

# Knowledge reports with(out) true belief

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## Introduction

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## Overarching question

Given the alternation (1), what's **the** meaning of *bil-*, or *hatırla-*?<sup>1</sup>

- (1) a. Dilara [Tunç-un çalış-tığını] *bilíyo/hatırlíyo*.  
 D. T.-GEN work-NOMIN'D knows/remembers  
 'Dilara knows/remembers that Tunç has a job.'
- b. Dilara [Tunç çalış-íyo diye] *biliyo/hatırlıyo*.  
 D. T. work-TENSED diye knows/remembers  
 'Dilara thinks/remembers<sub>[-truth]</sub> that Tunç has a job.'
- Same *verb*,
  - Different EMBEDDED CLAUSE,
  - Different meaning.

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<sup>1</sup>Pitch accent given for intended readings→Q&A.

## Factivity/The truth condition

- Verbs like “know” are called (semi-)factive:

(2) a. #John **knows** [<sub>*p*</sub> that Bernie is president ]

↪ Bernie is president (×)

b. John **knows** [<sub>*p*</sub> that Obama is president ]

↪ Obama is president (✓)

Uttering ‘S **knows** *p*’ generates inference that *p* is true.

⇒ The “factive presupposition.”

- Verbs like “think” are not factive:

(3) John **thinks** [<sub>*p*</sub> that Bernie is president ]

↯ Bernie is president

- Rarer: Inference patterns changing with the embedded clause.

⇒ The “factivity alternation.”

# Turkish knowledge reports: Factivity alternates

## The factive alternant

### (4) Embedded clause type 1: 'Nominalization'

Tunc [ Berni'nin kazan-dığını ] **biliyo**.

T.      B.                  win-**NMZ**      knows

'Tunc **knows** that Bernie won.'

Factive

a. Uttered in context:

(i) ✓ if Bernie won.

(ii) # if Trump won.

b. Explicit denial of embedded clause:

# ... ama Berni kazanmadı.

# ... but Bernie didn't win.

# Turkish knowledge reports: Factivity alternates

## The non-factive alternant

### (5) Embedded clause type 2: '*diye* clause'

Tunc [ Berni kazan-dı diye ] **biliyo**.

T.     B.     win-PAST *diye* knows

'Tunc **thinks** (lit.: knows) that Bernie won.'

a. Uttered in context:

(i) # if Bernie won.

(ii) ✓ **if Trump won.**

b. Explicit denial of embedded clause:

✓ ... ama Berni kazanmadı.

✓ ... but Bernie didn't win.

A knowledge report without true belief?

## Why is the factivity alternation *challenging*?

Tunç [B'nin kazandığını]<sub>NMZ</sub> biliyo.  
 'Tunc **knows** that Bernie won.'

Tunç [B kazandı diye]<sub>diye</sub> biliyo.  
 'Tunc **thinks** that Bernie won.'

Factive presupposition thought to be specified in lexicon:

- Semantic theories of presupposition<sup>2</sup>:
  - $\llbracket \mathbf{know} \rrbracket(p)(x)$  is defined iff  $p$  is true
  - $\llbracket \mathbf{know} \rrbracket(p)(x)$  is true iff ...
- Pragmatic theories of presupposition<sup>3</sup>:
  - Alternatives{**know**}={know, be unaware}
  - Alts “grow,” generate the global inference that  $p$  is true.

⇒ Both accounts predict both alternants to be factive:

The “presupposition trigger” is present in both alternants.

- (Not soft vs. hard, not accommodation [Heim, 1983].)

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<sup>2</sup>e.g., [Heim and Kratzer, 1998, Percus, 2006]

<sup>3</sup>e.g., [Stalnaker, 1999, Abusch, 2002]

## Proposal (sketch)

- What is the meaning of a factive when the truth req. is lifted?
    - V has a core meaning underlying F and non-F alternant.
    - In particular:
      - Non-factive “know” cannot be reduced to “think.”
      - understand<sub>[-truth]</sub>, remember<sub>[-truth]</sub>
  - A novel definition for *bil-* derives the alternation:
    - Definition non-factive, but “bears the seed” of factivity.
    - *bil-* denotes a relation between fact, belief and subject.
- (6) a. Non-factive *bil-*: Structure of a *diye* report  
 Tunç [[knows <sub>[fact]</sub> Trump won]] [<sub>[belief]</sub> Bernie won]]
- b. Factive *bil-*: Structure of a NMZ report  
 Tunç [[knows <sub>[fact]</sub> Trump won]] [<sub>[belief]</sub> Trump won]]

Truth condition enforced by matching fact and belief.



## Novelty of present work

- [Şener, 2008]: Example given (7), not commented on.

(7) Pelin [sen Timbuktu-ya gittin diye] *biliyormuş*.

P. you Timbuktu-DAT went diye knows

'Pelin thought that you went to Timbuktu.' [his (4/5)]

- [Baç and Irmak, 2011] about the phrase “to know wrongly”

(8) [Annesinin doğum yerini] *yalnış biliyor*.

his mother's birth place wrongly he knows

'He “wrongly knows” his mother's birth place.'

(E.g., he mistakenly believes she was born in Adana.)

- [Abrusán, 2011, Hanink and Bochnak, 2016, Moulton, 2009]
  - The factivity alternation cross-linguistically,
  - No account, or account based on “factive complementizers.”

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# Which verbs participate in the alternation?

## Alternating Vs

Do alternate: Cognitive semi-factives+perception Vs

(9) bil-, hatırla-, öğren-, anla-, gör-, duy-  
 know, remember, learn, remember, see, hear

a. Tunç [Berni'nin kazandığını]  $\acute{V}$

Tunç  $V_{+[truth]}$  that Bernie won.

Factive

b. Tunç [Berni kazandı diye]  $V$

Tunç  $V_{-[truth]}$  that Bernie won.

Non-factive

# Which verbs participate in the alternation?

## Non-alternating Vs

- Don't alternate: Non-factives

(10) düşün-, hayal et-, um-/ümit et-  
think, imagine, hope

a. Tunç [Berni'nin kazandığını] V Non-factive

b. Tunç [Berni kazandı diye] V Non-factive  
Tunç V<sub>-[truth]</sub> that Bernie won.

⇒ It's not the case that NMZ generates factivity.

- Incompatible with *diye* clauses: Emotive factives<sup>4</sup>+forget

(11) a. Tunç [Berni'nin kazandığına<sub>DAT</sub>] sevindi.  
Tunç got happy that Bernie won.

b. #Tunç [Berni kazandı diye] sevindi.  
Tunç rejoiced {and said/because} Bernie won.

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<sup>4</sup>Vs compatible with *diye* and NMZ all seem to assign ACC to the NMZ

## Conclusions

Some factives alternate:

know+NMZ→factive

know+diye→non-factive

Non-factives don't alternate:

think+NMZ→non-factive

think+diye→non-factive

Analytical desiderata:

- Alternation is unlikely to be due to lexical idiosyncracies.
- Nominalizations are not (consistently) inherently factive.
- Factivity is at least in part due to the semantics of the verb.

Next: What does a factive  $V_{-[\text{truth}]}$  mean?

## A naturally occurring example

### (12) 'Unmotivated' thought

✓ Çocuk [ babası onu terk etti diye ] düşünüyö.  
 kid his father him abandoned *diye* thinks

(And then...) the kid **thinks** his father abandoned him.<sup>5</sup>

### (13) No 'unmotivated' non-presuppositional knowledge report

# Çocuk [ babası onu terk etti diye ] biliyo.  
 kid his father him abandoned *diye* knows

Intended: The kid **thinks** his father abandoned him.

Available: The kid has evidence that...

**Justification** is required to license *diye*+know.

**But not truth.**

<sup>5</sup> <http://www.haberturk.com/yasam/haber/1207527-izmirde-babalar-dernek-kurdu>

## A controlled contrast

- (14) a. Tunç Berni kazandı diye biliyo.  
 Tunç **knows** [diye that Bernie won ]
- b. Tunç Berni kazandı diye düşünüyö.  
 Tunç **thinks** [diye that Bernie won ]
- c. Tunç Berni'nin kazandığını düşünüyö  
 Tunç **thinks** [NMZ that Bernie won ]
- (15) a. Context 1: Tunç is in solitary confinement.  
 b. Context 2: Tunç has watched fake TV reports.

	Context	(14a)	(14b)	(14c)
(16)	Solitary confinement	#	✓	✓
	Fake TV report	✓	✓	✓

What makes the *diye bil-* sentence good is proper acquaintance with a situation (despite the error).

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## Background: Attitude reports

- Naïve analysis of knowledge
  - “Tunç believes that Bernie won.” is true iff  
Tunç believes that Bernie won.
  - “Tunç knows that Bernie won.” is true iff  
Bernie won and Tunç believes that Bernie won.

Problem: Accidental truth. [Gettier, 1963]

- Alternative: Knowledge is true *de re* belief  
e.g., [Kratzer, 2002]

- (17) “Tunç knows that Bernie won.” is true iff
- a. There is a fact  $f$  such that Bernie won.
  - b. Tunç is acquainted with  $f$
  - c. Tunç believes about  $f$  that Bernie won.

## Proposal

- If fact and belief proposition are recovered from the same object, it's tricky to derive the alternation.
- New analysis: facts and belief proposition recovered from distinct, syntactically represented objects:
- *bil-* relates a fact, belief content, and an attitude holder.

- (18) a. Argument structure of a factive verb:  
           [<sub>VP</sub> Attitude Holder [<sub>VP</sub> Belief [<sub>VP</sub> Fact *bil-* ] ] ]
- b. Semantics of factive verb:
- (i) Att. holder is acquainted with the fact *f*,
  - (ii) Att. holder believes *p* of fact.

- *diye* clauses only determine belief;  
 Nominalizations determine fact+belief.

## Derivation: Non-factive knowledge reports

- Repeated from above:
  - (19) a. Argument structure of a factive verb:  
 [<sub>VP</sub> Attitude Holder [<sub>VP</sub> Belief [<sub>VP</sub> Fact *bil-* ] ] ]
  - b. Semantics of factive verb:
    - (i) Att. holder is acquainted with the fact *f*,
    - (ii) Att. holder believes *p* of fact.
- (20) a. Surface string:  
 Tunç Berni kazandı diye biliyo. Non-factive
- b. Structure:  
 Tunç [[<sub>belief</sub> Bernie won diye] [[<sub>fact</sub> Trump won] knows]].
- c. Truth conditions:
  - (i) Tunç is acquainted with Trump's victory.
  - (ii) Tunç believes of **Trump's** victory that it's a **Bernie** victory.

## Derivation: Factive knowledge reports

- *Bona fide* knowledge reports are achieved *via* matching.
- (21) a. Surface string:  
Tunç Trump'ın kazandığını biliyo. Factive
- b. Structure:  
Tunç [<sub>belief</sub> Trump won diye] [<sub>fact</sub> Trump won] biliyo.
- c. Truth conditions:
  - (i) Tunç is acquainted with Trump's victory.
  - (ii) Tunç believes of **Trump**'s victory that it's a **Trump** victory.
- Matching is enforced in the semantic composition:

(22) Tunç [ [<sub>fact</sub> Trump won ] [ λ<sub>8</sub> [ X<sub>belief-8</sub> [ t<sub>fact</sub> biliyo ] ] ] ]

## Looking for independent evidence

- Nominalizations are higher than *diye* clauses:  
Potentially in a position to bind the belief argument.

(23) a. Tunç Trump'ın kazandığını hızlı hatırladı.  
b. \*Tunç hızlı Trump'ın kazandığını hatırladı.  
'Tunç quickly remembered that Trump won.'

(24) a. Tunç Trump kazandı diye hızlı hatırladı.  
b. Tunç hızlı Trump kazandı diye hatırladı.  
'Tunç quickly remembered<sub>-[truth]</sub> that Trump won.'

- Simultaneous expression of fact and belief:

(25) Tunç [Trump'ın kazandığını] [Berni kazandı diye] biliyo.  
T. T. won-NMZ B. won diye knows  
'Tunç believes of Trump's victory that it's a Bernie victory.'

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## Cross-linguistic excursus

- (26) Azeri Murad Suleymanov, p.c.
- a. Ali [ Aişə-nin gəldiyini ] **bilir**.  
 A. A. come.NMZ knows  
 Ali **knows** that Ayse came.
- b. Ali *elə* **bilir** [ ki Aişə gəlib ].  
 A. **so** knows that A. came  
 Ali **is under the impression** that Ayse came.
- (27) Hungarian [Abrusán, 2011]
- a. Péter (azt) **tudja**, hogy János elment a buliba.  
 Peter it knows that Janos went the party  
 Peter **knows** that John went to the party.
- b. Péter *úgy* **tudja**, hogy János elment a buliba.  
 Peter **so** knows that Janos went the party  
 Peter **believes** that John went to the party.

# Summary

- Factivity alternates in Turkish.
- The alternation can be accounted for by enriching the meaning of factives. Verbs that participate in the alternation:
  - are not inherently factive,
  - allow generating factivity in the semantic composition.
- Further research:
  - Presupposition,
  - Better match with syntax.



## Appendix I: Formal definition of *bil-*

(28) **Lexical entry for *bil-*** (final)

For all  $w \in D_s$ ,  $\Phi, \Psi \in D_{v(st)}$ ,  $x \in D_e$ ,

a. **Presupposition component**





$\llbracket \text{bil-} \rrbracket(w)(\Phi)(\Psi)(x)$  is defined iff  $\exists e[\Phi(e)(w)]$

b. **Assertion component**





$\llbracket \text{bil-} \rrbracket(w)(\Phi)(\Psi)(x) = 1$  iff

- (i)  $\exists R[$
- (ii)  $\iota e'[\Phi(e')(w)] = \iota e''[R(x, e'', w)] \quad \wedge$
- (iii)  $DOX_{x,w} \subseteq \{w' | \Psi(\iota e'''[R(x, e''', w')])(w')\} \quad ]$

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