the first context*

Ana **uekasindi**<sub>w</sub> [[**sandarhu** esika Op<sub>1</sub> λ<sub>1</sub> Maria jirinantaaka<sub>w'</sub> t<sub>1</sub> UANEKUA kuanasichani]<sub>2</sub> λ<sub>2</sub> PRO  
 Anna **wants**<sub>w</sub> [[**-er** than Op<sub>1</sub> λ<sub>1</sub> Mary will.find<sub>w'</sub> t<sub>1</sub> MANY frogs]<sub>2</sub> λ<sub>2</sub> PRO  
 jirinantani<sub>w'</sub> t<sub>2</sub> UANEKUA kuanasichani]  
 to.find<sub>w'</sub> t<sub>2</sub> MANY frogs]

**TC:**  $\forall w' \in ACC_{\text{Anna}, w}: \max(\lambda d . \text{Anna finds } d\text{-many frogs in } w') > \max(\lambda d' . \text{Mary finds } d'\text{-many frogs in } w')$

(62) *Possible LF for (60) in the second context*

[**sandarhu** esika Op<sub>1</sub> λ<sub>1</sub> Maria uekasindi<sub>w</sub> PRO jirinantani<sub>w'</sub> t<sub>1</sub> UANEKUA kuanasichani]<sub>2</sub> λ<sub>2</sub> Ana **uekasindi**<sub>w</sub>  
 [**-er** than Op<sub>1</sub> λ<sub>1</sub> Mary wants<sub>w</sub> PRO to.find<sub>w'</sub> t<sub>1</sub> MANY frogs]<sub>2</sub> λ<sub>2</sub> Anna **wants**<sub>w</sub>  
 [PRO jirinantani<sub>w''</sub> t<sub>2</sub> UANEKUA kuanasichani]  
 [PRO to.find<sub>w''</sub> t<sub>2</sub> MANY frogs]

**TC:**  $\max(\lambda d . \forall w' \in ACC_{\text{Anna}, w}: \text{Anna finds } d\text{-many frogs in } w') > \max(\lambda d' . \forall w'' \in ACC_{\text{Mary}, w}: \text{Mary finds } d'\text{-many frogs in } w'')$

- However, an alternative analysis is available: when the sentence is used in the second context, its LF may involve not covert QR of the DegP but rather long-distance binding of a world variable:

<sup>3</sup>In some other varieties, this verb means ‘look for’.

(63) Possible alternative LF for (60) in second context

Ana uekasīndi<sub>w</sub> [[sandarhu esika Op<sub>1</sub> λ<sub>1</sub> Maria uekasīndi<sub>w</sub> PRO jirinantani<sub>w'</sub> t<sub>1</sub> UANEKUA kuanasīchani]<sub>2</sub> λ<sub>2</sub>  
 Anna wants<sub>w</sub> [[-er than Op<sub>1</sub> λ<sub>1</sub> Mary wants<sub>w</sub> PRO to.find<sub>w'</sub> t<sub>1</sub> MANY frogs]<sub>2</sub> λ<sub>2</sub>  
 PRO jirinantani<sub>w''</sub> t<sub>2</sub> UANEKUA kuanasīchani]  
 PRO to.find<sub>w''</sub> t<sub>2</sub> MANY frogs]

**TC:**  $\forall w' \in ACC_{Anna,w}: \max(\lambda d . \text{Anna finds } d\text{-many frogs in } w') > \max(\lambda d' . \forall w'' \in ACC_{Mary,w}: \text{Mary finds } d'\text{-many frogs in } w'')$

- But for clearer evidence of scopally ambiguous DegPs in Lake Pátzcuaro P'urhepecha, we can turn to the language's result construction.

## 6.2 Result constructions

(64) Tania xani iostarasīti eska uati andaxani juchiti takukatani. (J)

Tania **xani** iostara-sī-∅-ti **eska** u-a-∅-ti andaxa-ni juchiti takukata-ni.  
 Tania **so** be.tall-PFV-PRS-IND+3 SUB be.able-FUT-PRS-IND+3 reach-INF my book-ACC  
 'Tania is so tall that she can reach my book.'

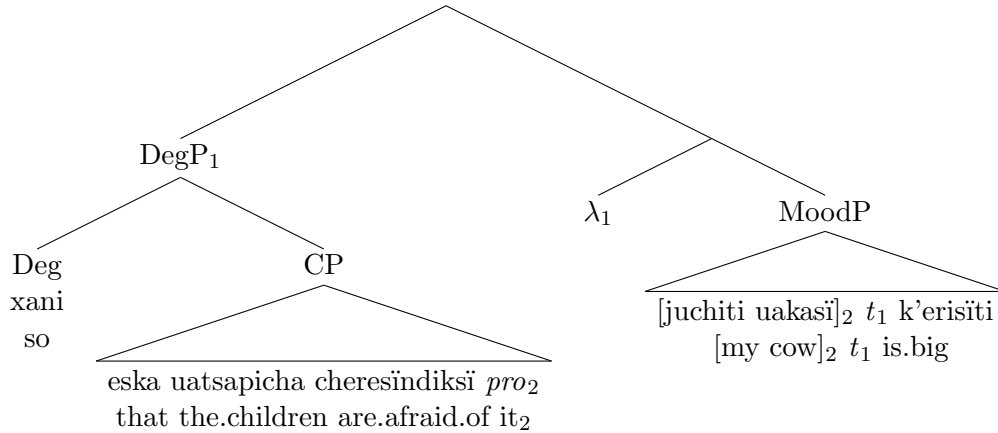
(65) Juchiti uakasī xani k'erisīti eska uatsapicha cheresīndiksī. (J)

Juchiti uakasī **xani** k'eri-i-sī-∅-ti **eska** uatsapi-cha chere-sin-∅-ti=ksī.  
 my cow **so** big-COP-PFV-PRS-IND+3 SUB child-PL be.afraid.of-HAB-PRS-IND+3=3pS  
 'My cow is so big that the children are afraid of it.'

(66) Entailments of (65)

- Entailment to the absolute:** My cow is big.
- Entailment of the result clause:** The children are afraid of my cow.
- Causal relation:** The children are afraid of my cow *because* it's big.

(67) LF of (65)



(68) Denotation of result *xani* (intensional)

$[[\mathbf{xani}_{res}]]^w = \lambda p_{\langle s,t \rangle} . \lambda P_{\langle d, \langle s,t \rangle \rangle} . \exists d [d > d_s \ \& \ P_w(d) \ \& \ CAUSE_w(P(d))(p)]$

(69) Truth conditions: (65)/(67) is true in a world *w* iff...

$\exists d [d > d_s^4 \ \& \ \text{my cow is } d\text{-big in } w \ \& \ CAUSE_w\{w' : \text{my cow is } d\text{-big in } w'\}\{w'' : \text{the children are afraid of my cow in } w''\}]$

<sup>4</sup>Cf. Kennedy's (1997:158-160) analysis of absolute constructions with no overt measure phrase.

### 6.3 Result constructions and scopally ambiguous DegPs

- (70) a. [Context: Mary doesn't like the floor of her house, because it's dirty and covered in stains. She wants to buy carpets in order to be able to cover it all.]

Maria uekasindi piani xani tapetechani eska jatsirunskapirindi iapurhu isi. (J)

Maria **ueka-sin-Ø-ti** pia-ni **xani** tapete-cha-ni eska jatsirunskapirin-Ø-ti iapurhu  
 Mary **want-HAB-PRS-IND+3** buy-INF **so** rug-PL-ACC SUB cover-COND-PRS-IND+3 wherever  
 isi.

thus

semilit. 'Mary wants to buy so many rugs that they would cover everywhere.'

id. 'Mary wants to buy so many rugs that they would cover the whole floor.' *want*  $\gg$  *so*

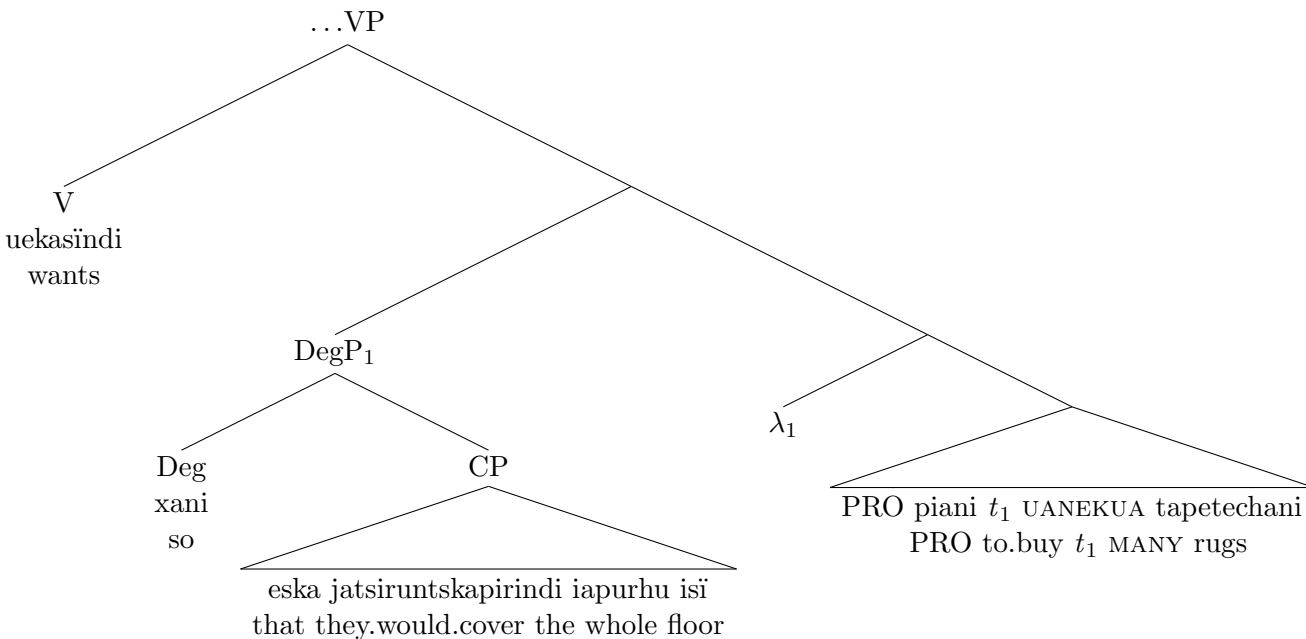
- b. [Context: Everyone criticizes Mary, because she's said that she wants to buy 500 rugs, and they think that doing such a thing would be a ridiculous excess.]

Maria uekasindi piani xani tapetechani eska iamindueecha uandatspesindi. (J)

Maria **ueka-sin-Ø-ti** pia-ni **xani** tapete-cha-ni eska iamindu-eecha  
 Mary **want-HAB-PRS-IND+3** buy-INF **so** rug-PL-ACC SUB all-PL  
 uandatspe-sin-Ø-ti.  
 criticize-HAB-PRS-IND+3

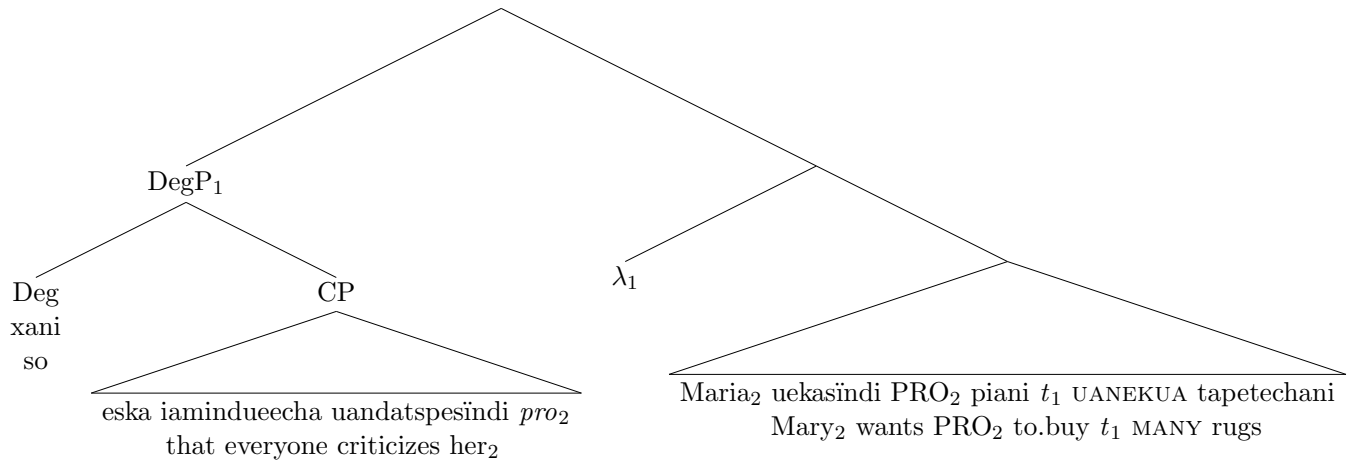
'Mary wants to buy so many rugs that everyone criticizes her.' *so*  $\gg$  *want*<sup>5</sup>

- (71) LF of (70a), *want*  $\gg$  *so*



<sup>5</sup>See Meier 2003:99-100 for discussion of a similar case in English.

(72) LF of (70b),  $\boxed{so \gg want}$



• Likewise:

(73) a. [Context: Anna’s dream is to found a school, but to do it she’s going to need a lot of money.]

Ana uekasindi xani tumina jatsini eska k’oru upirindi uni ma jorhengarikua. (J)

Ana **ueka-sin-Ø-ti** xani tumina jatsi-ni eska k’oru\_u-pirin-Ø-ti u-ni ma  
 Anna **want-HAB-PRS-IND+3 so** money have-INF SUB be.able-COND-PRS-IND+3 make-INF a  
 jorhengarikua.  
 school

semilit. ‘Anna wants to have so much money that she would be able to found a school.’

id. ‘Anna wants to have so much money that she could found a school.’  $\boxed{want \gg so}$

b. [Context: Everyone criticizes Anna, because she’s obsessed with accumulating a lot of money.]

Ana uekasindi jatsikuareni xani kanekua tumina eska iamindueecha uandatspesindi. (J)

Ana **ueka-sin-Ø-ti** jatsi-kuare-ni xani kanekua tumina eska iamindu-eecha  
 Anna **want-HAB-PRS-IND+3 have-REFL-INF so** much money SUB all-PL  
 uandatspe-sin-Ø-ti.  
 criticize-HAB-PRS-IND+3

‘Anna wants to have so much money that everyone criticizes her.’  $\boxed{so \gg want}$

• Two more inverse scope examples ( $so \gg want$ ):

(74) [Context: Carl wants 150 chairs, and everyone criticizes him, because they think that would be a ridiculous excess.]

Carlusi uekasindi jatsiani xani uanekua uaxantsikueechani eska iamindueecha uandatspesindi. (J)

Carlusi **ueka-sin-Ø-ti** jatsi-a-ni xani uanekua uaxantsikua-echa-ni eska iamindu-eecha  
 Carl **want-HAB-PRS-IND+3 have-pO-INF so** many chair-PL-ACC that all-PL  
 uandatspe-sin-Ø-ti.  
 criticize-HAB-PRS-IND+3

‘Carl wants to have so many chairs that everyone criticizes him.’  $\boxed{so \gg want}$



- (75) [Context: Bertha wants to buy 15,000 books, and everyone criticizes her, because they think that would be a ridiculous excess.]

Berta uekasindi piani xani uanekua takukateechani eska iamindueecha uandatspesindi. (J)

Berta **ueka-sin-Ø-ti** pia-ni **xani** uanekua takukata-echa-ni eska iamindu-eecha

Bertha **want-HAB-PRS-IND+3** buy-INF **so** many book-PL-ACC that all-PL

uandatspe-sin-Ø-ti.

criticize-HAB-PRS-IND+3

‘Bertha wants to buy so many books that everyone criticizes her.’ *so*  $\gg$  *want*

## 7 Conclusion: Theoretical and crosslinguistic implications

- Lake Pátzcuaro P’urhepecha has a wide variety of degree constructions:

(76) *Inventory of Lake Pátzcuaro P’urhepecha degree constructions*

<u>Construction</u>	<u>Example</u>
a. apparent phrasal comparatives	Katie is taller than Mike.
b. apparent phrasal equatives	Katie is as tall as Mike.
c. extreme degree constructions	Katie is so tall!
d. difference comparatives	Katie is <b>two inches taller</b> than Mike.
e. comparison with a degree	Katie is taller <b>than five feet</b> .
f. degree questions	<b>How</b> tall is Katie?
g. measure phrase constructions	Katie is <b>five feet</b> tall.
h. subcomparatives	Katie is taller than the table is long.
i. subequatives	Katie is as tall as the table is long.
j. result constructions	Katie is so tall that she can’t fit through that door.

- In the terms of Beck *et al.*’s (2009) typology, this means that Lake Pátzcuaro P’urhepecha has positive settings for the Degree Semantics Parameter, the Degree Abstraction Parameter, and the Degree Phrase Parameter.
- More generally, the findings reviewed here situate Lake Pátzcuaro P’urhepecha typologically as a language that makes full use of degrees as a basic semantic type and of abstraction over degrees.
- This means that approaches to the degree semantics of English such as that put forth in e.g. Heim (2001) can be successfully extended to Lake Pátzcuaro P’urhepecha, at least in the main.
- This approach—on which many degree expressions are generalized degree quantifiers that take scope by movement—predicts that at least some degree expressions should participate in scope ambiguities. This prediction is borne out in Lake Pátzcuaro P’urhepecha—specifically, by sentences in which a *xani...eska...* ‘so...that...’ phrase outscopes an intensional verb that c-commands it in surface syntax.
- Most generally, Lake Pátzcuaro P’urhepecha has a degree system extremely similar to that of English...
- ...although it is both historically unrelated to and typologically unlike English.
- This is an interesting result, because if we are to learn about the nature and limits of semantic variation, we must take into account not only those cases in which understudied languages diverge from familiar ones but also those in which they do not.
- That Lake Pátzcuaro P’urhepecha and English have such similar degree systems even though their grammars differ conspicuously along a number of other dimensions suggests that crosslinguistic variation in degree systems may be largely independent of variation in other areas of grammar.

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