

Intonation and meaning

EGG 2024 in Braşov

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Outline

A tonal quantifier in Turkish (“Possibility #3”)

- Relevant background on Turkish NPs

- Describing the universal contour

- The truth conditions associated with the universal contour

- The distribution of the universal contour

- A compositional analysis

- Concluding thoughts

Intonation signals universal quantification

In Turkish, noun phrases (NPs) modified by relative clauses (RCs) are ambiguous:

- (1) [Attığın top-u] tuttum.
that you threw ball-ACC I caught
- a. I caught **the** ball that you threw. DEFINITE
 - b. I caught **every** ball that you threw. UNIVERSAL

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The disambiguating factor is the intonation contour on NP+RC:

- ✧ Regular contours ⇒ Definite interpretation.
- ✧ Special contour ⇒ Universal interpretation.

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Empirical questions:

- ✧ What is this special contour? What makes it special?
- ✧ Which syntactic objects can it occur on?
- ✧ What is its meaning contribution?

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Current account of the ambiguity:



Turkish has a universal quantifier that is an intonation contour.

We should aim for a less ad hoc account...



Article

On the Prosodic Exponence of Universal Quantification in Turkish Relative Clauses

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Abstract: We identify a tonal contour in Turkish that expresses universal quantification. We show that the distribution of this contour is restricted to noun phrases modified by relative clauses and that it expresses universal quantification over situations rather than over individuals. We describe the prosodic structure of the contour, unexpected from the perspective of the phonology of Turkish intonation, and identify it as a tonal morpheme. We define it, and provide a compositional analysis of the sentences that contain it.

Don't necessarily publish with MDPI...

Bare NPs and determiners

Determiner-less NPs are commonly read as definites.

- (2) a. Tencere-yi kaldırdım.
pan-ACC I put away
- b. Tencere-ler-i kaldırdım.
pan-PL-ACC I put away
I put away **the** pan(s).

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There's a variety of ordinary demonstratives, quantifiers, etc.

- (3) {Bir, bu, **her**, ...} tencere-yi kaldırdım.
one this **every** pan-ACC I put away
I put away {a, this, every, ...} pan.

Issues about incorporation and the presence/absence of a DP layer won't be relevant.
But we can still talk about them.

Definite? Universal?

It's safe to think:

- ✧ “Definite” for Turkish = English “the NP.”
- ✧ “Universal” for Turkish = English “every NP.”

Relative clauses

Barker et al., *wa* and *ga* in Turkish

If the head noun is the subject of the RC, use *-(y)An*.

- (4) [Düş-en] tencere-yi kaldırdım.
fall-SREL pan-ACC I put away
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If the head noun is not the subject, use *-DIK* (or *-(y)AcAK*).

- (5) [Yıka-dıĝ-ım] tencere-yi kaldırdım.
wash-OREL-1S pan-ACC I put away
I put away the pan that I washed.

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- (5) [Yıka-dığ-ım] tencere-yi kaldırdım.
wash-OREL-1S pan-ACC I put away
I put away the pan that I washed.

The head noun can be left unpronounced (in both cases).

- (6) [Yıka-dığ-ım]-ı kaldırdım.
wash-OREL-1S-ACC I put away
I put away the thing that I washed.

Back to the ambiguity

Almost any NP + RC gives rise to the definite/universal ambiguity.

- (4) [Düş-en] tencere-yi kaldırdım.
fall-SREL pan-ACC I put away
a. I put away **the** pan that fell.
b. I put away **every** pan that fell.
- (6) [Yıka-dığ-ım]-ı kaldırdım.
wash-OREL-1S-ACC I put away
a. I put away **the** thing that I washed.
b. I put away **every**thing that I washed.

Methods

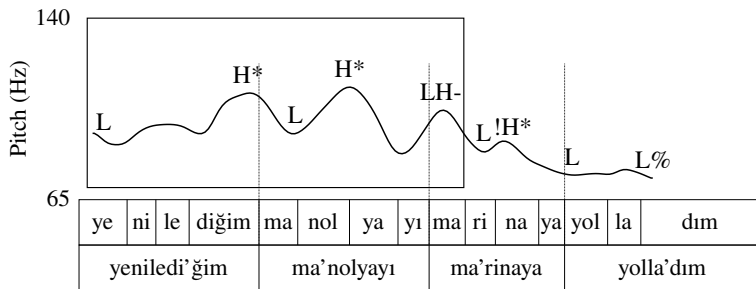
- ✧ The difference between definite and universal contours is clear,
and we *can* rely on the difference perceived.
- ✧ But, it's still good to put words on what the difference is,
to prove the point or prompt further inquiry.

We'll use the ambiguous sentence:

- (7) [Yenilediğim manolyayı] marinaya yolladım.
that I renewed magnolia to the marina I sent
I sent **the/every** magnolia that I renewed to the marina.

- ✧ Not very natural but,
 - ✧ words with a lot of sonorants,
 - ✧ and different positions of stress.
- ⇒ Good visualization of pitch movements.

Regular intonation

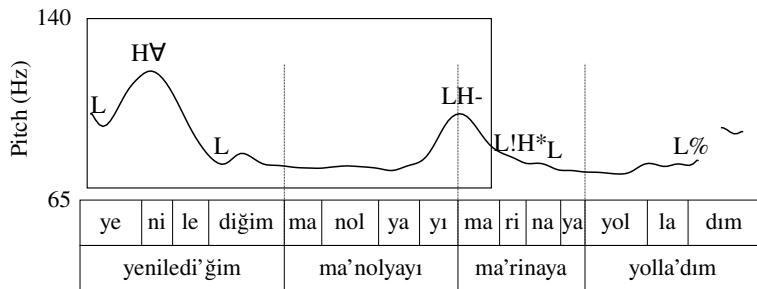


"I sent the magnolia that I renewed to the marina."

Under regular, broad focus intonation:

- ✧ Highs (H*) aligned with stressed syllables,
- ✧ Highs (H-) aligned with the right of syntactic constituents.
- ✧ Low targets that travel with them.

Universal intonation

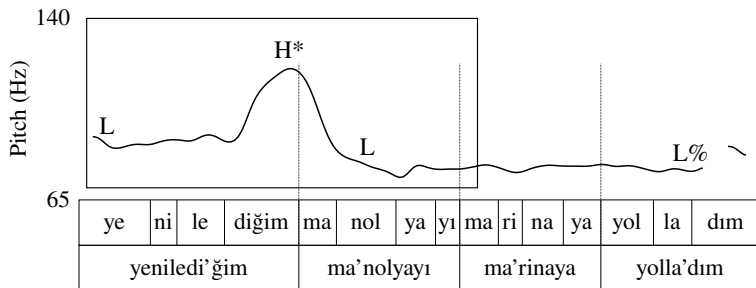


“I sent every magnolia that I renewed to the marina.”

Under the universal intonation:

- ✧ High (H∇) aligned with the left edge of the RC verb phrase,
- ✧ Regular *edge* marking Highs (H-).
- ✧ Sustained low between them.

Narrow focus intonation



“I sent the magnolia that I [renewed]_F to the marina.”

Under narrow focus:

- ✧ High (H*) aligned with the stressed syllable of the focus.
- ✧ Regular *edge* marking Highs (H-). (not visible)
- ✧ Sustained low after the narrow focus high.

Not the right contour,

but also narrow focus \neq universal quantification

The universal contour is very different from what we see in ordinary (broad or narrow focus) intonation:

✧ Immediate goal:

- ✧ we can treat the contour as special,
- ✧ and assign an *ad hoc* interpretation to it.

✧ Broader questions:

- ✧ *are* there other similar contours in Turkish?
- ✧ in other languages?
- ✧ link with more general phenomena.

In short:

- ✧ The universal contour does involve universal quantification,
- ✧ not over individuals, but over times/situations.

(8) [Yıka-dıĝ-ım] tencere-yi kaldırdım.
wash-OREL-1S pan-ACC I put away

- First approximation:
I put away every pan that I washed.
- Better approximation:
Every time I washed a pan, I put it away.

Not singular definites

- (9) a. I caught the ball that you threw.
b. I caught every ball that you threw.

How would you show that these two sentences have different truth conditions?

Not singular definites

- (9) a. I caught the ball that you threw.
b. I caught every ball that you threw.

Contexts:

Ömer throws, and Deniz catches, a certain number of balls.

n thrown	n caught	definite	universal
1	1	true	odd

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n thrown	n caught	definite	universal
1	1	true	odd
5	5	odd	true
5	3	odd	false

Column 4 is a first approximation of the truth conditions of the universal contour.

Not plural definites

Both of the sentences in (10) require (a) that you threw $n > 1$ balls, and (b) that I caught all of them.

- (10) a. I caught the balls that you threw.
 b. I caught every ball that you threw.

Let us now show that NPs with the universal contour pattern differently from *plural* definites as well.

How would you tease apart these two kinds of sentences?

Not plural definites

- (11) Gelen-ler bir hediye getirdi.
who came-PL a gift brought
The people who came brought a gift. ✓Collective gift

Not plural definites

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(12) Her gelen bir hediye getirdi.
every who came.SG a gift brought
Every person who came brought a gift. ✗Collective gift

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- (13) Gelen bir hediye getirdi.
who came.SG a gift brought
Every person who came brought a gift. ✗Collective gift

Not universal quantification over individuals

Context:

Ömer throws 4 balls *simultaneously*. Deniz catches all of them.

(14) Attığın her topu tuttum.
that you threw every ball I caught
I caught every ball that you threw.

true

(15) Attığın topu tuttum.
that you threw ball I caught
Intended: I caught every ball that you threw.

bizarre

Universal quantification over times/situations

Context:

Ömer throws 4 balls *one after the other*. Deniz catches all of them.

(16) Attığın her topu tuttum.
that you threw every ball I caught
I caught every ball that you threw.

true

(17) Attığın topu tuttum.
that you threw ball I caught
I caught every ball that you threw.

true

An additional context

Typical birthday cake scenario.

- (18) Yaktığın her mumu söndürdüm.
that you lit every candle I blew out
I blew out every candle that you lit. true
- (19) Yaktığın mumu söndürdüm.
that you lit candle I blew out
Intended: I blew out every candle that you lit. bizarre

Sentence (19) implies that you light a candle and that I blow it out in a sequential way.

Yet another context

Context:

A total of 12 students cheated 18 times, i.e., there were repeat cheaters. I call each cheater into my office for a total of 12 meetings.

(20) Kopya çeken odama çağırırım.
who cheated in my room I called

Intended:

I called in every person who cheated.

Available:

Everytime someone cheated, I called them in.

We've seen that there are contexts in which *her*, “every,” is true but the universal contour is not.

What about the other way around?

A How frequently do you call your students in?

Regular “every NP” can't be used to answer questions about frequency.

B #Kopya çeken her öğrenciyi çağırıyorum.
#I call in every student who cheats.

NPs with the universal contour can.

B' Kopya çeken öğrenciyi çağırıyorum.
I call a student in every time one cheats.

The relative clause requirement

Unmodified NPs don't give rise to the definite/universal ambiguity.

- (21) Tencereyi kaldırdım.
a. I put away the pan.
b. #I put away every pan.

Non-RC modifiers usually don't give rise to the ambiguity either.

- (22) Bakır tencereyi kaldırdım.
a. I put away the copper pan.
b. #I put away every copper pan.
- (23) Ömer'in tenceresini kaldırdım.
a. I put away Ömer's pan.
b. #I put away Ömer's every pan.

The eventivity requirement

The distribution of the universal contour seems to be governed by semantic/pragmatic factors.

- ✧ Sentences with an NP + RC contain two predicates.
- ✧ Both of these must be able to describe a repeatable event?

(24) [Yıka-dıĝ-ım] tencere-yi kaldırdım.
wash-OREL-1S pan-ACC I put away
I put away the/every pan that I washed.

Let's swap each predicate with a stative, and see how it feels.

The eventivity requirement

Eventive RC predicate, stative main predicate \Rightarrow ??

(25) ??[Yıka-dıĝ-ım] tencere bakırdandı.

wash-OREL-1S pan-ACC was made of copper

Intended: Every pan that I washed was made of copper.

The eventivity requirement

Eventive RC predicate, stative main predicate \Rightarrow ??

- (25) ??[Yıka-dığ-ım] tencere bakırdandı.
wash-OREL-1S pan-ACC was made of copper
Intended: Every pan that I washed was made of copper.

Stative RC predicate, eventive main predicate \Rightarrow ??

- (26) ??[Evyede dur-an] tencere-yi kaldırdım.
in the sink stand-SREL pan-ACC I put away
Intended: I put away every pan that was in the sink.

The eventivity requirement

Eventive RC predicate, stative main predicate \Rightarrow ??

- (25) ??[Yıka-dıĝ-ım] tencere bakırdandı.
wash-OREL-1S pan-ACC was made of copper
Intended: Every pan that I washed was **made of copper**.

Stative RC predicate, eventive main predicate \Rightarrow ??

- (26) ??[Evyede dur-an] tencere-yi kaldırdım.
in the sink stand-SREL pan-ACC I put away
Intended: I put away every pan **that was in the sink**.

These can possibly be *coerced* into describing repeatable events:

- ✧ For every pan that I wash, I *discover* that it's a copper pan.
- ✧ Pans pop into existence in the sink, I put each one away.

The relative clause + eventivity requirements

Hypothesis:

The reason that NPs modified by relative clauses are good hosts for the universal contour is that they can make available eventive predicates.

Question:

If we were to find non-RC modifiers that could describe events, these should be able to host the universal contour.

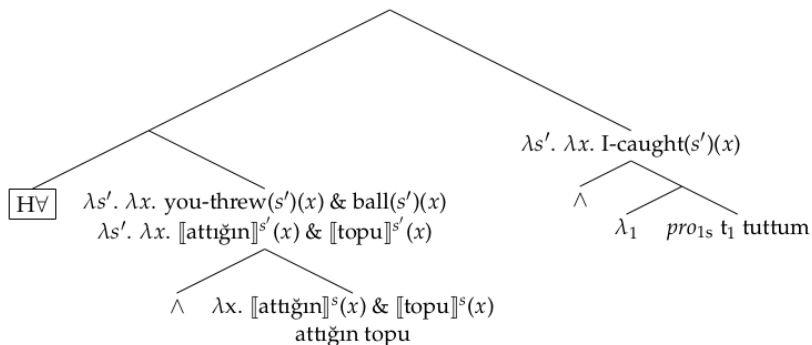
Participial modifiers, possibly:

(27) Context: I went through a bag of chestnuts and...

Çürü-müş kestane-yi attım.
rot-PTCP chestnut-ACC I threw

I threw away every chestnut that (I discovered) was rotten.

A structure



$H\forall$ is our universal contour:

- ✧ it requests two properties of the form:
 $\lambda s. \lambda x. P(s)(x)$
- ✧ it combines them like a universal quantifier over situations:
“Every situation in which there’s a ball that you throw develops into a situation in which I catch that ball.”

Some truth conditions

$$\llbracket \text{H}\forall \rrbracket = \lambda P_{\langle s,et \rangle}. \lambda Q_{\langle s,et \rangle}. \forall s_{\min}: (\exists x: P(s)(x)) \rightarrow (\exists s': s < s' \ \& \ Q(s')(t y: P(s)(y)))$$

After combining $\text{H}\forall$ with its arguments, we'd get...

$$\llbracket \text{H}\forall \rrbracket (\lambda s. \lambda x. \text{you-threw}(s)(x) \wedge \text{ball}(s)(x)) (\lambda s. \lambda x. \text{i-caught}(s)(x)) =$$

$$\forall s_{\min}: (\exists x: \text{you-threw}(s)(x) \ \& \ \text{ball}(s)(x)) \rightarrow (\exists s': s < s' \ \& \ \text{I-caught}(s')(t y: \text{you-threw}(s)(y) \ \& \ \text{ball}(s)(y)))$$

each minimal situation s is such that if there is an x such that x is a ball in s and you threw x in s , then there is a situation s' such that s is part of s' (i.e., s develops into s') and I caught in s' the unique y such that y is a ball in s and you threw y in s .

Questions about linear order and pronunciation

Thanks to Colin Davis

Treating $H\forall$ as a determiner and its position in the tree lead to questions about where it is pronounced compared to where regular determiners are pronounced.

The universal quantifier “her” may be pronounced...

- ✧ right before the relative clause predicate,
- ✧ between the relative clause predicate and the head noun

(28) (??Her) senin (her) attığın (her) topu tuttum.
every you every that you threw every ball I caught
I caught every ball that you threw.

The availability of the medial position is good for the present account (though many questions remain).

Comparison with correlatives

Thanks to Miriam Butt

Some languages have structures called correlatives:

- (29) Ne zaman güldüysen (o zaman) sevindim.
when you laughed then I rejoiced
Whenever you laughed, I rejoiced.
Literally: When you laughed, then I rejoiced.

These...

- ✧ have very similar truth conditions to the universal contour!
- ✧ *may* (but need not?) be pronounced with a similar contour...
- ⇒ Coincidence???

What can('t) intonation do?

Thanks to George Walkden

Individual tones may express contrasts in gender, number, case, ...

	<i>nominative</i>	<i>accusative</i>		<i>nom. vs. acc. tone patterns</i>
class I:	èlòkònyá èncùmátá	èlókúnyá èncúmátá	'head' 'horse'	L ⁿ -H vs. L-H ⁿ
class II:	èndéròni ènkòlòpà	èndèroni ènkòlópà	'rat' 'centipede'	H on σ_2 vs. σ_3
class III:	òlmérégèsh òlósówuàn	òlmèrègèsh òlósòwuàn	'ram' 'buffalo'	H on σ_2 & σ_3 vs. on σ_2 only
class IV:	òmótònyî òsínkirrî	òmótònyî òsínkirrî	'bird' 'fish'	identical tones

Maasai [Nilotic; Kenya, Tanzania], from Hyman (2012)

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world's languages.

What is the range of meaning categories that we expect
intonation to be able to express?