



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.

Keywords: prosody; universal quantification; situations; relative clauses; Turkish

1. Introduction

Received wisdom does not lead us to expect that the Turkish sentence in (1) should be ambiguous in the interpretation of its direct object, which is a noun phrase (NP) modified by a relative clause (RC). A speaker who utters (1) may describe a situation in which they put *the unique* pot that they washed on the counter, as paraphrased in (1a). This is the expected interpretation: Accusative-marked object NPs in Turkish receive a definite construal unless an overt determiner is used, such as the indefinite determiner *bir* or a universal quantifier such as *her* (Enç 1991, a.o.). However, and this is the topic of our paper, Turkish speakers are also able to produce and access another reading for the very same string. Under that reading, a speaker who utters (1) describes a situation in which they put *every* pot that they washed on the counter, as paraphrased in (1b). Here, the object NP is not interpreted as a definite, but as if it were universally quantified. We accordingly refer to these two options as the definite and the universal interpretation of the sentence.

- (1) [[e_1 yıka-dığ-ım] tencere-yi₁] tezgah-a koy-du-m.
wash-REL-POSS.1S pot-ACC counter-DAT put-PST-1S
- a. Under default intonation:
'I put the pot that I washed on the counter.'
- b. With the universal tonal contour:
'I put every pot that I washed on the counter.'

The availability of this second set of truth conditions is surprising by itself, warranting a description and an explanation. However, what makes this phenomenon even more noteworthy is that the string is disambiguated through prosody: When the sentence is pronounced with an unmarked prosodic structure, we obtain the definite description meaning in (1a), but with what we call a *universal tonal contour* aligned with the edges of the relative clause and object NP, we obtain the universally quantified meaning in (1b). We must postpone a presentation of the pitch tracks that visualize these and other related prosodic contours until Section 3. The reader interested in *hearing* the contrast under discussion may access the audio files available on the OSF repository associated with the paper (<https://osf.io/mjv7a/>, accessed on 29 June 2023).



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To our knowledge, not only is the prosodic contour described in this paper novel, and unobserved in the rich literature on Turkish intonation, but so is the observation that a language might make use of intonation to indicate whether a noun phrase should be read as a definite description or as a universal quantifier phrase.

In Section 2, we establish a core restriction on the distribution of the universal contour: it may only occur on NPs modified by relative clauses. In Section 3, we provide a prosodic description and evidence for its exceptionality. In Section 4, we describe in greater detail the truth conditions that sentences with the universal tonal contour have. It looks at first sight like these truth conditions involve universal quantification over individuals (here, over pots). In particular, they differ from the very similar ones given in (2a) for a sentence with a plural definite description. We find, however, that they also differ in subtle ways from the truth conditions given in (2b) for a sentence with the segmental (non-tonal) universal quantifier *her*. Based on this difference, we conclude that the universal tonal contour introduces universal quantification over situations (over pot washings, rather than over pots).

- (2) a. Yıka-dıĝ-ım tencere-ler-i tezgah-a koy-du-m.
wash-REL-POSS.1S pot-PL-ACC counter-DAT put-PST-1S
'I put the pots that I washed on the counter.'
- b. Yıka-dıĝ-ım her tencere-yi tezgah-a koy-du-m.
wash-REL-POSS.1S every pot-ACC counter-DAT put-PST-1S
'I put every pot that I washed on the counter.'

Putting these findings together in Section 5, we provide a formal semantic account of this link between prosody and meaning: we hypothesize that the universal tonal contour *denotes* a universal quantifier over situations. Its restrictor is recovered from an NP modified by a relative clause, and its scope, from a sentence's main predicate. In the case of (1b), we obtain the informal truth conditions in (3).

- (3) Every minimal situation in which I washed a pot develops into a situation in which I put that pot on the counter.

Throughout the paper, it will become clear that the pattern under discussion is fully productive, albeit subject to intriguing restrictions. We discuss the reason why these restrictions may be, and some other topics for further research, in Section 6.

2. The Relative Clause Requirement

The examples above involved a noun phrase modified by a relative clause. In this section, we show that the possibility of realizing the universal tonal contour and the availability of universal interpretations *require* the presence of a relative clause.¹ As we have not yet described how the universal tonal contour is realized, we will simply indicate whether a universal interpretation for a given sentence is available or not.

First, let us show that relative clauses of different shapes and sizes may give rise to the definite/universal ambiguity. We will not be exhaustive, but provide a representative sample. In (4), we have an object relative clause modifying a subject NP.²

- (4) Yıka-dıĝ-ım tencere tezgah-a çarp-tı.
wash-REL-POSS.1S pot.NOM counter-DAT hit-PST.3S
- a. Definite interpretation:
'The pot that I washed hit the counter.'
- b. Universal interpretation:
'Every pot that I washed hit the counter.'

In (5), we have a subject relative clause modifying an NP in object position. (Subject relative clauses are introduced by the relativizer *-(y)An*, as opposed to object relative clauses introduced by *-DIK*—see, e.g., (Barker et al. 1990). Object relative clauses may also

be introduced by *-AcAK*, which encodes the future and whatever we say about *-DIK* should extend to *-AcAK* as well.)

- (5) Bu sınav-a gir-en öğrenci-yi geç-ir-di-m.
 this exam-DAT enter-REL student-ACC pass-CAUS-PST-1S
 a. Definite interpretation:
 'I passed the student who took this exam.'
 b. Universal interpretation:
 'I passed every student who took this exam.'

In (6a), we have a pair of headless (or light-headed) relative clauses (Kornfilt 2011).

- (6) a. Yıka-dıg-ım-ı tezgah-a koy-du-m.
 wash-REL-POSS.1S-ACC counter-DAT put-PST-1S
 (i) Definite interpretation:
 'I put the thing that I washed on the counter.'
 (ii) Universal interpretation:
 'I put everything that I washed on the counter.'
 b. Bu sınav-a gir-en geç-ti.
 this exam-DAT enter-REL pass-PST.3S
 (i) Definite interpretation:
 'The one who took this exam passed it.'
 (ii) Universal interpretation:
 'Everyone who took this exam passed it.'

In sum, none of (a) the position of the relativized argument within the relative clause, (b) its position in the matrix clause, and (c) whether it is overtly realized or not matter for the availability of a universal interpretation. Relative clauses introduced by *-(y)An* and *-DIK* may receive this interpretation in general.

Second, we show that the presence of a relative clause is necessary for the availability of a universal interpretation (generally one introduced by *-(y)An* or *-DIK*, but see below for a possible exception). In (7a), we see that unmodified NPs do not give rise to universal interpretations and cannot be paraphrased by (7b). A definite interpretation is the only one available, even when one attempts to produce the universal tonal contour on the unmodified NP.

- (7) a. Toplantı-ya gir-di-m.
 meeting-DAT attend-PST-1S
 (i) Available definite interpretation:
 'I attended the meeting.'
 (ii) Unavailable universal interpretation:
 'I attended every meeting.'
 b. Her toplantı-ya gir-di-m.
 every meeting-DAT attend-PST-1S
 'I attended every meeting.'

The pairs in (8) and (9) suggest that the same conclusion holds for NPs that are modified by adjectives. The sentence in (8a), where an adjective directly modifies a noun, cannot be paraphrased by (8b), which features an overt universal determiner. And to the extent that the former can be assigned a meaning when it is produced with the universal contour, the NP has to remain a definite description.

- (8) a. Kırık tencere-yi at-tı-m.
 broken pot-ACC get.rid.of-PST-1S
 (i) Available definite interpretation:
 'I got rid of the broken pot.'

- (ii) Unavailable universal interpretation:
'I got rid of every broken pot.'
- b. Her kırık tencere-yi at-tı-m.
every broken pot-ACC get.rid.of-PST-1S
'I got rid of every broken pot.'

In sentence (9), the suffix *-ki(n)* is used to form an attributive adjective from the locative predicate "in the sink" (Göksel and Kerslake 2004, p. 68; see also Kornfilt 1997, pp. 131–2). Here too, the sentence cannot receive a universal interpretation to mean something similar to (9b), which has an overt universal determiner.³

- (9) a. Evye-de-ki tencere-yi tezgah-a koy-du-m.
sink-LOC-KI pot-ACC counter-DAT put-PST-1S
(i) Available definite interpretation:
'I put the pot (that was) in the sink on the counter.'
(ii) Unavailable universal interpretation:
'I put every pot (that was) in the sink on the counter.'
- b. Evye-de-ki her tencere-yi tezgah-a koy-du-m.
sink-LOC-KI every pot-ACC counter-DAT put-PST-1S
'I put every pot (that was) in the sink on the counter.'

This exercise can be performed with genitive possessive structures as well, with the same result: *İsa'nın tencere(si)* can be read as "İsa's pot", but not as "every one of İsa's pots".

Having shown that a relative clause is necessary, we would like to address the question of whether the presence of one is *sufficient* for the availability of universal interpretations. The answer here is negative. To see this, observe that the universal interpretation is unavailable both for (10a) and (10b), respectively a subject and an object relative clause.

- (10) a. Evye-de dur-an tencere-yi tezgah-a koy-du-m.
sink-LOC stay-REL pot-ACC counter-DAT put-PST-1S
(i) Available definite interpretation:
'I put the pot that was sitting in the sink on the counter.'
(ii) Unavailable universal interpretation:
'I put every pot that was sitting in the sink on the counter.'
- b. Farkında ol-duğ-um sorun-u çöz-dü-m.
be.aware-REL-POSS.1S problem-ACC solve-PST-1S
(i) Available definite interpretation:
'I solved the problem that I was aware of.'
(ii) Unavailable universal interpretation:
'I solved every problem that I was aware of.'

A fact that unites these two sentences and that sets them apart from the cases that we have seen where the universal interpretation was available is that their relative clauses contain stative predicates. We hypothesize, then, that for the universal contour to be available, not only is a relative clause required, but also that the relative clause predicate be eventive. (The lack of an eventive predicate to latch on to might be the reason why the universal interpretation is unavailable for unmodified NPs and NPs modified by adjectives.)

We close with a final modification structure, the consideration of which has been suggested to us by a reviewer. In (11), an NP is directly modified by a participle. Here, our judgments are not crisp, and although we tend to allow a universal interpretation, other speakers that we have consulted were unable to access one.

- (11) Çürü-müş kestane-yi çöp-e at-tı-m.
rot-PART chestnut-ACC trash-DAT throw-PST-1S

- a. Definite interpretation:
'I threw away the chestnut that had gone bad.'
- b. Universal interpretation not available to all:
'I threw away every chestnut that had gone bad.'

To the extent that the universal interpretation is available for such structures, very specific contexts seem to be required—the one provided in (12), for example.

- (12) Context for the universal interpretation of (11)
The speaker is going through a bag of chestnuts one by one. Every time they see a rotten chestnut, they throw it out.

Based on the restriction on eventivity that we have just seen, what we conjecture might be going on here is that the participle in (11) describes a state, that of having gone bad, and hence, that it is not the right kind of predicate for the universal contour. However, to the extent that one can enrich the situation described by the sentence to include events, ones of handling chestnuts, the universal interpretation might become available.

In sum, we have seen that *-(y)An* or *-DIK* relative clauses are the canonical hosts for the universal contour and interpretation. We have also seen that only those relative clauses whose main predicates were able to describe events (rather than states) were able to receive universal interpretations.

3. The Shape of the Universal Tonal Contour

We focus in this section on the sentence in (13), which is subject to the same ambiguity between a definite and a universally quantified interpretation of its object NP.

- (13) Yenile-diğ-im manolya-yı marina-ya yolla-dı-m.
renew-REL-POSS.1S magnolia-ACC marina-DAT send-PST-1S
- a. Under default intonation:
'I sent the magnolia that I renewed to the marina.'
 - b. With the universal tonal contour:
'I sent every magnolia that I renewed to the marina.'

Prosody disambiguates between the two interpretations. One set of prosodic structures brings out the sentence's definite interpretation. We will take default, or broad focus, intonation to exemplify this set, and briefly touch upon narrow focus intonation as well. The sentence's universal interpretation, on the other hand, is brought out by a specific prosodic contour that differs from regular broad and narrow focus intonation.⁴

Across the prosodic structures associated with the two interpretations, we find a salient difference in the pitch contour aligned with the relative clause and the NP that it modifies (*yenilediğim manolyayı*). We do not find any evidence that the rest of the prosodic structures differ in any significant way. One prominent tonal event associated with the universal interpretation is a high tone aligned with the left edge of the relative clause. This tone, which we label $H\checkmark$ ("H all"), is absent when the object is understood as a definite description and its presence in the universal case is not explained by regular phonological processes. For concreteness, we take $H\checkmark$ to be the main perceptual signal indicating that similar sentences should be read with a universally quantified NP, but we cannot at this stage rule out the possibility that it is a contour, rather than one of its constituent tones, that is signaling the universal meaning.

This section has two goals. The first one is to show that there is a salient *difference* in intonation between utterances that give rise to a definite versus a universal interpretation of the ambiguous strings at hand. This goal is easily accomplished by relying on intuition where there is one, by listening to the audio provided in the OSF repository associated with this paper (<https://osf.io/mjv7a/>, accessed on 29 June 2023), and by simply glancing at the pitch tracks provided in this section. The second goal is to *characterize* the universal tonal contour and to show that it is exceptional from the perspective of what we expect

from the literature on Turkish intonation (Kan 2009; Özge and Bozşahin 2010; Kamali 2011; Güneş 2015; İpek 2015, among others). This discussion will sound foreign to the casual reader, and perhaps naïve to the expert. The former can trust our word, and the latter, we hope, will be convinced that there is more to say on the matter.

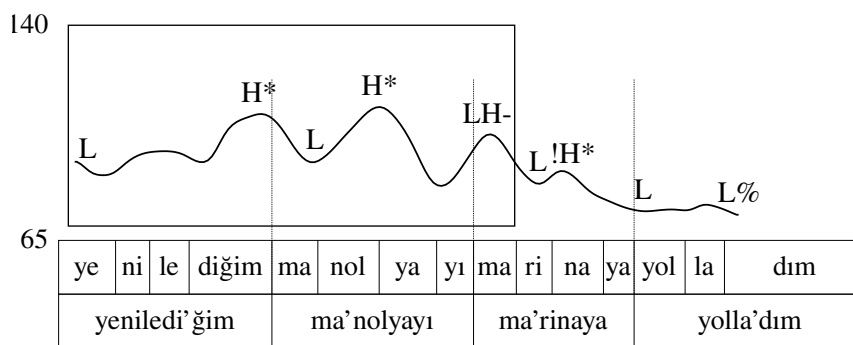
3.1. The Definite Interpretation under Default Intonation

Let us first illustrate the characteristics of an unmarked tonal contour in Turkish, which also brings out the definite interpretation of the sentences under scrutiny. This will then serve as a basis of comparison for the universal tonal contour.

Example (14b) provides the pitch track corresponding to a broad focus utterance of the sentence in (14a) when its direct object is understood as a definite description.⁵ The portion of the pitch track corresponding to the NP and relative clause is boxed, and stressed syllables are indicated by apostrophes to their left.

(14) Definite interpretation of NP + relative clause

- a. Yenile-diğ-im manolya-yı marina-ya yolla-dı-m.
 renew-REL-POSS.1S magnolia-ACC marina-DAT send-PST-1S
 'I sent the magnolia that I renewed to the marina.'
- b. Pitch track corresponding to an utterance of (14a)



On this pitch track, a series of low (L) and high (H) tones structure the utterance into different prosodic constituents. There are also three regions, articulated around the sentence's nucleus, the dative argument *marinaya*. Preceding it is the prenuclear field, which contains the relative clause and noun phrase *yenilediğim manolyayı*, and following it is the postnuclear field, which contains the verb *yolladım*. The kinds of tones that are found in these three regions are different from one another.

The tones that are visible on this pitch track are grouped into pitch accents and boundary tones. Pitch accents, labeled with an asterisk (H*), are aligned with the stressed syllable of prosodic words. The relative clause predicate, its head noun, and the sentence's dative argument all bear an H* pitch accent. Stress, in Turkish, usually falls on the final syllable of a word. Two exceptions to this pattern are relevant for the discussion throughout this section (Sezer 1981; Inkelas 1999; Kabak and Vogel 2001; Inkelas and Orgun 2003; Özçelik 2014, a.o.) First, some roots have lexically specified non-final stress. Here, *ma'nolya* and *ma'rina* have penultimate stress. Second, some suffixes 'attract' stress, for most such suffixes, on the syllable preceding them. While the positive verb *yolla'dım* has final stress, its negated form *yol'lamadım* has peninitial stress, as the negative suffix *-mA* is one such prestressing suffix. (This will become relevant in Section 3.2 below.) The inclusion of non-finally stressed words in our test sentences is important as it allows us to determine whether given tonal events are aligned with particular syllables, or with the edges of a word.⁶

We will mostly be concerned with prenuclear tonal events in this study, but it is worth noting that the nuclear pitch accent on *marinaya* is downstepped (!H*) and lower than prenuclear pitch accents, and that the verb does not bear a pitch accent, even though its final syllable is stressed. This is normal: while stressed syllables in Turkish are eligible for a

pitch accent, they sometimes do not or cannot receive one. In explaining the accentlessness of the verb, work on Turkish intonation converges on the idea that verbs form a prosodic constituent with their most local arguments and modifiers, when there are any and under default intonation. This prosodic constituent is headed by the leftmost stressed syllable that it contains (here, *marinaya*'s), which in turn precludes the verb from being accented. We cannot do justice to the delicate ways in which various proposals differ from one another here, and must refer the reader to [Kabak and Vogel \(2001\)](#), [Kan \(2009\)](#), [Kamali \(2011\)](#), and [Güneş \(2015\)](#) for more on how nuclear and postnuclear elements are phrased.

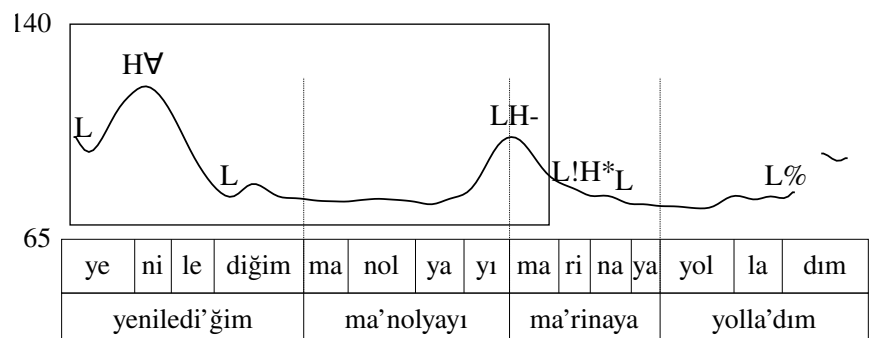
In contrast to pitch accents, which track certain syllables, boundary tones are aligned with the left or the right boundary of prosodic constituents. Of these, there are several kinds here: the utterance ends in a low tone, labeled L%. This tone marks the right edge of declarative intonation phrases—a large prosodic constituent, which in this case encloses the entire utterance. At the right edge of the head noun *manolyayı*, we find a low high target LH-. This tone indicates that the relative clause and the NP that it modifies form another prosodic constituent—an intermediate phrase.⁷ We can tell that this boundary tone is distinct from the head noun's pitch accent, as the word's stressed syllable is not final, that is, at the right edge.⁸ Finally, we see low targets at the left edge of prosodic words. We will not say much about the low targets surrounding the pitch accents and the intermediate phrase boundary: These are sometimes grouped together with the following pitch accent ([Kan 2009](#)) and sometimes, with the preceding one ([Kamali 2011](#)). The interested reader is referred to [İpek \(2015\)](#), who compares these different positions and whose model we adopt here.

What is important here for the (upcoming) comparison with the universal tonal contour is the pitch contour realized on the relative clause predicate and head noun. Under default broad focus intonation, both words bear an H* pitch accent and the right edge of the head noun is marked by an LH- boundary tone. Equally important is something that we do *not* see: No high tonal event is aligned with the left edge or the initial syllables of the relative clause predicate. This is the regular pattern, and to understand the exceptionality of the universal contour, it is worth spelling out why: The left edges of prosodic constituents are (to our knowledge) never marked with high tones in Turkish, and the word *yenilediğim* has final stress—so the only position that can host a high tone is its final syllable, which is the observed position of a high target on the pitch track above.⁹

3.2. The Universal Tonal Contour

Let us now turn to the characteristics of the universal tonal contour. Example (15b) provides the pitch track corresponding to an utterance of the sentence in (15a) when its direct object is understood as if it were universally quantified.

- (15) Universal interpretation of NP + relative clause
 - a. Yenile-diğ-im manolya-yı marina-ya yolla-dı-m.
 renew-REL-POSS.1S magnolia-ACC marina-DAT send-PST-1S
 'I sent every magnolia that I renewed to the marina.'
 - b. Pitch track corresponding to an utterance of (15a)



The first observation about this pitch track is that it is qualitatively different from the one in (14b), in particular in the location of the contour realized on the prenuclear relative clause and head noun. This contour, in the boxed region, is what we call the universal tonal contour. Pitch movements on the nuclear and postnuclear region are more compressed and higher overall when compared to (14b). But pending a finer-grained investigation, we attribute any differences here to variability in production, rather than inherently associating them with the universal interpretation.

In the prenuclear region in (15b), we observe two high tones, both of which are immediately preceded by a low. The first one of these LH movements is aligned with the left edge of the relative clause predicate such that the H is realized on the word's second syllable, and the second one, with the right edge of the head noun. These two events are separated by a sustained low. The second LH target is a point of similarity between the universal tonal contour and the default contour from (14b): This is an LH– boundary tone suggesting that the prenuclear relative clause and NP form an intermediate phrase. More accurately, the tone marked LH– suggests that there is a right intermediate phrase boundary at the right edge of the head noun, and we have no reason to think that the relative clause predicate is not included in that phrase. We might have expected to see, for example, an additional H– at the right edge of the predicate if we were dealing with two intermediate phrases here rather than one. Two characteristics of the universal contour, however, distinguish it from the default contour in (14b): First, the LH movement aligned with the left edge of the relative clause predicate, and second, the suppression of the pitch accents on the predicate and the head noun.¹⁰

We will single out the initial high target, label it $H\forall$, and treat it as the prosodic exponent of universal quantification in Turkish. We do not wish to hide that this choice is in part arbitrary at this stage: Given only the comparison between (14b) and (15b), we could just as well have included one or both of the low targets adjacent to $H\forall$ in the label, or held the entire contour responsible for the quantificational meaning. Instead, then, of arguing for our choice, we would now like to discuss a couple of facts pertaining to the salience of $H\forall$ and to its unexpectedness from the perspective of what we know about Turkish intonation.

The $H\forall$ target is a salient tonal event, on the pitch track and, informally, in perception. One factor that almost certainly contributes to this salience is that it is surrounded by low targets. In particular, the low following it is sustained and marks the suppression at least of pitch accents, which are other high targets that would be realized under default intonation. This first suggests that $H\forall$ is not separable from its immediate environment based on salience, and that the contour should be considered as a whole. It also raises the question of whether the suppression of pitch accents following it could be reduced to an *effect* of $H\forall$ in a phenomenon similar to post-focal deaccenting, which we observe on the verbs in (14b) and (15b), and in (19) below (see Özge and Bozşahin 2010 and references therein). It is clear that further work is required, in production and in perception, to understand the finer grained details of the $H\forall$ contour. Understanding what the main perceptual cues are to a sentence's universal interpretation, for example, would help adjudicate what components of the contour are responsible for its meaning.

The $H\forall$ target is also an unexpected tonal event, as its position is not one where high targets commonly occur in Turkish. Indeed, $H\forall$ and the low target preceding it seem to be tracking the left edge of the prosodic constituent that they occur on. (Here, this happens to be the relative clause predicate but alternative positions are possible, which we discuss below.) The reason that this is surprising is that left edges in Turkish are not usually marked with high tones. While the utterance's initial *low* target in (15b) is consistent with İpek's (2015) proposal that left edges of prosodic words are marked with a low tone ($[L \dots H^* \dots]_{PW}$), the only high targets associated with prosodic constituents are—to the best of our knowledge—pitch accents and *right* boundary tones. We have seen examples of both in the default contour in (14b), but $H\forall$ cannot be explained in this way: The tone is not at a right edge, and it is not aligned with a stressed syllable, as the word *yenilediğim*

has final stress. (Pitch accents may occur on initial or peninitial syllables, but they track the position of stress, not the left edge.) In sum, the position of H_V does not seem to be predicted by regular phonological factors and needs rules of its own.

In the rest of this section, we would like to make two additional points regarding the position of H_V. For the sake of brevity, the intuitive position of H_V will be indicated by boldface and uppercase in the Turkish line of the examples, and by the prefix H_V in the gloss.

First, it is interesting to ask whether the position of H_V is sensitive to the position of stress in exceptionally stressed words, that is, those words that do not have final stress. Preliminary evidence here suggests that it is not. Take a word such as *yenile'yemediğim* ('that which I was not able to renew'), where the negative suffix *-mA* forces the syllable preceding it to be stressed. When the universal tonal contour is realized on this word, as shown in (16a), H_V remains aligned with its left edge, rather than with its stressed syllable.

- (16) a. **Y**Enile-ye-me-diğ-im manolya-yı marina-ya yolla-dı-m.
 H_V.renew-ABIL-NEG-REL-POSS.1S magnolia-ACC marina-DAT send-PST-1S
 'I sent every magnolia that I was not able to renew to the marina.'
- b. ??Yenile-**Y**E-me-diğ-im manolya-yı marina-ya yolla-dı-m.
 H_V.renew-ABIL-NEG-REL-POSS.1S magnolia-ACC marina-DAT send-PST-1S
 Intended: 'I sent every magnolia that I was not able to renew to the marina.'

Second, while the position of H_V seems to be fixed within a word, there is some flexibility as to which word within a relative clause it may be realized on. Take for example the relative clause in (17a), which contains an accusative-marked object, an instrumental argument, and the relativized predicate. Our judgments for possible positions of H_V are given in (17b).

- (17) a. Tencere-sin-i su-yla yıka-yan öğrenci otur-du.
 pot-POSS.3S-ACC water-COMIT wash-REL student sit-PST.3S
 'Every student who washed their pot with water sat down.'
- b. Available positions for H_V
- (i) ***T**Enceresini suyla yıkayan öğrenci oturdu.
 (ii) ?Tenceresini **S**Uyla yıkayan öğrenci oturdu.
 (iii) Tenceresini suyla **Y**ıkayan öğrenci oturdu.

What we observe is that while H_V seems to occur most naturally on the relative clause predicate, it may also occur on the verb's instrumental argument. It may not, however, occur on the accusative argument here.

An additional example is provided in (18) to show that the case in which particular arguments occur in is not the determining factor here. In particular, the accusative argument in (18) *may* host H_V.

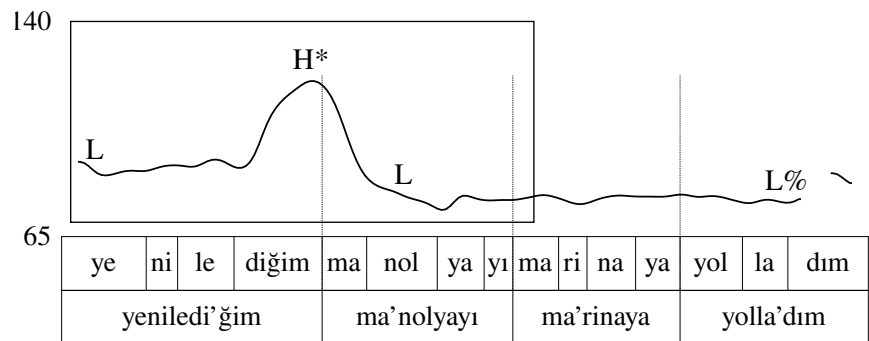
- (18) a. Bana ışığ-ı göster-en ödül al-dı.
 1S.DAT light-ACC show-REL prize take-PST.3S
 'Every person who showed me the light received a prize.'
- b. Available positions for H_V
- (i) ***B**Ana ışığı gösteren ödül aldı.
 (ii) ?Bana **I**şığı gösteren ödül aldı.
 (iii) Bana ışığı **G**Österen ödül aldı.

We conclude that the preferred position of H_V is the left edge of a relative clause predicate, but that there also seems to be some flexibility as to where else within the relative clause H_V is allowed to occur. Words that are close to the predicate are eligible hosts, and ones that are farther away are not.¹¹

3.3. The Universal Tonal Contour Is Distinct from Narrow Focus

An important question that arises at this stage is whether the universal tonal contour could be attributed to information structural factors such as narrow focus on the NP or the relative clause. Our answer here is negative. Observe first the pitch track in (19b), associated with an utterance of (19a), where the relative clause predicate bears narrow focus (indicated by subscript F). This contour is elicited when the sentence serves as the congruent answer to a question such as “Which magnolias did you send to the marina?” This particular position is chosen for narrow focus as it is the best candidate for eliciting any exceptional tonal contour on the relative clause predicate.

- (19) Narrow focus on relative clause predicate¹²
 - a. Yenile-diğ-im_F manolya-yı marina-ya yolla-dı-m.
renew-REL-POSS.1S magnolia-ACC marina-DAT send-PST-1S
'I sent the magnolia that I renewed_F to the marina.'
 - b. Pitch track corresponding to an utterance of (19a)



What we see here is that the relative clause predicate bears a word initial low tone and an H* pitch accent aligned with its stressed and final syllable. This is qualitatively different from the universal contour from (15b), in particular in that there is no high target at the predicate's left edge. Another difference is that the right edge of the head noun *manolyayı* is no longer marked by an intermediate phrase boundary. The absence of pitch accents and boundary tones following the relative clause predicate (replaced by a sustained low) is characteristic of the postnuclear field in Turkish, and indicates that *yenilediğim* is the nucleus of the sentence. We conclude then that the universal tonal contour cannot be reduced to a narrow focus contour at the prosodic level.

A reduction to narrow focus is also impossible on semantic grounds. First, observe that the sentence with H_V in (20b) may serve as a congruent answer to a question that elicits broad focus utterances such as (20a). (We indicate that an utterance is broad focus by not subscripting anything with F.) This is also the case for a default intonation utterance of the same string, in (20c). However, the utterance in (20d), with narrow focus on the relative clause predicate, is infelicitous.

- (20) a. Bugün iş-ler nasıl-dı?
today work-PL how-COP.PST.3S
'How was business today?'
- b. YEnile-diğ-im manolya-yı marina-ya yolla-dı-m.
H_V.renew-REL-POSS.1S magnolia-ACC marina-DAT send-PST-1S
'I sent every magnolia that I renewed to the marina.'
- c. Yenile-diğ-im manolya-yı marina-ya yolla-dı-m.
renew-REL-POSS.1S magnolia-ACC marina-DAT send-PST-1S
'I sent the magnolia that I renewed to the marina.'
- d. #Yenile-diğ-im_F manolya-yı marina-ya yolla-dı-m.
renew-REL-POSS.1S magnolia-ACC marina-DAT send-PST-1S
'I sent the magnolia that I renewed_F to the marina.'

If the H \forall sentence did involve narrow focus, the observation that it is felicitous in this context would be unexpected. Hence, we conclude that narrow focus is not (necessarily) involved in the phenomenon at hand. A final observation that is relevant is that utterances such as (20d), when felicitous, seem to most naturally give rise to a definite description interpretation. It is simply not a known property of narrow focus to introduce universal quantification.

This discussion raises the additional question of whether constituents with the universal contour can bear narrow focus, and, if yes, what prosodic structure such sentences would have. We believe that examples such as (21) sound good enough with the universal contour and the associated interpretation, which is a tentative yes to the first question.

- (21) a. Marina-ya hangi manolya-lar-ı yolla-dı-n?
marina-DAT which magnolia-PL-ACC send-PST-2S
'Which magnolias did you send to the marina?'
- b. ?YEnile-diğ-im_F manolya-yı yolla-dı-m.
H \forall .renew-REL-POSS.1S magnolia-ACC send-PST-1S
'I sent every magnolia that I renewed to the marina.'

At the level of intuition, the relative clause and head noun retain the universal contour here instead of bearing the narrow focus contour illustrated in (19b)—and this, despite the fact that the question in (21a) should be focusing the relative clause predicate. We must, however, leave a confirmation of whether (21) is the test case that we are seeking, and an inspection of the example's prosodic properties for another occasion.

4. Describing the Semantics

In this section, we will substantiate our claim that the object NP in (22) is read as a definite description while (23), which features H \forall , involves universal quantification over situations.

- (22) [NP [RC e₁ at-tığ-in] top-u₁] tut-tu-m.
throw-REL-POSS.2S ball-ACC catch-PST-1S
'I caught the ball you threw.'
- (23) [NP [RC e₁ AT-tığ-in] top-u₁] tut-tu-m.
H \forall .throw-REL-POSS.2S ball-ACC catch-PST-1S
~ 'I caught every ball you threw.'

As a baseline, consider native speakers' intuitions about these sentences in the three contexts given in (24).

- (24) a. Context 1: You throw a single ball and I catch it.
(22) is true; (23) is odd¹³
- b. Context 2: You throw five balls and I catch all of them.
(23) is true; (22) is odd
- c. Context 3: You throw five balls and I catch three of them.
(23) is false; (22) is odd

The fact that (23) is judged odd in context 1 informs us that H \forall requires there to be more than one referent that fits the NP description. Likewise, the fact that (23) is judged true in context 2 informs us that H \forall does not require there to be a unique referent that fits the NP description. Furthermore, the fact that (23) is judged false in context 3, tells us that H \forall brings in a *maximality* requirement. This state of affairs (i.e., the maximality requirement and the requirement for multiple referents) is compatible with at least three hypotheses on what H \forall means. In what follows we explore these hypotheses.

At a very intuitive level, sentence (25), when pronounced with the H \forall contour, could in principle be given the three different paraphrases in (26), all of which are consistent with the judgment pattern in (24).

- (25) [NP [RC AT-tığ-in] top-u] tut-tu-m.
 H \forall .throw-REL-POSS.2S ball-ACC catch-PST-1S
- (26) a. Definite plural
 ~ ‘I caught the balls you threw.’
- b. Universal over individuals
 ~ ‘I caught every ball you threw.’
- c. Universal over situations
 ~ ‘In all situations where you threw a ball, I caught it.’

The paraphrase in (26a) requires that the complex object NP that carries the H \forall contour must be construed as a plural definite description—despite the lack of plural morphology in the string in (25). The paraphrases in (26b) and (26c) both involve universal quantification. The difference between them is that (26b) involves quantification over *individuals* but (26c) involves quantification over *situations* (Heim 1990; Kratzer 2007; Lewis 1975; Schwarz 2012; von Stechow 2004, a.o.). We will argue that sentences pronounced with the H \forall contour involve universal quantification over *situations*.

As is well known, Turkish has regular ways of expressing both (26a) and (26b). Definite plural descriptions appear with overt plural marking, as in (27). And universally quantified NPs appear with an overt determiner such as *her*, as shown in (28). (What we say in this section applies to other universal quantificational determiners such as *bütün*, ‘all’, as well.)

- (27) [NP [RC at-tığ-in] top-lar-ı] tut-tu-m.
 throw-REL-POSS.2S ball-PL-ACC catch-PST-1S
 ‘I caught the balls you threw.’
- (28) [NP [RC at-tığ-in] her top-u] tut-tu-m.
 throw-REL-POSS.2S every ball-ACC catch-PST-1S
 ‘I caught every ball you threw.’

We argue that the right truth conditions for sentences that feature H \forall involve universal quantification over situations, not pluralization or universal quantification over individuals. If H \forall expressed run-of-the-mill pluralization, we would expect it to be identical in meaning to (27). And if H \forall introduced universal quantification over individuals, we would expect it to be identical in meaning to (28). Even though these sentences can often be felicitously and truthfully used in identical situations, there are subtle interpretive differences between them, which can be identified in certain contexts. In what follows, we discuss these differences.

Let us start with a telling contrast between plural definite descriptions and universal quantification, which concerns the availability of *distributive* vs. *collective* readings. On its salient (perhaps only) construal, (29a) can felicitously and truthfully describe a situation where the people who came to the party *collectively* brought a present (single-present reading). This contrasts with the sentence in (29b) which contains a universal quantifier. We note that (29b) does not allow this collective construal. That is, the single-present reading is not available. Rather, it forces a *distributive* reading where every guest who came to the party separately brought a present. When we turn to (29c), which features neither a plural marker nor an overt determiner but only the H \forall contour, we observe that it also forces a *distributive* construal and disallows a collective one. Given that distributivity is a feature of universal quantification, we infer that H \forall really brings in universal force.

- (29) a. [NP Parti-ye gel-en-ler] bir hediye getir-di.
 party-DAT come-REL-PL a present bring-PST
 ‘The ones who came to the party brought a present.’ ✓ collective
- b. [NP Parti-ye her gel-en] bir hediye getir-di.
 party-DAT every come-REL a present bring-PST
 ‘Everyone who came to the party brought a present.’ × collective
- c. [NP Parti-ye GEI-en] bir hediye getir-di.
 party-DAT H \forall .come-REL a present bring-PST

~ ‘Everyone who came to the party brought a present.’ × collective

To corroborate our finding, we present another contrast between plural definite descriptions and universal quantification, which concerns the (in)tolerance of exceptions. While plurals tolerate exceptions in judging the truth of a proposition, universals do not (Brisson 1998; Schwarzschild 1996). Let us consider a context where you light 30 candles and I try to put out all of them but end up missing two. In such a context, speakers may still judge (30a) as true, showing that plurals *do* tolerate exceptions. In the same context, (30b) will be judged false since there were candles that you lighted but I failed to put out. Importantly, the parallel example in (30c) that features H \forall receives the same judgment, again showing that H \forall contributes universal quantification.

- (30) a. [NP Yak-tığ-in mum-lar-ı] söndür-dü-m.
light-REL-2S candle-PL-ACC put.out-PST-1S
‘I put out the candles you lighted.’ true when exceptions
- b. [NP Yak-tığ-in her mum-u] söndür-dü-m.
light-REL-2S every candle-ACC put.out-PST-1S
‘I put out every candle you lighted.’ false when exceptions
- c. [NP YAK-tığ-in mum-u] söndür-dü-m.
H \forall .light-REL-2S candle-ACC put.out-PST-1S
‘I put out every candle you lighted.’ false when exceptions

Now that we have shown that H \forall does not introduce pluralization but brings in universal quantification, the task ahead of us is to think of a context which distinguishes universal quantification over *individuals* and universal quantification over *situations*. The truth conditions that we expect from our original sentence in (25) under these two hypotheses are given in (31). It is obvious that these truth conditions are so similar to each other that in many contexts they will both be satisfied together. Nevertheless, we can still distinguish them, as we show below.

- (31) a. Universal quantification over individuals
For each x , if x is a ball that you threw, I caught x .
- b. Universal quantification over situations
For each minimal situation s^{14} , if you threw a ball in s , there is a situation s' such that s develops into s' and I caught in s' the ball that you threw in s .

Let us consider the examples in (33) and (34) in the context in (32), where you threw four balls all at the same time and I caught them all. The defining characteristic of this context is that while there are several balls thrown, there is a single minimal throwing situation.

- (32) Context: You throw four balls at me all at the same time, and I catch them all.

In this context, I can utter (33) to describe what I have achieved. But in the same context, (34) sounds pretty odd. The native speakers we have consulted share our intuition that (34) requires there to be multiple situations of ball throwing and multiple situations of ball catching. This is not what we find in the given context.

- (33) [NP [RC at-tığ-in] her top-u] tut-tu-m.
throw-REL-POSS.2S every ball-ACC catch-PST-1S
‘I caught every ball you threw.’

- (34) [NP [RC AT-tığ-in] top-u] tut-tu-m.
H \forall .throw-REL-POSS.2S ball-ACC catch-PST-1S
‘All situations where you threw a ball extend to situations where I caught it.’

If H \forall and *her* had the exact same meaning, this contrast, of course, would not be expected. The truth conditions associated with universal quantification over situations correctly predict the judgment we are reporting here. In the context where you threw

four balls all at the same time and I caught them all, there is really just a single minimal situation in which multiple balls are thrown.¹⁵ Since we are *universally* quantifying over minimal situations of ball throwing in (34), there need to be multiple such situations, which is how universal quantifiers in natural languages usually behave. Furthermore, the truth conditions in (31b) require each of those ball-throwing situations *s* to develop into a situation where I catch the unique ball you threw in *s*. As is clear in the context, no such unique ball can be retrieved in this case, for there are four balls being thrown in that situation.

Given this contrast between $H\forall$ and *her* in the context given, we conclude that they cannot mean the same thing. Moreover, we observe that the truth conditions in (31b) correctly predict that $H\forall$ should be infelicitous in the context given. We take this to mean that $H\forall$ indeed brings in universal quantification over situations and, accordingly, sentences that contain it have truth conditions like (31b).

Next, consider the alternative scenario in (35), where the ball throwings and catchings happen in a sequence.

- (35) Context: You throw four balls at me, one after the other. I catch each ball that you throw at me right after you throw it.

In this context, (34) can be uttered felicitously and truthfully. In (35), each ball-throwing situation contains a unique ball and develops into a distinct ball-catching situation where a unique ball can be retrieved, as predicted under the truth conditions in (31b).¹⁶ The reader will note that example (33) is also true. While it is usually true that whenever a sentence with $H\forall$ is defined and true, so is its counterpart with *her*, contexts can also be constructed where the former is true, while the latter is false—that is, the truth conditions associated with *her* and $H\forall$ are independent.

Consider a context in which a total of 12 students cheated on several exams, with a total of 18 cheating incidents, i.e., there have been repeat-cheaters. Furthermore, suppose that the teacher calls cheaters into their office. If the teacher has exactly one meeting per cheater, exactly 12 meetings, the $H\forall$ sentence in (36a) is judged to be false, or at least deviant in some sense. In contrast, the *her* sentence in (36b) is perfectly acceptable and true.¹⁷

- (36) a. [NP [RC kopya ÇEk-en] öğrenci-yi] oda-m-a çağır-dı-m.
 $H\forall$.cheat-REL student-ACC room-POSS.1S-DAT call-PST-1S
 ‘Whenever a student cheated, I called them into my room.’
 b. [NP [RC kopya çek-en] her öğrenci-yi] oda-m-a çağır-dı-m.
 cheat-REL every student-ACC room-POSS.1S-DAT call-PST-1S
 ‘I called every student who cheated into my room.’

For (36a) to become true, there need to be 18 meetings, or *one meeting per cheating situation*. In addition to showing a difference in truth conditions, this example also illustrates the difference between quantification over individuals and over situations. We will now consider a final contrast that corroborates our thesis.

A contrast between *her* and $H\forall$ can also be detected in question–answer pairs. The question in (37a) inquires about the frequency of doing laundry. We find the $H\forall$ sentence in (37b) to be a fully congruent answer to the question about frequency in (37a). Under the quantification over situations hypothesis, this is so because (37b) is understood to report that a distinct washing situation exists for each piece of clothing that becomes dirty. Naturally, this is a congruent answer, as it informs the inquirer about the unusually high frequency of doing laundry. By contrast, the *her* sentence in (37c) has truth conditions that predict it to be an incongruent answer to the question about the frequency of doing laundry. This seems right. Although a cooperative inquirer, trying to interpret (37c) as a congruent answer, may be able to enrich the sentence’s truth conditions and understand it as describing situation similar to (37b), we believe that there is a contrast here between

her and $H\forall$. To questions about frequency, $H\forall$ sentences naturally provide congruent responses, which is expected given their hypothesized truth conditions.

- (37) a. Ne sıklık-la çamaşır yık[a]-ıyor-sun?
 what frequency-with laundry wash-IMPF-2S
 ‘How often do you do laundry?’
- b. Valla, [NP [RC KİRlen-en] giysi-yi] yık[a]-ıyor-um.
 honestly $H\forall$.become.dirty-REL clothing-ACC wash-IMPF-1S
 ‘Honestly, whenever a piece of clothing becomes dirty, I wash it.’
- c. #Valla, [NP [RC kirlen-en] her giysi-yi] yık[a]-ıyor-um.
 honestly become.dirty-REL every clothing-ACC wash-IMPF-1S
 ‘Honestly, I wash every piece of clothing that becomes dirty.’

5. A Compositional Analysis

In the previous section, we have established that the $H\forall$ contour signals universal quantification over situations. In this section, we propose a logical form for $H\forall$ -marked sentences which will allow us to derive the truth conditions associated with them. To achieve this, we will take $H\forall$ to be a morpheme, which, although it is realized suprasegmentally, composes with the structure around it just like any regular segmental morpheme. We will give a meaning to $H\forall$ which will allow us to derive, under standard rules of compositional semantics, the desired truth conditions of the sentences in which it is realized.

5.1. A Tonal Morpheme

In Section 3, we have shown that the occurrence of the $H\forall$ contour is not explained by regular phonological rules of pitch accent placement and prosodic phrasing in Turkish. In addition to this, we are not aware of any systematic relationship between intonation and universal quantification in the semantics and pragmatics literature. For this reason, we will posit that $H\forall$ is the realization of a tonal morpheme.

Now, Turkish is not thought to be a language with grammatical tone, i.e., where tone is used to mark grammatical contrasts (Hyman and Leben 2017, a.o.). Then, the claim that it has tonal morphology might come as surprising. Yet, such claims are not unprecedented: Constant (2014) proposes analyzing contrastive topic in English as a tonal morpheme. Similarly, Yu (2011) argues that the exponence of absolutive case is a high tone in Samoan. Neither English nor Samoan have grammatical tone, yet, they might have tonal morphemes. Turkish and its tonal universal quantifier $H\forall$ are, we claim, an addition to this list.

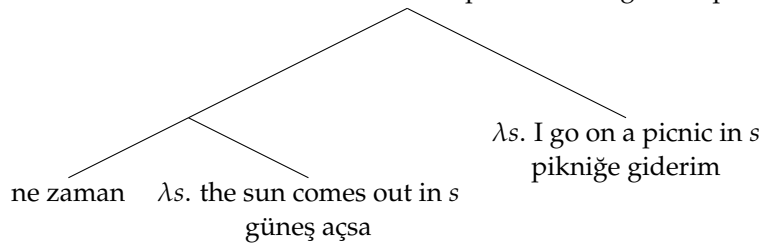
5.2. The Definition and Compositional Analysis

Recall that the suprasegmentally realized morpheme $H\forall$ is not a determiner like *her*, ‘every’, but a quantifier over situations. What does a quantifier over situations look like? In Turkish, *wh*-correlatives present a good approximation of what universal quantification over situations amounts to.¹⁸ So, we will first illustrate what needs to be achieved with the example in (38).¹⁹

- (38) Ne zaman güneş aç-sa pikniğ-e gid-er-im
 when(ever) sun come.out-COND picnic-DAT go-AOR-1S
 ‘Whenever the sun comes out, I go on a picnic.’

A toy logical form for (38) is given in (39), where *ne zaman* is a two-place function that combines with both the antecedent (“the sun comes out”) and the consequent (“I go on a picnic”) clauses, deriving the intuitively correct truth conditions for the sentence.

(39) $\forall s: \text{the sun comes out in } s \rightarrow \exists s': s \text{ develops into } s' \ \& \ \text{I go on a picnic in } s'$

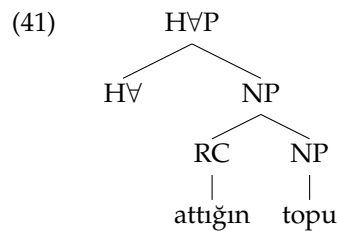


Our case is slightly more involved than this example because we are trying to derive the truth conditions (repeated) in (40). Note that the information that we find in the relative clause+NP complex occurs twice (underlined). To put it simply, we are talking about both ball-throwing situations and ball-catching situations but in each pair of situations, the ball being talked about is the same. After all, I catch the balls *you* throw, not some other balls. So, this needs to be achieved.

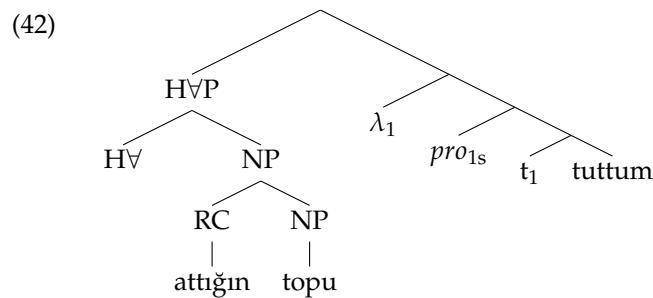
(40) $[\text{NP } [\text{RC } \text{AT-tığ-in} \quad] \text{ top-u} \quad] \text{ tut-tu-m.}$
 $\text{H}\forall.\text{throw-REL-POSS.2S} \quad \text{ball-ACC} \quad \text{catch-PST-1S}$

For each minimal situation *s*: if you threw a ball in *s*, there is a situation *s'* such that *s* develops into *s'* and I caught in *s'* the ball you threw in *s*.

We propose achieving this by assuming that H \forall is a morpheme at the edge of the NP containing the RC, which allows it to semantically combine with it. Let us call this complex phrase H \forall P, as shown in (41).

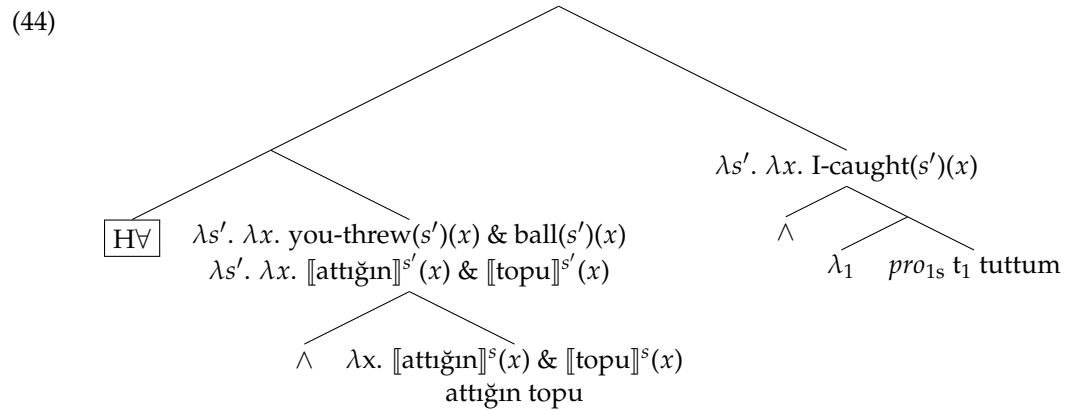


We further assume that H \forall P undergoes quantifier raising (QR) for semantic type reasons, giving us the derivation in (42).



Notably, this derivation is no different from the derivation assumed for quantifiers over individuals in object position in Heim and Kratzer (1998). However, there is a crucial difference here: H \forall does not combine with predicates of individuals but needs to combine with functions from situations to predicates of individuals. Although various other implementations are possible to generate functions from situations, for concreteness we adapt the \wedge (“up”) operator proposed by Keshet (2011), defined syncategorematically in (43).²⁰

(43) $[[\wedge \text{XP}]^s = \lambda s'. [[\text{XP}]^{s'}$



The denotation that we assign to HV is given in (45). It denotes a two-place function that is looking for two inputs, both of which are functions from situations to predicates of individuals. The proof that we derive the desired truth conditions from the logical form in (44) using the meaning in (45) is given in (46).

$$(45) \quad \llbracket HV \rrbracket = \lambda P_{\langle s, et \rangle} \cdot \lambda Q_{\langle s, et \rangle} \cdot \forall s_{\min}: (\exists x: P(s)(x) \rightarrow (\exists s': s < s' \ \& \ Q(s')(iy:P(s)(y))))$$

$$(46) \quad \llbracket (44) \rrbracket = 1 \text{ if and only if}$$

- a. $[\lambda P_{\langle s, et \rangle} \cdot \lambda Q_{\langle s, et \rangle} \cdot \forall s_{\min}: (\exists x: P(s)(x) \rightarrow (\exists s': s < s' \ \& \ Q(s')(iy:P(s)(y)))] (\lambda s'. \lambda x. \text{you-threw}(s')(x) \ \& \ \text{ball}(s')(x)) (\lambda s'. \lambda x. \text{I-caught}(s')(x))$
- b. $[\lambda Q_{\langle s, et \rangle} \cdot \forall s_{\min}: (\exists x: \text{you-threw}(s)(x) \ \& \ \text{ball}(s)(x) \rightarrow (\exists s': s < s' \ \& \ Q(s')(iy:\text{you-threw}(s)(y) \ \& \ \text{ball}(s)(y))))] (\lambda s'. \lambda x. \text{I-caught}(s')(x))$
- c. $\forall s_{\min}: (\exists x: \text{you-threw}(s)(x) \ \& \ \text{ball}(s)(x) \rightarrow (\exists s': s < s' \ \& \ \text{I-caught}(s')(iy:\text{you-threw}(s)(y) \ \& \ \text{ball}(s)(y))))$
- d. 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 .

A notable property of the meaning we assign to HV is that it makes use of the meaning of its sister to build a restrictor for the universal quantifier (i.e., situations in which you threw a ball) and to retrieve the unique entity that is a ball you threw in each ball-throwing situation.²¹ This uniqueness requirement allows us to explain the fact that HV is not licensed in every case where *her*, 'every', is.

6. Conclusions, Directions for Future Research

In this paper, we have identified a yet undescribed tonal contour in Turkish and shown that it is not predicted by regular pitch accent placement and prosodic phrasing rules active in the language. We have seen that the contour only occurs on NPs modified by relative clauses, and that it gives rise to truth conditions where such NPs are apparently universally quantified. We have argued that this contour should be treated as a tonal morpheme, and based on interpretive and distributional asymmetries between it and its determiner counterpart *her*, 'every', we have shown that it introduces universal quantification over *situations* (unlike quantificational determiners, which typically quantify over individuals). Finally, we have provided a meaning for this tonal quantifier and proposed a logical form that allows us to derive, compositionally, the truth conditions associated with sentences that feature it.

Needless to say, there are many questions remaining. We will only mention some of them: What are the finer-grained phonological and phonetic properties of the universal

tonal contour and how do these interact with other factors that affect the intonation of Turkish sentences? Are there differences between the intonational structure of sentences with *segmental* universal quantifiers and sentences with no quantifiers at all? To what extent can structures containing the tonal morpheme be embedded under various operators (such as negation)? What is the diachronic path to the emergence of this tonal morpheme? These questions, we must leave for a further occasion.

We conclude with some comments on the most pressing issue, i.e., the restrictions on the distribution of the tonal quantifier documented in Section 2. We have observed that our tonal quantifier is picky about where it can occur: NPs modified by $-(y)An$ or $-DIK$ relative clauses are the canonical hosts for it. Furthermore, we have also seen that this structural configuration is only necessary, not sufficient: Only those relative clauses whose main predicates are able to describe events license the tonal quantifier. How do we derive these restrictions?

We have two educated guesses. First, recall that under our compositional analysis, the tonal quantifier wants to combine with functions from situations to predicates of individuals. It could be that whatever mechanism allows the grammar to generate such functions is not freely available (be it syntactically present ‘situation abstractors’ or a syncategorematic composition rule). For example, there could be privileged positions in the clausal spine where λ -abstraction over situation variables is allowed. Relative clauses but not other modifiers would make such positions available. Indeed, relative clauses are known to exhibit a level of intensional flexibility that other modifiers do not (Keshet 2011). One of the anonymous reviewers suggests a concrete implementation of this idea which we would like to share here. Suppose that λ -abstraction over situation pronouns is not free and has to be induced by movement of an operator (Op) that starts out as a sister to the *main predicate* of clausal structures (Percus 2000; von Stechow and Heim 2011). Given that simple NPs that are not modified by relative clauses will not contain such an Op, we will fail to derive a constituent of type $\langle s, et \rangle$. Hence, under this account no syntactic object of type $\langle e, t \rangle$ can complement HV unless it contains an Op that can move out to induce λ -abstraction and generate a constituent of type $\langle s, et \rangle$. Such an account could explain why the tonal quantifier can only combine with NPs modified by $-(y)An$ or $-DIK$ relative clauses. However, under this syntactic account, further assumptions need to be made in order to rule out cases where the main predicate of the relative clause is describing a state, rather than an event.

This brings us to the second possibility, namely, that the further assumptions required to restrict the syntactic account to cover only those relative clauses with eventive main predicates may in fact be sufficient in and of themselves. Recall that the tonal quantifier is unable to occur on unmodified NPs, NPs modified by adjectives, NPs modified by an adjective formed with $-ki(n)$, and NPs modified by $-(y)An$ or $-DIK$ relatives whose main predicates are stative. What unifies these impossible hosts for the tonal quantifier is that they do not provide an event, unlike $-(y)An$ or $-DIK$ relatives whose main predicates are eventive. Hence, if the tonal universal quantifier requires something eventive to latch onto, and if no NP modifier can provide that except for $-(y)An/-DIK$ relative clauses with the appropriate predicate, the distributional restrictions under scrutiny could be explained. Our account of these sentences’ truth conditions in terms of quantification over situations (that contain pots) rather than over individuals (the pots themselves) also fares well here: While extra assumptions are required, we can place restrictions such as eventivity onto situations, but we cannot place similar ones on individuals.

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Abbreviations

The following abbreviations are used in this manuscript:

ABIL	ability
ACC	accusative
AOR	aorist
CAUS	causative
COMIT	comitative
COND	conditional
COP	copula
DAT	dative
LOC	locative
NEG	negation
PART	participle
PL	plural
POSS	possessive agreement
PST	past tense
REL	relativizer
S	singular

Notes

- These relative clauses are restrictive, although we do not dwell on the distinction with non-restrictive ones. Interestingly, non-restrictive relative clauses do not occur with quantified NPs: **Each child, who was examined by the doctor, received a lollipop* (example from McCawley (1981), original observation attributed to Smith (1964)).
- All of our examples feature main verbs in the simple past so that we may avoid generic or habitual interpretations. These may independently give rise to the impression that universal quantification might be involved in a sentence's truth conditions: "I (always) place the pot that I washed on the counter" may be read as involving multiple pots, washings, and placings (compare with "I placed the pot that I washed on the counter"). The readings that the universal tonal contour gives rise to are not generic.
- One of our reviewers draws our attention to postnominal relative clauses introduced by *ki*, a morpheme distinct from the adjective forming *-ki(n)*. These may not host the universal contour either or otherwise give rise to the universally quantified interpretation discussed in this paper. This is possibly because of their postnominal position and because they are canonically non-restrictive relative clauses (fn. 1). See Griffiths and Güneş (2014), and the references therein regarding *ki* relatives. See also Bayırlı (2018) for a relevant discussion on NP modification in Turkish.
- We leave the description of across- and within-speaker variability in production for another occasion. Changes in intonation also give rise to different information structural effects such as focusing or backgrounding. These are largely orthogonal to the definite vs. universal contrast at hand.
- The pitch tracks in this section are based on recordings of the first author, a 32 year old male speaker of Modern Standard Turkish from Ankara. They have been produced using Praat (Boersma and Weenink 2022). By broad focus, we mean that the sentence can be uttered felicitously, with the intonation given, as an answer to a question such as *Bugün n'aptın?* ("What did you do today?").
- This is one of the reasons why this particular sentence was chosen, despite the fact that it describes an unnatural event. The second is that it is made up of sonorants, which allows us to better visualize speakers' pitch movements.
- We follow İpek and Jun (2013) and İpek (2015) in calling these constituents intermediate phrases. For our purposes, they correspond to what are sometimes also called phonological phrases. See Shattuck-Hufnagel and Turk (1996) for clarification on these terminological matters.
- Strictly speaking, we would also have to show that the H* on the relative clause predicate is a pitch accent and not a boundary tone by moving the position of the stressed syllable leftwards and checking that the high target follows it. We rely on prior work on Turkish intonation here, which diagnoses this target as a pitch accent (İpek and Jun 2013; Kamali 2011).
- If the relative clause predicate did have exceptional initial stress, we would have expected an initial high. It is indeed to show the exceptionality of the universal contour that we chose a relative clause predicate with final stress. However, it would be equally

interesting to compare the default realization of predicates with initial and peninitial stress to their realization with the universal contour.

10 It is an open question how, in general, the universal tonal contour interacts with regular phonological processes on the one hand, such as pitch accent assignment or the mapping from syntactic to prosodic constituents, and with semantic or pragmatic factors that affect prosody on the other, such as newness and givenness. Preliminary evidence suggests that H \forall takes precedence, as seen, for example, in the suppression of pitch accents here.

11 A reviewer points out that H \forall might be tracking the position where a nuclear pitch accent (NPA) is expected to occur in a broad focus utterance of the sentence that makes up the relative clause, and that this position might be shifted due to givenness. Contrary to what we observe, we think that this would lead us to expect that H \forall should be fully natural on the instrumental in (17a) and on the direct object in (18), as these are the expected NPA bearers. Factors that govern NPA placement and H \forall placement might overlap, e.g., both occur by default on VP internal constituents, but whether the two tonal events share the *same* distribution is at this stage unclear and the effects of givenness on H \forall remain to be investigated.

12 Work on Turkish intonation would agree that the high tone on the final syllable of the predicate, as it is the nucleus here, is a pitch accent (rather than a boundary tone), but the tone might more accurately be represented as an LH*, as the high target is preceded by an elbow-like rise rather than a gradual one. Only in Kan (2009) and Özge and Bozşahin (2010) are we aware of proposals that Turkish might have L+H* pitch accents.

13 By “odd”, we mean that the unicity presupposition of the definite description and the multiplicity presupposition of the universal quantifier fail.

14 A minimal situation in which you throw a ball contains you throwing a ball and nothing else. In particular, it cannot contain me catching it. However, a minimal situation *s* may ‘develop into’ or ‘extend to’ a non-minimal situation *s'* that *s* is part of. Accordingly, a minimal situation *s* in which you throw a ball can extend to a situation *s'* such that *s* is part of *s'* and I catch the ball you throw in *s'*. See Heim (1990); von Stechow (2004) for relevant discussion on why we need to talk about minimal situations.

15 An anonymous reviewer rightly points out that counting situations is tricky. We are also aware that the notion of minimal situation must in fact be defined relative to a proposition (Kratzer 2007). Hoping that what the current discussion intends to convey is explicit enough, we leave a more rigorous account to future work.

16 There are some subtle questions on how exactly the distinctness of situations should be understood with respect to the temporal relationship between them. Native speaker intuitions consistent with H \forall sentences suggest that the notion of ‘develop into’ comes with a temporal contiguity/adjacency requirement. In particular, it seems more natural to construe distinct situations as temporally sequential (rather than co-temporal). We leave it to future work to investigate these more subtle questions on situation semantics.

17 We are grateful to the same anonymous reviewer for their excellent suggestions on distinguishing the two kinds of universal quantification, which is what we report on in closing. A final suggestion involved conjoining *her* and H \forall phrases to check whether they have the same semantic type. As suspected, such conjunctions are unacceptable, and such a test is inconclusive in that we cannot determine if the unacceptability is due to prosodic factors, or to an incompatibility in semantic types.

18 The restrictor of a quantifier over situations is typically recovered from context (i.e., they are not overt). *If* clauses, however, *can* overtly restrict a quantifier over situations (Kratzer 2007; von Stechow 2004).

19 An anonymous reviewer raises the question of whether H \forall marking might also be present in these *unconditional* sentences. We agree with the intuition that it might be, and leave to further work a finer-grained prosodic comparison, as well as the question of whether H \forall on relative clauses and on conditionals might have a common semantic core. It is worth noting that conditionals are constructed with *wh*-phrases that are prosodically prominent just like *wh*-phrases in matrix questions. This makes it difficult, initially at least, to pin the intonation of conditionals on H \forall . However, a *general* association between H \forall and universal quantification (perhaps including the intonation of sentences with overt *her*) is an intriguing possibility. This may also shed light on why H \forall may have grammaticalized to encode universal quantification in the absence of any segmental morpheme that supports universal interpretations.

20 Alternatively, we could assume that λ -abstractors over situations can be inserted in syntax freely, as in Percus (2000). Similarly, intensional functional application (von Stechow and Heim 2011) can be used to derive functions of $\langle s, et \rangle$ from situations to predicates of individuals. Each of these methods will allow us to derive the right truth conditions for H \forall sentences. Nothing hinges on the particular implementation chosen.

21 Regarding the task of building a restrictor, there could be an alternative analysis where the relative clause+NP complex is simply a definite description and the quantifier over situations binds into this definite NP. In this case, the restrictor of the quantifier would need to be contextually retrieved. We believe the alternative we are presenting below is more transparent.

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