Compounding with a Polymorphic Deverbalizer in Turkish

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1 Introduction

- We investigate compounds headed by nouns built by the deverbalizer ***-Im*** in Turkish.

- Our basic observation is that they can correspond to both

    - compounds like 'home-made'

    - compounds like 'cake-baking'   (see Borer 2012)

    > (1)   ev   yap-**ım**-ı   zor.
    >   house make-IM-CMPD difficult
    >   'Making houses is difficult.'
    >
    > (2)   ev   yap-**ım**-ı   kek
    >   house make-IM-CMPD cake
    >   'home-made cake'

- We make two claims:

    - This systematic ambiguity is a result of ***-Im*** being a polymorphic deverbalizer.

    - The **theme** has a distinguished status in these compounds, strongly suggesting that the base for ***-Im*** cannot be a plain event predicate but has argument structure.

- **Preview of what's inside**:

    - we provide a compositional semantics for the kinds of compounds built by ***-Im***.

    - we discuss the implications of our data on the question of whether the base of a deverbal noun may have argument structure or not (Kratzer, 1996; Marantz, 1997; Harley, 2009; Grimm and McNally, 2015).

    - we explore some further meaning restrictions that we identify concerning the modifier function of these compounds.

2   Data

- Compounds headed by nouns built by the deverbalizer -Im can be **event descriptions**.

(3) a. [ev-de   saç   kes-**im**-in]-i   ögren-iyor-um
         house-LOC hair.NOM cut-NMZ-CMPD-ACC learn-IMPF-1SG
         Lit: 'I am learning [hair-cutting at home.]'

     b. [badem unuyla   kek   yap-**ım**-ın]-a   merak sar-dı-m
         with.almond.flour cake.NOM make-NMZ-CMPD-DAT develop.passion-PST-1SG
         Lit: 'I've developed a passion for [cake-baking with almond flour].'

- These compounds may also denote a **predicate of individuals** just like simple adjectives.
    - they can occur in the predicate position as shown in (4a) and (5a).
   - they can also occur as a modifier as shown in (5b) and (4b).

(4) a. Bu kekler [ev   yap-**ım**-ı].
         This cakes house make-NMZ-CMPD
         Lit: 'these cakes are house-making'
         'These cakes are home-made'

     b. [anne   yap-**ım**-ı]   kek
         mother make-NMZ-CMPD cake
         'mom-made cake'

(5) a. Bu çanta [fabrika üret-**im**-i].
         this bag   factory produce-NMZ-CMPD
         'This bag is factory-produced.'

     b. [fabrika üret-**im**-i]   çanta
         factory produce-NMZ-CMPD bag
         Lit: 'factory-production bag'
         'a factory-produced bag'

- The ambiguity of these compounds (i.e. **event descriptions** vs **predicate**) is systematic.

  – Assuming the simplified structure (to be revised) in (6), the thematic role of the NP is crucial in determining which of the two interpretations will be available.
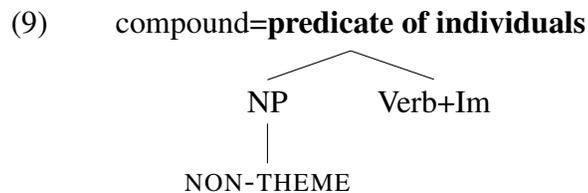
    (6)　　compound

    ```
            compound
           ╱      ╲
         NP      Verb+Im
         │          │
         ev      yap+ım
    ```
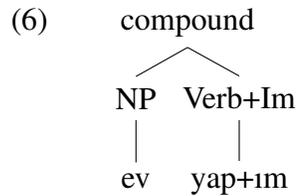
      a.　*home-made* : compound denotes a predicate of individuals.
      b.　*making-homes* : compound denotes an event description.

  – If the NP is the theme of the (nominalized) verb, the only interpretation available is an event description.

    (7)　　compound=**event description**

    ```
              ╱      ╲
            NP      Verb+Im
            │
          THEME
    ```
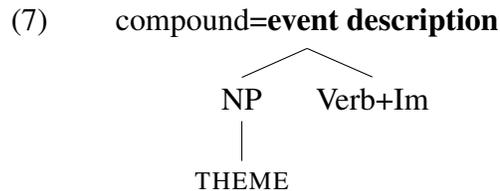
    (8)　　saç$_{theme}$ kes-**im**-i
    　　　　hair　　cut-NMZ-CMPD
    　　　　'hair-cutting'

  – If, on the other hand, the NP is some other relation to the (nominalized) verb, then the event-description interpretation is no longer available (cf. Borer 2003, 2012).

  – Instead, the compound denotes **a predicate of individuals that range over the theme**.

    (9)　　compound=**predicate of individuals**

    ```
              ╱      ╲
            NP      Verb+Im
            │
        NON-THEME
    ```

(10)　a.　[fabrika$_{location}$ üret-**im**-i]　　çanta
　　　　　　factory　　produce-NMZ-CMPD bag
　　　　　　'a factory-produced bag'

　　　b.　[anne$_{agent}$ yap-**ım**-ı]　　kek
　　　　　　mother　make-NMZ-CMPD cake
　　　　　　Lit:'mom-made cake'

- Thus the generalization is that the theme has a distinguished status in these compounds. It either
    - contributes to the event description, or
    - corresponds to a target for 'relativization'.

Theme has to contribute to the event description

- Even in sentences where the available reading is unacceptable due to world knowledge, the reading that does make sense cannot be accessed.
    - To illustrate, in (11) the compound is structurally in a position where it cannot be a predicate but has to denote an event description. (i.e. it complements a postposition)
    - This means that the overt NP has to be a theme, given our generalization.
    - Indeed, this interpretation is the only one available, although it is odd because of our world knowledge.
    - In particular, we cannot access a reading where the NP is construed as the agent - even though that reading *does* make sense.

(11)   [bebek tüket-im-i]   hakkında bir belgesel   izledim.
        baby   consume-NMZ-CMPD about   a   documentary I.watched
        Lit: 'I watched a documentary about baby-consuming.'
        <u>intended but unavailable</u> :
        '... a documentary about the consumption behaviour of babies.'
        <u>available</u> :
        '... a documentary about consuming babies.'

Theme has to be the target of relativization if compound denotes a predicate of individuals

- Prediction: if the compound denotes a predicate of individuals, then relativization cannot target a non-theme position.
- If it does, we get ungrammaticality.

(12)   [çanta üret-im-i]   fabrika-lar
        bag   produce-NMZ-CMPD factory-PL
        <u>intended but unavailable</u> : 'factories {where bags are produced/that produce bags}'
        <u>available</u> : 'factories produced by bags'

(13)   a. *[çanta$_{theme}$ üret-im-i] fabrika-lar$_{location}$ (intended but unavailable)

        b. [çanta$_{agent}$ üret-im-i] fabrika-lar$_{theme}$ (available but non-sensical)

3   Proposal

- We propose that -Im denotes a polymorphic/polysemous deverbalizing function whose first argument is **uniformly** a verb with an unsaturated THEME argument.

- We implement this analysis within a uniform syntax, given in (14).

(14)

$$\text{NP}_{\langle e,t\rangle}$$

$$\text{V}_{\langle e,vt\rangle} \quad \textbf{-ım}$$
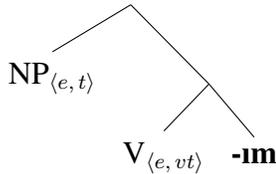
where
NP = predicate of individuals; of type $\langle e, t\rangle$
V = function from individuals to predicates of events; of type $\langle e, \langle v, t\rangle\rangle$

- We distinguish between the two functions of -Im and label them

    - Im_{event} outputs **event descriptions**; of type $\langle v, t\rangle$

    - $\text{Im}_{\text{relative}}$ outputs **predicate of individuals**; of type $\langle e, t\rangle$

- The semantic functions of both these entries are provided in (15)

(15)   a. $[\![\text{-Im}_{\text{event}}]\!] = \lambda Q_{\langle e,vt\rangle}.\ \lambda f_{\langle e,t\rangle}.\ [\ \lambda e.\ \exists x: f(x)=1\ \&\ Q(x)(e)=1\ ]$

      b. $[\![\text{-Im}_{\text{relative}}]\!] = \lambda Q_{\langle e,vt\rangle}.\ \lambda f_{\langle e,t\rangle}.\ [\ \lambda x.\ \exists y\ \exists e: Q(x)(e)=1\ \&\ f(y)=1\ \&\ R_c(y)(e)=1\ ]$
            (R_c is a contextually retrieved relation)

- Next, we discuss how these functions help us derive the ambiguity.

3.1   Deriving event descriptions

- Recall: if NP = THEME $\rightarrow$ compound denotes an event description

     (16)   compound

          NP   Verb+Im
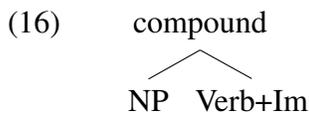
- The meaning we gave to -Im$_{\text{event}}$ ensures that the NP is used to saturate the verb.

     (17)   a.

$$\text{NP}_{\langle e,t\rangle}$$

$$\text{V}_{\langle e,vt\rangle} \quad \text{-Im}_{\text{event}}$$

          b. $[\![\text{-Im}_{\text{event}}]\!] = \lambda Q_{\langle e,vt\rangle}.\ \lambda f_{\langle e,t\rangle}.$
               $[\ \lambda e.\ \exists x: f(x)=1\ \&\ Q(x)(e)=1\ ]$

- In particular, -Im$_{event}$ takes an argument of type $\langle e, vt \rangle$ and returns a function that takes an NP meaning (a predicate of individuals).

- This function is applied to the NP in (18), which is construed as the theme/internal argument thanks to the meaning we gave to -Im$_{event}$.

- Hence, applying -Im$_{event}$ to a verb and then an NP derives a set of events where there is an individual x true of the NP such that x is the internal argument of the verb.

(18) $\lambda e.\ \exists x:\ cake(x)\ \&\ make(x)(e)$
       'set of events of making cake'

    $\lambda x.cake(x)$ $\lambda f_{\langle e,t \rangle}.\ [\ \lambda e.\ \exists x:\ f(x)=1\ \&\ make(x)(e)\ ]$

        $\lambda x.\ \lambda e.\ make(x)(e)$ $\lambda Q_{\langle e,vt \rangle}.\ \lambda f_{\langle e,t \rangle}.\ [\ \lambda e.\ \exists x:\ f(x)=1\ \&\ Q(x)(e)=1\ ]$
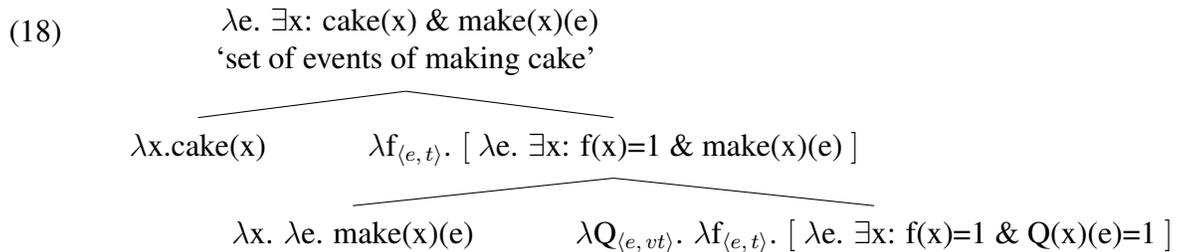
3.2 Deriving predicates of individuals

- Recall: NP = NON-THEME $\rightarrow$ compound denotes a predicate ranging over the THEME

(19)   compound

     NP   Verb+Im
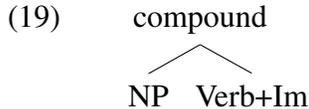
- The meaning we give to -Im$_{relative}$ abstracts out the theme argument. Hence, we derive a predicate of individuals that range over the theme.

(20)   a.

    NP$_{< e,t >}$

        V$_{< e,vt >}$ -Im$_{relative}$

b. $[\![$-Im$_{relative}]\!] = \lambda Q_{\langle e,vt \rangle}.\ \lambda f_{\langle e,t \rangle}.$
     $[\ \lambda x.\ \exists y\ \exists e:\ Q(x)(e)=1\ \&\ f(y)=1$
      $\&\ R_c(y)(e)=1\ ]$
     (R$_c$ is a contextually retrieved thematic relation)
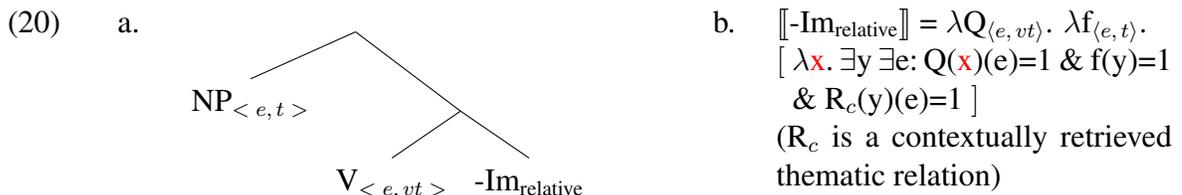
- The overt NP is construed as a non-theme argument, relating to the event via a thematic relation R$_c$ retrieved from the context.

(21) λx. $\exists$y $\exists$e: make(x)(e) & mother(y) & R_c(y)(e) | R_c=AGENT
'set of things made by mothers'

λx.mother(x) λf$_{\langle e,t\rangle}$. [λx. $\exists$y $\exists$e: make(x)(e) & f(y)=1 & R_c(y)(e)=1]

λx. λe. make(x)(e) λQ$_{\langle e,vt\rangle}$. λf$_{\langle e,t\rangle}$.
[λx. $\exists$y $\exists$e: Q(x)(e)=1 & f(y)=1 & R_c(y)(e)=1]
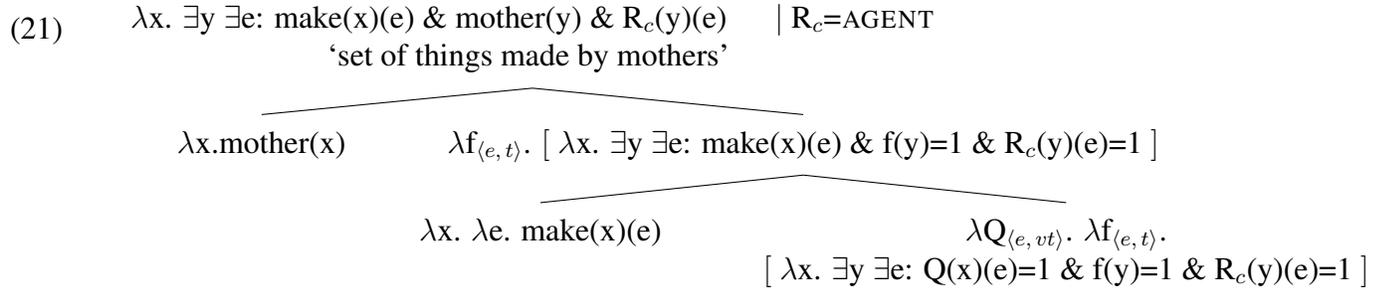
3.3   Interim Summary

- The dervebalizing suffixes -Im$_{event}$ and -Im$_{relative}$ take the same arguments.
  - first argument: a Verb of type $\langle e, \langle v, t\rangle\rangle$
  - second argument: an NP of type $\langle e, t\rangle$
- But they have distinct meanings and output different types of semantic objects
  - Im$_{event}$ outputs **event descriptions**; of type $\langle v, t\rangle$
  - Im$_{relative}$ outputs **predicate of individuals**; of type $\langle e, t\rangle$
- In the next section, we show that this baseline analysis makes a number of correct predictions.
- In Section 5, we will refine our analysis in an attempt to explain some further data and additional restrictions.

4   Predictions

- Prediction #1: Unergative verbs should not be able to be deverbalized with -Im.
  - This prediction follows from the fact that both Im$_{event}$ and Im$_{relative}$ require a Verb of type $\langle e, vt\rangle$, i.e. one that requires an internal argument.

(22)

NP$_{\langle e,t\rangle}$ type mismatch!!

V$_{\langle v,t\rangle}$ **-ım**
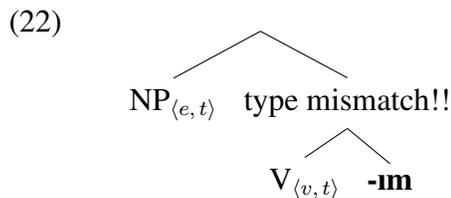
  - Indeed, there is no instance of a deverbal noun built by -Im based on unergative verbs, which we assume are of type $\langle v, t\rangle$, not $\langle e, vt\rangle$.

7

(23)   a.   *koş-um
           intended: running

        b.   *konuş-um
           intended: talking, speaking

        c.   *kay-ım
           intended: skiing

- <u>Prediction #2:</u> If a theme NP incorporates, no further NP incorporation should be possible.

  - Non-theme NP incorporation is mediated by R_c which is specific to -Im$_{\text{relative}}$.

  - However, -Im$_{\text{relative}}$ necessarily abstracts over the theme slot, making it impossible for a theme NP to appear in the first place.

    (24)   *ev   kek$_{\text{theme}}$ yap-ım-ı
            house cake   make-NMZ-CMPD-DAT
            Intended: 'cake-baking at home'

  - If R_c were freely available to -Im$_{\text{event}}$, (24) could be expected to be fine, at least for the compositional semantics.

- <u>Prediction #3:</u> Unless the overt NP is the theme, no event modifiers can appear.

  - If the overt NP is not the theme, the only available parse is with -Im$_{\text{relative}}$, with which theme is abstracted out and the NP has some other thematic relation

  - Crucially, in this parse, there is no $\langle v, t \rangle$ node in syntax which would accept event modifiers.

    (25)   Bu   kekler [(*az   malzeme-yle)$_{\langle v, t \rangle}$ [ev   yap-**ım**-ı]   ].
            This cakes   little ingredient-WITH   house make-NMZ-CMPD
            'These cakes are home-made(-with-little ingredients)$_{\text{intended, *}}$'
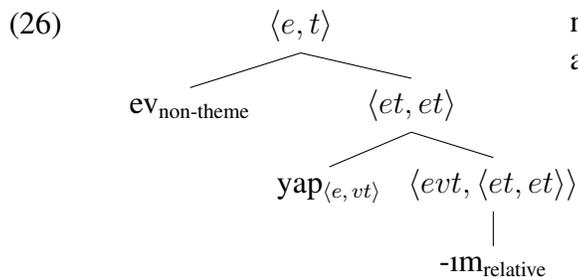
    (26) $\langle e, t \rangle$ notice: no position of interpretation is available for *az malzeme-yle*.

            ev$_{\text{non-theme}}$ $\langle et, et \rangle$

               yap$_{\langle e, vt \rangle}$ $\langle evt, \langle et, et \rangle \rangle$

                        -ım$_{\text{relative}}$

– But as predicted, event modifiers *are* available to the parse with -Im$_{event}$, as shown in (27).

(27) az   malzeme-yle$_{\langle v,t \rangle}$ ev-de$_{\langle v,t \rangle}$ [kek   yap-**ım**]$_{\langle v,t \rangle}$ -ı
      little ingredient-WITH house-LOC cake.NOM make-NMZ CMPD
      Lit: 'cake-baking with little ingredients at home.'
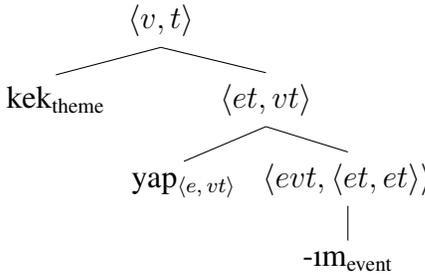
(28) $\langle v,t \rangle$ notice: the highest node will accept the
         _____/   _____   modifiers *az malzeme-yle* and *ev-de*
      kek$_{theme}$ $\langle et,vt \rangle$
                          _____/   _____
                    yap$_{\langle e,vt \rangle}$ $\langle evt,\langle et,et \rangle \rangle$
                                           |
                                      -ım$_{event}$

5   Refining the proposal

• -Im$_{event}$ and -Im$_{relative}$ are both productive. However, -Im$_{relative}$ exhibits a more restricted distribution.

   – Building an event description by -Im$_{event}$ always seems possible when the NP is a theme.

(29) a. bina   yık-ım-ı
             building   destroy-NMZ-CMPD
             Lit: 'building-destroying'

       b. ev   onar-ım-ı
             house   repair-NMZ-CMPD
             Lit: 'house-repairing'

       c. saç   kes-im-i
             hair   cut-NMZ-CMPD
             Lit: 'hair-cutting'

       d. tamlama   türet-im-i
             compound   derive-NMZ-CMPD
             Lit: 'compound-deriving'

       e. balina   doğ-um-u
             whale   be.born-NMZ-CMPD
             Lit: 'whale-birthing/being.born' (nb: *doğ* in Turkish is an unaccusative verb)

9

- However, -Im$_{\text{relative}}$ is more restricted in that it imposes meaning restrictions on what it generates.

- So far, what we have said predicts that -Im$_{\text{relative}}$ can combine with any verb that selects for a theme (i.e. verbs of type $\langle e, vt \rangle$).

- However, we find that -Im$_{\text{relative}}$ does not generate sensical interpretations with all transitive verbs.

- For example, -Im$_{\text{relative}}$ is readily compatible with verbs of creation/production:

(30) a. [ev   yap-ım-ı]   kek
          house make-NMNZ-CMPD cake
          'home-made cake'

     b. [fabrika üret-im-i]   çanta
          factory produce-NMNZ-CMPD bag
          'factory-produced bag'

     c. [terzi dik-im-i]   elbise
          tailor sew-NMNZ-CMPD dress
          'tailor-sewed dress'

- However, verbs of destruction systematically yield odd meanings with -Im$_{\text{relative}}$.

(31) a. #[belediye   yık-ım-ı]   bina
          municipality destroy-NMNZ-CMPD building
          'municipality-destroyed building'

     b. #[makine kes-im-i]   ağaç
          machine cut-NMNZ-CMPD tree
          'machine-cut tree'

     c. #[makine kır-ım-ı]   bardak
          machine break-NMNZ-CMPD glass
          'machine-broken glass'

- Intuitively, the predicate that -Im$_{relative}$ generates does not seem to be on a par with the predicate that standard relativization generates.

    (32)   makine-nin   kestiği ağaç
            machine-GEN cut.REL tree
            (the) tree that the machine cut(s)

- Rather, we (try to) understand (33) on a par with how we understand (34). But this yields an odd reading for (33).

    (33)   #[makine kes-im-i]   ağaç
            machine cut-NMNZ-CMPD tree
            ≈ "a kind of tree that comes to exist as a result of machine-cutting"

    (34)   [fabrika üret-im-i]   çanta
            factory produce-NMNZ-CMPD bag
            ≈ "a kind of bag that comes to exist as a result of factory-production"

- Hence, it seems clear that -Im$_{relative}$ does not simply abstract over the theme giving us a predicate of individuals.

- Rather, the predicate that it creates seems to be some sort of a kind-level modifier.

- There is further evidence for the kinds of meanings that we claim -Im$_{relative}$ can generate:

- Some verbs have both a destruction sense and a production sense.

    – For example, consider the verb *kes* 'cut'.

        (35)   [berber kes-im-i]   saç
                barber cut-NMNZ-CMPD hair
                ✓ 'barber-cut hair' (kind of hair that comes to exist as a result of barber cutting it)
                ✗ 'left-over hair on the floor after barber's operation'

    – (36) cannot refer to the left-over hair on the floor after the hair-dresser cut it, but has to refer to a specific kind of hair model, namely the one made by a hair-dresser (as opposed to self-made or shaver-made ones).

    – Compare this with a standard relative clause modifying 'hair'. Here, the modified noun can certainly refer to the left-over hair on the floor

        (36)   [berber-in   kes-tiği] saç
                barber-GEN cut-REL hair
                ✓ 'left-over hair on the floor after barber's operation'

- A similar pattern is observed with the verb *sık* 'squeeze'.

  (37) a. #[makine sık-ım-ı]   portakal
            machine squeeze-NMNZ-CMPD orange
            'machine-squeezed orange'

        b. [makine sık-ım-ı]   portakal su-yu
            machine squeeze-NMNZ-CMPD orange juice
            'machine-squeezed orange juice'

- Although what is squeezed is the orange in (37a), the predicate of individuals created by -Im$_{\text{relative}}$ cannot modify it.

  - this follows if (37a) is being forced into the interpretation in (38).

    (38) #a kind of orange that comes to exist as a result of machine-squeezing

  - However, the end production, which is the orange juice, is modifiable by 'makine sıkımı' *machine-squeezed*. And this again follows if (37b) is interpreted as (39).

    (39) a kind of orange juice that comes to exist as a result of machine-squeezing

- Given the meaning restrictions -Im$_{\text{relative}}$ imposes on the predicate it generates, the analysis we sketched for -Im$_{\text{relative}}$ is incomplete.

- It will need to be refined to capture the kind-level modification it seems to be involved in as illustrated below.

  {X: X is a kind of orange juice that comes to exist as a result of machine-squeezing}

  {X: X is a kind that comes to exist as a result of machine-squeezing }   {X: X is an orange-juice kind }

  machine   orange-juice

  squeeze   -Im$_{\text{relative}}$

- We leave the formal details of how kind-level modifiers can be compositionally generated to future work.[1]

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[1]Sağ (2018, 2019) argues that kind denoting expressions can also be found in predicative position in Turkish. We leave it to future work whether this is also the case for predicates generated by -Im$_{\text{relative}}$. Alternatively, there may be a possibly restricted type shift that converts kind level modifiers to object level predicates (cf. Carlson 1977; Chierchia 1998) . We will not be able to resolve this question here.

6 Summary of the claims

- We have examined compounds in Turkish whose heads feature the deverbalizer -Im.

  - We have seen that these compounds are ambiguous between
    event descriptions ($\approx$ home-building) and predicates of individuals ($\approx$ home-made).

- We ascribe the cause of this ambiguity to -Im having two different meanings:

  - -Im$_{\text{event}}$ outputs event descriptions

  - -Im$_{\text{relative}}$ outputs predicates of individuals

- Notably, under both functions, the theme argument of the nominalized verb has to contribute to the meaning of the compound:

  - It either has to contribute to the event description, or

  - It has to correspond to a target for 'relativization'.

- We argue that the obligatory presence of the theme argument in these compounds can be captured if the verbal base of -Im is not a plain event predicate, but has *argument structure*.

  - Hence, we propose that the theme has to contribute to something in these compounds because the verbal base of -Im is semantically specified for a theme argument,

  - namely, it is a function of type $\langle e, vt \rangle$.

  - That -Im cannot combine with unergative verbs (verbs of type $\langle v, t \rangle$) as opposed to transitives and unacccusatives support this claim (cf. Kratzer 1996).

- Finally, we have investigated some restrictions on the kinds of meanings that -Im$_{\text{relative}}$ can generate.

  - We have proposed that these restrictions follow from the idea that -Im$_{\text{relative}}$ generates kind-level modifiers.

  - We have found this idea to be supported by robust contrasts between predicates generated by standard relativization vs. those generated by -Im$_{\text{relative}}$

References

Borer, Hagit. 2003. Exo-skeletal vs. endo-skeletal explanations: Syntactic projections and the lexicon. *The nature of explanation in linguistic theory* 31:67.

Borer, Hagit. 2012. In the event of a nominal. *The theta system: Argument structure at the interface* 52:77.

Carlson, Gregory Norman. 1977. *Reference to kinds in English.*. University of Massachusetts Amherst.

Chierchia, Gennaro. 1998. Reference to kinds across language. *Natural language semantics* 6:339–405.

Grimm, Scott, and Louise McNally. 2015. The-ing dynasty: Rebuilding the semantics of nominalizations. In *Semantics and Linguistic Theory*, volume 25, 82–102.

Harley, Heidi. 2009. The morphology of nominalizations and the syntax of vp. In *Quantification, definiteness and nominalization*, 320–342. Oxford University Press.

Kratzer, Angelika. 1996. Severing the external argument from its verb. In *Phrase structure and the lexicon*, 109–137. Springer.

Marantz, Alec. 1997. No escape from syntax: Don't try morphological analysis in the privacy of your own lexicon. *University of Pennsylvania working papers in linguistics* 4:14.

Sağ, Yağmur. 2018. The semantics of Turkish numeral constructions. In *Proceedings of Sinn und Bedeutung*, volume 22, 307–324.

Sağ, Yağmur. 2019. The semantics of number marking: Reference to kinds, counting, and optional classifiers. Doctoral Dissertation, Ph. D. thesis, Rutgers University, New Brunswick, NJ.