

Knowledge reports with and without true belief
(and other explorations in Turkish clausal embedding)

Generals Paper (Revised Draft)

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1 Introduction

Core empirical contribution The “factivity alternation” in (1) raises a challenge for existing proposals about the semantics of attitude reports that are introduced by cognitive factive verbs. In Turkish,¹ the availability of a factive inference is conditioned by two factors. The first factor is the use of a certain kind of attitude verb, for instance, *bil-*, “know” in (1), vs. *düşün-*, “think” or *reddet-*, “deny” in (2). The second factor is the use of a certain kind of embedded clause, a nominalized embedded clause like in (1a) vs. a tensed clause like in (1b). *If either condition fails, the factive inference is not detected.* The main challenge for the existing proposals comes from the observation that the factive inference seems to arise in the *composition*² of the attitude verb and the embedded clause. The inference cannot be traced back to the attitude verb alone [Abusch, 2002, 2009, Kratzer, 2002, Percus, 2000, Romoli, 2012, Simons, 2001, Stalnaker, 1999], or to the complementizer alone [Kiparsky and Kiparsky, 1970, Kratzer, 2006, Moulton, 2009], yet it must be encoded somewhere (*pace* Hazlett 2010, 2012). In sum, in these accounts, factivity has no room to alternate.

Both attitude reports in (1) are introduced by the same matrix verb, *bil-*, which translates as sentence embedding (as opposed to acquaintance) “know.” The shape of the embedded clause differs across (1a) and (1b), which conditions a difference in the global inferences associated with each sentence.

(1) Illustration of the factivity alternation

a. The factive alternant

Tunç [Hilari-nin kazan-dıĝ-ın-ı] bil-iyo (#ama kazan-ma-dı.)
Tunç Hillary-GEN won-NMZ-3S-ACC know-PRES.3S but win-NEG-PST.3S
Tunç knows that Hillary won (#but she didn't).

b. The non-factive alternant

Tunç [Hilari kazan-dı diye] bil-iyo (✓ama kazan-ma-dı.)
Tunç Hillary.NOM won-PST.3S diye know-PRES.3S but win-NEG-PST.3S
Tunç thinks (lit. knows) that Hillary won (✓but she didn't).

In (1a), the embedded clause is a nominalization. The attitude report carries the inference that the proposition expressed by the nominalization is true. That is, the sentence is “factive.” Evidence is that it sounds contradictory to conjoin the attitude report with the denial of the belief proposition.

In (1b), on the other hand, the embedded clause is tensed and introduced by the morpheme *diye*. The truth inference does not arise, which is seen in the (perfect) acceptability of conjoining the report with the denial of the belief proposition. That is, the sentence is not factive.³ The difference in clause type correlates with the (un)availability of the factive inference.

The examples in (2) suggest that nominalizations do not inherently denote facts (which is a reasonable hypothesis). These clause types naturally occur embedded under non-factive verbs like “think,” and

¹Some other languages display similar phenomena. Data is found in Abrusán [2011], Moulton [2009], and Hanink and Bochnak [2016]. My colleagues Murad Suleymanov and Travis Major (p.c.) respectively report that Azeri and Uyghur also pattern like Turkish. This data is presented in the appendix. Other verbs participate in the alternation as well, though the focus here is the knowledge predicate.

²This intuition is present in Moulton [2009] and in Schulz [1999]. Compare “John remembered {to bring the wine/bringing the wine/that he brought the wine},” the first of which does not imply that John brought the wine (Schulz’s exx. (8–10)).

³“Not factive” does not mean “anti-factive.” Although reports of the form in (1b) do, in some circumstances, generate the pragmatic inference that the attitude proposition is false, they can be used in cases where the belief is not false. This is described in section 5.3.

“deny.” In these cases, the truth of the embedded proposition is not presupposed. Then, it becomes implausible to say that the source of the factive inference in (1a) is only the nominalization, and we must accept that the semantics of the matrix verb plays a role in triggering the factive inference.

- (2) Nominalized embedded clauses do not necessarily denote facts
- a. Tunç [Hilari-nin kazan-dığ-ın-ı] düşün-üyo (✓ ama kazan-ma-dı.)
Tunç Hillary-GEN won-NMZ-3S-ACC think-PRES.3S but win-NEG-PST.3S
Tunç thinks that Hillary won (✓ but she didn't).
 - b. Tunç [Hilari-nin kazan-dığ-ın-ı] reddet-ti.
Tunç Hillary-GEN won-NMZ-3S-ACC deny-PST.3S
Tunç denied that Hillary won.

Challenges Factivity alternations are a challenge for existing accounts of factivity. Proposals that trace the factive inference back to the lexical semantics of the attitude verb cannot explain why the inference is not present in sentences like (1b). Now, there are familiar cases where, sometimes, presuppositions go undetected. In (3), when the trigger “discover” occurs unembedded, the inference that the embedded proposition is true must arise. When the trigger is embedded under a question operator (for instance), there is a reading where the inference is absent.

- (3) a. Mary discovered that she had not told the truth.
 \rightsquigarrow Mary had not told the truth.
b. Did Mary discover that she had not told the truth?
 $\not\rightsquigarrow$ Mary had not told the truth.

This kind of contrast has prompted certain authors to claim that there are “soft” presupposition triggers, whose presuppositions are pragmatic and easily suspended, and “hard” triggers, whose presuppositions are semantic and not so easily suspended (the observation goes back to Karttunen [1971], and the terms to Abusch [2002]). Will the claim that the Turkish predicate *bil-* is a soft trigger suffice to explain the factivity alternation? The answer is no. Indeed, the presuppositions of soft triggers do go through when the trigger is unembedded, as in (3a). In the example illustrating the factivity alternation, the trigger *bil-* occurs *unembedded* in both alternants (1a) and (1b), yet the factive inference arises in (1a) and does not in (1b). As a result, the alternation cannot be attributed to the trigger's strength.

The second set of cases where presuppositions seem to go undetected are cases of accommodation [Lewis, 1979, Heim, 1988]. I can utter (4a) felicitously, in a context where my addressee has no prior knowledge about the truth of the embedded proposition. In this case, all goes as if I had asserted (4b), where the presupposition of (4a) has been conjoined to its asserted content.

- (4) a. I discovered that my partner had an affair in Bogotá.
b. My partner had an affair in Bogotá and I discovered it.

The crucial difference between (4) and (1b) is that the embedded proposition in (1b) can be understood, in context, to be false. This is not expected if the presupposition were being accommodated. Accommodation, when the trigger is unembedded, forces us to take the embedded proposition as true. Compare (4b) with (5), where the embedded proposition is denied and the result is odd.

- (5) My partner didn't have an affair in Bogotá, #though I discovered that she did.

In sum, the Turkish factivity alternation cannot be explained away by appealing to the strength of the trigger, or to presupposition accommodation.

It might seem like ascriptions of non-factive knowledge, like (1b), provide support for types of accounts that claim that “know” is not a factive verb at all [Hazlett, 2010, 2012]. This hope might be misplaced, however. Such accounts admit—they must—that the factive inference *tends* to arise in those familiar cases that have prompted others to subscribe to the myth that “know” *is* factive. Such accounts must now explain why this tendency is absent in sentences like (1b).

A third set of proposals exports the factive inference out of the attitude verb and into, say, special complementizers. (This line of thinking can, I believe, be traced back to the Kiparskys’ (1970) intuition that ‘S knows that p’ is underlyingly ‘S knows the fact that p,’ with the factive semantics built into the unpronounced NP.) The alternation can then easily be accounted for: The embedded clause in (1a) would be introduced by a factive complementizer, while the embedded clause in (1b) would be introduced by a non-factive complementizer.⁴

As far as I can see, there are at least two issues here. If factive complementizers are available in a language’s lexicon, what prevents them from heading CPs that compose with verbs that we otherwise recognize as being non-factive, like “think” or “hope”? That is, why do we not seem to find a factive “think” or a factive “hope”? This issue need not concern us much for two reasons: First, verbs in general come with selectional restrictions on their arguments. One can *know* a rumor or a fact, but one can hardly *think* a rumor or a fact. It is not odd to claim, then, that some verbs select for certain types of embedded clauses (say, factive clauses), and that others for other types of embedded clauses (say, non-factive clauses).⁵ Second, there is some evidence that factive “think” *is* attested in Korean, though it is not, to my knowledge, in Turkish. I refer the reader to the discussion and references in Moulton [2009]. Then, the expectation that, if a language has factive complementizers, they should be able to head CPs that compose with non-factive verbs would seem to be borne out.

The second issue is about accidental homophony. If the factive inference is encoded in the embedded clause, we must conclude, comparing (1a) and (2), that there are two string identical embedded clauses, one of which encodes factivity, and the other does not. That is, the choice of a factive vs. a non-factive complementizer would not, in this case, have a morphological reflex. (This point could well be made by looking at English as well. What exacerbates the issue, I believe, is that the non-factivity of (1b) would also be explained by assuming that the embedded clause is introduced by a non-factive complementizer. This is leading to redundancy in the lexicon, with a layer of accidental homophony. Now, I must concede that neither issue delivers a decisive blow to the “factive complementizers” account. This paper is based on an attempt, however, to account for the factivity alternation without making the claim that embedded clauses have a different semantics depending on which predicates embed them.

Overarching question and proposal The question this paper sets out to answer then is this: What must the denotation of *bil-* look like, such that composing *bil-* with a nominalization gives rise to a factive inference, but that composing *bil-* with a *diye* clause does not?

I argue that *bil-* introduces a relation between actual world situations (“eventuality type *reses*”) and beliefs about those situations. Much like in analyses of *de re* belief about individuals [Quine, 1956, Charlow and Sharvit, 2014], the predicates that hold true of the *res* in the evaluation world, and the ones that

⁴The particle *diye* is a good candidate for being categorized as a “non-factive complementizer.” It derives from the verb *de-*, “say.” The present proposal remains uncommitted to any particular analysis of this lexical item. Non-factive knowledge reports obtain with tensed clauses that are not introduced by *diye* as well, see section 6.

⁵This is what I take from discussions with and a seminar by Angelika Kratzer. I do not wish to mischaracterize this point or attribute it to myself.

hold true of its counterparts in the attitude holder’s belief worlds, need not be all identical. The possibility of this mismatch derives non-factive knowledge reports. The truth conditions of the non-factive alternant (1b) are informally sketched out in (6).

(6) Tunç believes of [_{res} the Trump victory] that [_{belief} it is a Hillary victory]

The belief is directly recovered from the *diye* clause, while the *res*, here, is a contextually salient fact.

Factive knowledge reports are derived by forcing, in the semantic composition, the description of the *res* and the content of the belief to match. Consequently, the truth conditions of the factive alternant (1a) resemble (7).

(7) Tunç believes of [_{res} the Hillary victory] that [_{belief} it is a Hillary victory].

Both the *res* and the belief are recovered from the nominalized embedded clause. Uttering the factive report (1a) in the actual circumstances (our world, post Nov. 8th 2016) results in infelicity. This deviance is reduced here to the non-existence of a Hillary victory in the actual world.

Crucially, the present proposal makes use of a single lexical entry for *bil-*, and derives the difference in truth conditions in the semantic composition between the verb and the embedded clause.

Roadmap In section 2, I describe relevant aspects of the factivity alternation. This constitutes the core of what is to be explained. Section 3 contains the unified lexical entry for *bil-* and shows how it derives the factive and the non-factive alternants. The lexical entry relies on the introduction of two semantic arguments. Sections 4 and 5 are dedicated to constraints on the mapping between *bil-*’s syntactic arguments and its semantic arguments. Section 6 discusses open issues, and section 7 concludes.

2 The factivity alternation

Knowledge reports are widely thought to be factive in the sense that they presuppose the truth of the proposition embedded under the knowledge predicate.⁶ Various proposals exist as to how this presupposition is triggered, its strength, and how it projects. My goal in this section is to show that the factive alternant patterns in relevant respects like factive attitude reports from familiar languages, and that the non-factive alternant does not, specifically in that a non-factive knowledge report does not presuppose the truth of the embedded proposition. Non-factive knowledge reports are nevertheless not reducible to plain belief.

2.1 The factive alternant is presuppositional

Composing *bil-* with a nominalized clause triggers the presupposition that the proposition expressed by the embedded clause is true.

Sentence (1a) is repeated from the introduction. Conjoining an utterance of the form ‘S _{p_{nmz}} *bil-*’ with the denial of p results in the intuition that the speaker is contradicting himself.

(1a) Tunç [Hilari-nin kazan-diğ-in-1] bil-iyo (#ama kazan-ma-di.)
 Tunç Hillary-GEN won-NMZ-3S-ACC win-PRES.3S but win-NEG-PST.3S
 Tunç knows that Hillary won (#but she didn’t).

⁶This is, to the best of my knowledge, the case in the linguistics literature. Other traditions might choose to define factivity as veridicality, the logical entailment of truth, rather than presuppositionality.

Furthermore, it is infelicitous to utter ‘S p_{nmz} *bil-*’ in a discourse context where both the speaker and the addressee agree and take it for granted that p is false. The speaker, again, sounds self-contradictory. This is illustrated by (8b) uttered in (8a).

- (8) a. Context:
Dilara says to Deniz “Did you watch the election last night? I was shocked by Trump’s victory.”
Deniz replies “Yeah. I was shocked too. You know what’s funny though...”
- b. Target sentence:
#Tunç Hilari’nin kazandığını biliyo.
Tunç Hillary-GEN won.NMZ knows
#Tunç knows that Hillary won.
Intended: Tunç has a mistaken belief about the outcome of the election.

Both observations point to the fact that ‘S p_{nmz} *bil-*’ implies the truth of p. The truth of p is inconsistent with the second conjunct in (1a), and with the common ground in (8), which results in infelicity.

Sentences where the matrix verb is negated, in (9), give rise to the same inference that the embedded proposition is true. The “projection” of the inference from the scope of negation indicates that the inference is a presupposition.

- (9) a. Tunç [Hilari-nin kazan-dığ-ın-ı] bil-m-iyo (#ve kazan-ma-dı.)
Tunç Hillary-GEN won-NMZ-3S-ACC win-NEG-PRES.3S and win-NEG-PST.3S
Tunç doesn’t know that Hillary won #and she didn’t win.
- b. Context for (9c)
After the election, I call Tunç and he tells me that he’s very disappointed by Trump’s victory.
- c. Target sentence:
#Tunç Hilari-nin kazandığını bil-m-iyo.
Tunç Hillary-GEN won.NMZ know-NEG-PRES.3S
#Tunç doesn’t know that Hillary won.
The assertive content is true: It is false that Tunç knows that Hillary won.

For completeness, when the embedded clause denotes a true proposition, reports of the form ‘S p_{nmz} *bil-*’ or ‘S p_{nmz} *bil-NEG*’ are felicitous.

- (10) a. Context:
Deniz to Dilara: Tunç also watched the election and...
- b. Tramp’ın kazandığını biliyo.
Trump-GEN won-NMZ knows
He knows that Trump won.
- c. Context:
Deniz to Dilara: Tunç didn’t follow the election results so...
- d. Tramp’ın kazandığını bilmiyo.
Trump-GEN won-NMZ doesn’t know
He doesn’t know that Trump won.

Turkish attitude reports where the predicate *bil-* composes with a nominalization presuppose the

truth of the proposition expressed by the nominalization. The factive alternant, then, patterns like English attitude reports of the form ‘S knows that p.’⁷

2.2 The non-factive alternant is not presuppositional

Composing *bil-* with a *diye* clause does *not* give rise to the inference that the proposition expressed by the embedded clause is true.

Sentence (1b) is repeated from the introduction. Conjoining an utterance of the form ‘S p_{diye} *bil-*’ with the denial of p results in a perfectly felicitous utterance that reports on a mistaken belief held by the attitude holder.

- (1b) Tunç [Hilari kazan-dı diye] bil-iyο (✓ama kazan-ma-dı.)
 Tunç Hillary.NOM won-PST.3S diye know-PRES.3S but win-NEG-PST.3S
 Tunç thinks (lit. knows) that Hillary won (✓but she didn’t.)

Furthermore, sentences of the form ‘S p_{diye} *bil-*’ can be uttered in contexts where discourse participants take it for granted that p is false.

- (11) a. Context, repeated from (8a):
 Dilara says to Deniz “Did you watch the election last night? I was shocked by Trump’s victory.”
 Deniz replies “Yeah. I was shocked too. You know what’s funny though. . .”
- b. Target sentence:
 Tunç Hilari kazandı diye biliyo.
 Tunç Hillary won diye knows
 Tunç thinks (lit. knows) that Hillary won.

The felicity of (1b) (compare with the infelicity of (1a)) suggests that the first conjunct does not give rise to the inference that the embedded proposition is true (otherwise, contradiction would ensure). The felicity of (11b) in context (11a) (compare with (8b)) corroborates this result.

At this stage, the meaning of these non-factive knowledge reports is well approximated by plain belief or thought reports. In section 2.3, it will become apparent that this is not entirely true: Non-factive alternants are felicitous in a proper subset of contexts where think or belief reports are acceptable.

2.3 The non-factive alternant cannot be reduced to plain belief

The meaning of the non-factive alternant cannot be reduced to plain belief. That is, it is not the case that the occurrence of *bil-* in the non-factive alternant has the same semantics as “believe.” Let us call the

⁷One difference between the Turkish factive alternant and English attitudes introduced by “know that,” might be that the factive inference is, at least for some speakers, defeated in Turkish given an appropriate prosodic contour on the sentence. This is the object of ongoing research, and I am unable to expand on it here. For concreteness, the location of the relevant perceived pitch accents (H*) and edge tones (H-) for a sentence with the inference and a sentence without is given in (i).

- (i) tunc hila^{H*}rinin kazandığım^{H*+H-} bili^{H*}yo. (factive)
 tunc hila^{H*}rinin^{H-} kazandığım biliyo. (non-factive)
 Tunç Hillary.GEN won.NMZ knows

All of the sentences reported to be factive here are judged with the factive contour.

hypothesis that it does the “homophony hypothesis.” The homophony hypothesis states that Turkish has two attitude predicates pronounced [bil], one that is equivalent to English “know” and another that is equivalent to English “believe.” In the case of the factive alternant, we observe the former. In the case of the non-factive alternant, we observe the latter. But then, the semantics of “believe” is disguised by a quirky pronunciation that misleads us into thinking that we are dealing with the knowledge predicate. According to the homophony hypothesis, the puzzle is only apparent.

The first argument against the homophony hypothesis comes from the observation that predicates other than *bil-* participate in the factivity alternation as well. Take the predicate *hatırla-*, ‘remember,’ from Hooper’s (1975) list of semi-factives. With a nominalized clause, the sentence implies that the embedded proposition is true, in (12a). With a tensed clause introduced by *diye*, it does not, in (12b).

- (12) a. Tunç [Hilari’nin kazandığını] hatırlıyor (#ama kazanmadı).
 Tunç Hillary.GEN won.NMZ remembers but she didn’t
 Tunç remembers that Hillary won #but she didn’t.
- b. Tunç [Hilari kazandı diye] hatırlıyor (✓ama kazanmadı).
 Tunç Hillary won diye remembers but she didn’t
 Tunç (lit.) remembers that Hillary won ✓but she didn’t.

The first trouble for the homophony hypothesis is that homophony would affect a class of predicates, which we have reasons to believe is a natural class. This is especially troubling given that the syntax of the embedded clause does vary on the surface, while the predicate does not. Trusting this observation should place the locus of the alternation in the embedded clause, or better still, in the composition between the embedded clause and the attitude predicate—not in the possibility that some languages have homophonous predicates.⁸

The second trouble is harder to formulate, but I believe, significant. Assume that “remember” is like “know,” a veridical attitude. Assume moreover that “know” has a non-veridical counterpart “believe.” What is the non-veridical counterpart of “remember”? It seems like we do not have a word for that, to “remember, with the possibility of being wrong.” I propose, then, that the non-veridical counterpart of “know” is not “believe.” It is more like to “know, with the possibility of being wrong.” Rather, I will argue that there is no veridical or non-veridical counterparts to begin with. Instead, I will let the predicates *bil-* and *hatırla-* denote whatever they denote—some mental state having to do with the possession or the accessing of information—and let the grammar decide on the rest. The rest is about whether the speaker is ready to take the belief proposition to be true (as in the factive alternant) or not (as in the non-factive alternant). The next argument should make this point clearer.⁹

The second argument goes like this: Non-factive knowledge reports cannot be reduced to plain belief

⁸I do not wish to reject the possibility of homophony altogether, nor the possibility that some languages have a single word for two notions that other languages might have two words for. For instance English collapses propositional “know” and acquaintance “know,” a distinction that is lexically clear elsewhere between *savoir* and *connaître* or *wissen* and *kennen*. The point here goes through, I believe, because a class of predicates is affected, and because what alternates can be singled out: A requirement on the truth of the embedded proposition, nothing in the denotation of the matrix predicate.

⁹Some readers may find it uneasy to speak about “knowledge without true belief” and claim that knowledge is what it is only because there is true belief. That it is misleading to talk about knowledge reports in the absence of true belief. I agree that this is a concern. Those readers might find it easier to think about *bil-* as denoting a mental state that is not knowledge. The linguistic puzzle remains: Why do some attitude ascriptions with *bil-* require the truth of the embedded proposition, while others do not? Why do some attitude predicates participate in the alternation, while others do not? Why does the alternation have a syntactic reflex? Why do some languages have the factivity alternation, while others do not? The answers to these questions might teach us something about what it means to know, to remember, etc., or these puzzles might remain merely linguistic in nature.

because *there are contexts in which plain belief reports are acceptable, but in which non-factive knowledge reports are not*. If the reduction were possible, the expectation would be that both kinds of reports should be acceptable in the same set of contexts. This is not what we observe, however. Rather, the distribution of non-factive knowledge reports is *more restricted* than that of plain belief reports.¹⁰ I take this to suggest that the former has a meaning component that is absent from the latter.

To see this difference between plain belief and non-factive knowledge reports, take the context in (13a). The context in (13a) is such that Tunç's belief is ungrounded, in an intuitive sense. He believes that Hillary won, though he is in possession of no objective evidence that bears upon the question of whether she actually did. The speaker is aware of the content of Tunç's belief, and of the fact that the belief is based on some obsession. But the speaker has no personal belief about who won. In this context, the belief and thought reports in (13b) are felicitous and true. On the other hand, the non-factive knowledge report in (13c) sounds odd.¹¹

- (13) a. Context: 'Obsession'
- (i) Attitude holder's doxastic state:
Tunç is obsessed with Hillary. So much so that, although he was unable to watch the outcome of the election, he assumes that he lives in a world where Hillary has won the election by a landslide, and has become POTUS.
- (ii) Speaker's doxastic state:
I am not much involved in politics. I do not know who won. And I do not have a belief either way.
- b. Tunç Hilari kazandı {diye düşünüyö, sanıyo}.
Tunç Hillary won diye think believe
Tunç thinks/believes that Hillary won.¹²
- c. #Tunç Hilari kazandı diye biliyo.
Tunç Hillary won diye knows
Tunç (lit.) knows that Hillary won.

The felicity and truth of (13b) suggests that not much is required to license belief and thought reports. There must be belief. But how that belief was acquired does not seem to be constrained. The infelicity of (13c) is then unexpected, if it simply meant "Tunç thinks/believes that Hillary won."

Now, what is odd about (13c)? The core empirical contribution of this paper is that attitude reports like (13c) are odd because *bil-* imposes the condition that the belief must be, in some sense, justified. The context in (13a) fails to satisfy this condition. To see this, compare the infelicity of (13c) in context (13a) to its felicity in (14a). The context in (14a) is modified from (13a). In (14a), the attitude holder's belief has an external source of information, a news report, which is furthermore conventionally taken to be reliable. The speaker is aware of the content of the attitude holder's belief, and that it is grounded

¹⁰I think this situation can be compared to the contexts where *some* (ok in a broader set of contexts) and *all* (ok in a restricted set of contexts) are acceptable. For this reason the meaning of *all* cannot be reduced to the meaning of *some*. This is just an analogy. I do not argue that plain belief reports and non-factive knowledge reports differ in quantificational force.

¹¹It is difficult to intuit whether the sentence is false or infelicitous. The latter may be the case. This shakiness is attested in the literature and is claimed to occur when reliability conditions on knowledge are not met [Kratzer, 2002, Egré, 2016].

¹²For reasons that I do not know, the predicate *san-* ('believe') is degraded with *diye*, when the embedded clause is immediately preverbal. Given that we are comparing overall felicity conditions here, this should not matter. When the minimality of pairs is relevant, I prefer to use *düşün-* ('think'), which seems to be compatible with *diye* in conditions similar to *bil-*.

in this sense. But again, he is not personally opinionated as to the outcome of the election.¹³ In this new context, belief and thought reports remain acceptable. The crucial contrast with (13) is that the non-factive knowledge report becomes acceptable as well.

- (14) a. Context: ‘News report’
- (i) Attitude holder’s doxastic state:
The attitude holder watched a news report that conveyed the information that Hillary won the election. He thereby came to believe that Hillary won.
 - (ii) Speaker’s doxastic state:
I am not much involved in politics. I do not know who won. And I do not have a belief either way. I do know that Tunç watched the news, and that he came to believe that Hillary won.
- b. Tunç Hilari kazandı {diye düşünüyö, sanıyo}.
Tunç Hillary won diye think believe
Tunç thinks/believes that Hillary won.
- c. ✓ Tunç Hilari kazandı diye biliyo.
Tunç Hillary won diye knows
Tunç (lit.) knows that Hillary won.

The acceptability of a non-factive knowledge report, then, does depend on whether there is *justified* belief, rather than whether there is belief *simpliciter*. Justified in what sense? I must remain vague here and appeal to the intuition that the difference between (13a) and (14a) makes use of the availability of an external, (usually) reliable source of information.

Let us now factor *in* the speaker’s belief about whether the attitude holder’s belief is true. Take the ‘News report’ context in (14a), where the non-factive attitude report is licensed. We now manipulate whether the news report conveyed, loosely speaking, ‘real’ information, or ‘fake’ information. By real information, I intend information that reflects the actual outcome of the election (Hillary won, and the news says “Hillary won”), and by fake information, information that does not reflect the actual outcome of the election (Trump won, but the news says “Hillary won”). The speaker is now taken to know the outcome of the election.

(15) Contexts: ‘Fake vs. real information’

¹³These attempts to keep the speaker agnostic about the truth of the belief proposition serve the purpose of factoring out speaker evaluativity in third person attitude ascription. Indeed, when we choose “S believes p” or “S knows p” etc., we tend to reveal our own beliefs about p. But these attitude ascriptions also introduce constraints on *how* the belief was formed, on top of whether the belief should be taken to be true. The enterprise here is to tap into our intuitions about the former.

Now, one might wonder whether contexts like (14a) are natural. If Tunç tells me “I watched the news. Hillary won.” (citing the source, and the belief) will I not be prompted to make that belief also my own? Usually, yes. But this is not necessary. If Tunç were a bit more indirect and said “I watched the news. It’s incredible that this country now has its first female president.” thereby forcing me to accommodate that Hillary won, I might not make that belief mine that easily, though I did accommodate whatever was necessary for the purpose of that exchange.

Readers might also find the following experience familiar:

- (i) Tunç: “I watched the news. Hillary won.”
Deniz: “No way! [Googling it...] Ok. I guess you’re right.”

This suggests that it is natural to possess information about the content and the source of other people’s beliefs, while remaining agnostic about that content.

- a. Attitude holder’s doxastic state:
The attitude holder watched a news report that conveyed the information that Hillary won the election. He thereby came to believe that Hillary won.
- b. State of the world and speaker’s doxastic state:
Add to (14a):
 - (i) Trump won. The news report conveyed *fake* information. The speaker knows this.
Thought/belief: ✓ (14b)
Non-factive knowledge: ✓ (14c)
 - (ii) Hilary won. The news report conveyed *real* information. The speaker knows this.
Thought/belief: # (14b)
Non-factive knowledge: # (14c)

In the fake information context, the judgments in (14) still hold. The belief and thought reports are acceptable, as well as the non-factive knowledge report. In the real information context, all three types of attitude reports sound odd.

Is it surprising that plain belief reports and non-factive knowledge reports start sounding odd in a context where both the attitude holder and the speaker believe *p*, and furthermore, that they are justified in believing *p*? I think not.¹⁴ Indeed, the reason for this oddness might be the fact that the factive alternant is licensed in this precisely this context, but in none of the other contexts. The factive alternant is repeated in (16), with acceptability judgments in the contexts introduced above. In the Obsession, (speaker agnostic) News report, and the Fake news report contexts, the sentence is odd presumably due to presupposition failure. In the Real news report context, the sentence is felicitous.

- (16) Tunç Hilari’nin kazandığını biliyo.
Tunç Hillary.GEN win.NMZ knows
Tunç knows that Hillary won.
- | | |
|------------------------|------------------------|
| a. Obsession: # | Presupposition failure |
| b. News report: # | Presupposition failure |
| c. Fake news report: # | Presupposition failure |
| d. Real news report: ✓ | |

It is possible, then, that plain belief and non-factive knowledge reports are odd in the Real news report context because a stronger alternative, namely (16), is licensed. This should be the same kind of oddness that arises with utterance “Some sailors smoke Players” in a context where all (of the relevant) sailors smoke Players.

Recall that nominalized embedded clauses can also occur under the predicates *düşün-* and *san-*. Such cases were not mentioned in this section. For completeness, the relevant judgments are provided in (17).

¹⁴Paul Marty (p.c.) suggests that this might be surprising. Traditional accounts of anti-presupposition are based on the claim that knowledge and belief are pragmatic competitors, and that the choice of the latter in contexts where the former is licensed gives rise to the inference that the belief proposition is false. This competition is easy to set up if the knowledge predicate entails the truth of the proposition it embeds, but the belief predicate does not. The view from Turkish is that care should be taken in how this competition is set up, given that there is no obvious sense in which *bil(p)* entails *p*. If the entailment went through, we would be hard pressed to explain how *p* could be denied when *bil(p)* is asserted.

(17) Tunç Hilari'nin kazandığını düşünüyö/sanıyo.
 Tunç Hillary.GEN win.NMZ think/believe
 Tunç thinks/believes that Bernie won.

- a. Obsession: ✓
- b. News report: ✓
- c. Fake news report: ✓
- d. Real news report: #

Stronger assertion, (16), is licensed

The judgments for (17) are not distinct from the judgments for its counterpart with a tensed embedded clause above. This suggests that there is no evidence for the claim that clause type affects the acceptability of belief and thought reports in the contexts provided in this section.

To sum up, the following picture emerges: Factive knowledge reports are felicitous in a proper subset of contexts where non-factive knowledge reports are felicitous, which are in turn felicitous in a proper subset of contexts where plain belief reports are felicitous.

(18) a. $C(\text{NMZ}+bil-) \subseteq C(\text{diye } bil-) \subseteq C(\text{believe})$
 Belief+Justification+Truth Belief+Justification Belief

b. Licensing conditions on some Turkish attitude reports

| | | requirement | | |
|----------|-------------------------|---------------|----------------------|--------------|
| | | <i>belief</i> | <i>justification</i> | <i>truth</i> |
| | <i>factive know</i> | yes | yes | yes |
| attitude | <i>non-factive know</i> | yes | yes | no |
| | <i>think/believe</i> | yes | no | no |

Given that we cannot reduce the non-factive alternant to a factive knowledge report (last section), and that we cannot reduce it to a plain belief report (this section), we need an “intermediate” attitude category. The observation that natural language encodes this category is the core empirical contribution of this paper. The predicate *bil-*, I claim, introduces the core meaning component “to have the justified belief that,” which corresponds to that category. This kind of attitude is strictly stronger than plain belief (which requires no justification) and strictly weaker than factive knowledge (which requires both justification and truth). How to get the truth requirement alternate in the composition is the topic of section 3.¹⁵

3 Proposal

3.1 A unified semantics for *bil-*

Recall our overarching question from the introduction:

(19) What must the denotation of *bil-* look like, such that composing *bil-* with a nominalization gives rise to a factive inference, but that composing *bil-* with a *diye* clause does not?

The factivity alternation can be captured with the unified lexical entry for *bil-* given in (20). The denotation of the attitude predicate relates a possible world, two predicates of events (of type $\nu(st)$), and an

¹⁵A detailed exploration of the nature of this “justification” is a topic for further research. How do the judgments for non-factive knowledge reports fare in the so-called Gettier (and related) cases [Gettier, 1963, a.o.]?

attitude holder (which could very well be severed à la Kratzer—this is not directly relevant at this point). The predicates of events are an innovation over familiar lexical entries for “know,” and their independence is what underlies the possibility of a unified account.

- (20) Lexical entry for *bil-*
 For all $w \in D_s$, $\Phi, \Psi \in D_{\nu(st)}$, $x \in D_e$,
- a. Presupposition component
 $\llbracket bil- \rrbracket(w)(\Phi)(\Psi)(x)$ is defined iff $\exists e[\Phi(e)(w)]$
 - b. Assertion component
 $\llbracket bil- \rrbracket(w)(\Phi)(\Psi)(x) = 1$ iff
 - (i) $\exists R[$
 - (ii) $\iota e'[\Phi(e')(w)] = \iota e''[R(x, e'', w)]$
 - \wedge
 - (iii) $DOX_{x,w} \subseteq \{w' | \Psi(\iota e'''[R(x, e''', w')])(w')\}$
 - $]$

A particular eventuality e , the *res*, is recovered from the first predicate of events Φ .¹⁶ The eventuality e , which satisfies Φ , is located in the actual world by a definedness condition on the function denoted by *bil-*. This is spelled out in (20a). The attitude holder is acquainted with e in the evaluation world through a relation R , (20bi) & (20bii). Crucially, the attitude holder need not believe that e is a Φ event. This is where the second predicate of events Ψ becomes relevant. The predicate Ψ describes what the attitude holder believes the eventuality that they are acquainted with to be, (20biii). This lexical entry makes use of a design feature of the traditional “dedicated *de re* LF” analyses of *de re* beliefs about individuals.

Before moving on, it is useful to rehearse attitudes *de dicto* and *de re*, as well as the traditional “dedicated *de re* LF” analysis of *de re* beliefs about individuals. Take example (21).

- (21) a. Context:
 Kim is walking around in the hospital, peeking into some of the rooms as she's going along. She doesn't personally know any of the patients there. One of the rooms is hosting a delivery, which Kim decides to watch.
 Kim thinks to herself: “That person is giving birth.”
- b. De dicto belief report:
 Kim believes that that person is giving birth.
 - c. De re belief report:
 Kim believes that Kate is giving birth.

In this context, we can choose to report Kim's belief in one of two ways. In (21b) we report Kim's belief literally (so to speak). And in (21c), we fill in the name of the person giving birth. The former is a *de dicto* belief report, and the latter, a *de re* belief report. The crucial observation about (21c) is that the report

¹⁶Note that Φ does not range over eventualities directly. There is precedent in the literature for recovering *reses* from predicates [Frana, 2006]. For present purposes, this choice should not be viewed as a strong commitment, but rather as simple way of exposing the solution to the problem raised by the factivity alternation and of formulating the semantic presupposition. A candidate type for the *res* argument is that it could range over intensions of eventualities (sv), denoting some (potentially different) event in every relevant possible world. Given that presuppositions are propositional, an extra mechanism would then be required to locate the *res*, viewed as an eventuality concept, in the evaluation world. This is an avenue for further research.

is felicitous *even though Kim does not know that the subject of her belief is called Kate*. Suppose now that Kim *misrecognizes* the person giving birth as Mary. It is perfectly acceptable to report this belief (de dicto) as follows:

(22) Kim believes that Mary is giving birth.

What is important here is that the identity of the person giving birth in the actual world, and their identity in Kim's belief worlds is allowed to mismatch.

For reasons that are not crucial here, traditional analyses of propositional attitudes do not capture the fact that we can felicitously and truthfully report Kim's belief by uttering (21c) (for an overview, see Charlow and Sharvit [2014]). This prompts an analysis of *de re* belief ascriptions along the following lines. There is a dedicated *de re* lexical entry for “believe,” given in (23b), alongside a dedicated *de dicto* lexical entry, given in (23a).

(23) Definitions of *de dicto* and *de re* believe.

a. De dicto believe

For all $w \in D_s$, $p \in D_{st}$ and $x \in D_e$,

$$\llbracket \text{believe} \rrbracket(w)(x)(P)(y) = 1 \text{ iff } DOX_{x,w} \subseteq \{w' | p(w')\}$$

b. De re believe

For all $w \in D_s$, $x \in D_e$, $P \in D_{e(st)}$ and $y \in D_e$,

$$\llbracket \text{believe} \rrbracket(w)(x)(P)(y) = 1 \text{ iff}$$

(i) $\exists R[$

(ii) $\text{acquaintance}(R)$

\wedge

(iii) $x = \iota x' [R(y, x', w_0)]$

\wedge

(iv) $DOX_{y,w} \subseteq \{w' | P(\iota x'' [R(y, x'', w')])\}(w')\}$

$]$

The LF for the *de re* ascription in (21c) is given in (24).

(24) LF for (21c):

$$\llbracket \text{believe} \rrbracket(w_0)(\text{kate})(\lambda x \lambda w. \text{give-birth}(x)(w))(\text{kim}) = 1 \text{ iff}$$

$$\exists R[\text{kate} = \iota x' [R(\text{kim}, x', w_0)] \wedge DOX_{\text{kim}, w_0} \subseteq \{w' | \text{give-birth}(\iota x'' [R(\text{kim}, x'', w')])\}(w')\}$$

The definition of (23b) makes Kim's belief be about an individual in the actual world, Kate. Kim does not need to know Kate's name for her to form a belief about Kate, so long as she is properly “acquainted” with her. Here, the context provides a proper acquaintance relation: $R = \lambda x \lambda y \lambda w. x$ watches y in w . The de dicto analysis of belief does not capture this possibility. According to (23a) applied to the material in (21c), the belief proposition will be of the form “Kate is giving birth,” which will evaluate to false in the context given simply because Kim does not know Kate's name.

Importantly for the present proposal, this analysis of *de re* belief extends to *reses* provided by definite descriptions as well. This is important because eventualities, unlike individuals, do not necessarily have names—though both eventualities and individuals can be described, by using the predicates they satisfy.

(25) a. Context:

Same as (21a). But this time, what's going on in that room is a post-contemporary play. A

male actor is playing the part of a person giving birth. Kim doesn't realize that its a set up. (In this possible world, still only women are able to give birth.)

- b. Target sentence:
 Kim believes that the man is giving birth.
 Kim's literal (de dicto) belief: "That person is giving birth."

Uttering (25b) is felicitous and true in the context given. But surely the individual that is giving birth is not a man in Kim's belief worlds!

This feature of *de re* belief, which allows for a mismatch between the identity of the *res* in the actual world and its identity in the attitude holder's belief worlds, is what is transferred to the analysis of *bil-*, visible in the lexical entry in (20).¹⁷ The main difference is that beliefs introduced by *bil-* are about eventuality-type *reses*. And, like with individual-type *reses*, the description of the eventuality in the evaluation world (the "fact" about which the belief is) need not match its description in the the attitude holder's belief worlds (what the attitude holder believes that fact is).¹⁸

The specific way in which this lexical entry derives the felicity and truth conditions of the alternating attitude reports is given in the next two subsections. Before proceeding, I would like to comment on the difference between the analysis of the knowledge predicate presented here and traditional analyses. These share the feature of recovering the actual world correlate of the belief and the content of the belief from the same semantic object. These proposals are designed to account for the "truth condition" on knowledge (see section 2.1). A few examples are given in (26):

- (26) a. $\llbracket know \rrbracket(w)(p)(x)$ is defined iff $p(w)$
 $\llbracket know \rrbracket(w)(p)(x)$ is true iff $DOX_{x,w} \subseteq \{w' | p(w')\}$ Textbook analysis, e.g., Percus [2006]
- b. S knows p iff
 (i) There is a fact f that exemplifies p ,
 (ii) S believes p *de re* of f ,
 (iii) S's belief is reliable. Adapted from Kratzer [2002]
- c. S knows $P \in D_{e(st)}$ in w iff
 there is some individual y of which P holds in w and S believes P *de re* of y in w Frana [2006]

The definitions in (26a) and (26b) have the knowledge predicate compose with a proposition. That proposition is presupposed true (26a), or asserted to "correspond," in some sense, to an actual world situation. The definition in (26c), designed to account for the semantics of concealed questions introduced by *know*, has the knowledge predicate compose with a predicate of individuals. This predicate holds true of an individual in the world of evaluation as well as in the attitude holder's belief worlds. In sum, in none of these proposals is a mismatch possible between what the evaluation world is like, and what the belief worlds are like—in their relevant aspects.

Independent reference to a *res* and to belief content provides a way of accounting for non-factivity, which is a positive result in light of Turkish non-factive knowledge ascriptions, provided that there is a

¹⁷There are three minor differences between (20) and (23b): The semantic type of the *res* argument (individual vs. eventuality), how it is recovered (selected directly vs. extracted from a predicate), and the semantic presupposition component.

¹⁸It is legitimate to ask whether the attitude reports in the factivity alternation can be *de re* of individuals. I think so. Capturing this would probably involve implementing traditional analyses of *de re* belief about individuals on top of the proposed mechanism. I am unaware of accounts dealing with *de re* in knowledge contexts. Sentences like: "Kim knows that the man is giving birth" where "the man" is read *de re*.

way of capturing the truth condition on knowledge, like the proposals in (26) are able to do. The results of the preceding discussion is summed up by the analytical constraint in (27).

(27) **The persistence of truth**

If the truth component and the belief component of a knowledge ascription are recovered from the same proposition ϕ (same predicate Φ , etc.), for any unembedded occurrence of the knowledge predicate, factivity cannot be defeated.

Now that the core component of the proposal has been motivated, let us put it to use and see how it accounts for the factivity alternation.

3.2 Deriving the non-factive alternant

The definition of *bil-* gives the right truth conditions for the non-factive alternant straightforwardly, when its arguments are “plugged in.” They are similar to the truth conditions of *de re* belief ascriptions about individuals.

Recall example (1b):

- (1b) Tunç [Hilari kazandı diye] biliyo.
 Tunç Hillary won diye knows
 Tunç thinks that Hillary won.

Informally, we want the *diye* clause to describe the content of Tunç’s belief. And we want that belief to be about a (potentially) different actual world event. Assume for simplicity that the speaker has a specific event in mind, the Trump victory, about the which the attitude holder has the mistaken belief that it is a Hillary victory. The target felicity and truth conditions for (1b) are spelled out formally in (28).

(28) a. Notation:

- (i) $T := \lambda e \lambda w. victory(e)(w) \wedge agent(e)(w) = trump$
 (ii) $H := \lambda e \lambda w. victory(e)(w) \wedge agent(e)(w) = hillary$

b. Target felicity and truth conditions for (1b)

- (i) $\llbracket (1b) \rrbracket(w_0)$ is defined iff $\exists e [T(e)(w_0)]$
 (ii) $\llbracket (1b) \rrbracket(w_0)$ is true iff

$$\begin{aligned} & \exists R [\\ & \quad \iota e' [T(e')(w_0)] = \iota e'' [R(tunc, e'', w_0)] \\ & \quad \wedge \\ & \quad DOX_{tunc, w_0} \subseteq \{w' | H(\iota e''' [R(tunc, e''', w')]) (w')\} \\ &] \end{aligned}$$

That is, $\llbracket (1b) \rrbracket$ is defined at w_0 iff there is a Trump victory at w_0 , and true iff Tunç is acquainted with the Trump victory, but believes that it is a Hillary victory.

To arrive at the truth conditions in (28), the way the *res* and the belief content are recovered needs to be specified. Assume first that the *diye* clause must correspond to the belief content argument Ψ . How then is the *res* recovered? I propose that the *res* argument is (typically) unpronounced in sentences like (1b), and can be filled in in one of two ways: By the insertion of a referential pronoun denoting a specific event, or by existential closure of a variable ranging over predicates of events. The choice of one strategy or the other has interpretive consequences spelled out in upcoming discussion. The semantic object

from which the *res* is recovered is indicated by \varnothing_i , where i is a typical pronominal index.

The semantic parse of (1b) looks like (29). Syntactic structure is provided in pseudo-Turkish on the first line. The second line matches surface material to *bil*-’s abstract argument slots. The third line fills in the denotation of *bil*-, its arguments and the root abstractor over worlds.

$$(29) \quad \begin{array}{l} \text{[Tunç [[Hillary won diye] } [\varnothing_8 \quad \text{knows}]]] \\ x \quad \Psi_{\text{belief}} \quad \Phi_{\text{res}} \quad \text{bil-}w_0 \\ \lambda w_0 [tunc [[\lambda e \lambda w. H(e)(w)] [g(8)/x_8 [\lambda w \lambda \Phi \lambda \Psi \lambda x. \text{bil}(w)(\Phi)(\Psi)(x) w_0]]]]] \end{array}$$

With the assumption that $g(8)$, the *res* argument, denotes the specific predicate of events T , corresponding to the Trump victory, the truth conditions in (28b) follow from (29).

3.3 Deriving the factive alternant

Introducing the possibility of a mismatching *res* and belief is useful for deriving the non-factive alternant. Such a mismatch, however, does not immediately account for the factive alternant. In traditional accounts, ‘S knows p’ entails (among other things) that S believes p and that p is true. The belief proposition matches a proposition that is true in the actual world.

$$(30) \quad \begin{array}{l} \text{Tunç Tramp’ın kazandığını biliyo.} \\ \text{Tunç Trump.GEN won.NMZ knows} \\ \text{Tunç knows that Trump won.} \end{array}$$

In the present system, the truth condition is recast as a matching condition between the description of the *res* and the content of the belief. In a factive attitude report like (30), the attitude holder is acquainted with the Trump victory in some appropriate way (the *res*), and has formed about the Trump victory the belief that it is a Trump victory (the belief). It is in this sense that the description of the *res* matches the content of the belief. This condition is formulated in (31).

$$(31) \quad \begin{array}{l} \textbf{The fact-belief matching condition, for predicates of events:} \\ \text{If ‘S knows } \Phi_{v(st)} \Psi_{v(st)} \text{’ describes a situation of } \textit{bona fide} \text{ knowledge at } w, \text{ then } \Phi = \Psi. \\ \textbf{Notation: } \Phi \text{ corresponds to the } \textit{res} \text{ and } \Psi \text{ to the belief} \end{array}$$

This condition is a descriptive. It is what needs to be enforced in the composition to capture the meaning of factive attitude reports. Simply put, in the system proposed, matching is obtained by covaluing Φ and Ψ . In traditional accounts of knowledge reports, this condition is directly enforced by recovering the truth component and the belief component from the same semantic object (recall the discussion surrounding (26) and (27)), which is not an option here.

Turning now to the derivation of the factive report (30), its target felicity and truth conditions are given in (32).

- (32) a. Notation:
 $T := \lambda e \lambda w. \text{victory}(e)(w) \wedge \text{agent}(e)(w) = \text{trump}$
- b. Target felicity and truth conditions for (1a)
- (i) $\llbracket (1a) \rrbracket$ is defined iff $\exists e [T(e)(w_0)]$
- (ii) $\llbracket (1a) \rrbracket$ is true iff
- $$\begin{aligned} & \exists R [\\ & \quad \iota e' [T(e')(w_0)] = \iota e'' [R(\text{tunc}, e'', w_0)] \\ & \quad \wedge \\ & \quad \text{DOX}_{\text{tunc}, w_0} \subseteq \{w' | T(\iota e''' [R(\text{tunc}, e''', w')]) (w')\} \\ &] \end{aligned}$$

Note first that definedness condition, that there is a Trump victory in the actual world, captures the observation that (30) presupposes the truth of the proposition that Trump won. The existence of a Trump victory in the attitude holder's belief worlds is asserted: The belief matches the fact. This is equivalent to what traditional accounts of knowledge guarantee: The truth of the embedded proposition p and the belief that p .

Now how does one guarantee that the matching condition (31) will be met when *bil-* composes with a nominalization? My proposal is that the nominalization spells out the *res* argument Φ , which proceeds to raise and bind the belief argument Ψ . This is illustrated in (33).

- (33) Forced matching with belief argument bound by *res*
 Semantic parse for (1a)
 $\text{Tunc} \zeta [\text{[_{res}} \lambda e \lambda w. \text{Trump-won}(e)(w)] [\lambda_8 [\Psi_8 [t_8 \text{ bil}]]]]$

The sister to *bil-*, t_8 , is the trace left by raising the *res* argument. Ψ_8 is a variable ranging over predicates of eventualities, which is in the appropriate structural position to saturate *bil-*'s belief content argument. The variable Ψ_8 gets bound by the abstractor created by raising the *res* argument. Both t_8 and Ψ_8 get valued by the material in brackets subscripted *res*.

In sum, the lexical entry for *bil-* allows for the derivation of both non-factive and factive attitude reports modulo assumptions about the composition between the attitude verb and different types of embedded clauses.

4 Discussion 1: Regulating the distribution of embedded clauses

4.1 Simultaneous realization of *res* and belief arguments

The semantics sketched out in the previous section relies on syntactic assumptions which are clarified, and to the extent possible, motivated in this section.

The lexical entry proposed for *bil-* introduces two semantically selected “internal” arguments, both of which are represented in the composition. This is not standard.¹⁹ Perhaps the strongest indepen-

¹⁹The dedicated *de re* analysis of “believe” is criticized on similar grounds. Not necessarily because of the fact that it requires feeding the attitude verb two arguments, but because of how the verb's *res* argument “gets there” (the claim that *res* movement is an ad hoc mechanism). As for existing *de re* analyses of “know,” they quantify over a *res* in the metalanguage, but the attitude

dent motivation for this aspect of the proposal comes from the acceptability²⁰ of sentences where both arguments are simultaneously pronounced. Such an example is provided in (34).

- (34) Tunç _{[NMZ}Trump'ın kazandığını] _{[diye}Hilari kazandı diye] biliyo.
 Tunç Trump.gen won.nmz Hillary won diye knows
 a. Available: Tunç believes of Trump's victory that Hillary won.
 b. Unavailable: Tunç believes of Hillary's victory that Trump won.

In (34), one of the arguments is realized by a nominalization and the other, by a *diye* clause. The nominalization denotes an actual world situation, the fact that Trump won, though it does not determine the content of Tunç's belief. The nominalization expresses what the belief is about, and in this sense, constitutes the argument from which the *res* is recovered. The belief is determined by the *diye* clause, whose content, on the other hand, does not correspond to any actual world situation. The meaning of (34) is given in (34a). The attempt to give (34) an alternative meaning, one where the content of the belief is recovered from the nominalization, and the *res* is recovered from the *diye* clause, is not successful, as indicated by the reading marked unavailable in (34b). In other words, there is a rigid mapping between the nominalization and the *res*, and the *diye* clause and the belief.

This is the only configuration in which the expression of two arguments is licensed with *bil-*.²¹ Attempts to saturate *bil-*'s argument slots with two nominalizations or with two *diye* clauses result in ungrammaticality. This is illustrated by the pair of examples in (35).

- (35) a. *Tunç _{[NMZ}Trump'ın kazandığını] _{[NMZ}Hilari'nin kazandığını] biliyo.
 Tunç Trump-gen won.nmz Hillary-gen won.nmz knows
 (i) Intended: Tunç believes of Trump's victory that Hillary won.
 (ii) Or, intended: Tunç believes of Hillary's victory that it's a Trump victory.
 b. */#Tunç _{[diye}Trump kazandı diye] _{[diye}Hilari kazandı diye] biliyo.
 Tunç Trump won diye Hillary won diye knows
 (i) Intended: Tunç believes of Trump's victory that Hillary won.
 (ii) Or, intended: Tunç believes of Hillary's victory that it's a Trump victory.
 (iii) Available, unintended: Because Trump won, Tunç believes that Hillary won.

The patterns in (34) and in (35) are perhaps surprising from the point of view of the semantic type of *bil-*'s two internal arguments. These were both presented as being of type $\nu(st)$, the type of predicates of eventualities. We observe *diye* clauses saturating one argument slot, what accounts for the impossibility of its saturating the other? The same question applies to nominalizations. One (or both) of two things might be going on:

1. The semantics of *bil-* might be slightly different in the kinds of arguments it introduces, though

verb selects for a single internal argument in the syntax/semantics.

²⁰A disclaimer is in order. I find such examples acceptable and this judgment predates the two argument analysis for *bil-* given here. However, collecting judgments about them, which was done in an informal setting, has yielded mixed results. Several native speakers, who were asked in written form, did not accept them. One native speaker, who was asked face to face, as well as several native speakers in the audience at the Tu+2 workshop, where some of this material was presented, did accept them. This deserves further thought. The acceptability of these sentences might be illusory, depend on prosody, and be prone to various forms of experimenter bias.

²¹Leaving aside the possibility of substituting the nominalization and the *diye* clause with appropriate proforms. Even then, although the surface realization of the *res* and the belief will be "different" from what is seen here, the correspondence between types of proforms and semantic argument slots is rigid.

the general mechanism for deriving the factivity alternation need not be very different from what is presented here;

2. And/or: syntactic restrictions apply differently to nominalizations and *diye* clauses, which regulates their distribution and correspondence to semantic categories.

I pursue an account based on syntactic restrictions in section 4.2. Some thoughts about implementing a different semantics for *diye* are given in section 6.2.

4.2 Case licensing nominalizations

It is possible to express *bil*-’s two semantic arguments simultaneously, and the mapping between the syntactic objects that fill in those arguments and the semantic categories they map on to is rigid. What explains the rigidity of this mapping? First, let us try to make sense of the restriction on having two arguments of the same syntactic type.

Nominalizations have to be case marked In the examples where *bil*- composes with a nominalization, overt accusative case on the nominalization is obligatory. This is illustrated by (36), which differs from the examples seen before in that it highlights the fact that the omission of the accusative marker leads to ungrammaticality:

- (36) Tunç Tramp’ın kazandığı*(n-1) biliyo.
Tunç Trump.GEN won.NMZ-ACC knows
Tunç knows that Trump won.

Different embedding verbs assign different cases to the nominalizations that they embed. This is shown by (37), where the predicate *üzül*-, “become sad about,” assigns the dative to the nominalization.

- (37) Tunç Tramp’ın kazandığı*(n-a) üzüldü.
Tunç Trump won.NMZ-DAT got sad
Tunç got sad about the fact that Trump won.

Furthermore, nominalizations are grammatical as sentential subjects, in (38a), and as complements of postpositions, in (38b).

- (38) a. [Tramp’ın kazandığı] ortada.
Trump.GEN won.NMZ in the middle
That Trump won is obvious.
b. Tunç [[Tramp kazandığı] için] üzüldü.
Tunç Trump won.NMZ for got sad
Tunç got sad because Trump won.

Although overt case morphology is not visible in the pair of sentences in (38), the nominalization is in a case position.

Finally, in examples like (39a) and (39b), the main predicate is respectively an intransitive, and a light verb construction. The intransitive does not take an internal argument: This yields ungrammaticality when the attempt is made to compose it with a nominalization. The light verb construction’s internal

argument is saturated by the light noun “dream,” with the same result that the verbal compound cannot compose with a nominalization.

- (39) a. *Tunç Tramp’ın kazandığını konuştu.
 Tunç Trump.GEN won.NMZ.ACC talked
 Intended: *Tunç talked that Trump won.
- b. *Tunç Tramp’ın kazandığını rüya gördü.
 Tunç Trump.GEN won.NMZ.ACC dream saw
 Intended: Tunç dreamed that Trump won.

From these observations, we can draw the conclusion that nominalizations must occupy case positions.²² The case requirement on nominalized embedded clauses explains the ungrammaticality of sentences like (35). The verb *bil-* can case license exactly one argument. Given that every nominalization must be case licensed, *bil-* cannot compose with more than one nominalization.

This observation might also give us a handle of the mapping between nominalizations and *reses*. Standard (though perhaps naïve) assumptions about phrase structure make a verb’s internal argument start out as the verb’s sister in the syntactic derivation. If there is a case marked argument in the structure, it must be the *res* argument.

- (40) [SUBJECT [RES-ACC [8 [... [t₈ V]]]]]

The discussion in this section accounts for the restriction on feeding two nominalizations to *bil-* and for the descriptive generalization that nominalizations map on to *bil-*’s *res* argument. What is left to do is make sense of *diye*’s distribution. For now, it seems like nothing in the system prevents *diye* clauses from getting case, and feeding into *bil-*’s *res* argument.

No evidence that *diye* clauses need case licensing The syntactic status of *diye* clauses is less easily read off their distribution. Unlike nominalizations, *diye* clauses are not grammatical as sentential subjects and as complements of postpositions. This is given in (41).

- (41) a. *Tramp kazandı diye ortada.
 Trump won diye in the middle
 Intended: It’s obvious that Trump won.
- b. *Tunç Tramp kazandı diye için üzüldü.
 Tunç Trump won diye for got sad
 Intended: Tunç got sad because Trump won.

²²The observation that nominalizations occur in predicate positions might conflict with this claim, as in (i). Rajesh Bhatt (p.c.) points out that the predicate position might not be a good test case. DPs, which usually require case, do occur there. It is possible that the predicate in this case might be a headless relative—whose head can optionally be expressed as in (ii).

- | | | | |
|-----|--|------|---|
| (i) | Yalan Hilari’nin kazandıydı. lie Hillary.gen won.nmz.pst The lie was that Hillary won. | (ii) | Yalan Hilari’nin kazandığı yalan ydı. lie Hillary.gen won.nmz.nom lie-compound-pst The lie was the lie that Hillary won. |
|-----|--|------|---|

I leave it an open question here whether nominalizations are uniformly introduced by NPs, some of which are unpronounced. The alternative is to arrive at an NP-like object by type shifting the embedded clause. In general, I am making the assumption throughout the paper that there is exactly one kind of nominalization. This hypothesis needs tested.

Furthermore, they readily compose with intransitives, and with verbs whose internal argument slot is already saturated.

- (42) a. Tunç [Trump kazandı diye] konuştu.
Tunç Trump won diye talked
Tunç talked saying/and said that Trump won.
- b. Tunç [Trump kazandı diye] rüya gördü.
Tunç Trump won diye dream saw
Tunç dreamed that Trump won.

These patterns suggest that *diye* clauses do not, (42), and cannot, (41), occupy argument positions.

The observation that *diye* clauses appear in (surface) direct object positions, however, casts doubt on the strength of this conclusion.

- (43) a. Tunç [Trump kazandı diye] biliyo/düşünüyo.
Tunç Trump won diye knows/thinks
Tunç thinks that Trump won.
- b. Tunç [Trump kazandı diye] üzüldü.
Tunç Trump won diye got sad
Tunç got sad that Trump won.

If *diye* clauses were overtly case marked, we could conclude that they are arguments. From the lack of case morphology, however, we cannot conclude that *diye* clauses are not arguments.²³ It is likely that in sentences like (43b), the verb is being used as an intransitive, and that this configuration can be reduced to the ones in (42a) or (42b). The same kind of reduction is more difficult for the configuration in (43a). Aside from the factivity alternation, the *diye* clause matches the thematic role assigned by the matrix verb, that of denoting belief content.

It seems like we are faced with two analytical options.

- (44) a. Hypothesis 1: Restricted argumenthood for *diye* clauses
A *diye* clause can occur in argument positions. But the kind of position it can occur in is restricted to the internal argument position of certain predicates.
- b. Hypothesis 2: Uniform modifier-hood for *diye* clauses
A *diye* clause is always a modifier.

For present purposes, I will take the pattern in (41) and (42) to be general and *conjecture* that Hypothesis 2 is correct: A *diye* clause is always a modifier. With this assumption, it follows that *diye* clauses do not require, and in fact cannot be assigned, case. Consequently, *diye* clauses cannot saturate *bil*-’s *res* argument, which corresponds to a case marked position. This, however, does not prevent *diye* clauses from being semantically selected.

²³The meaning of (37), where a nominalization composes with *üzül*-, and (43b), where it is a *diye* clause, are different. In (37) the nominalization denotes a fact, the cause of the attitude holder’s sadness. In (43b) the *diye* clause may denote speech content “Tunç got sad, saying that Trump won” or a cause. These readings are presumably due to different structural configurations between the main verb and the *diye* clause. The latter option, where the *diye* clause introduces a cause, is globally available and probably independent from the core phenomena discussed in this paper.

Nominalizations and *diye* clauses in the nominal domain The distribution of nominalizations and *diye* clauses in the nominal domain provides additional support for the uniform argument-hood of the former, and the uniform modifier-hood of the latter. Both clause types compose with NPs. However, as seen in (45a), nominalizations are licensed by the suffix glossed POSS (for ‘possessive,’ though this suffix is polyvalent) on the head noun. Such a licenser is not required for *diye* clauses, as seen in (45b). The pair in (45) provides information about the relative linear order of each clause type with respect to adjectival elements. Nominalizations are linearized closer to the head noun, that is, are lower than modifiers. This is consistent with their claimed argumenthood. On the other hand, *diye* clauses are linearized to the left of modifiers, which is consistent with their claimed modifier-hood.

- (45) a. (iyi bir) Tramp’ın kazandığı (*iyi bir) haber*(-i)
 good one Trump won.NMZ good one news-POSS
 a good piece of the news that Trump won
- b. (*iyi bir) Tramp kazandı diye (iyi bir) haber
 good one Trump won diye good one news
 a good piece of news that Trump won

Section summary Before moving on, it is useful to look at a synthesis of the claims made in this section. Although the predicate *bil-* composes with two arguments of the same semantic type (*vst*), the distribution of these arguments is regulated in the syntax. Nominalizations are base generated in a low position (sister to V), and they require case. On the other hand, *diye* clauses are base generated in a high position, and they (seem to) repel case.

(46) Properties of *bil-*’s arguments

| Position | Selected? | Case required? | Denotation | Surface realization |
|----------|-----------|----------------|----------------|---------------------|
| low | yes | yes | fact/res | nominalization |
| high | yes | no | belief content | <i>diye</i> clause |

The fact that the lower argument denotes a fact and serves as the *res* of the belief and that the higher argument denotes the content of the belief is enforced by the lexical semantics of *bil-*.

5 Discussion 2: Valuing null arguments

Attitude reports with *bil-* do not ordinarily introduce two overt arguments. However, according to the present proposal, *bil-*, in its sentential use, does always introduce two interpreted arguments. This section expands on how the *res* is recovered when only a *diye* clause is available on the surface, and how belief content is recovered when only a nominalization is present on the surface.

The constraint that *bil-* must assign accusative case, coupled with the constraint on *diye* clauses that they cannot be assigned case, raises the question of what saturates *bil-*’s *res* argument in attitude reports like (1b), repeated below:

- (1b) Tunç Hillary kazandı diye biliyo.
 Tunç Hillary won diye knows
 Tunç thinks that Hillary won.

This section explores the claim, mentioned in section 3.2, that sentences like (1b) introduce a *res* argument in the form of a pronoun ranging over predicates of eventualities, and have a semantic parse of the form illustrated in (47).

(47) [Tunç [[Hillary won diye] [*pro*_{RES} knows]]]

That this pronoun is present in the semantics, though unpronounced, is perhaps best evidenced by the possibility of expressing it, as in (48). The linear position of the pronoun is one expected of overt accusative marked objects.

(48) Tunç o-nu_{RES} [Hillary kazandı] diye biliyo.
 Tunç 3S-ACC Hillary won diye knows
 Tunç believes of that event that it's a Hillary victory.

Section 3.2 gave an example derivation for the semantics of (1b) using a referential pronoun in the *res* position. This strategy is explicated in the next subsection. In that section, an alternative strategy was mentioned: the possibility of closing the *res* argument existentially. The need for this strategy is motivated, and the strategy is illustrated, in the subsequent section.

5.1 The referential pronoun strategy

The referential pronoun strategy derives the meaning of (1b) straightforwardly. Assume that the *res* argument of *bil-* is saturated by an index bearing pronoun of type $\nu(st)$, which is noted X_8 . This pronoun is not pronounced.²⁴ The structure to be interpreted is illustrated in (49a). The value of X_8 is provided by the assignment function g , in the same way that the assignment function is used to interpret pronouns denoting individuals. Here, to get the felicity and truth conditions given in (49b), the assignment function contains a mapping from the index 8 to the predicate T (which, see (28a), is shorthand for the predicate of events that holds of Trump victories). This mapping is indicated by the superscript $g^{[8 \rightarrow T]}$ on the denotation function.

(49) The referential pronoun strategy

- a. Parse:
 Tunç [[Hillary won diye] [X_8 knows]]
- b. Felicity and truth conditions for (1b)
 - (i) $\llbracket (1b) \rrbracket^{g^{[8 \rightarrow T]}}(w_0)$ is defined iff $\exists e[T(e)(w_0)]$
 - (ii) $\llbracket (1b) \rrbracket^{g^{[8 \rightarrow T]}}(w_0)$ is true iff

$$\begin{aligned} & \exists R[\\ & \quad \iota e'[T(e')(w_0)] = \iota e''[R(tunc, e'', w_0)] \\ & \quad \wedge \\ & \quad DOX_{tunc, w_0} \subseteq \{w' | H(\iota e'''[R(tunc, e''', w')])(w')\} \\ & \quad] \end{aligned}$$

When this strategy is followed, the speaker presupposes the existence of a specific event, and what that event is. Indeed, (49a) is defined iff there is a Trump victory in the actual world. In a context where the discourse participants are in agreement about the existence of that event, and its identity, all should go well.

²⁴Turkish is an object drop language, unpronounced pronouns in this position are common.

5.2 The existential closure strategy

The referential pronoun strategy generally results in absurd truth conditions with first person attitude holders. A target sentence with a first person attitude holder is given in (50a), and its semantic parse in (50b) applying the referential pronoun strategy. Its felicity and truth conditions are in (50c).

- (50) a. Target sentence:
 (Ben) [Hilari kazandı diye] bil-iyor-um.
 1S Hillary won diye know-PRES-1S
 I think that Hillary won.
- b. Parse:
 SPEAKER [[Hillary won diye] [X_8 knows]]
- c. Felicity and truth conditions for (50a)
 (i) $\llbracket (1b) \rrbracket^{g[8 \rightarrow T]}(w_0)$ is defined iff $\exists e[T(e)(w_0)]$
 (ii) $\llbracket (1b) \rrbracket^{g[8 \rightarrow T]}(w_0)$ is true iff
 $\exists R[$
 $\quad \iota e'[T(e')(w_0)] = \iota e''[R(\text{speaker}, e'', w_0)]$
 $\quad \wedge$
 $\quad DOX_{\text{speaker}, w_0} \subseteq \{w' | H(\iota e'''[R(\text{speaker}, e''', w')])(w')\}$
 $\quad]$

According to the definedness condition in (50c), the speaker presupposes the existence of a Trump victory. According to the assertion, the speaker asserts the belief that the Trump victory they are acquainted with is a Hillary victory. An unwelcome result!

It is possible, given that the *res* is assumed to be determined by the assignment function here, that $g(8)$ is set to map onto the same predicate that determines belief content, in this case $g(8) = H$. No contradiction would arise then—the speaker presupposing the existence of a Hillary victory, and asserting their belief that the Hillary victory *is* a Hillary victory. This possibility is at odds with our previous observations that attitude reports with *diye* are not factive. Structures derived in the fashion illustrated here, where the *res* and the belief match are reminiscent of accidental coreference. They might be competing with the structures involved in the factive alternant and get blocked by independent principles.²⁵

The absurd truth conditions in the first person attitude holder case, and the unintended truth conditions that arise if the problem is solved by the assignment function, motivate the appeal to a second strategy in recovering the *res*. The second strategy allows for the possibility of existentially closing the *res* argument. The parse for (1b) following the existential closure strategy is given in (51a). In (51a), a variable over predicates of events is inserted to saturate *bil*'s *res* argument. This variable gets bound by an existential quantifier at the top node.²⁶

²⁵Sentences like (i), where both the *res* and the belief are expressed, and match, are acceptable for me. This would argue against banning the generation of reports where the *res* and the belief accidentally match from the grammar. Pragmatic restrictions (Be brief! Don't be redundant!) might apply however.

- (i) ?Tunç [Hilari'nin kazandığını] [Hilari kazandı diye] biliyo.
 Tunç Hillary.gen won.nmz Hillary won diye knows
 Tunç believes of the Hillary victory that it's a Hillary victory.

²⁶Further research will test which positions are legitimate existential closure positions. Data involving potential interactions with negation should be helpful to this effect.

hope to achieve this, let us illustrate the range of pragmatic inferences associated with the use of the non-factive alternant.

The uses of the non-factive alternant illustrated in the previous sections focused on ones which gave rise to the inference that the attitude holder was mistaken—the attitude report was conjoined with the explicit denial of the belief proposition, or uttered in a context that supported the truth of a proposition inconsistent with the belief proposition. This phenomenon is known in the literature under the name of “anti-presupposition” [Percus, 2006, Sauerland, 2007, Chemla, 2009] and is associated with the use of belief reports when certain conditions on the competence and the authority of the speaker are met. More generally, it is about the choice to use of a non-presuppositional item over a presuppositional one with the same assertive content, when those conditions are met. The example in (55) gives rise to the inference that the speaker’s parents are mistaken, even if it is uttered out of the blue. This is presumably because the speaker is an authority about whether they have graduated.

- (55) Annemler [mezun oldum diye] biliyo.
my parents graduate.ADJ I became diye knows
My parents think that I graduated.
Inference: Speaker did not graduate.

The goal of the following examples is to suggest that the generation of antipresuppositions from the utterance of the non-factive alternant is conditioned by contextual factors. That is, the non-factive alternant is not factive, it is not “anti-factive.”

The inference that the attitude holder is mistaken is suspended if the speaker asserts their ignorance about the truth of the belief proposition.²⁷ This is illustrated in (56).

- (56) a. Context:
Dilara asks an amnesic Tunç: “Have you graduated yet?”
b. Target sentence:
Valla ben bilmiyom ama anamlar oldum diye biliyo.
really I don’t know but my parents I became diye know
Like, I really don’t know but my parents think I have (so perhaps I have).
Not an inference: Speaker did not graduate.

The anti-presupposition is generally suspended when the truth of the embedded clause is under discussion:

- (57) a. Context:
Dilara to Deniz: “Hillary won the election.”
b. Target sentence:
Hayır. Tramp kazanmış olamaz çünkü Tunç Tramp kazandı diye biliyo.
No Trump won can’t have because Tunç Trump won diye knows
No. Tunç thinks that Trump won (so Trump must have won).
Not an inference: Trump did not win.

Finally, the inference does not arise with first person attitude holders in general.²⁸

²⁷See Simons (2001) for pragmatic inferences suspended by assertion of speaker ignorance.

²⁸Glass [2016] cites Wittgenstein: “If there were a verb meaning ‘to believe falsely,’ it would not have any significant first

- (58) a. Context:
Dilara to Deniz: “Did you watch the election? Who won?”
- b. Target sentence:
Trump kazandı diye biliyorum.
Trump won diye I know
I think that Trump won.
Not an inference: Trump did not win.

The use of the non-factive alternant with a first person attitude holder results in a hedged assertion.

Pragmatic inferences of the kind mentioned here can be calculated by making reference to alternative utterances. An natural alternative to a non-factive knowledge report is its factive counterpart. However, we have multiple ways of generating the semantic form of non-factive reports. This, I believe, might be giving rise to the different types of inferences we observe. It seems like the antipresupposition is generated if the speaker has a specific *res* in mind, the description of which differs from the attitude holder’s belief. This strategy is presumably blocked in the first person.

(59) Strategies for recovering the *res* and associated inferences

| AH has in mind | AH is | <i>res</i> recovery strategy | pragmatic inference |
|----------------------|-------|------------------------------|---|
| A specific event | 1S | referential pronoun | blocked |
| A specific event | 3S | referential pronoun | antipresupposition |
| A non-specific event | 1S | existential closure | no antipresupposition: hedging |
| A non-specific event | 3S | existential closure | no antipresupposition: deferred knowledge |

The existential closure strategy is essentially equivalent to speaker ignorance about the description of the *res*. This ignorance might be a reason that antipresuppositions are not generated. Indeed, non-factive attitude reports can be used “weakly” to convey positive thought and evidence.

6 Open issues

6.1 ECM?

Independent evidence in favor of the proposal that the factivity alternation could be accounted for with the introduction of two arguments came from the possibility of expressing them both, as in (34).

- (34) Tunç [NMZ Trump’ın kazandığını] [_{diye} Hilari kazandı *(diye)] biliyo.
Tunç Trump.gen won.nmz Hillary won diye knows
Tunç believes of Trump’s victory that Hillary won.

There is a possibility that data like (34) involve an embedded *diye* clause as the matrix predicate’s sole syntactic and semantic argument, in the form of an embedded clause with an accusative marked subject nominalization.²⁹ This is a reasonable hypothesis. It is certainly grammatical to have accusative marked subjects in ECM clauses introduced by *bil-* [Zidani-Eroğlu, 1997, Şener, 2008]. This is shown in (60a). The hypothetical ECM structure for (34) is in (60b).

person, present indicative.”

²⁹Thanks to Vincent Homer for pointing this out.

- (60) a. Tunç [Dilara-yı Nijmegen'de] (?diye) biliyo.
 Tunç Dilara-acc Nijmegen-loc diye knows
 Tunç knows Dilara to be in Nijmegen.
 b. Tunç NMZ-ACC TP diye bil
 Tunç Subject Predicate know

The appeal of this kind of analysis twofold. First, ECM complements of *bil-* are not factive, as shown by the acceptability of conjoining (60a) with the negation of the embedded proposition given in (61).

- (61) ...ama (Dilara) Nijmegen'de değil.
 ...but Dilara Nijmegen-loc neg
 ...but Dilara isn't in Nijmegen.
 Acceptable continuation to (60a)

The second appealing feature of this analysis is that the definition of *bil-* passes its *res* argument to an embedded predicate. This mirrors the semantics of ECM clauses with accusative subjects denoting individuals.

There are however various differences between ECM clauses and sentences of the form in (34). First, with accusative marked subjects, there is always the option of not marking them with the accusative. In other words, example (62), which corresponds to (61) with a nominative embedded subject, is fine:

- (62) Tunç Dilara Nijmegen'de diye biliyo.
 Tunç Dilara Nijmegen-loc diye knows
 Tunç thinks that Dilara is in Nijmegen.

Second, it is usually possible to have the embedded clause occur as a root clause, as in (63a). The attempt is starkly ungrammatical to have the nominalization act as the subject of a tensed clause, regardless of the expression of *diye*, (63b).

- (63) a. Dilara Nijmegen'de (*diye).
 Dilara Nijmegen-loc diye
 Dilara is in Nijmegen.
 b. *Tramp'ın kazandığı Hilari kazandı (diye).
 Trump won.nmz Hillary won diye
 Intended: #Trump's victory is a Hillary victory.

I must leave the rest for further research.

6.2 Other attitude verbs

Other attitude predicates that participate in the alternation are given in (64). This set of predicates seems to correspond to the class of cognitive semi-factives, and some perception verbs.

- (64) Context: Bernie seçimi kazanmadı ama...
 Bernie didn't win the election but...
 a. # Tunç [Bernie-nin kazan-dığ-ı-nı] anladı/öğrendi/hatırlıyo/fark etti/gördü.
 Tunç Bernie-GEN win-NMZ-3S-ACC understood/learned/remembers/realized/saw

Tunç understood/learned/remembers/realized/saw that Bernie won.
 \rightsquigarrow Bernie won.

- b. Tunç [Bernie kazan-dı diye] understood/öğrendi/hatırlıyo/fark etti/gördü.
 Tunç Bernie won-PST.3S C understood/learned/remembers/realized/saw
 Tunç (lit.) understood/learned/remembers/realized/saw that Bernie won.
 $\not\rightsquigarrow$ Bernie won.

The proposal for *bil-* should straightforwardly extend to these predicates, with some modification to the modal base introduced by each predicate, and the kinds of *res* es they require. For instance, we might expect an “understand” relation to be about words as well as eventualities.

The present account is centered around the issue of capturing the factivity alternation. How does it fare with *non-factive* speech and attitude predicates? I sketch out two options in this section, and leave the issue of whether the two options can be reduced to one for further research.

Option #1 for non-factives: They compose with a single predicate of events Certain predicates compose both with nominalizations and with *diye* clauses, without there being an obvious meaning difference between the two embedding strategies.

(65) *Dusun-* type predicates: apparently no meaning difference

- a. Tunç Berni kazandı diye düşünüyö/umuyo.
 Tunç thinks/hopes [_{diye} Bernie won]
- b. Tunç Berninin kazandığını düşünüyö/umuyo.
 Tunç thinks/hopes [_{NMZ} Bernie won]

The observation that the predicates in (65) are non factive, and that there is some optionality in the clause types they compose with, suggests that definitions along the lines of (66) are on the right track for these non-factives. A predicate like *dusun-* composes with a single event predicate, which can be introduced by a nominalization or by a *diye* clause. A proposition is recovered from the predicate by existential closure over the predicate’s event argument.

(66) For all $w \in D_s$, $\Phi \in D_{v(st)}$ and $x \in D_e$,
 $\llbracket \textit{dusun} \rrbracket(w)(\Phi)(x) = 1$ iff $DOX_{x,w} \subseteq \{w' | \exists e[\Phi(e)(w')]\}$

This option is equivalent to the familiar way of composing attitude predicates directly with proposition-type objects.

Option #2 for non-factives: *Diye* clauses specify the content of contentful eventualities For some predicates, composing with a *diye* clause is the only available strategy for composing with a clause. Manner of speech predicates are a good example:

(67) Manner of speech predicates compose only with *diye* clauses

- a. Tunç annesi kazandı diye bagirdi.
 Tunç screamed [_{diye} his mother won]
- b. *Tunç annesinin kazandığını bagirdi.
 Tunç screamed [_{NMZ} his mother won]

With some non-speech predicates, composition with a *diye* clause generates a meaning such that the main event cooccurs with a speech event.

- (68) a. Tunç annesi kazandı diye sevindi.
Tunç got happy while saying that his mother won.
b. Tunç annesinin kazandığına sevindi.
Tunç got happy about the fact that his mother won.

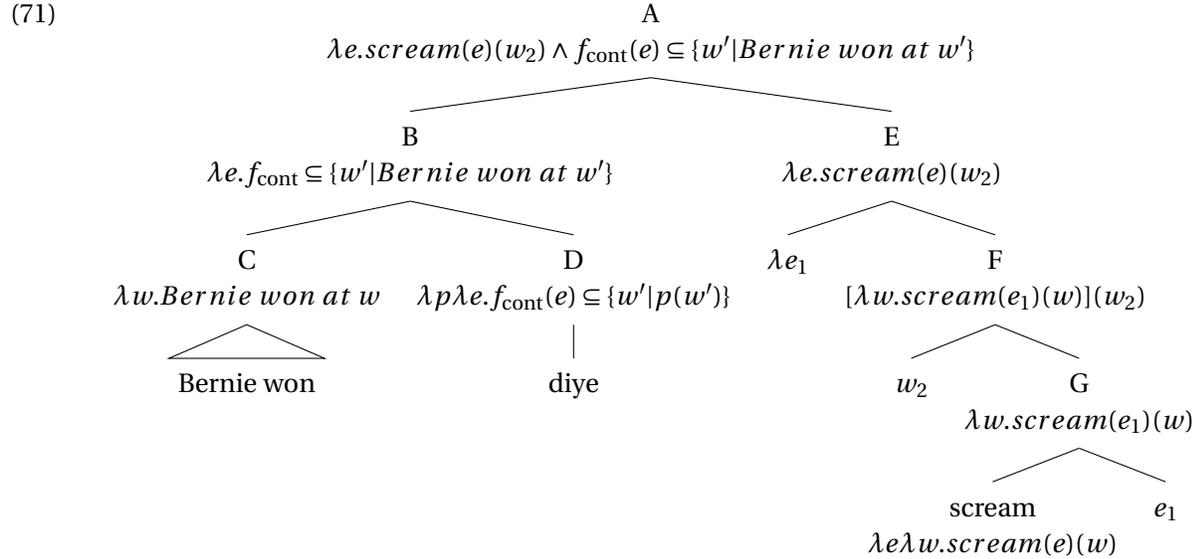
I take these observations as evidence that *diye* clauses may *modify* certain eventuality arguments directly, and specify their propositional content. Following Hacquard [2006], I assume that some eventualities, chiefly attitude and speech eventualities, have propositional content that is visible to the semantics. This denotation for *diye* is given in (69). The particle denotes a function that composes with a proposition p , and a contentful eventuality argument e_c (the set of contentful eventualities can be seen as a subset of the domain of eventualities D_v), to assert that the content of s_c is a subset of the worlds w' at which p holds. I borrow f_{cont} from Moulton [2009], Kratzer [2006].

- (69) For any $p \in D_{st}$ and $e_c \in D_c = \{e \mid e \in D_v \ \& \ e \text{ is contentful}\}$
 $\llbracket \text{diye} \rrbracket(p)(e_c) = 1$ iff $f_{\text{cont}}(e_c) \subseteq \{w' \mid p(w')\}$

To capture the meanings of the sentences in (68) with the predicate “scream,” assume that the predicate is intransitive. The attempt to compose it with a nominalized complement clause results in ungrammaticality for this reason. In the following, the external argument is severed [Kratzer, 1996].

- (70) For any $e \in D_c$ and $w \in D_s$
 $\llbracket \text{scream} \rrbracket(e_c)(w) = 1$ iff e is a screaming event in w

A clause introduced by *diye* combines with such predicates by intersecting event arguments:



- (72) $\llbracket (68a) \rrbracket(w_0) = 1$ iff
 $\exists e[\text{scream}(e)(w_0) \wedge f_{\text{cont}}(e) \subseteq \{w' \mid \text{Bernie won at } w'\} \wedge \text{agent}(e) = \text{tunc}]$

Going down this path, we do not need to say anything extra about nominalizations. They may have the following semantics:

- (73) a. $[[\text{NMZ } \Phi(e_2)(w_3)]] = \lambda e.\lambda w.\Phi(e)(w)$
 b. $[[\text{yağmur yağ-dI(k)}]] = [[\text{rain NMZ}]] = \lambda e\lambda w.\text{rain}(e)(w)$

Thus, nominalizations cannot simply be intersected with predicates of eventualities.

Remarks on Option #2 Before closing off this section, I would like to discuss two arguments in favor of the existence of the strategy labeled Option #2. The first argument might come from looking at the counterparts of these constructions in Azeri.

- (74) a. Əli Aişə gəldi deyə qışqırdı.
 Əli Aişə came diye screamed
 Əli screamed that Aişə came.
 b. Əli elə bilir ki, Aişə gəlib, amma Aişə (əslində) gəlməyib.
 Əli so knows comp Aişə came but Aişə really didn't come
 Əli thinks (lit. knows) that Aişə came, but she really didn't.

Murad Suleymanov p.c.

In Azeri, contents of manner of speech predicates are introduced by the counterpart of *diye*, while the non-factive alternant is not. Of course, more tests need to be run here.

The second piece of evidence comes from the contrast, in Turkish, between nominalizations and *diye* clauses composing with negative predicates. Nominalizations are interpreted with narrow scope with respect to the predicate, while *diye* clauses resist this interpretation.

- (75) a. Tunç annesinin kazandığını inkar etti.
 Tunç his mother won.nmz deny did
 Tunç denied that his mother won.
 Tunç said “my mother didn't win.”
 b. Tunç (onu) annesi kazandı diye inkar etti.
 Tunç that.acc his mother won diye deny did
 Tunç denied that by saying that his mother won.
 Tunç said: “my mother won.”

This is expected if *diye* is basically introducing the propositional content of a speech act.

Finally, observe the following contrast with the predicate *forget*. While nominalizations are acceptable with this predicate, *diye* clauses are ungrammatical:

- (76) a. Tunç Berninin kazandığını unuttu.
 Tunç forgot [_{NMZ} Bernie won]
 Tunç forgot that Bernie won.
 b. *Tunç Berni kazandı diye unuttu.
 Tunç forgot [_{diye} Bernie won]

This falls out from the Option #2 analysis of *diye*, with the (natural) assumption that forgetting is not a

contentful state.

7 Concluding remarks

This exploration through the Turkish clausal embedding system started out with the observation that some factive predicates alternate between their factive and a non-factive readings depending on the syntax of the embedded clause they compose with. The focus was on attitude reports introduced by *bil-*, “know.” This factivity alternation was derived compositionally, in a “conservative” semantic system.

I have argued that we had no reason based on Turkish to abandon the view that certain predicates encode factivity lexically (a view that is compatible with both semantic and pragmatic views on the factive entailment and presupposition). My lexical entry for *bil-* is slightly different than the one we are used to for “know.” (I believe that the move to a richer lexical entry is motivated on independent grounds.) The denotation of *bil-* is a relation between facts and beliefs. If the fact and the belief match, we observe the factive alternant in the factivity alternation. If the fact and the belief do not match, the system allows for them to not to, we observe the non-factive alternant.

Further research includes spelling out some of the points that this paper could only touch upon. How is the justification condition implemented? How do we account for the inferences seen to be associated with the use of non-factive alternants? Can the present proposal be extended to other languages?

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