Clauses can be modifiers, or arguments: Evidence from alternations in factivity and answer-orientedness in Turkish and Japanese

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Abstract

Turkish and Japanese attitude predicates combine with two main kinds of embedded clauses: Nominalizations, and clauses introduced by the morphemes *diye* (Turkish) and *to* (Japanese). It has been previously been observed that the choice of the embedded clause conditions the availability of a factive inference, for declaratives under certain predicates (Özyıldız 2017; Kusumoto 2017). We describe the syntactic and semantic properties of interrogative nominalizations and *diye/to*-clauses. We show that the interrogative nominalizations give rise to familiar answer-oriented inferences with responsive predicates, but that interrogative *diye/to*-clauses must remain question-oriented. In particular, they give rise to the entailment that the attitude holder linguistically produce the question that they introduce. We propose a compositional fragment where attitude predicates take nominalizations as arguments, which they may impose semantic restrictions on, and where *diye/to*-clauses modify and enrich attitude meanings with a linguistic production inference. We end with a discussion of whether this proposal is viable uniformly for all instances of *diye/to*-clauses.

Keywords: clausal embedding, question embedding, *diye*, *to*, factivity alternations, answer/question-orientedness, Turkish, Japanese

1 Introduction

Empirical landscape Languages have different ways of combining clausal constituents with attitude predicates. In this paper, we focus on combining attitude predicates with nominalized clauses, in (1), and clauses introduced by the morphemes *diye* and *to*, in (2), in Turkish and in Japanese (respectively in a. and b.).

(1) a. Ai [kar   yağ-**dığ**-ın-a   ] şaşırdı.
         Ai   snow fall-NMZ-3S.POSS-DAT   was.surprised

b. Ai-wa　[yuki-ga　　hutta-**no**-ni　] odoroita
   　　Ai-TOP　snow-NOM fall-NMZ-DAT　was.surprised

   　　Ai was surprised that it was snowing. $\Rightarrow p \wedge B_a p$

(2)　a. Ai [kar　yağ-ıyor　**diye**] şaşırdı.
　　　Ai　snow fall-PRES.3S DIYE　was.surprised

　　b. Ai-wa　[yuki-ga　　hutta-**to**] odoroita
　　　Ai-TOP　snow-NOM fell-TO　was.surprised

　　　Ai was surprised, thinking "it's snowing." $\not\Rightarrow p$

As is the case here, the same predicate may often combine with either type of clause, with the choice giving rise to interpretive differences. One difference visible here is that the sentences in (1) are factive, where "be surprised" combines with nominalized declaratives, while the ones in (2) are non-veridical, with D/T-declaratives. This phenomenon, known as a factivity alternation, has been studied in a variety of languages for declarative complements.[1] A second difference will play a central role here: *diye* and *to* often give rise to a *linguistic production inference* (Saito 2012, 2015; Shimamura 2018; Goodhue & Shimoyama 2023; Demirok et al. 2019). This inference, rendered into English with the adjunct clause *thinking "S"* (for these examples), requires that the attitude holder say, mentally entertain, or otherwise produce the clause that *diye* and *to* introduce.[2] Factivity alternations and linguistic production inferences, while having been described on their own, have not been related in the literature. In this paper, we argue that they are related.

Many predicates that combine with nominalized and D/T-declaratives also combine with nominalized and D/T-interrogatives, in (3) and (4). (For the nominal status of Japanese embedded questions like in (3b), which don't feature an overt nominalizer, see Tomioka (2020).) These two interrogative embedding strategies form the novel empirical landscape we explore in this paper.

(3)　a. Ai [kar-ın　　ne zaman yağ-dığ-ın-a　　　] şaşır-dı.
　　　Ai　snow-GEN when　　fall-NMZ-3S.POSS-DAT　was.surprised

　　b. Ai-wa　[yuki-ga　　itsu　hutta-ka-ni] odoroita.
　　　Ai-TOP　snow-NOM when fell-Q-DAT　was.surprised

　　　Ai was surprised by when it had snowed.

(4)　a. Ai [kar　ne zaman yağ-dı　　diye] şaşır-dı.
　　　Ai　snow when　　fall-PST.3S DIYE　was.surprised

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[1]The question of whether emotive factives presuppose that their complement is true or that their subject believes that their complement is true does not affect our main point (Klein 1975). The body of work on factivity alternations includes at least Bondarenko (2023) for Azeri, Bondarenko (2020) for Buryat, Djärv (2019) for Greek, Lee (2018) and Jeong (2020) for Korean, Kusumoto (2017) for Japanese, Özyıldız (2017) for Turkish, and Hanink & Bochnak (2017) for Washo.

[2]The morpheme *diye* derives from the root *de-*, for the verb "say." (*Diye* clauses may independently be read as reason or purpose clauses, neither of which is intended anywhere in this paper.) The morpheme *to* does not derive from any speech predicate. See Grimshaw (2015) for a systematic description of what it means to *say* something, and Major (2021, 2024), Bossi (2023) and Driemel & Kouneli (2024) for recent cross-linguistic work on "say" complementation.

b. Ai-wa [yuki-ga   itsu   huttano-ka-to] odoroita.
  Ai-TOP   snow-NOM when fell-Q-TO   was.surprised

  Ai was surprised, thinking "when did it snow?"

Here too, the choice of a nominalization vs. a D/T-clause makes an interpretive difference. The examples in (3) imply that Ai believes and was surprised by the true answer to the question of when it snowed (e.g., that it had snowed in the morning). In contrast, the examples in (4) require that Ai be surprised by something, and that she linguistically produce the interrogatives introduced by *diye* and *to*. In this sense, the former attitude reports are answer-oriented, whereas the latter, question-oriented.

Overarching questions and proposal   These data raise the broad questions of what the syntactic properties are of these different clause embedding strategies, what semantic effects they have on the overall truth conditions of attitude reports, and if these effects can be analyzed uniformly across declarative and interrogative embedding.

In a nutshell, we propose that attitude predicates stand in a function-argument relation to nominalized clauses, and that they may thus impose on them semantic restrictions like answer-orientedness, factivity, and the like. (This part should not come as a surprise, but is worth spelling out.) *Diye* and *to* clauses, on the other hand, are modifiers and supplement attitude predicates' meaning with the inference that the attitude holder linguistically produces the clause that *diye* and *to* introduce. By virtue of the fact that these clauses do not feed into the attitude predicate directly, and that producing an interrogative is different from producing a declarative, we capture the contrast between question vs. answer-orientedness and expect that D/T-clauses should escape certain semantic restrictions that attitude predicates may otherwise impose on their arguments. This generally supports the view that certain languages feature at least two ways of composing clauses with attitude predicates: One that relies on syntactic and semantic argumenthood, and another, on adjunction. (Pace Elliott (2017) and Bondarenko (2022) who argue for uniformly adjunctive strategies.)

At the same time, we will also acknowledge that there are cases where D/T-clauses function, prima facie, as the internal argument of certain matrix predicates, which raises the question of whether our proposal covers all, or only some uses of D/T-clauses. In a programmatic discussion, we will take a closer look at the syntactic and semantic properties of argument-like D/T-clauses, and suggest that our account can be refined so that it extends uniformly to these cases as well. Specifically, instead of introducing the description of a linguistic production event that enriches the meaning of matrix attitude predicates, we will let D/T-clauses sometimes introduce an attitude predicate that is identified with the matrix attitude predicate that they modify. Overall, the current analysis provides converging evidence, along with Goodhue & Shimoyama's (2022; 2023) recent analysis of *to*-clauses, that D/T-clauses can uniformly be treated as syntactic adjuncts whose interpretation involves a linguistic production inference.[3]

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[3]See the discussion between Driemel & Kouneli (2024) and Bossi (2023) for the possible existence of multiple "say"-complementation strategies in Kipsigis that differ along the adjunct vs. argument dimension.

Outline   In **Section 2**, we diagnose the different inferences that nominalized and D/T-clauses give rise to, and suggest that the difference is surprising if certain aspects of meaning are preserved across declarative and interrogative embedding. **Section 3** presents syntactic tests revealing that nominalized clauses pattern like arguments of attitude predicates, and D/T-clauses, like verb phrase modifiers. This difference is used in **Section 4** to propose a compositional semantics for the structures at hand. **Section 5** explores the predictions of our proposal beyond the data considered in **Section 2**, specifically in terms of semantic restrictions imposed by matrix embedding predicates. **Section 6** then focuses on cases where D/T-clauses apepar to behave as arguments, rather than adjuncts, and provides a revised adjunctive analysis of D/T-clauses that accounts for such cases. **Section 7** concludes.

2   Inferences associated with nominalized and D/T-interrogatives

Answer-oriented and question-oriented attitudes   Attitude reports that minimally differ, on the surface, in whether they feature a nominalized or a D/T-interrogative give rise to different inferences about the (relationship that the attitude holder bears to the) denotation of the interrogative.

To illustrate this difference, we begin with emotive factives.[4] Attitude reports where emotive factives combine with nominalized interrogatives typically give rise to the inference that the attitude holder is related to an answer to the interrogative, which is true and which they believe to be true. (We set aside issues related to exhaustivity.) In the case of "be surprised," in the Turkish example (5), the sentence asserts that the attitude holder is surprised by that answer.

(5)   Ai [parti-ye   hangi şarkıcının geldiğine   ] şaşırdı.
      Ai   party-DAT which singer   come.NMZ   was.surprised

      Ai was surprised by which singer came to the party.

In contrast, when the same predicate combines with a D/T-interrogative, in (6), the sentence no longer implies that the attitude holder is related to any answer to the interrogative. Rather, the inference is that they linguistically produce the interrogative itself, in addition to being surprised by something.

(6)   Ai [parti-ye   hangi şarkıcı geldi diye] şaşırdı.
      Ai   party-DAT which singer came DIYE   was.surprised

      Ai was surprised, thinking "Which singer came to the party?"

To substantiate the difference in answer-orientedness just described, observe that the continuations in (7) sound contradictory after (5) but acceptable (in the appropriate contexts) after (6). The first two contrasts substantiate the difference in whether the attitude holder believes an answer to the

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[4]Emotive factive reports are convenient because the answer-oriented report in (5) and the question-oriented one in (6) can be true in similar situations: Being surprised by which singer came to the party may elicit the production of the interrogative "Which singer came to the party?" and, conversely, being surprised and producing that question may indicate which singer came is what is surprising.

interrogative, for (7b), that is true, for (7a). The third illustrates that "be surprised" + a D/T-interrogative can be conjoined with a question-oriented attitude of wondering about the content of that interrogative.

(7)   a. ...ama partide şarkıcı yoktu.
          ...but there were no singers at the party.   # after (5); ✓ after (6)

      b. ...ama hangisinin geldiğine dair bir düşüncesi yoktu.
          ...but she had no thoughts as to which had come.   # after (5); ✓ after (6)

      c. ...ve hangisinin geldiğini merak etti.
          ...and wondered which had come.   # after (5); ✓ after (6)

Note that not knowing and wondering about the answer are not obligatory inferences with D/T-interrogatives, and that example (6) may *also* naturally describe Ai's surprise at hearing the (true) piece of information that Carly Rae Jepsen has arrived at the party.[5]

Nominalized and D/T-interrogatives give rise to interpretive differences with predicates other than emotive factives as well. The examples in (8a) and (8b) illustrate with Turkish "guess" and "answer." Sentence (8a) entails that Ai produced the answer to the embedded interrogative, saying, for example, that Lovelace was a mathematician. In contrast, (8b) entails that Ai produced the interrogative itself, saying "Who is Ada Lovelace?" (in a game of Jeopardy! for example, where contestants' answers have to be questions).

(8)   a. Ai [Ada Lovelace'in   kim olduğunu] {tahmin etti, cevapladı}.
          Ai   Ada Lovelace.GEN who be.NMZ   guessed   answered

          Ai {guessed, answered} who Ada Lovelace was.

      b. Ai [Ada Lovelace kim diye   ] {tahmin etti, cevapladı}.
          Ai   Ada Lovelace who DIYE   guessed   answered

          Ai {made a guess, answered a question}, saying "Who is Ada Lovelace?"

A parallel pattern is observed with Japanese "guess" and "write" as well:

(9)   a. Ai-wa [Ada Lovelace-wa dare-ka   ]-o   {iiateta, kaita}.
          Ai-TOP   Ada Lovelace-TOP who-Q-TO -ACC   guessed wrote

          Ai {guessed, wrote down} who Ada Lovelace was.

      b. Ai-wa [Ada Lovelace-wa dare-ka-to] {iiateta,   kaita}.
          Ai-TOP   Ada Lovelace-TOP who-Q-TO   guessed wrote

          Ai {made a guess and said, wrote down} "Who is Ada Lovelace?"

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[5]This difference in answer- vs. question-orientedness is reminiscent of what happens with predicates like *interest* Abenina-Adar (2020), *care* Elliott et al. (2017) or Estonian *motlema*, 'think, consider,' Roberts (2018). With declarative complements, these predicates describe a relationship to the declarative, but with interrogatives, they describe a relationship to the interrogative, and not necessarily to any one of its answers. This difference is argued to arise because of the lexical semantics of these predicates, however, and it is not conditioned by clause-type like the contrasts under scrutiny.

The interpretive contrast that nominalized and D/T-interrogatives give rise to generally affects the Japanese and Turkish equivalents of those responsive predicates that are characterized as answer-oriented, e.g., "agree," "deny," other response-stance, manner of speech, and certain preferential predicates.[6]

Now, there is a class of responsive predicates that combine naturally with nominalized interrogatives, but that give rise to unexpected results with D/T-clauses. For Japanese, the predicate *siru*, 'know,' is factive across nominalized vs. *to*-clauses and does not seem to display an interpretive difference between the two clause types.[7] This is exemplified in the following examples from Kusumoto (2017):

(10) a. Taro-wa Hanako-ga   kinzyo-ni   sundeir-u koto-o   si-tteiru
          Taro-TOP Hanako-NOM neighbor-at live-pres NMZ-ACC know-ASP.PRES
          'Taro knows that Hanako lives in the neighborhood.'

      b. Taro-wa Hanako-ga   kinzyo-ni   sundeir-u to si-tteiru
          Taro-TOP Hanako-NOM neighbor-at live-pres TO know-ASP.PRES
          'Taro knows that Hanako lives in the neighborhood.'   (Kusumoto 2017: 63)

In contrast, *siru* 'know' is incompatible with an interrogative *to*-clause:

(11) *Ai-wa ame-ga   hutta   ka-to sitteiru.
        Ai-TOP rain-NOM fall.PAST Q-TO know.ASP

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[6]Rogative predicates like the equivalents of "wonder" and "ask" are also compatible with both nominalized and D/T-interrogatives. With these, both types of clauses give rise to question-oriented reports.

[7]Kuno (1973) notes that the combination of *siru* and *to*-complements is restricted to certain syntactic configurations, citing the following paradigm (Kuno 1973: 217–8; slightly adapted due to cultural insensitivity in the original examples):

(i)   a.*Anata-wa Mary-ga   isya   da-to   sitte-imasu   ka?
          you-TOP Mary-NOM doctor COP-TO know-ASP.POL Q
          Intended: 'Do you know that Mary is a doctor?'

      b. Watasi-wa Mary-ga   isya   da-to   sono toki sitta.
          I-TOP   Mary-NOM doctor COP-TO that time know.PAST
          'I learned that Mary was a doctor that time.'

      c. Watasi-ga Mary-ga   isya   da-to   sitta-no-wa   sono toki datta.
          I-NOM   Mary-NOM doctor COP-TO know.PAST-NMZ-TOP that time COP.PAST
          'It was that time that I learned that Mary was a doctor'.

(ii) a.*Mary-ga   konnani kasikoi-to sitte-imasita   ka?
          Mary-NOM so   smart-TO know-ASP.POL.PAST Q
          Intended: 'Did you know that Mary is so smart?'

      b. Mary-ga   konnnani kasikoi-to siri-masen-desita.
          Mary-NOM so   smart-TO know-POL.NEG-POL.PAST
          'I didn't know that Mary was so smart.'

Kuno leaves open how the restriction can be theoretically accounted for. Despite the judgment reported by Kuno, however, Kusumoto's (2017) data and the judgment of one of the co-authors suggest that the restriction is not robust in the present-day Japanese. Specifically, we contend that (ia) and (iia) above are acceptable. In this paper, we will treat the combination of *siru* and a *to*-clause to be grammatical across the board and leave the question of why certain configurations sound unacceptable at least for some speakers.

Intended: 'Ai knows whether it's raining.'

The Japanese *oboeru* 'remember' patterns in the same way as *siru* 'know' in that it is compatible and factive with *to*-declaratives while incompatible with *to*-interrogatives:

(12) Ai-wa ame-ga   hutte-ita no-da-to   oboe.teiru
      Ai-TOP rain-NOM fall-ASP NMNL-COP-TO remember.ASP
      'Ai remembers that it was raining.'

(13) *Ai-wa ame-ga   hutte-ita ka-to oboe.teiru
       Ai-TOP rain-NOM fall-ASP Q-TO remember.ASP
       Intended 'Ai remembers whether it was raining.'

In Turkish, the predicate *bil-*, "believe" or "know," is perfectly acceptable and non-veridical with *diye* declaratives, but it is unacceptable with *diye* interrogatives unless the predicate is further embedded, e.g., under "want" (Özyıldız 2017, 2019; Rabinovitch 2022).

(14) Ai [yağmur yağıyor mu   diye] {*biliyor, bilmek   istiyor}.
      Ai rain   is.falling POLQ DIYE   knows know.INF wants

      a. Unavailable: Ai {knows, believes an answer to} whether it's raining.

      b. Ai wants to know whether it's raining.

Additional restrictions seem to bear on the distribution of D/T-clauses, some of which we discuss in Section 6. Our investigation focuses for now on the existence and behavior of the class of predicates that includes "be surprised," "guess," and "answer," which give rise to the answer- vs. question-oriented attitude contrast described above.

Probing for the linguistic production inference   The intuition that the pairs of sentences discussed for 'surprise,' repeated from (5) and (6), differ in whether or not they may give rise to a linguistic production inference is evidenced by the contrast in the felicity of the continuation in (15c) uttered after (15a) and (15b). The continuation (with focus on the subject) triggers the additive presupposition that somebody else *said* the question corresponding to a nominalized vs. a D/T-interrogative, which is satisfied in the latter case, but not in the former.[8]

(15)   a. Ai [partiye hangi şarkıcının]$_{NMZ}$ geldiğine şaşırdı.
         Ai was surprised by which singer came to the party.

       b. Ai [partiye hangi şarkıcı geldi diye]$_{DT}$ şaşırdı.
         Ai was surprised, saying "Which singer came to the party?"

       c. Ben$_F$ de   [hangi şarkıcı geldi] dedim.
         I   ADD   which singer came   I said

         I too said "Which singer came?"   # after (15a); ✓after (15b)

In the context of the continuation, (15b) can be interpreted as involving a saying, as opposed to, e.g., a thinking. Consistent with the data, we take events of linguistic production to be underspecified. They may involve physical utterances, in different modalities, or thoughts, and possibly other acts of communication so long as these events have a linguistic form (Grimshaw 2015; Maier 2017; Major 2021). While the surprise eventuality in (15a) is not conceptually incompatible with the accommodation of the saying event described by (15c), the infelicity of the continuation suggests that this might be difficult to do.

The continuation test in (15) shows that D/T-interrogatives *may* give rise to a linguistic production inference. Can we further test whether this inference is obligatory? Because many kinds of events count as linguistic productions, it is difficult to probe for the obligatoriness of the inference by means of a direct cancellation test. Indeed, uttering "...but she didn't say or think such a thing" sounds unnatural after (15a) or (15b), in addition to not exhausting the ways in which one can linguistically produce an interrogative. Instead of cancellation, we use of the pair in (16), which ascribes surprise to a cat: Example (16a) is unmarked, while (16b) sounds odder—to the extent that it is acceptable, it involves anthropomorphizing the cat.[9]

(16) a. Kedi [ev-e   kim-in   geldiğine] şaşırdı.
         cat   home-DAT who-GEN came.NMZ   was.surprised

      The cat was surprised by who came home.

      b.?Kedi [ev-e   kim geldi diye] şaşırdı.
         cat   home-DAT who came DIYE   was.surprised

      ?The cat was surprised, saying/thinking "Who came home?"

These tests suggest that the inference is obligatory with D/T-clauses and unavailable with nominalizations, at least for predicates like "be surprised."

Because of the linguistic production inference, attitude reports with D/T-interrogatives appear to describe two events: The matrix event, and a linguistic production event. These events must occur at the same time, but they are not independent from each other. For the attitude reports at hand introduced by "be surprised," for example, the surprise has to *cause* the linguistic production event. We will be more specific about this in Sect. 4 and 6 and say that the linguistic production event and the eventuality described by the matrix attitude predicate have to be either (a) identical or (b) directly causally linked, partly following Özyıldız et al. (2019).

However, with D/T-clauses, the equivalence fails in both directions. Example (17a) does not entail that Ai uttered an answer to the question which singer came, e.g., (17b). And example (17b) does not entail that Ai uttered any question that "Carly Rae came" is an answer to, e.g., (17a). As both of the sentences entail that the attitude holder is surprised by something, this component of meaning does not make a difference here. But, intuitively, because linguistically producing an interrogative is independent of linguistically producing an answer to that interrogative, the equivalence fails.

(17) a. Ai [partiye hangi şarkıcı geldi diye]_{DT} şaşırdı.
         Ai was surprised, thinking "Which singer came to the party?"

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[9]Note that sentences like *My cat is happy that I got back home from work* are acceptable, and under standard treatments of emotive factives, they should imply that the cat believes that I got back home *from work*—a belief that cats, arguably, cannot hold. Such ascriptions have a different flavor than ones like (16b).

    b. Ai [partiye Carly Rae geldi diye]$_{\text{DT}}$ şaşırdı.
      Ai was surprised, thinking "Carly Rae came to the party."

Desiderata and the preview of the proposal   Thus, nominalized clauses and D/T-clauses give rise to the following interpretive contrasts:

1. Nominalized declaratives exhibit factivity while D/T-declaratives do not (under predicates that are typically classified as factive, like 'surprise').

2. Nominalized interrogatives exhibit answer-oriented inferences while D/T-interrogatives exhibit question-oriented inferences (under responsive predicates, such as 'surprise,' 'guess' and 'answer')

3. D/T-clauses exhibit the linguistic production inference.

The primary goal of this paper is to account for these contrasts in a unified manner. To do this, we will make use of a syntactic difference between the two kinds of clauses, namely that the former are complements of attitude predicates, and that the latter are verb phrase modifiers. The assumption that predicates may only impose semantic restrictions (like answer-orientedness or factivity) on their complements will account for the truth conditions associated with nominalized clauses. The assumption that *diye* and *to* are semantically contentful and that they encode the linguistic production inference will account for those associated with these clauses.

3   Argumenthood and adjuncthood

In this section, we turn to syntactic differences between nominalized clauses and D/T-clauses. Specifically, we will present evidence suggesting that nominalized clauses pattern like other *arguments* in the language whereas some cases of D/T-clauses pattern like *adjuncts* (Saito 2012, 2015; Shimamura 2018; Yoshida 2019; Yamada 2019; Goodhue & Shimoyama 2022, 2023; Yıldırım-Gündoğdu 2017, 2018). This syntactic difference will turn out to be crucial as we attempt to capture the semantic behavior of nominalized clauses and D/T-clauses outlined in the previous section. Importantly, our claim is not that *all* instances of D/T-clauses are adjuncts. In Sect. 6, we will discuss cases where D/T-clauses behave as if they were arguments rather than adjuncts of some embedding predicates like Turkish *bil-* "know/believe" and *düşün-* "think," as well as Japanese *siru* "know". What is crucial for our purposes is that the adjunct parse for D/T-clauses is possible for the relevant examples involving factivity-alternating predicates discussed in the previous section.

    Below, we will present two empirical arguments for the syntactic distinction between nominalized and D/T-clauses: (i) one based on the clauses' (in)ability to compose with (derived) intransitive predicates and (ii) one based on the ability to trigger a diagnostic case alternation under causativized predicates. We will furthermore discuss data concerning the possibility of extraction out of D/T-clauses in light of the widely held belief that adjuncts might be islands for extraction after Ross (1967).

3.1 Composition with (derived) intransitive predicates

One property that generally distinguishes arguments from adjuncts is that predicates impose restrictions on the number of arguments that they can (or must) have, whereas adjuncts are generally free to compose with predicates regardless of these restrictions. We observe, for example, that a sentence like (18a) is ungrammatical when we try to combine the predicate *eat* with two object NPs, but that a sentence like (18b) is acceptable, regardless of whether we choose to express the modifier *quickly* or not.

(18)   a. Alex ate a taco (*a burrito).

      b. Alex ate a taco (quickly).

Applying this test to nominalized vs. D/T-clauses composed with "be surprised," we observe a similar pattern.

(19)   Turkish

a.*Ai kar-a   [ne zaman yağ-dığ-ın-a   ] şaşırdı.
    Ai snow-DAT   when   fall-NMZ-3S.POSS-DAT   was.surprised

b. Ai kar-a   [ne zaman yağdı diye] şaşırdı.
    Ai snow-DAT   when   fell   DIYE   was.surprised

    Ai was surprised by the snow, thinking "When did it fall?"

(20)   Japanese

a.*Taro-wa yuki-ni   [itsu   hutta-ka(-ni)] odoroita.
    Taro-TOP snow-DAT   when fell-Q-DAT   was.surprised

b. Taro-wa yuki-ni   [itsu   huttano-ka-to] odoroita.
    Taro-TOP snow-DAT   when fell-Q-TO   was.surprised

    Taro was surprised by the snow, saying/thinking "When did it snow?"

The a. examples in (19–20) show that nominalized clauses cannot be combined with "be surprised" if its internal argument slot is already saturated by a DP "(the) snow," or, the other way around. (Note that the a. examples should be read without a break between 'snow' and the nominalized clause in order to avoid parataxis, as in: *Ai was surprised by the snow, by when it fell*. This leads to substantial improvement, at least for Turkish.) On the other hand, the b. examples show that D/T-clauses are free to co-occur with an internal argument of "be surprised." The same points can be made with lexically intransitive verbs, such as "look around" or "stand up."

(21)   Turkish

a.*Taro [ses-in   ne   ol-abil-eceğ-in-e   ] arandı.
    Taro   sound-GEN what be-MODAL-NMZ-3S.POSS-DAT   looked around

b. Taro [ses   ne   ol-abil-ir   diye] arandı
    Taro   sound what be-MODAL-AOR.3S DIYE   looked around

    Taro looked around, saying/thinking "What sound could it be?"

(22) Japanese

a.*Taro-wa [nan-no   oto   daroo-ka] tachiagatta.
  Taro-TOP   what-GEN sound MODAL-Q   stood.up

b. Taro-wa [nan-no   oto   daroo-ka-to   ] tachiagatta.
  Taro-TOP   what-GEN sound MODAL-Q-TO   stood.up

Taro stood up, saying/thinking "What sound could it be?"

Given that these intransitive verbs clearly do not take internal arguments, these examples suggest that D/T-clauses may be adjuncts.

3.2 Case-marking under causativized predicates

Another argument for the adjunct status of D/T-clauses comes from data concerning case-marking on arguments with causativized predicates. The argument, roughly, goes as follows. Both in Turkish and Japanese, the case assigned to the causee argument under certain causativized predicates is conditioned by the presence of an accusative internal argument. Specifically, the causee receives the dative case when an accusative internal argument is present, while it receives the accusative case otherwise (see Çetinoğlu & Butt 2008, Akkuş (2021), a.o., for Turkish). This property of causativized predicates can be exploited to test the argument/adjunct status of D/T-clauses (Yıldırım-Gündoğdu 2017, 2018). The data show that, with causativized predicates, a causee argument co-occurring with a D/T-clause can receive an accusative case. This leads us to conclude that it is possible for the D/T-clauses in these cases not to occupy the internal argument slot of causativized predicates, which in turn suggests that the relevant cases of D/T-clauses are adjuncts. Interestingly, the diagnostic also challenges a simplistic view where D/T-clauses are always adjuncts. This is because the causee argument co-occurring with a D/T-clause can also receive dative case, suggesting that a D/T-clause can optionally be parsed as an argument itself or as co-occurring with a null accusative argument. Crucially, however, the existence of such seemingly argumental D/T-clauses does not affect our analysis of the data presented in the previous section, as long as the adjunction parse is *possible* for the relevant cases. At the end of the subsection, we will elaborate on the implication of this lexical variation with respect to embedding predicates, which will furthermore be expanded in Section 6. Below, we provide the argument with examples.

With causativized predicates, the causee argument takes the accusative case if the internal argument of the causativized predicate is not overtly present. This is shown for the causativization of Japanese *kowagar(u)* "fear" in (23b): the causee *Jiro* receives the accusative marker *-o* (cf. (23a) shows the non-causativized form). In contrast, if the internal argument of the causativized predicate *kowagar-aseru* is present, as in (23c), the causee receives the dative case. In (23d), it is shown that the presence of an adjunct (*izyoo-na-hodo* "to an extraordinary extent" in the case of this example) does not trigger the dative assignment on the causee (Harada 1973, 1975).

(23) a. Jiro-wa obake-o   kowagat-teiru.
    Jiro-TOP ghost-ACC fear-ASP
    "Jiro fears ghosts."

b. Taro-wa   Jiro-o   kowagar-aseta
   Taro-TOP Jiro-ACC fear-CAUS.PAST
   "Taro scared Jiro." (Lit. Taro made Jiro fear)

c. Taro-wa   Jiro{*-o/-ni} obake-o   kowagar-aseta
   Taro-TOP Jiro-ACC/DAT ghost-ACC fear-CAUS.PAST
   "Taro made Jiro fear ghosts."

d. Taro-wa   Jiro{-o/*-ni} izyoo-na-hodo   kogawar-aseta
   Taro-TOP Jiro-ACC/DAT extraordinary-COP-degree fear-CAUS.PAST
   'Taro made Jiro fear to an extraordinary extent.'

This predicate can take both nominalized and *to*-complements, as in (24a). Crucially, when these clauses co-occur with a causativized version of the predicate, the causee receives different sets of case markers depending on the type of the clause. With a nominalized clause, the causee obligatorily receives the dative case, as in (24b). With a *-to* clause, however, the causee may be marked with either dative or accusative, as in (24c) and (24d).

(24)   a. Jiro-wa [obake-ga   iru   kamosirenai] {-koto-o/-to} kowagatta.
          Jiro-TOP ghost-NOM exist may   NMZ-ACC/-TO fear.PAST
          "Jiro feared (the fact) that there might be ghosts."

       b. Sono monooto-wa Jiro{*-o/-ni}   [obake-ga   iru   kamosirenai] koto-o
          the   sound-TOP Jiro-ACC/-DAT ghost-NOM exist may   NMZ-ACC
          kowagar-aseta
          fear-CAUSE.PAST
          "The sound made Jiro fear the fact that there might be ghosts."

       c. Sono monooto-wa Jiro{-o/-ni}   [obake-ga   iru   kamosirenai]-to kowagar-aseta
          the   sound-TOP Jiro-ACC/-DAT ghost-NOM exist may   -TO fear-CAUS.PAST
          "The sound made Jiro fear that there might be ghosts."

       d. Sono monooto-wa Jiro{-o/-ni}   [obake-ga   iru   noka]-to kowagar-aseta
          the   sound-TOP Jiro-ACC/-DAT ghost-NOM exist Q   -TO fear-CAUS.PAST
          "The sound scared Jiro, making him think 'Is there a ghost?'."

These facts suggest that nominalized clauses must occupy the internal argument slot of *kowagar(u)* "fear" in (24b), as the causee must be dative. They also suggest that *to*-clauses at least allow for a parse in which they are adjoined to the VP headed by *kowagar(u)*, as the causee in (24c) and (24d) may be accusative.[10]

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[10]In the literature on Japanese syntax, a PF-level constraint against multiple accusative-case marking has been observed in possessor raising, light-verb constructions, and head-internal relative clauses (among other constructions) and has been dubbed as the Double-*o* Constraint. The ban on multiple accusative case marking in *causatives* is qualitatively different from the PF-level Double-*o* Constraint in that it cannot be obviated by operations such as clefting and has been attributed to a non-surface-level constraint on θ-assignment (Harada 1975; Fukui 2000; Hiraiwa 2010). We believe that such a non-surface-oriented constraint on double accusative marking is operative in the test presented here, as opposed to the Double-*o* Constraint.

But, the question arises of how to decide on the argument vs. adjunct status of the *to*-clause in (24c) and (24d) when the causee is dative. The simplest option is to say that *to*-clauses may also sometimes saturate internal argument positions and receive accusative case. Another set of options, motivated by the appeal of treating *to*-clauses *uniformly* as adjuncts, would be to say that these may co-occur with a silent element which itself is an internal argument and receives accusative case. We elaborate on these options in Section 6. For now, it suffices to know that a bona fide adjunct parse is available for D/T-clauses, and that the compositional fragment we propose in Section 4 covers at least adjunct D/T-clauses in contrast with nominalizations.

3.3 Extraction

Our claim that (at least some) D/T-clauses are adjuncts raises the question of whether it is possible to extract out of them. This is because adjuncts are often considered to be islands for extraction (Ross 1967), and the prediction is that extraction should be impossible at least out of those D/T-clauses that are adjuncts. In this section, we discuss whether this prediction is borne out, based on attempts to extract adjunct *wh-* phrases like *why* and *how*. Indeed, some environments proposed to be islands in some languages are easier to travel out of than expected, and the extraction of adjuncts (vs. arguments) shows the greatest resistance, hence providing the best diagnosis for islandhood (Özsoy 1996, İşsever 2009 for Turkish; Richards 2000, Kusumoto 2017 for Japanese, a.o.). We will show (a) that extraction is possible out of D/T-clauses *even when we independently make sure that they are adjuncts* and (b) that the (im)possibility of extraction might thus not be a good empirical test for determining the adjunct vs. argument-hood of D/T-clauses, following the configurational view on adjunct islands (Uriagereka 1999; Johnson 2003; Privoznov 2022).[11]

The question of whether *to*-clauses are islands has been addressed for Japanese by Kusumoto (2017) and by Shimamura (2018) among others. We are not aware of any relevant literature on Turkish *diye* clauses, and report on Japanese here. In a nutshell, Kusumoto's (2017) and Shimamura's (2018) views are the following. Kusumoto judges *wh*-extraction to be possible out of *to*-clauses. She takes this as evidence for the view that *to*-clauses are (always) arguments. On the other hand, Shimamura allows for both an argument parse and an adjunct parse for *to*-clauses, and claims that extraction out of *to*-clauses becomes impossible when *to*-clauses are forced to be adjuncts (due to the presence of another phrase that fills the argument slot). Below, we will add further data to the mix, which suggest that extraction remains possible even when a *to*-clause is forced to be an adjunct given its co-occurrence with an intransitive predicate.

Kusumoto (2017: 58) provides the following examples to argue for the claim that Japanese *to*-clauses are not adjuncts. In (25a), it is shown that the in-situ *wh* phrase *naze* inside a *to*-clause allows an interpretation where it undergoes covert movement out of the clause (to yield a matrix *wh-* question interpretation). In contrast, a parallel extraction in its counterpart with a nominalized clause, (25b), is ungrammatical for independent reasons, either because of the complex NP constraint or to a constraint similar to the factive island constraint—see Bondarenko (2022).[12]

The data provided here only involve declarative *to* and nominalized clauses. Extraction out of

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[11]We thank Sabine Iatridou and David Pesetsky for pushing us on the point of expected islandhood.

[12]In contrast with Japanese, there is no general ban on adjunct *wh*-extraction from Turkish nominalizations:

interrogative clauses is degraded regardless of whether they are *to*-clauses or nominalized clauses, possibly due to the *wh*-island effect (Shimoyama 2001).

(25) a. Anata-wa [koibito-ga naze tumetaku natta   to] setumei-sita   no?
         you-TOP   lover-NOM why cold   become TO   explain-do.PAST Q
         "Why did your girlfriend start to act coldly to you, according to your explanation?"

      b. *Anata-wa [koibito-ga naze tumetaku natta   koto]-o   setumei-sita   no
         you-TOP   lover-NOM why cold   become NMZ -ACC explain-do.PAST Q

(Kusumoto 2017: 58)

The same contrast holds with *odoroku* "surprise," as shown in our constructed examples:

(26) a. Anata-wa [koibito-ga naze tumetaku natta   to] odoroita   no?
         you-TOP   lover-NOM why cold   become TO   be.surprised.PAST Q
         "What is the reason such that you were surprised that your girlfriend started to act coldly to you for that reason?"

      b. *Anata-wa [koibito-ga naze tumetaku natta   koto]-ni   odoroita   no
         you-TOP   lover-NOM why cold   become NMZ -ACC be.surprised.PAST Q

Thus, extraction out of a *to*-clause seems to be possible. Yet, to what extent these data are problematic for our analysis requires more scrutiny, as it is still theoretically possible that *to*-clauses can be parsed as (something like) complements or as adjuncts. The data so far are compatible with the possibility that extraction is possible when a *to*-clause is a complement while it is impossible when it is an adjunct. The fact that (25a) and (26a) are grammatical (under the intended interpretations) only suggests that the *to*-clauses *allow* a complement parse. That is, the extraction data in itself do not invalidate the additional availability of the adjunct parse seen in the previous section. Ultimately, we will not endorse this interpretation of the data, i.e., that it is made possible by a complement parse, but it is worth examining its plausibility, especially since Shimamura (2018) provides an analysis that appeals to a complement/adjunct asymmetry.

Shimamura (2018: 119) offers the following contrast in the possibility of extraction from *to*-clauses. (We modify Shimamura's translations, but report the judgments that he provides.) Note, for the translations, that the "thinks" is provided by the verb *omou* and "believing" by the *to* clause.

(27) a. Taro-wa [Hanako-ga   naze tasuketekureta-to] omotta-no?
         Taro-TOP Hanako-NOM why help.give.PAST-TO   think.PAST-Q
         "What is the reason such that Taro thinks Hanako helped him for that reason?"

(i)   [Partnerinin sana   nasıl davran-ma-ya   başla-dığ-ın-ı]   düşünüyorsun?
        your partner 2S.DAT how behave-NMZ-DAT start-NMZ-3S-ACC you think
        How do you think your partner started to act towards you?

What matters for present purposes is not the variation in the possibility of extraction out nominalizations, but the possibility of extraction out of D/T-clauses—where Turkish does pattern like Japanese.

14

b. Taro-wa [Hanako-ga   tasuketekureta to   ] [kanozyo-no kooi-o
   Taro-TOP Hanako-NOM help.give.PAST TO   she-GEN   goodwill-ACC
   arigata-ku   ] omotta.
   appreciate-COP.INF   think.PAST
   "Taro thought he appreciated Hanako's kindness, believing she helped him."

c. *Taro-wa [Hanako-ga   naze tasuketekureta-to   ] [kanozyo-no kooi-o
   Taro-TOP Hanako-NOM why help.give.PAST-TO   she-GEN   goodwill-ACC
   arigata-ku   ] omotta-no?
   appreciate-COP.INF   think.PAST-Q
   Intended: "What is the reason *r* such that Taro thought he appreciated Hanako's kindness, believing she helped him for the reason *r*?"

Here, it is shown that the covert extraction of *naze* "why" is possible if the *to*-clause occurs in isolation under the predicate *omou* "think," (27a). This data point is structurally similar to Kusumoto's example in (25a). But extraction becomes impossible if the *to*-clause co-occurs with an infinitive complement, (27c). If the *to*-clause in the former sentence can be parsed as a complement but the one in the latter cannot, the contrast makes sense: When we independently force the *to*-clause to be an adjunct by providing the verb an internal argument (the infinitive), extraction becomes impossible, which is what is expected by the adjunct-island hypothesis.

Similar examples can be constructed that have a similar structure to (27) but with an NP in the internal argument position, where extraction out of an adjunct *to*-clause is judged to be ungrammatical in the presence of the internal argument:

(28) a. Taro-wa [Hanako-ga   naze tsumetaku natta   to   ] odoroita-no?
         Taro-TOP Hanako-NOM why cold   become.PAST TO   surprise.PAST-Q
         "What is the reason such that Taro was surprised that Hanako started to act coldly for that reason?"

      b. Taro-wa [Hanako-ga   tsumetaku natta   to   ] [kanozyo-no koodoo-ni   ]
         Taro-TOP Hanako-NOM cold   become.PAST TO   she-GEN   action-DAT
         odoroita.
         surprise.PAST
         "Taro was surprised by Hanako's action, saying that she started to act coldly."

      c. *Taro-wa [Hanako-ga   naze tsumetaku natta   to   ] [kanozyo-no koodoo-ni
         Taro-TOP Hanako-NOM why col   become.PAST TO   she-GEN   action-DAT
         ] odoroita-no?
         surprise.PAST-Q
         "What is the reason such that Taro was surprised by Hanako's action, saying she started to act coldly for that reason?"

As a control for the extraction out of *to*-clauses examples above, attempting to extract a *naze* phrase from a reason clause or the antecedent of a conditional, in (29), results in unacceptability in a way that is not qualitatively different from (27c) and (28c). These examples are taken from Richards (2000: 203):

(29) a. *[Syatyoo-ga Taroo-o Tookyoo-ni naze yatta kara] umaku iku no?
president-NOM Taroo-ACC Tokyo-DAT why sent because well go Q

'Why are things going well [because the president sent Taroo to Tokyo t]?

b. *[Syatyoo-ga Taroo-o Tookyoo-ni naze yattara] umaku iku no?
president-NOM Taroo-ACC Tokyo-DAT why send-if well go Q

'Why are things going well [if the president sends Taroo to Tokyo]?

If we assume with Shimamura that the *to*-clauses in (27a) and (28a) allow a parse as a complement, the pattern thus far is consistent with the adjunct island hypothesis: an extraction out of a *to*-clause is possible if it is a complement while extraction is impossible if it is (forced to be) an adjunct. This view, however, is challenged by the following data, where extraction is possible out of an 'unselected' *to*-clause co-occurring with an intransitive verb *tobiagar(u)* 'jump up':

(30) Anata-wa [koibito-ga naze tumetaku natta to] tobiagatta no?
you-TOP lover-NOM why cold become TO jump.up.PAST Q
"What is the reason such that you jumped (in surprise) that your girlfriend started to act coldly to you for that reason?"
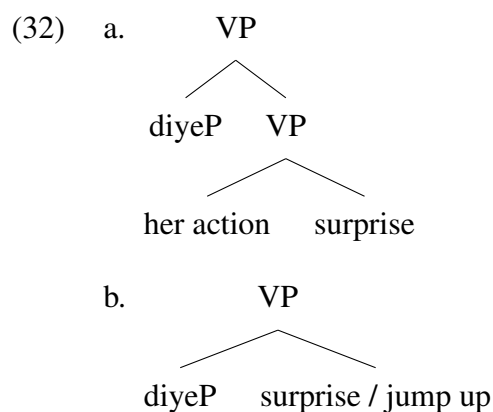
Here, given the intransitive nature of the verb, the *to*-clause only allows a parse as an adjunct. Despite this, the *wh*-extraction is perfectly acceptable. This is unexpected under the view where adjunctive *to*-clauses in general behave as an island for extraction. The example in (31) replicates the Japanese example in (30) in Turkish. Again, because the verb is intransitive, the *diye* clause must be an adjunct here, and yet, the clause does not act as an island for adjunct extraction.

(31) a. Context: Ai is planning to celebrate her birthday by riding on a small propeller plane. Taro is telling us about Ai, when he jumps up and says "she's going to celebrate her birthday by riding on a small propeller plance." Our other friend doesn't hear this last part and asks. . .

b. Taro [Ai doğum gününü nasıl kutla-yacak diye] zıpladı?
Taro Ai her birthday how will celebrate DIYE jumped up

What is the manner such that Taro jumped up, saying that Ai was going to celebrate her birthday in that manner?

The issue is then how we reconcile the apparent adjunct island behavior in those cases where the adjunct parse is forced in (27) and (28) and the apparent violation of the adjunct island in (30) and (31). To address this issue, we follow Bondarenko (2022), who observes a similar pattern in the possibility of extraction out of CP complements to the verb *objsnit'*, "explain," under their "explanans" reading. Under Bondarenko's analysis, a CP co-occurring with *objasnit'* under the explanans reading is treated as a modifier with respect to the verbal semantics. Despite this, *wh*-extraction out of the relevant CPs is possible, posing an apparent problem for the analysis. To resolve this problem, Bondarenko resorts to the configurational account of adjunct islands (Uriagereka 1999; Johnson 2003; Privoznov 2022), according to which the island status of an adjunct is dependent on its precise syntactic configuration. Specifically, extraction out of an adjunct

is possible if it is introduced as a sister of a head although it is impossible if it attaches to a phrase.[13] In Bondarenko's analysis, Russian explanans CPs can be introduced as a sister of a complex verbal head. Hence, under the configurational view on adjunct islands, it follows that the clause is transparent for extraction in such a syntactic configuration, despite the modificational semantics.

Our analysis of D/T-clauses to be presented in the next section allows for a similar explanation of the island status of D/T-clauses. A D/T-clause, which we label as diyeP, can either adjoin to a VP as in (32a) or can be introduced as a sister of an intransitive verb as in (32b):

(32) a.
```
            VP
           /  \
       diyeP    VP
               /  \
        her action  surprise
```

b.
```
         VP
        /  \
    diyeP   surprise / jump up
```

The examples containing a nominal internal argument in (27b,c) and (28b,c) involve the adjunction structure in (32a) while those examples without a nominal internal argument (in (27) and (28)) or

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[13]Privoznov (2022) provides the following contrast in Russian to motivate the configurational account of adjunct island:

(i) a.*Éto —pros'ba, [kotoruju on [[menja pozovët], [esli ty ne vypolniš **t**₁]]]
    this.is request REL   he I.ACC will.call if you NEG will.fulfill

    'This is the request₁ that he will call me if you don't fulfill __₁'   (Privoznov 2022:103)

   b. Éto —pros'ba, [kotoruju on [ogorčitsja,   [esli ty ne vypolniš **t**₁]]]
    this.is request REL   he will.be.upset if you NEG will.fulfill

    'This is the request₁ that he will be upset if you don't fulfill __₁'   (Paducheva & Zaliznyak 1979: 100)

Privoznov suggests that the crucial difference between these two examples lies in how the if-clause is integrated in the structure. In (ia), the if-clause attaches to the VP *menja pozovët* 'will call me' while in (ib), it directly attaches to the intransitive predicate *ogorčitsja* 'will be upset'. The account we sketch in the main text predicts that a similar contrast should be available in Turkish and Japanese. The following is our attempt in Japanese, following Richards' examples from (29). (The Turkish counterparts of these sentences are equally unacceptable.)

(ii) a. ??Hanako-wa [syatyoo-ga   Taroo-o   Tookyoo-ni naze yatta kara]   watasi-ni denwa-sita no?
    Hanako-TOP president-NOM Taroo-ACC Tokyo-DAT why sent because I-DAT   called   Q

    'Why did Hanako call me [because the president sent Taroo to Tokyo t]?

   b. ??Hanako-wa [syatyoo-ga   Taroo-o   Tookyoo-ni naze yatta kara]   odoroita   no?
    Hanako-TOP president-NOM Taroo-ACC Tokyo-DAT why sent because was.surprised Q

    'Why was Hanako surprised [because the president sent Taroo to Tokyo t]?

According to the second author's judgment, both sentences are somewhat degraded and it is not entirely clear if (iib) is qualitatively better than (iia). We would like to leave open whether the configurational account of adjunct islands is generally viable for Turkish and Japanese.

with an intransitive predicate (in (30) and (31)) involve the structure in (32b). Under the configurational view on adjunct islands, it follows that the D/T-clauses in the former case are opaque for extraction while those in the latter case are transparent for extraction. Thus, we submit that the structural variability between (32a) and (32b) accounts for the variable possibility of extraction out of D/T-clauses, despite their status as an adjunct with respect to verbal semantics, i.e., that they do not saturate an internal argument slot for the verb it co-occurs with.

3.4 Interim summary

In sum, we provide two empirical arguments for the existence of an adjunct parse of the D/T-clauses: one based on their ability to combine with (derived) intransitive predicates and one in terms of their ability to trigger an accusative/dative case alternation under causativised predicates. Importantly, the case alternation data in fact suggest that there are instances of D/T-clauses that involve saturation of the internal argument slot (by virtue of the D/T-clauses themselves or by virtue of a co-occurring null pronoun). This is not a problem for us, as our proposal, to be detailed in the next section, relies on the *availability* of the adjunct parse of D/T-clauses.

4 Proposal

In this section, we propose our semantic analysis of the nominalized complements and D/T-clauses with "be surprised," based on the argument/adjunct distinction we argued for in the previous section. Our analysis aims to capture the following three observations, repeated from Section 2:

1. Nominalized declaratives exhibit factivity while D/T-declaratives do not (under predicates that are typically classified as factive, like "surprise").

2. Nominalized interrogatives exhibit answer-oriented inferences while D/T-interrogatives exhibit question-oriented inferences (under responsive predicates, such as "surprise," "guess" and "answer")

3. D/T-clauses exhibit the linguistic production inference.

To account for these observations, we will make two crucial assumptions about semantic ingredients. One is a relatively uncontroversial one: Emotive factives like "be surprised," when they take a question as their internal argument, relate the attitude holder to a true answer of the question (though see Klein (1975)). The other assumption concerns the semantics of *diye*/*to*. Building on insights from the existing literature on D/T and similar complementizers cross-linguistically (Saito 2012, 2015; Özyıldız 2017; Shimamura 2018; Yoshida 2019; Yamada 2019; Demirok et al. 2019; Major 2021; Goodhue & Shimoyama 2022, 2023), we argue that D/T-clauses adjoin to a VP and introduce an additional linguistic-production event which is related to the main event (e.g., the surprisal event) in systematic ways.

As we will see below, the observations in i–iii above fall out straightforwardly once we combine these assumptions with the syntactic distinction between nominalized and D/T-clauses. Given this

syntactic distinction, semantic restrictions that a predicate imposes on the internal argument (such as factivity and the answer-orientedness) are only operative with nominalized complements, but not with D/T-clauses. This leads to factivity alternations and to the presence/absence of the answer-oriented inference (Observations i and ii).[14] Furthermore, the semantics of *diye/to* encodes the linguistic production inference characteristic of D/T-clauses, capturing Observation iii.

4.1 The semantics of predicates and nominalized complements

Concretely, the semantics of predicates like "surprise" is defined as in (33):

(33) $[\![odoroku / şaşır\text{-} \text{ 'be surprised'}]\!]^w$
$= \lambda Q_{\langle st,t \rangle} \lambda e_v \colon \underline{\exists p \in Q[p(w)]}. \, \exists p \in Q[p(w) \wedge \textbf{surprise}(e) \wedge \textbf{Theme}(e,p)]$

Assuming a uniform semantics for clausal complementation (Theiler et al. 2018; Uegaki 2019, 2022), we take both declarative and interrogative nominalized complements to saturate the internal argument slot Q in (33). (We do not attempt to unify cases where "surprise" combines with plain DPs like "the snow" with when it combines with clausal nominalizations. See the literature that treats attitude verbs as combining with entity-type arguments, e.g., Kratzer (2006), Moulton (2009), among others, as well as Abenina-Adar (2020) and Djärv (2023) for unified treatments of DP and clausal arguments for verbs that take both.) When (33) takes a declarative complement, Q is the singleton set consisting of the proposition (classically) expressed by the complement. This ensures that the predicate imposes factivity on nominalized declarative complements. This is illustrated below:

(34) $[\![[p]_{nmz} \, odoroku/şaşır\text{-}]\!]^w$
$= \lambda e_v \colon \exists p' \in \{p\}[p'(w)]. \, \exists p'' \in \{p\}[p''(w) \wedge \textbf{surprise}(e) \wedge \textbf{Theme}(e,p'')]$
$= \lambda e_v \colon \underline{p(w)}. \, p(w) \wedge \textbf{surprise}(e) \wedge \textbf{Theme}(e,p)$

The account furthermore ensures that "surprise" with a nominalized interrogative yields an answer-oriented inference, as can be seen in the the denotation of "surprise" + a nominalized interrogative below:

(35) $[\![[Q]_{nmz} \, odoroku/şaşır\text{-}]\!]^w$
$= \lambda e_v \colon \underline{\exists p \in Q[p(w)]}. \, \exists p \in Q[p(w) \wedge \textbf{surprise}(e) \wedge \textbf{Theme}(e,p)]$

In addition to the transitive denotation that takes an internal argument, as in (33), we assume an intransitive denotation for "be surprised" as follows, where the theme slot of surprise is existentially closed:

(36) $[\![odoroku / şaşır\text{-} \text{ 'be surprised'}]\!]^w = \lambda e_v. \, \exists p[p(w) \wedge \textbf{surprise}(e) \wedge \textbf{Theme}(e,p)]$
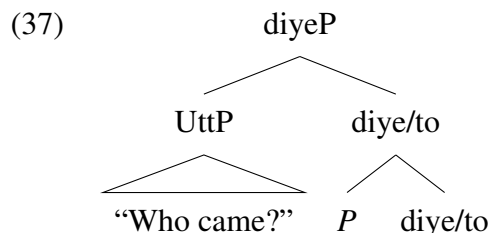
This means that a sentence involving this predicate, but without an explicit internal argument, can be parsed in two ways: (a) one with (33) and a phonologically null pronoun referring to the internal argument; and (b) one with (36) and without any internal argument. Although this distinction is not crucial in our account of the three observations listed above, it will be relevant as we try to

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[14]See Bondarenko (2020) for a similar analysis of factivity alternations.

account for the case alternation facts under causatives in Section 6. It is outside the scope of this paper to explain how certain verbs like Japanese and Turkish "be surprised" can alternate between transitive and intransitive uses, though see Glass (2022) and the references therein for more on transitivity alternations.

4.2 The semantics of D/T-clauses

D/T-clauses adjoin to a VP and introduce an additional eventuality of linguistic production associated with the main attitudinal event. In our analysis, *diye/to* has two semantic contributions: (a) it specifies the linguistic form of events that satisfy a contextually supplied description P (for linguistic forms see Maier 2017, see also Shan 2010; Potts 2007); and (b) it relates P to a matrix event description. Per (a), we do not hard wire linguistic production directly into the semantics of *diye* and *to*. The reason for this will become apparent in Sectioh 6. Concretely, we have the LF and the denotation for a D/T-clause in (37), which we label as diyeP for convenience.

(37)

```
                  diyeP
              /‾‾‾‾‾‾‾‾‾\
          UttP          diye/to
        /‾‾‾‾‾\         /‾\
   "Who came?"       P   diye/to
```

(38) $[\![(37)]\!]^{w,g} = \lambda R_{vt}\lambda e_v. \exists e_1 \exists e_2 [e_1 \sim e_2 \wedge g(P)(e_1) \wedge \mathbf{form}(e_1) = $ "Who came?" $\wedge R(e_2)]$
       $(e \sim e' \Leftrightarrow e$ is directly causally linked to e', Özyıldız et al. 2019)
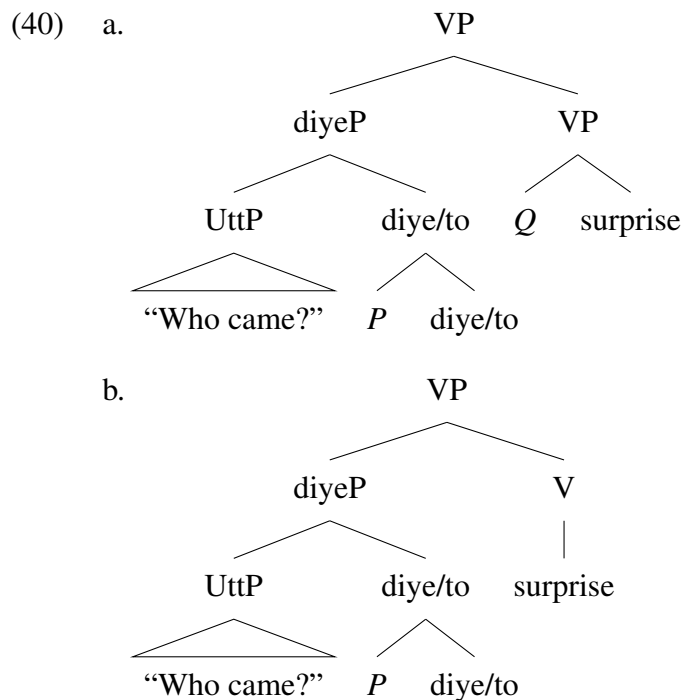   (To be revised)

Here, P is a pronoun for a contextually supplied event description true of a linguistic production event (e_1).[15] The body of the function in (38) states that the linguistic form of this event is specified as "who came?" while there exists another event (e_2) true of the main predicate R. The two events e_1 and e_2 are specified to be "directly causally linked", following Özyıldız et al. (2019) and pace an earlier formulation in Özyıldız & Uegaki (2023). For instance, the direct causal relation includes the surprisal event (e_2) directly causing an agent to utter something (e_1).

    Let us illustrate this with a concrete Japanese example in (39):

(39) Ai-wa [dare-ga   kitano-ka-to] odoroita.
      Ai-TOP   who-NOM came-Q-TO   was.surprised
      Ai was surprised, saying "Who came?"   (Jp)

As briefly mentioned in the last subsection, the LF of the VPs in (39) can be represented in two ways, one with a null pronoun for the internal argument of "surprise" (40a) and one without (40b):

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[15]The introduction of a linguistic production event here is similar to Grimshaw's (2015) inclusion of an abstract verb SAY in the lexical semantics of so-called *say*-verbs, as well as Kratzer's (2022) inclusion of a functionally similar item in the left periphery of clauses combining with certain speech verbs.

(40) a.

```
                    VP
              ┌─────┴─────┐
           diyeP          VP
        ┌────┴────┐     ┌──┴──────┐
      UttP     diye/to  Q      surprise
    ┌──┴──┐    ┌──┴──┐
 "Who came?"  P  diye/to
```

b.

```
                    VP
              ┌─────┴─────┐
           diyeP          V
        ┌────┴────┐       │
      UttP     diye/to  surprise
    ┌──┴──┐    ┌──┴──┐
 "Who came?"  P  diye/to
```

In both of these structures, P is a contextually supplied event description for the linguistic production event and Q in (40a) is a null pronoun for the internal argument of "surprise."[16] The denotation of (40a) and (40b) come out as in (41a) and (41b), respectively:

(41) a. $\lambda e_v : \exists p \in Q[p(w)]. \exists e_1 \exists e_2[e_1 \sim e_2 \land g(P)(e_1) \land \mathbf{form}(e_1) = \text{"Who came?"}$
        $\land \exists p \in g(Q)[p(w) \land \mathbf{surprise}(e_2) \land \mathbf{Theme}(e_2, p)]]$

   b. $\lambda e_v. \exists e_1 \exists e_2[e_1 \sim e_2 \land g(P)(e_1) \land \mathbf{form}(e_1) = \text{"Who came?"}$
        $\land \exists p[p(w) \land \mathbf{surprise}(e_2) \land \mathbf{Theme}(e_2, p)]]$

The two interpretations in (41) differ in whether the theme of the surprise is specified to be a member of the contextually supplied pronoun denotation. In addition to this semantic distinction, the two structures in (40) will be crucial as we account for the case alternation phenomena under causatives in Section 6.

The direct causal link relation denoted by $\sim$ in (41) captures the fact that Ai's surprisal causes her linguistic production of "who came?" in (39). We also assume $\sim$ relation to be underspecified

---

[16]We assume that the event description P is always silent but that the internal argument of the predicate Q can be pronounced along with a D/T-clause. Evidence for this comes from examples such as the following, where a nominalized interrogative and a D/T-interrogative co-occur:

(i)   Ai [kimin geldiğine] [Carly mi   geldi diye] şaşırdı.
       Ai who   came.NMZ Carly POLQ came DIYE was.surprised
       Ai was surprised by who came, thinking "Is it Carly who came?"

(ii)   Ai-wa [*pro* Carly datta-noka to] [dare-ga   kita-ka-ni]   odoroita.
       Ai-TOP   Carly COP.PST-Q TO who-NOM came-Q-DAT was.surprised
       Ai was surprised by who came, thinking "It was Carly!?"

with respect to the directionality of causation, thus rules in causation in the direction from the D/T eventuality to the matrix one. This is illustrated by cases like the following, repeated from (21–22), which are thus captured by our analysis.

(42) Taro [ses   ne ol-abil-ir   diye] arandı
       Taro sound what be-MODAL-AOR.3S DIYE looked around

       Taro looked around, saying/thinking "What sound could it be?"   (Turkish)

(43) Taro-wa [nan-no   oto   daroo-ka-to] tachiagatta.
       Taro-TOP what-GEN sound MODAL-Q-TO   stood.up

       Taro stood up, saying/thinking "What sound could it be?"   (Japanese)

Here, we take the linguistic production (either out loud or internal) of "What sound could it be?" to be directly causing Taro's action of standing up.[17]

Finally, in addition to capturing the linguistic production inference, the analysis correctly captures the fact that interrogative D/T-clauses do not license the answer-oriented inference. According to our analysis, an interrogative D/T-clause gives rise to the interpretation that there is a linguistic production event whose form is the relevant interrogative clause. Such an interpretation is not answer-oriented, as it is compatible with the attitude holder not producing (or believing) any of its answers. For example, (39) does not yield the inference that Ai linguistically produced an answer to "who came?"

4.3   Interim summary and discussion

In this section, building on the argument/adjunct distinction of nominalized and D/T-clauses discussed in Sect. 3, we have proposed a semantic analysis of nominalized and D/T clauses that accounts for the different inferences associated with each clause type, as outlined in Sect. 2. Since a nominalized clause serves as an internal argument of the clause-embedding predicate, various semantic restrictions imposed by the embedding predicate manifest themselves with nominalized

---

[17]We follow Goodhue & Shimoyama (2022) in assuming that a mere temporal overlap between the linguistic production and the event described by the main predicate would be too weak. In the following example from Goodhue & Shimoyama (2022: 100) (adapted from Kim & Tomioka 2014: 282), there is temporal overlap between Yoko's action of putting the mackerel in the oven and her (internal) linguistic production. However, the sentence is felt to be infelicitous, presumably due to the lack of the causal relation between the two events.

(i) ??Yoko-wa [[kyoo syokuba-de yatta   koto-wa tadasikatta (no) ka] to] saba-o   oobun-ni ireta.
      Yoko-TOP today work.place-at do.PST thing-TOP right.PST   no   Q TO mackerel-ACC oven-in put.in.PST
      'Yoko put the mackerel in the oven, (while) wondering whether she did the right thing at work today.'

To this, we add a second data point that further support the causal account:

(ii) Yoko-wa [[*pro* oisiku naru   daroo] to] saba-o   oobun-ni ireta.
      Yoko-TOP   tasty become MODAL TO mackerel-ACC oven-in put.in.PST
      'Yoko put the mackerel in the oven, thinking it will be tasty.'

In contrast to (i), (ii) is felt to be felicitous. This is presumably because Yoko's linguistic production and her action of putting the mackerel to the oven are not only temporally overlapping in (ii), but also causally linked: Thinking that it will be tasty has caused Yoko to put the mackerel to the oven.

complements. These include the factive inference and the answer-oriented inference. On the other hand, the adjunct status of D/T-clauses derives the lack of both factive and answer-oriented inferences. In addition, we outlined how the linguistic production inference comes about as a result of the semantics of the *diye*/*to* head, as well as how the relation between the main attitudinal event and the linguistic production event can be constrained.

At this stage, there are several comments to make on the connection between our proposal and the general literature on answer vs. question-orientedness, factivity, and composition with clausal constituents. These can safely be skipped by some readers. First, it is sometimes assumed that whether an interrogative embedding predicate introduces a relationship to a question vs. one of its answers is mediated through the insertion of answerhood operators ('Ans'), which are introduced in the syntax following the schema in (44) (see, at least, Heim (1994), Dayal (1996, 2016)).

(44)   [Subject [Verb [Ans [Interrogative Clause]]]]

Such operators do not feature in our account, where answer-orientedness is presented as an unanalyzed property of the lexical semantics of certain attitude predicates. If answerhood operators were to be incorporated into our account, two additional assumptions are required: First, they would need to be able to only apply to predicates' internal arguments (i.e., to nominalizations in Turkish and Japanese;w), and second, they would need to be banned from applying to interrogative complements to *diye* and *to*.

Second, work on factivity suggests (a) that whether a predicate entails or presupposes its (declarative) clausal complements is not entirely a property of the lexical semantics the predicate in question—see the references from footnote 1 as well as Schulz (2003)) and (b) whether a given inference associated with a predicate projects or not is not entirely a property of the lexical semantics of the predicate in question, but incorporates facts about world knowledge and the organization of discourse (see Tonhauser (2016), Tonhauser et al. (2018;w), among others). Our analysis does not incorporate these finer-grained distinctions, but so far as we can tell, it is not incompatible with them in essence.

Finally, we have been proposing translations for sentences that contain nominalizations in Turkish and Japanese that feature *that*-clauses in English. As we argue that nominalizations are syntactic and semantic arguments, this correspondence is made difficult by the fact that many authors argue that English *that* clauses are unlike arguments but more like modifiers (Moulton 2009; Bogal-Allbritten 2016; Elliott 2017; Bassi & Bondarenko 2020; Moltmann 2020; Stephen 2022; Bondarenko 2023), which we argue D/T-clauses are like. Here, we must leave a comparison and synthesis of the existing cross-linguistic facts about clausal embedding for further research, but note that some authors also curerently argue for the existence of multiple paths to composition with clauses within the same language, in particular one that involves adjunction, and another, complementation (Shimamura 2018; Özyıldız 2020; Bochnak & Hanink 2022; Bossi 2023).

5   Predictions

Our analysis of nominalized and D/T-clauses makes further predictions about differences in their interpretation and their distribution. In this section, we discuss two such predictions, both of which

are borne out, as far as we can see.

5.1 Semantic restrictions on internal arguments other than factivity

Our analysis predicts that there may be semantic restrictions other than factivity that are imposed by predicates and that apply uniformly to nominal declaratives and interrogatives, but not to D/T-declarative/interrogatives. This prediction is borne out, for example, with the class of *response-stance predicates* (Cattell 1978), which presuppose that the content of their clausal argument is a response to something in the surrounding discourse or context. We illustrate with Japanese *hantai-suru* "to oppose," but the fact replicates for Turkish, and for the available counterparts of Cattell's original list in either language ("accept, admit, agree, confirm, deny, verify").

(45)   a. Ai-wa [Ken-o   yobu koto-ni] hantai-shita.
        Ai-TOP   Ken-ACC invite NMZ   opposed
        Ai opposed inviting Ken.
        ⤳ The proposition that Ken would be invited was present in the preceding discourse.

     b. Ai-wa [Ken-ga   kuru to   ] hantai-shita.
        Ai-TOP   Ken-NOM come come   TO   opposed
        Ai opposed something, saying "Ken will come."
        ↛ The proposition that Ken would come was present in the preceding discourse.

(46)   a. Ai-wa [Ken-o   yobu ka-ni] hantai-shita.
        Ai-TOP   Ken-ACC invite Q-DAT   opposed
        Ai opposed the decision on whether to invite Ken
        ⤳ The question of whether Ken will be invited was present in the preceding discourse.

     b. Ai-wa [dare-ga   kuru-ka to] hantai-shita.
        Ai-TOP   who-NOM come-Q TO   opposed
        Ai opposed something, saying "who will come?"
        ↛ The question of who will come was present in the preceding discourse.

In (45) and (46), the examples with a nominalized complement give rise to the inference that its content (the corresponding assertion or question) was present in the discourse preceding the events that these sentences describe. The ones with a *to*-clause do not give rise to a parallel inference. Rather, they imply that Ai produced an utterance with the content expressed by the *to*-clause in opposition to something else. This is what is expected if the semantic restrictions that (responsive) predicates impose manifest themselves with nominalized complements, but not with D/T-clauses.

5.2 S(emantic)-selection

Our analysis furthermore predicts that S-selectional restrictions—which can be thought of lexical semantic restrictions on the (sub)types of internal arguments that predicates can combine with—should be observed for nominalized clauses but not necessarily for D/T-clauses.

In (47), we see that the Turkish predicate *um-* "hope" is incompatible with nominalized interrogatives, but acceptable with D/T-interrogatives (see Goodhue & Shimoyama 2023: 9–10 for similar observations in Japanese):

(47)   a. *Ai [birisi-nin   yardım ed-ip   ed-me-yeceˇ-in-i   ] umdu.
          Ai   someone-GEN help   do-CONJ do-FUT.NMZ-3S.POSS-ACC   hoped

          Intended: Ai hoped whether someone would help.

       b. Ai [birisi   yardım ed-ecek   mi   diye] umdu.
          Ai   someone-GEN help   do-FUT.3S.POSS DIYE Q   hoped

          Ai hoped and wondered if someone would help her.

This contrast is expected if the predicate *um-* is lexically restricted such that it does not combine with interrogative complements. This would account for the unacceptabity of (47a). On the other hand, there is nothing conceptually or lexical-semantically deviant with hoping and entertaining a thought at the same time, where that thought is expressed by (certain) question forms, which is consistent with the acceptability of (47b).[18]

The example in (48) makes a similar point with the predicate *tazuneru*, "ask." While this predicate is incompatible with nominalized declaratives, much like English "ask" with indicative *that* clauses, it is acceptable with *to* declaratives.

(48)   a.*Ai-wa [musume-ga   katta hazu-na-no-o   ] shimpan-ni (shoosai-o)
          Ai   her daughter-GEN won should-COP-NMZ-ACC   judge-DAT details-ACC
          tazuneta.
          asked

       b. Ai-wa [musume-ga   katta hazu-da-to   ] shimpan-ni (shoosai-o) tazuneta.
          Ai-TOP   daughter-NOM   won   should-COP-TO   judge-DAT details-ACC asked

          'Ai asked the judge about details, saying her daughter should have won.'

At first sight, these D/T-clause examples may appear to involve violations of the S-selectional restrictions of *um-*, "hope," and *tazuneru*, "ask," but this behavior is not unexpected: S-selectional properties, qua semantic restrictions on predicates' internal arguments, do not apply to D/T-clauses under the motivated assumption that they are modifiers. They do apply to nominalized clauses, which pattern like internal arguments.

We should note, at this stage, that this result does not imply that *any* D/T-clause will be acceptable with any attitude predicate. The observant reader will have noticed that the examples above involve a non-canonical question for Turkish, and contextual effort for Japanese. We will return to this matter shortly. In light of unacceptable combinations of attitude predicates and D/T-clauses, we will suggest that we must also take into account restrictions imposed by *diye*, *to*, and matrix attitude predicates in explaining their distributional and interpretive properties.

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[18]We acknowledge here that there is an ongoing debate as to whether (English) preferential predicates are able to combine with interrogative complements or not. See the discussion between Uegaki & Sudo (2019) and White (2021). Pertaining to the Japanese examples in (48), see Ciardelli & Roelofsen (2015) and Theiler et al. (2019) for an account of why rogative predicates like "ask" and "wonder" resist declarative embedding—or, more precisely, declarative internal arguments.

6 Towards an understanding of argument-like D/T-clauses

6.1 The hypothesis space

Argument-like D/T-clauses In Section 3.2, we were not able to conclude that all *to* clauses had to be adjuncts, only that some were. The main piece of evidence against the stronger conclusion was example (49), repeated from (24c) above, where a *to*-clause with causativized *kowagar(u)* "fear" could co-occur either with an accusative or a dative causee. Example (50) suggests that the same optionality is present in Turkish as well.[19]

(49) Sono monooto-wa Jiro{-o/-ni} [obake-ga iru kamosirenai]-to kowagar-aseta
     the sound-TOP Jiro-ACC/-DAT ghost-NOM exist may   -TO fear-CAUS.PAST

"The sound made Jiro fear that there might be ghosts."

(50) O ses {bana, beni} [hayaletler gerçek olabilir diye] düşün-dür-dü.
     that sound me.DAT me.ACC ghosts   real   might be DIYE think-CAUS-PST

"That sound made me think that ghosts are real."

The intuition reported in (50) is corroborated by naturally occurring examples like (51). Note, in both cases, that *diye* is introducing a question, which suggests that this optionality is not conditioned by the type of *diye*'s complement.

(51) Ancak [Salih'i   İsmail Hacıoğlu oyna-sa   nasıl ol-ur-du] diye düşün-dür-dü
     but   Salih.ACC İsmail Hacıoğlu play-COND how be-AOR-PST DIYE think-CAUS-PST
     ben-i.
     1S-ACC

But it (= the movie) made me think what it would've been like if İsmail Hacıoğlu had played Salih.

(52) [Aşağılık bir adam ol-mak daha mı güzel ol-ur-du   acaba] diye düşün-dür-dü
      jerk   a man be-INF COMP Q nice be-AOR-PST PRT   DIYE think-CAUS-PST
     bana.
     1S.DAT

It (= the movie) made me think whether it would have been nicer to be a jerk.

Given how this case alternation works, when the causee surfaces in the dative, there must be something in the structure that is receiving accusative case. The simplest hypothesis is that D/T-clauses may sometimes be that thing. And indeed on the basis of the possibility of dative causees, Akkuş (2021: p. 272) tentatively concludes that *diye*-clauses may directly serve as arguments. But it could alternatively be that these sentences contain silent NPs or pronouns that are the true accusative bearers, while D/T-clauses remain modifiers. A range of analytical options will be spelled out in greater detail shortly. Note already, however, that when the causee is in the accusative, we

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[19]For the sake of comparabity, what we call "argument-like" *to*-clauses correspond to what Goodhue & Shimoyama (2022, 2023) call "selected" *to*-clauses. Mutatis mutandis for *diye*.

simply assume that the verb that the D/T-clause combines with is being used intransitively, like foreshadowed in Section 4.2.

A second set of facts consistent with the possibility that some D/T-clauses might be argument-like comes from interpretation. In subexample b. of (53), repeated from (10) above, we observe Japanese *siru* "know" composing with a *to* declarative. The resulting attitude report does not give rise to a linguistic production inference, and it is veridical like the sentence's nominalized clause counterpart in (53a).[20] This intuition of veridicality is corroborated by the intuition that the continuations in (54) sound contradictory.

(53) a. Taro-wa Hanako-ga kinzyo-ni sundeir-u koto-o si-tteiru.
       Taro-TOP Hanako-NOM neighborhood-at live-pres NMZ-ACC know-ASP.PRES

       "Taro knows that Hanako lives in the neighborhood."

      b. Taro-wa Hanako-ga kinzyo-ni sundeir-u to si-tteiru
       Taro-TOP Hanako-NOM neighborhood-at live-pres TO know-ASP.PRES

       "Taro knows that Hanako lives in the neighborhood."   (Kusumoto 2017: 63)

(54) *As a continuation of (53a) and (53b)*

      # Demo kanozyo-wa kinzyo-ni   sunde-inai   / # Demo sore-wa matigai-da.
        but   she-TOP   neighborhood-at live-ASP.NEG / but   it-TOP incorrect-COP

      "But she doesn't live in the neighborhood." / "But it is incorrect."

To the authors' knowledge, no combination of a predicate with a *diye* clause gives rise to veridical attitude reports. But, there are such combinations that fail to give rise to linguistic production inferences. The examples in (55) illustrate, where *bil-* ("know/believe") and *inan-* ("believe") compose with *diye* declaratives and simply ascribe to the attitude holder the stative belief that the *diye* clause is true.

(55) a. Tunç Hillary kazandı diye biliyor.
       Tunç Hillary won   DIYE BIL

       Tunç believes that Hillary won.   Özyıldız (2017)

      b. Erdoğan datayı   saklıyor diye inanıyor ve bunu kanıtlamaya çalışıyorsanız,
       Erdoğan the data is hiding DIYE believe and this to prove   you're trying
       raporlananın   gerçek ölümlerden azlığını kullanamazsınız.
       what has been documented real   deaths   fewness you can't use

       If you believe that Erdoğan is hiding the data and you're trying to prove this, you can't use the fact that what has been documented is fewer than the real number of deaths.

                                                                    (attested online)

The Turkish examples are consistent with the possibility that *bil-* and *inan-* have the option of taking *diye* clauses as their complements, with no additional meaning contribution coming from

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[20]See also Bossi (2023) for the availability of two kinds of 'say'-complementation in Kipsigis, one giving rise to linguistic production inferences and the other, not.
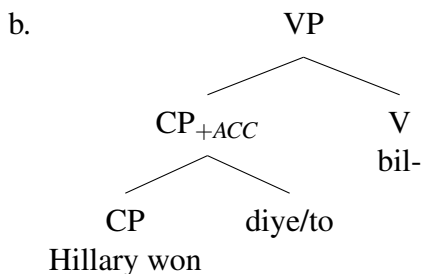
this morpheme. The Japanese examples appear to support this hypothesis even more clearly, where not only do we not observe the lack of a linguistic production inference, but also we see that a *to* clause is subject to an interpretive restriction—veridicality—that *siru* arguably imposes on its semantic complements. None of these sentences are obviously different in interpretation from their counterparts with nominalized embedded clauses (not shown for Turkish).

In this section, we discuss three hypotheses about the syntax and semantics of D/T-clauses that might lead to (a) them receiving accusative case, at least in appearance, and (b) the semantic vacuity of *diye* and *to*.[21] We conclude that the proposal from Section 4, where D/T-clauses are adjuncts, already accounts for the challenging examples just seen better than two reasonable competing hypotheses, but only if we allow for a principled weakening of the semantics that we have proposed for the meaning contribution of *diye* and *to*. We are not alone in thinking so, see Goodhue & Shimoyama (2022, 2023) for a similar and similarly unified account. Our goal here is not to propose a one size fits all solution however, but rather to highlight the diverse set of behaviors exhibited by D/T-clauses, delimit the space of hypotheses that account for it, and highlight the what each one gets right or wrong.

Three hypotheses about argument-like D/T-clauses   One reasonable hypothesis about the cases above is that D/T-clauses are sometimes able to function as internal arguments and receive accusative themselves. This is illustrated in (56), where we assume the semantic contribution of *diye/to* to be vacuous. We use the VP "Hillary kazandı diye bil-" from example (55a) across this and the next two hypotheses, but we do not provide semantic types or specific compositional semantic details, as these would have to differ across the ways of implementing the three hypotheses we are interested in.

(56)   **Hypothesis 1**: D/T-clauses as bona fide arguments

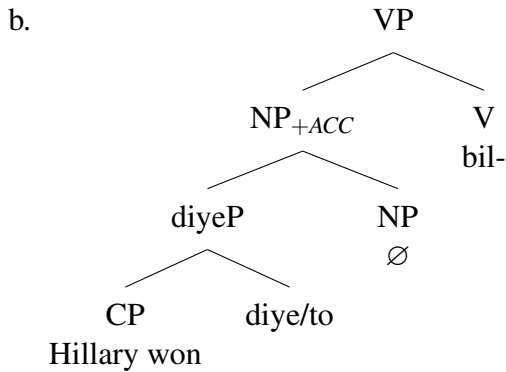a. D/T-clauses may sometimes saturate internal argument positions.

b.

```
                      VP
                    /    \
              CP_{+ACC}    V
              /    \       bil-
            CP    diye/to
        Hillary won
```

This isn't the only hypothesis that could capture the argument-like behavior of certain D/T-clauses, however. It could be that D/T-clauses don't receive case directly, but that they co-occur with a silent NP that does. This hypothesis comes in two flavors: According to Hypothesis 2a, D/T-clauses modify silent noun phrases which are what saturate transitive predicates' internal argument

---

[21]Finite clauses are sometimes argued to be unable to receive case (Stowell 1981, Hartman 2012, a.o.). Clauses introduced by *diye* and *to* are finite, which, if this is correct, would discredit the possibility that they might receive case from the get go, at least at first sight. But the behavior of D/T-clauses is different from that of, e.g., English *that*-clauses, that Stowell and Hartman base their conclusions on. This makes a direct reference to this body of work difficult presently, but a necessary perspective for further research.

positions and receive accusative. Here, assume that *diye* and *to*'s meaning contribution is simply to specify the form or the content of the NP that they combine with (Kratzer 2006, Moulton 2009, Elliott 2017, Bondarenko 2022, among many others).

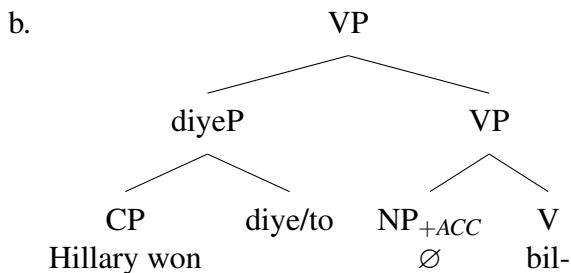(57) **Hypothesis 2a**: D/T-clauses as modifiers of silent NPs

a. D/T-clauses may sometimes modify silent NPs that serve as internal arguments.

b.
```
                        VP
                    ／      ＼
              NP+ACC          V
            ／      ＼        bil-
        diyeP          NP
      ／    ＼          ∅
    CP       diye/to
 Hillary won
```

According to Hypothesis 2b, D/T-clauses are uniformly verb phrase modifiers, and transitive predicates' internal argument positions are saturated by silent arguments that are not *directly* related to the D/T-clause.[22] The structure provided in (58) differs from one where the verb V is intransitive only in the presence or absence of the internal argument NP. We will return to what the meaning contribution of *diye* and *to* must be in such cases, as well as how the silent arguments are interpreted and related to the D/T-clause.

(58) **Hypothesis 2b**: D/T-clauses as modifiers of verb phrases

a. D/T-clauses are uniformly verb phrase modifiers. They sometimes co-occur with silent NPs that saturate transitive predicates' internal argument positions.

b.
```
                        VP
                    ／      ＼
              diyeP          VP
            ／    ＼        ／    ＼
        CP      diye/to  NP+ACC    V
    Hillary won             ∅     bil-
```

The availability of the D/T-*clauses as verb phrase modifiers* hypothesis is what we have argued for and implemented in Sections 3 and 4. So if the *bona fide arguments* and the *modifiers of silent NPs* options are operative in Japanese and Turkish, they must then coexist with the *verb phrase*

---

[22]Here and in section 4.2, we assume that D/T-clauses adjoin to VPs rather than, e.g., to vPs. We do not currently have any strong empirical reasons for deciding one way or another, but VP adjunction has the advantage of simplifying the semantic composition: Little v can then relate the subject to the eventuality introduced by *diye/to* and to the one introduced by V in a single step.

modifiers option. What we would like to understand is which of these hypotheses account(s) for the syntactic and semantic signature of argument-like D/T-clauses, which we have identified as (apparently) being able to receive accusative case, and as being interpreted without the additional linguistic production inferences otherwise associated with D/T-clauses, in a way that is (apparently) synonymous with their nominalized clause counterparts.

6.2 For and against the uniform validity of these hypotheses

About D/T-clauses as bona fide arguments   Both the *bona fide arguments* and the *modifiers of silent NPs* hypotheses overgenerate structures where we would expect D/T-clauses to be acceptable, and they make wrong predictions regarding the interpretation of sentences with D/T-clauses. Let us first see this for the *bona fide arguments* hypothesis.

In (59a), we attempt to combine a *diye* declarative with the predicate *unut-*, 'forget,' which results in unacceptability. In (59b), we attempt to combine a *diye* interrogative with the predicate *bil-*, 'believe/know,' which also results in unacceptability.

(59)　a. *Ai [kar　yağ-ıyor　　diye] unuttu.
　　　　Ai　snow fall-PRES.3S diye　forgot

　　　　Intended: Ai forgot that it was snowing.

　　　b. *Ai [kim geldi diye] biliyor.
　　　　Ai　who came DIYE knows

　　　　Intended: Ai knows who came.

If D/T-clauses generally had the option of being bona fide arguments of verbal predicates, we expect that these two sentences should be acceptable, and have the interpretations intended in (59) (assuming that the meaning contribution of *diye*/*to* is vacuous). Indeed, this is what we observe with nominalized clauses, in (60):

(60)　a. Ai [kar　yağ-dığ-ın-ı]　　 unuttu.
　　　　Ai　snow fall-NMZ-3S-ACC forgot

　　　　Ai forgot that it was snowing.

　　　b. Ai [kim-in　　gel-diğ-in-i]　　　biliyor.
　　　　Ai　who-GEN come-NMZ-3S-ACC knows

　　　　Ai knows who came.

The pair in (61) makes a similar point. In (61a), we see that when the predicate *inkâr et-*, 'deny,' combines with a *diye*-clause, the interpretation is that the subject denied something and uttered the material in the *diye*-clause as their denial—here, Ai said that it snowed. In contrast, when the same predicate combines with a nominalized clause, in (61b) we get the interpretation that the content of the nominalized clause is what was denied—here, Ai said that it wasn't snowing. But the *bona fide arguments* hypothesis, coupled with the assumption that *diye*/*to* is semantically vacuous when D/T-clauses are bona fide arguments, leads us to expect that (61a) should at least have a reading that is synonymous with (61b), contrary to fact.

(61)   a. Ai [kar   yağ-ıyor   diye] inkâr etti.
       Ai snow fall-PRES.3S DIYE denied

       Ai denied something, saying that it snowed.

       b. Ai [kar   yağ-dığ-ın-ı]   inkâr etti.
       Ai snow fall-NMZ-3S-ACC denied

       Ai denied that it was snowing.

In fact, at least two observations suggest that the complement of *inkâr et-*, in (61a), is a silent pro-noun distinct from the *diye*-clause. First, such sentences sound odd out of the blue and prompt the question "What did Ai deny?" This is consistent with the presence of a dropped object whose reference cannot be resolved without contextual support. Second, in (62) this complement is expressed overtly with an accusative marked demonstrative.

(62)   Ai on-u   [kar   yağ-ıyor   diye] inkâr etti.
       Ai that-ACC   snow fall-PRES.3S diye   denied

       Ai denied that, saying that it snowed.

One could object that this only shows that the predicate's complement *can* be something other than the *diye*-clause, but we believe that first observation and the unavailability of the meaning in (61b) for the string in (61a) commits us to the stronger view: The predicate's complement *must* be something other than the *diye*-clause.

   The *bona fide arguments* hypothesis, then, overgenerates acceptable strings and leads to the expectation that sentences with D/T-clauses should generally have readings that are synonymous with minimally different sentences with nominalized clauses. Because neither one of these expectations is met, we cannot allow for the possibility that D/T-clauses *always* have the option of being bona fide arguments.

   If this option is available at all, however, then it must only be available when *diye/to* introduce certain clause types but not others, and when these clauses combine with certain predicates but not others. To elaborate on this point—the *bona fide arguments* hypothesis might be true for predicates like Japanese *siru* ('know') and Turkish *bil-* ('know/believe'), but even then, one has to say that only D/T-*declaratives* may be bona fide arguments, and not D/T-interrogatives. Indeed, as we see for Turkish in (59b) and Japanese in (63), repeated from (11), D/T-interrogatives are not possible with these predicates, which is unexpected if they could be arguments.

(63)   *Ai-wa ame-ga   hutta   ka-to sitteiru.
       Ai-TOP rain-NOM fall.PAST Q-TO know.ASP

       Intended: 'Ai knows whether it's raining.'

While we do not discuss this hypothesis further as a general one, we cannot entirely refute the possibility that it might hold in some specific cases. If it does, we would want to understand *why* D/T-clauses can be bona fide arguments in those cases, i.e., with declaratives and *siru*, *bil-* or *inan-*, but not others, i.e., with *unut-* ('forget') or *inkâr et-* ('deny').

About D/T-clauses as modifiers of silent NPs The *modifiers of silent NPs* hypothesis makes predictions that are inaccurate in ways similar to what we have just seen. Observe first that the sentences in (64) are grammatical, with a *diye*-clause modifying an NP, *bilgi*, 'information,' that then composes with *unut-*, 'forget,' and *inkâr et-*, 'deny.'

(64) a. Ai [kar yağ-ıyor   diye] bir bilgi(-yi)   unuttu.
        Ai snow fall-PRES.3S diye one information-ACC forgot

        Ai forgot a piece of information that said that it was snowing.

    b. Ai [kar yağ-ıyor   diye] bir bilgi(-yi)   inkâr etti.
        Ai snow fall-PRES.3S diye one information-ACC denied

        Ai denied a piece of information that said that it was snowing.

This is unexpected if it is generally possible to parse strings of the form *x p diye V* as involving a silent NP: Whether this NP is overt or silent should not matter in determining the acceptability of D/T-clauses with particular verbs, modulo, of course, independent constraints on the licensing and interpretation of overt vs. silent NPs. But even if this issue were appropriately addressed, the meaning of a sentence like (64b) differs from its NP-less counterpart in (61a): The former implies that Ai denied (the piece of information) that it snowed, thus being synonymous with the nominalized clause case in (61b), whereas the latter implies that Ai said, as a denial, that it snowed.

In general, while *diye*-clauses may modify overt NPs, it is unclear whether they are ever able to modify *silent* NPs. Observe, for example, the contrast in (65). It is possible for NPs modified by *diye*-clauses to be the subjects of predicates like *doğru*, in (65a). If it were possible to parse *diye*-clauses as containing silent NPs, the unacceptability of (65b) is unexpected. Note that the predicate *doğru* tolerates null subjects, in (65c).[23]

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[23] D/T-clauses are generally degraded with adjectival predicates, but when these describe mental or emotional states that can be construed as dynamic, like *ajite*/*dooyoo-suru*, 'agitated' or *endişeli*/*sinpai-suru* 'worried,' D/T-clauses improve. Note that the clause here is not the subject of these adjectives, Ai is.

(i)   ?Ai [anne-m   gelecek diye] {ajite, endişeli}. (Turkish)
      Ai mother1S-POSS will come DIYE   agitated worried

(ii)   ?Ai-wa [hahaoya-ga kuro to] {dooyoo-siteiru, sinpai-siteiru}.   (Japanese)
      Ai   mother-NOM come TO agitated   worried

      Ai is {agitated, worried}, thinking "my mom is coming."

For the informed reader worried that the *diye*-clause is being parsed as a reason clause, note that it contains a shifted indexical in (i), which is otherwise impossible in reason clauses, as seen in (iii). This concern does not hold for Japanese, where *to*-clauses do not express reason clauses.

(iii)   Ai [patron{#-um, -u}   düştü diye] düştü.
      Ai boss-1S.POSS 3S.POSS fell   DIYE fell

      With 3rd person: Ai fell because her boss fell.
      With 1st person: Ai fell because my boss fell.

(65) a. [Kar yağıyor diye] bir bilgi   doğru.
         snow fall   DIYE an information true

      A piece of information that says that it's snowing is true.

      b. *[Kar yağıyor diye] doğru.
         snow fall   DIYE true

      Intended: Something that says that it's snowing is true.

      c. Doğru.
         true

      That's true.

Even in contexts that support NP elision, this seems to be impossible. In (66), if a silent NP were possible in the second sentence, the sentence should be able to mean that Tomoko spread a rumor with the content given. Such a meaning, however, is unavailable.

(66) Ai [kar   yağıyor diye] bir dedikodu yaydı. #Tomoko ise [yağmur yağıyor diye] yaydı.
      Ai snow fall   DIYE a rumor   spread Tomoko TOP rain   fall   DIYE yaydı

      a. Intended: Ai spread a rumor that says that it's snowing. And Tomoko spread a rumor that says that it's raining.

      b. Available, degraded: Ai spread a rumor that says that it's snowing. And Tomoko spread one by saying that it was raining.

   Finally, Japanese differs from Turkish in that *to*-clauses cannot directly modify NPs at all. Instead, clauses must be introduced by a form of the verb *iu*, 'say,' which itself introduces a *to*-clause, as shown in (67).

(67) [John-ga   UConn-ni ku-ru-to   *(iu)] uwasa
       John-NOM UConn-to come-NONPAST-TO SAY   rumor

      'the rumor that John will come to UConn'

                                        (modified from Saito 2018, via Shimamura 2018)

The *modifiers of silent NPs* hypothesis already leads, then, to syntactic overgeneration: We observe *iu*-less *to*-clauses combining with certain predicates and if a silent NP were present there, we would expect a form of the verb *iu* to be pronounced. The example in (68) suggests that this is not an option: We try to combine the verb *sinziru*, 'believe,' with a *to*-clause introduced by *iu*, but this is not possible unless an overt NP is present in the sentence.

(68) Jiro-wa [John-ga   UConn-ni ku-ru-to   iu] *(uwasa-o) sinziteiru.
       Jiro-TOP John-NOM UConn-to come-NONPAST-TO SAY   rumor   believes

      Jiro believes the rumor that John will come to UConn.

To maintain the hypothesis that argument-like *to* clauses are modifiers of silent NPs (which are the real arguments), one would then have to assume that the verb *iu* is also obligatorily elided in the context of those silent NPs. That verbs may be elided or that silent NPs exist are not in themselves

controversial notions, but the conjunction of assumptions required to get the *modifiers of silent NPs* hypothesis off the ground contains an ad hod assumption, namely that the elision of the content NP forces the elision of the morpheme (*iu*) that introduces the clause that specifies its content.

We conclude that the *modifiers of silent NPs* hypothesis is fully implausible in light of the distributional and interpretive differences between bare D/T-clauses and D/T-clauses modifying overt NPs, as well as Turkish and Japanese specific morphosyntactic facts suggesting that D/T-clauses cannot modify silent NPs.
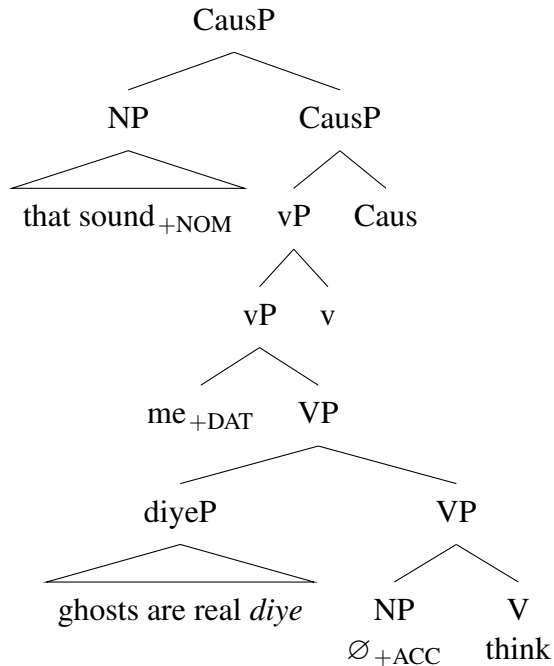
About D/T-clauses as modifiers of verb phrases: Bleaching the meaning *diye* & *to* The *modifiers of verb phrases* hypothesis is independently required for the treatment of attitude reports in which D/T-clauses trigger linguistic production inferences. When D/T-clauses are modifiers of verb phrases, the clauses that *diye* and *to* introduce are not fed into the argument slots of matrix predicates. Because of this, this hypothesis avoids the challenges raised for the *bona fide arguments* and the *modifiers of silent NPs* hypotheses outlined above: We do not expect sentences with modifier D/T-clauses to be interpreted similarly to their counterparts with nominalized clauses, and we do not expect the two types of clauses to share the same distribution. It is therefore tempting try to implement the *modifiers of verb phrases* hypothesis as a unified syntax/semantics for D/T-clauses.

Accounting for apparently accusative D/T-clauses: Silent NPs If this hypothesis is on the right track, we must assume that sentences like (69) with a dative causee, repeated in part from (50), also contain a silent NP that receives the accusative. Indeed, this is what we will assume for the structure. This is consistent with Goodhue & Shimoyama (2022, 2023) who also assume a silent pronoun in the internal argument position of transitive predicates when they compose with *to*-clauses in Japanese.

(69)   O   ses   bana   [hayaletler gerçek olabilir   diye] düşün-dür-dü.
           that sound me.DAT ghosts   real   might be DIYE think-CAUS-PST
           "That sound made me think that ghosts are real."

For conspicuity, we would then have the structure in (70), for (69), which features the silent accusative NP in question:

(70)

```
                          CausP
                    ┌───────┴───────┐
                   NP              CausP
             ┌──────┴──────┐    ┌────┴────┐
        that sound_{+NOM}     vP      Caus
                         ┌────┴────┐
                        vP        v
                   ┌─────┴─────┐
              me_{+DAT}       VP
                        ┌──────┴──────┐
                     diyeP           VP
                 ┌─────┴─────┐    ┌───┴───┐
          ghosts are real *diye*  NP      V
                              ∅_{+ACC}  think
```

And the same assumption would extend to cases where we have *non-causativized* transitive predicates as well. (The reason for focusing on causativized predicates is that they provide a way of seeing whether an accusative has been assigned silently.)

A precondition for the plausibility of this hypothesis is that silent NPs or pronouns must be able to receive the accusative, and trigger dative causees in the right circumstances. The examples in (71) and (72) show that this is possible: When we *force* a sentence to contain a silent direct object pronoun, e.g., one anaphoric to 'the apple' in (71b) and (72b), a causee coargument in the same structure *must* surface in the dative.

(71) Turkish

    a. Elma-yı   ne   yap-tı-n?
       apple-ACC what do-PST-3S

       What did you do with the apple?

    b. {Tunç'a,   *Tunç'u}   ∅   ye-dir-di-m
       Tunç-DAT Tunç-ACC 3S.ACC eat-CAUS-PST-1S

       I made Tunç eat it.

(72) Japanese

    a. Ringo-o   doo si-ta-no?
       apple-ACC how do-PST-Q

       What did you do with the apple?

    b. Taro-{ni,   *o}   ∅   tabe-sase-ta-yo
       Taro- DAT ACC 3S.ACC eat-CAUS-PST-PARTICLE

       I made Taro eat it.

This hypothesis also leads to the expectation that whenever a transitive predicate is modified by a D/T-clause, we should be able to express, overtly and at the same time, both the D/T-clause and the predicate's accusative argument. We have seen was possible with predicates like *odoroku* and *şaşır-*, 'surprise,' in Section 3.1. When we turn to the predicates *bil-* ('know/believe'), *düşün-* ('think') or *siru* ('know'), which we have identified, in this section, as predicates that might be taking D/T-clauses as arguments, an uncertain situation arises with respect to the expectation at hand.

Predicates like *bil-* are acceptable with a *diye*-clause and an accusative argument that is overtly expressed.[24]

(73)   Tunç {o-nu,   o   durum-u}   [Hillary kazandı diye] biliyor.
           Tunç 3S-ACC that situation-ACC Hillary won   DIYE BIL

           Tunç knows {that, that situation} as one of Hillary winning.

<div align="right">modified from Özyıldız (2017)</div>

On the other hand, the Japanese counterpart of (73) with the predicate *siru* is degraded, in (74), so are Turkish sentences with the predicate *düşün-*, in (75).

(74)   Japanese

      ?Taro-wa [Hillary-ga   katta to] sono zizitu-o sitteiru.
      Taro-TOP Hillary-NOM won TO that fact-ACC know.

      Taro knows the fact as one of Hillary winning.

(75)   Turkish

      ?Ben o   ses-i   [hayaletler gerçek olabilir   diye] düşündüm.
      I   that sound-ACC ghosts   real   might be DIYE thought

      I thought of that sound that ghosts might be real.

While these sentences do not sound crashingly bad to us, they are certainly degraded. This warrants a larger scale acceptability survey or corpus research to determine whether their underlying structures are grammatical or not. We will conclude here by saying that there might be independent

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[24]Both *diye* and *to* clauses may express a predicate in ECM/raising to object constructions, as in (ia)—see Şener (2008), Kusumoto (2017) and references therein. We do not believe that the examples in (75) and (74) receive this analysis as there is no gap (and in particular no subject gap) in the D/T-clauses. Moreover, if these examples involved predicating the *diye* and *to*'s complement of the accusative NP directly, we would expect examples like (ib) to be acceptable, where we attempt to establish this subject-predicate relation in a root copular clause.

(i)   a. Tunç Hillary-yi   [kazandı diye] biliyor.
        Tunç Hillary-ACC   won DIYE BIL

        Tunç believes of Hillary that she won/Hillary to have won.

    b. *{O,   o durum}   Hillary kazandı.
         3S.NOM that situation.NOM Hillary won

        Intended: {That, that situation} is a winning by Hillary.

restrictions on the simultaneous expression of a D/T-clause and an associated internal argument, which would vary across predicates and across the two languages. Relatedly, it could be that the delineation between the *bona fide arguments* and the *modifiers of verb phrases* hypotheses is not clear cut in the synchronic grammar of Turkish and Japanese (as spoken by the authors). Said in simpler terms, it could be that some D/T-clauses are moving, or have moved from bona fide modifier to bona fide argument status. The task of determining whether this is the case, we leave for further research.[25]

The interpretation of argument-like D/T-clauses Two facts remain to be accounted for under the assumption that the *modifiers of verb phrases* hypothesis applies uniformly. One is distributional: We have seen that D/T-clauses were unable to combine naturally with certain predicates like *unut-*, 'forget,' and *doğru*, 'true,' as well as their Japanese counterparts. This is surprising at first, as it is certainly possible to modify these predicates. Even though not every modifier can modify every predicate (e.g., one can know something well, but not hastefully), we would like to know what it is that prevents D/T-clauses from modifying the predicates that they cannot naturally combine with.

The second is semantic: Above, we have implemented the *modifiers of verb phrases* hypothesis in such a way that it generates linguistic production inferences with emotive predicates. We did this by assuming that *diye* and *to* introduce a contextually determined eventuality description whose linguistic form was determined by these morphemes' clausal arguments. This, however, cannot generally be true: Not all sentences with D/T-clauses trigger linguistic production inferences (even under the broadest construal of what it means to be a linguistic production), and not in all cases can *diye* and *to*'s complements be (obviously) taken to describe linguistic forms.

In the rest of this section, we present three aspects of the semantics of *diye* and *to* that need to be better understood in order for a unified treatment of D/T-clauses to be possible—one that accounts for the flexibility of and the restrictions on their distribution, as well as the interpretations that they give rise to. These are:

1. **What attitude?** If it is assumed that *diye* and *to* always introduce an attitudinal eventuality description P in addition to the predicate Q that D/T-clauses combine with, what is that eventuality description allowed (or forced) to be depending on Q?

2. **Form or content?** How to model the fact that *diye* and *to*'s clausal arguments are sometimes pure quotations, and sometimes indirect reports? How to appropriately relate eventualities described by P and the denotations of these clausal arguments?

3. **What glue?** What is the relationship between the eventuality described by P and the eventuality described by Q?

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[25]We do not think that the *to*-clause in (74) is modifying the NP *sono zizituo*, 'that fact,' for the reasons provided around the examples (67) and (68) above. Yet, there is another point about similar examples that merits further research: To the extent that a *to*-clause and an accusative NP can be expressed together with *siru*, the NP must follow the *to*-clause and cannot precede it. The puzzle is that this contrasts with examples like (20b), where the accusative NP could precede the *to*-clause.

As an answer to the "what attitude?" question, we suggest first that the contextually valued eventuality description that *diye* and *to* introduce need not always be a linguistic production, but that it may sometimes match the kind of attitude that the matrix predicate introduces. For instance, in an example like (76) where *bil-* is a belief predicate, we must allow it to be interpreted as $\lambda e.believe(e)$.[26] One way of conceptualizing this is that the attitude that D/T-clauses and matrix attitude predicates describe may match in modality.

(76) Tunç Hillary kazandı diye biliyor.
      Tunç Hillary won   DIYE BIL

      Tunç believes that Hillary won.   Özyıldız (2017)

While we want to relax how that eventuality description is interpreted, we do not (always) want to allow for the option of interpreting it as being *identical* to the matrix predicate. Otherwise, we would risk predicting that sentences like (77), repeated from (59a), should imply that Ai forgot that it was snowing. Similar comments apply to 'deny,' in (78), or 'repeat,' in (79). We use an interrogative complement with the latter because that's where a difference in meaning arises.

(77) *Ai [kar   yağ-ıyor   diye] unuttu.
       Ai   snow fall-PRES.3S DIYE forgot

      Intended, unavailable:

      a. Ai forgot that it was snowing.

      b. Ai forgot a piece of information that said that it was snowing.

(78) #Ai [kar   yağ-ıyor   diye] inkâr etti.
       Ai   snow fall-PRES.3S DIYE denied

      a. Intended: Ai denied that it was snowing.

      b. Available: Ai denied something, saying that it was snowing.

(79) #Ai [kar   yağ-ıyor   mu diye] tekrarladı.
       Ai   snow fall-PRES.3S Q   DIYE repeated

      a. Intended: Ai repeated (the answer to the question) whether it's snowing.

      b. Available: Ai repeated the question of whether it's snowing.

What this suggests is that *diye* and *to* are sensitive to the doxastic or speech modality introduced by the matrix predicate, but that they do not copy matrix predicates' full lexical semantics or feed the clause that they introduce into that predicate's internal argument slot.

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[26]As seen previously, D/T-clauses are also compatible with preferential predicates like the counterparts of 'hope' and 'fear.' With these, the question arises of whether we need to assume that *diye/to*'s eventuality description can also interpreted as $\lambda e.prefer(e)$ or $\lambda e.disprefer(e)$. As far as we can tell, linguistic production suffices here, as linguistic productions can be enriched to correspond to one or the other. Take respectively, for example, "Is my daughter going to win?" (a preference for winning) or "You're not drinking again are you?" (a dispreference for drinking). See Qing et al. (2024) for further discussion.

With this in mind, it appears that there are two ways of understanding the linguistic production inferences that we have seen so far. First, with a speech predicate as the matrix predicate (like 'deny,' 'repeat,' etc.), modality matching will result in the eventuality description introduced by *diye/to* being interpreted as something like $\lambda e.utter(e)$ or $\lambda e.say(e)$. Second, as we have seen D/T-clauses give rise to linguistic production inferences with non-attitude verb phrases (e.g., 'jump up') or with emotive predicates, we must assume that interpreting *diye/to*'s extra eventuality description as a speech predicate is an option that is generally available—if that interpretation makes sense in context. At the same time, to accommodate cases like (76), we must allow for the description introduced by *diye/to* to be a belief.

Turning now to the "form or content?" question, if we allow for the possibility that *diye/to*'s eventuality predicate may be interpreted as a belief predicate, we must make an amendment to these morphemes' lexical entries. We have treated them as relating eventualities to linguistic *forms* through the form function in (80a). But unlike utterances, beliefs do not (necessarily, at least) have linguistic forms and are rather characterized by their propositional *content*. We must then allow for the possibility that *diye* and *to* sometimes relate eventualities to this kind of content, as determined by the function in (80b).

(80) a. $\lambda S_u.\lambda e_v.\mathbf{form}(e) = S$ ⟶ Maier (2017, 2020)

  b. $\lambda p_{\langle\langle s,t\rangle,t\rangle}.\lambda e_v.\mathbf{content}(e) = p$ ⟶ Kratzer (2006); Hacquard (2006); a.o.

How to choose which of these functions are introduced by *diye/to* will be illustrated shortly.

As the functions in (80) differ in the semantic type of their first argument, saying that *diye* and *to* are flexible as to which function they introduce has consequences on what we must assume about the semantic type of their clausal argument. Empirically, these can either be quoted or not quoted, as suggested by the data in (81a) and (81b) respectively. In (81a) the interjection *öğ* suggests that *diye*'s complement is quoted. In (81b), coreference between the embedded third person possessive and the matrix subject suggests that *diye*'s complement is not quoted.

(81) a. Tunç "öğ bu biber çok acı" diye düşündü.
     Tunç eww this pepper very spicy DIYE thought

     Tunç thought "eww this pepper is very spicy."

  b. Tunç hala-sın-ın   biberi çok acı   diye düşündü.
     Tunç paternal aunt-3S.POSS-GEN pepper very spicy DIYE thought

     Tunç thought that his aunt's pepper was very spicy.

Let us then assume that these morphemes are flexible as to the type of their clausal argument as long as that argument is in the union of the domain of linguistic utterances with the domain of sets of propositions ($D_u \cup D_{\langle\langle s,t\rangle,t\rangle}$), the latter corresponding to the semantic type of embedded clauses. This means that in addition to being able to introduce eventuality descriptions like (82a), which we have made use of in Section 4, D/T-clauses also have the option of introducing eventuality descriptions like (82b).[27]

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[27]An alternative would be to take *diye* and *to* clauses as introducing an underspecified attitude description. A

(82) a. $\lambda e.utterance(e) \wedge form(e) = S$ $S \in D_u$

       b. $\lambda e.belief(e) \wedge content(e) = p$ $p \in D_{\langle\langle s,t\rangle,t\rangle}$

The question now arises as to how to relate these eventuality descriptions to the variety of predicates that D/T-clauses combine with, e.g., *be surprised*, *look around*, *think*, etc. This is the "what glue?" question. In addressing this question for *surprise*-like predicates above, we made use of the 'direct causal link' relation $\sim$. This relation has the advantage of being stronger than the mere requirement that D/T eventualities and matrix ones sum, overlap temporally or share participants. Here, however, we must weaken the account in the following way: In addition to $\sim$, we allow for the possibility that D/T and matrix eventualities might be identified.

This is because there are cases where we do not want to incorporate causation into our semantics. For example, in sentences like (83), we do not want to say that an eventuality introduced by *diye* that has some form or content *causes* an eventuality of screaming or believing. The same intuition holds for the other possible causal direction from screaming or believing to the eventuality introduced by *diye*. Rather, we are tempted to assume, for such cases, that the eventuality introduced by *diye* and *to* is *the same* as the matrix eventuality of screaming or believing.[28]

(83) a. Ai [kim geldi diye] bağırdı.
         Ai who came DIYE screamed

         Ai screamed "who came?"

     b. Tunç [Trump kazandı diye] biliyor.
         Tunç Trump won   DIYE BIL

         Tunç believes that Trump won.

We have seen, however, that identifying the D/T eventuality with the matrix clause eventuality is not be an option in the general case, e.g., with predicates like *forget*, *deny*, or *repeat*.

With all of this in mind, we propose the following *general* definition for *diye* and *to*.

(84) $[\![\text{diye/to}]\!]^{w,g} = \lambda P_{vt}.\lambda\Phi : \Phi \in D_u \cup D_{\langle\langle s,t\rangle,t\rangle}.\lambda R_{vt}\lambda e_v.$
$$\exists e_1 \exists e_2 [e = e_1 \star e_2 \wedge P(e_1) \wedge f(e_1) = \Phi \wedge R(e_2)]$$

---

test case here would be to look at conjoined predicates modified by D/T-clauses, as seen in naturally occurring data like (i) for Turkish. Mismatches in modality or content vs. form, here, would point towards underspecification—but the resolving the issue is complicated by the possibility of conjunction reduction. See Hirsch (2017) and references therein.

(i) a. Allah her iste-diğ-in-i   yapabilir diye biliyor ve inanıyorum.
         Allah every want-REL-3S-ACC can do   DIYE BIL   and believe

         I am informed and believe that Allah can do anything They please.

    b. Herkes,   "Gazze'nin ihtiyacı ne?" diye konuşuyor ve düşünüyor.
         everybody Gaza-GEN need   what DIYE talks   and thinks

         Everybody is talking and thinking: "What does Gaza need?"

We must leave an exploration of this data to further research, and refer the reader to Bogal-Allbritten (2016) and Močnik & Abramovitz (2019) for more on variable flavor attitudes.

[28]The first author is indebted to discussions with Angelika Kratzer, Emar Maier and Travis Major about the possibility and the limits of event identification.

where

a. $f \in \{\lambda S_u.\lambda e_v.\mathbf{form}(e) = S, \quad \lambda P_{\langle\langle s,t\rangle,t\rangle}.\lambda e_v.\mathbf{content}(e) = P\}$

b. $\star \in \{\lambda e.\lambda e'.\imath e''[e'' = e' = e], \quad \lambda e.\lambda e'.\imath e''[e'' = e' \sim e]\}$

This is a function that takes an eventuality predicate P that corresponds to an attitude, a clausal argument Φ that corresponds to an utterance or to a set of propositions, another eventuality predicate R that corresponds to the matrix predicate, and returns an eventuality predicate. This eventuality predicate is true of events e that are made up of (existentially introduced) events e_1 and e_2, the first of which is a P with a form or content Φ, and the second, an R.[29]

This definition allows for a great deal of flexibility, but it is not entirely unconstrained: The choice of f will be constrained, for example, by *diye* and *to*'s clausal argument, one of type u forcing the form function and one of type $\langle\langle s,t\rangle,t\rangle$, the content function. This choice, in turn, will constrain the kind of attitude that P may correspond to. For instance if we assume that beliefs do not necessarily have linguistic forms, then a clausal argument of type u will then prevent P from being interpreted as $\lambda e.belief(e)$.

Similar considerations apply to the choice of $\star$, depending on whether eventualities that satisfy the matrix predicate can be identified with P eventualities, we will have the option as interpreting this relation as identity, or forced onto the direct causal link option. We additionally suggest, however, there is a pressure for event identification here, and that the direct causal link option is only available if identification is not possible, or if motivated by context.
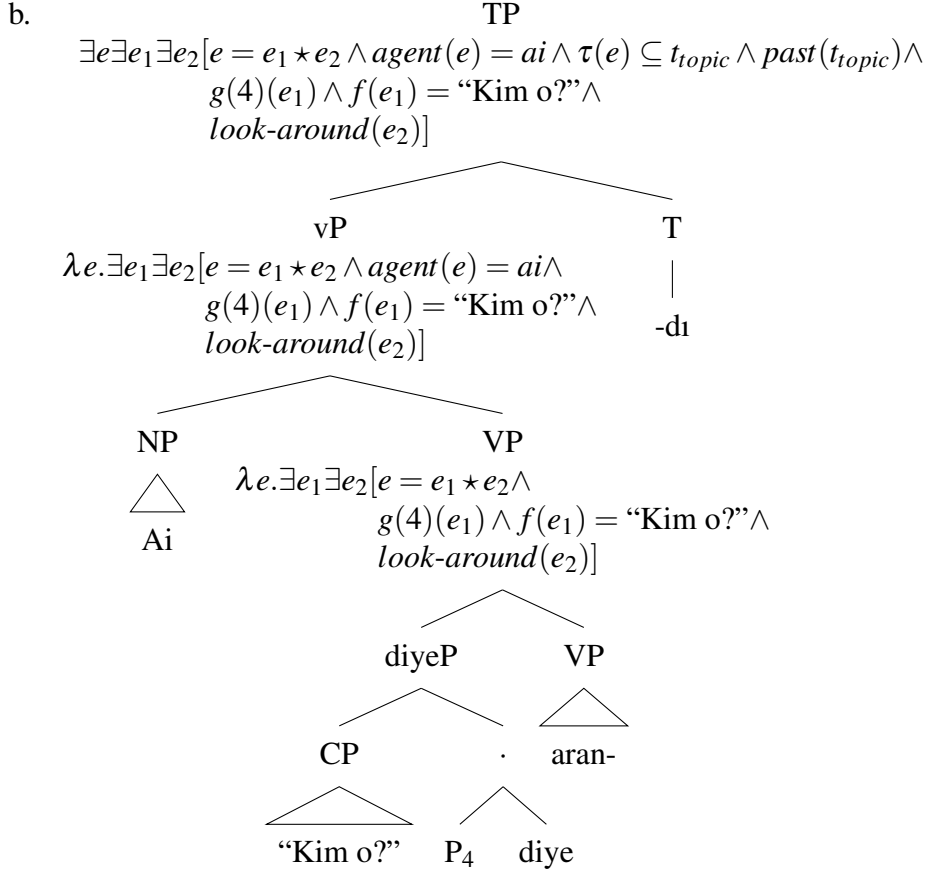
(85) **Pressure to identify**
In sentences of the form $S \Phi$ *diye/to V* attempt to identify the attitude introduced by *diye/to* with the eventuality described by V before assuming that they are (merely) directly causally linked.

6.3 Applications and refinements of the *modifiers of verb phrases* hypothesis

Let us now apply this proposal to some characteristic cases. We begin with D/T-clauses composing with matrix predicates that are not attitude predicates, e.g., (86). (We illustrate with the intransitive predicate *aran-*, "look around," but the case extends to transitives like *telefonu aç-*, "answer the phone," and any other non-attitude predicate.)

(86) a. Ai kim o   diye arandı.
      Ai who that DIYE looked around

      Ai looked around, saying/thinking "Who's that?"

---

[29]This definition is disjunctive in at least three places, which optionality could also be modeled with distinct lexical entires for homophonous morphemes *diye* and *to*. We do not object to this possibility, and welcome further results that might weigh on the question in one direction or the other.

b.

$$\exists e \exists e_1 \exists e_2 [e = e_1 \star e_2 \wedge agent(e) = ai \wedge \tau(e) \subseteq t_{topic} \wedge past(t_{topic}) \wedge$$
$$g(4)(e_1) \wedge f(e_1) = \text{``Kim o?''} \wedge$$
$$look\text{-}around(e_2)]$$

TP

vP
$$\lambda e.\exists e_1 \exists e_2 [e = e_1 \star e_2 \wedge agent(e) = ai \wedge$$
$$g(4)(e_1) \wedge f(e_1) = \text{``Kim o?''} \wedge$$
$$look\text{-}around(e_2)]$$

T

-dı

NP

Ai

VP
$$\lambda e.\exists e_1 \exists e_2 [e = e_1 \star e_2 \wedge$$
$$g(4)(e_1) \wedge f(e_1) = \text{``Kim o?''} \wedge$$
$$look\text{-}around(e_2)]$$

diyeP

VP

CP

· aran-

"Kim o?" P_4 diye

c. After resolution of *diye*'s underspecified components

$$\exists e \exists e_1 \exists e_2 [e = e_1 \sim e_2 \wedge agent(e) = ai \wedge \tau(e) \subseteq t_{topic} \wedge past(t_{topic}) \wedge$$
$$utter(e_1) \wedge form(e_1) = \text{``Kim o?''} \wedge$$
$$look\text{-}around(e_2)]$$

Of importance here is that we provide *diye* with a clause that denotes a linguistic form. This allows us to restrict the choice of the eventuality predicate $g(4)$ to ones that describe eventualities that do have a linguistic form, e.g., $g(4) = \lambda e.utter(e)$. And because utterings and lookings around are not the same kinds of eventualities, we cannot identify e_1 and e_2, and have to let $\star$ be valued as $\sim$. What could a causal link be between uttering a question and looking around? Here is one possibility: If Ai utters the question, she likely entertains it, and this causes her to look around, as an attempt to resolve it.

Another important feature of the composition is that we let the subject Ai be the agent of the *complex* event e and tense locate that event in time. This constrains the relationship between e_1 and e_2 further: We are looking for two events that (a) are directly causally linked, (b) that have the same agent,[30]

---

[30]Natural questions arise with respect to what happens with plural subjects and whether we can modify the D/T and matrix eventualities independently from one another. We will note that examples (ia) and (ib) are most naturally true, respectively, when both Ai and Taro performed both of the same actions, and when both the saying and the looking

We now turn to attitude predicates. Composing D/T-clauses with intransitive attitude predicates and some transitive ones is straightforward and proceeds no differently from what we have seen in (86). This was illustrated in Section 4. In (87) and (88), we provide the truth conditions obtained for the predicates *düşün-*, "think," and *inkâr et-*, "deny," to make explicit our proposal for the argument-like D/T-clauses. These will involve event identification.

In (87), *diye*'s clausal complement is not a quote under the intended reading of the sentence where the third person possessive pronoun is coreferential with Tunç. Then, we must treat it as a proposition and fix f as the content function. One way of resolving $g(6)$ in this case is as the belief predicate $\lambda e.believe(e)$. Now, just like its English counterpart "think," the predicate *düşün-* may describe stative beliefs. Because of this, we assume that it is possible to identify the eventualities e_1 and e_2. In the end, the truth conditions ascribe to Tunç the belief that his mom is in Ankara.

(87) a. Tunç [anne-si   Ankara'da diye] düşünüyor.
         Tunç   mom-3S.POSS in Ankara DIYE   thinks
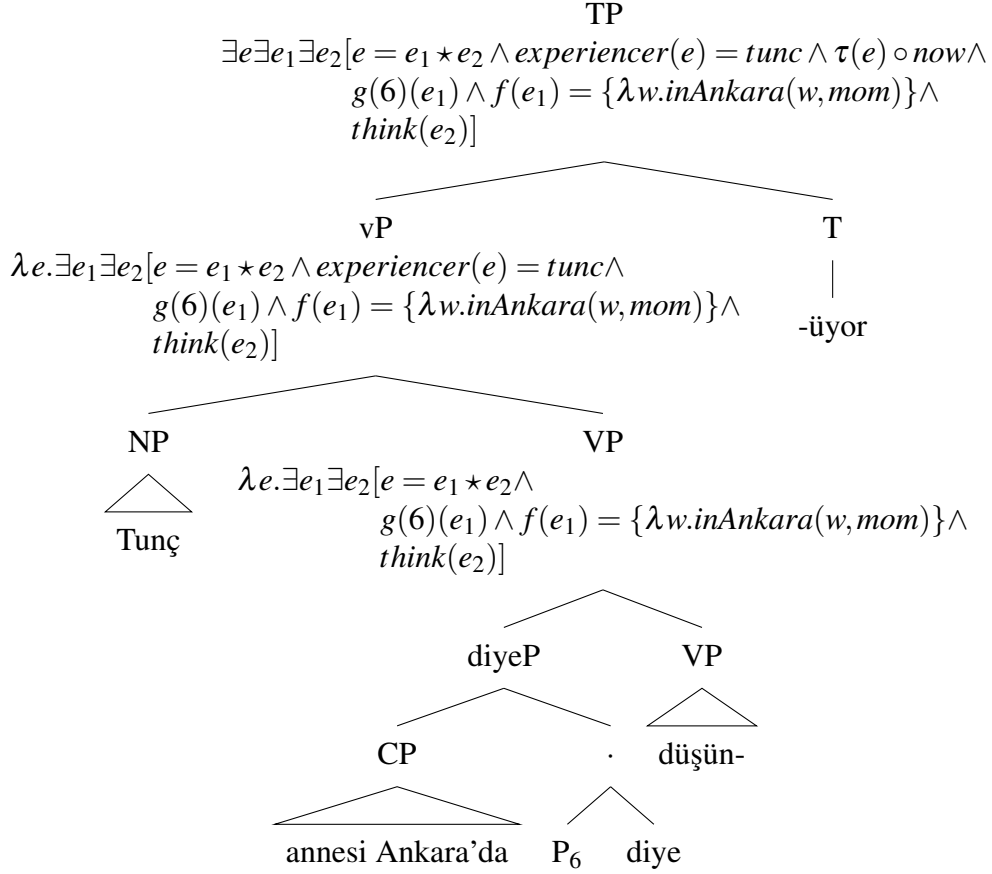
         Tunç thinks that his mom is in Ankara.

---

around were performed quickly.

(i)   a. Ai ve Taro "Kim o?" diye arandı.
          Ai and Taro who that DIYE looked around

          Ai and Taro looked around, saying/thinking "Who's that?"

       b. Ai hızlıca "Kim o?" diye arandı.
          Ai quickly who that DIYE looked around

          Quickly Ai looked around, saying/thinking "Who's that?"

We do not know how true they are when only one of Ai or Taro said "Who's that?" and the other looked around, and when only one of the saying or the looking around was done quickly, while the other was done at a regular pace, and leave the matter to future work.

For the idea that verbs or projections close to the verb may have truth conditions that are underspecified, and that these might be refined by the addition of specific thematic heads (e.g., that the addition of an 'agent' subject thematic head might favor a linguistic production interpretation, whereas the addition of 'holder' might favor stative belief ascription, we are grateful to discussions with Tatiana Bondarenko, Travis Major and Maribel Romero, which take root in Ramchand (2018).

b.

TP

$$\exists e\,\exists e_1\,\exists e_2[e = e_1 \star e_2 \wedge experiencer(e) = tunc \wedge \tau(e) \circ now \wedge$$
$$g(6)(e_1) \wedge f(e_1) = \{\lambda w.inAnkara(w,mom)\} \wedge$$
$$think(e_2)]$$

vP

$$\lambda e.\exists e_1\,\exists e_2[e = e_1 \star e_2 \wedge experiencer(e) = tunc \wedge$$
$$g(6)(e_1) \wedge f(e_1) = \{\lambda w.inAnkara(w,mom)\} \wedge$$
$$think(e_2)]$$

T

-üyor

NP

Tunç

VP

$$\lambda e.\exists e_1\,\exists e_2[e = e_1 \star e_2 \wedge$$
$$g(6)(e_1) \wedge f(e_1) = \{\lambda w.inAnkara(w,mom)\} \wedge$$
$$think(e_2)]$$

diyeP

VP

CP

· düşün-

annesi Ankara'da

P_6 diye

c. After resolution of *diye*'s underspecified components

$$\exists e[experiencer(e) = tunc \wedge \tau(e) \circ now \wedge$$
$$believe(e) \wedge content(e) = \{\lambda w.inAnkara(w,mom)\} \wedge$$
$$think(e)]$$

In (88), we have the 'deny' case. Assume that we interpret the eventuality description introduced by *diye* as $\lambda e.utter(e)$ and that we are able to identify events that satisfy this predicate with events that satisfy the predicate $\lambda e.\exists x[deny(e,x)]$. This is motivated by the intuition that (at least some) denials are linguistic productions.

(88)   a. Ai kar   yağıyor   diye inkâr etti.
       Ai snow fall-PRES.3S DIYE denied

       Ai denied something, saying that it snowed.

b.

TP
$$\lambda e.\exists e_1\exists e_2\exists x[e = e_1 \star e_2 \wedge agent(e) = ai \wedge \tau(e) \subseteq t_{topic} \wedge past(t_{topic}) \wedge$$
$$g(9)(e_1) \wedge f(e_1) = \{\lambda w.snow(w)\} \wedge$$
$$deny(e_2,x)]$$

vP
$$\lambda e.\exists e_1\exists e_2\exists x[e = e_1 \star e_2 \wedge agent(e) = ai$$
$$g(9)(e_1) \wedge f(e_1) = \{\lambda w.snow(w)\} \wedge$$
$$deny(e_2,x)]$$

T
|
-ti

Ai

VP
$$\lambda e.\exists e_1\exists e_2\exists x[e = e_1 \star e_2 \wedge$$
$$g(9)(e_1) \wedge f(e_1) = \{\lambda w.snow(w)\} \wedge$$
$$deny(e_2,x)]$$

diyeP

VP

CP

$\cdot$

$\exists x$

VP
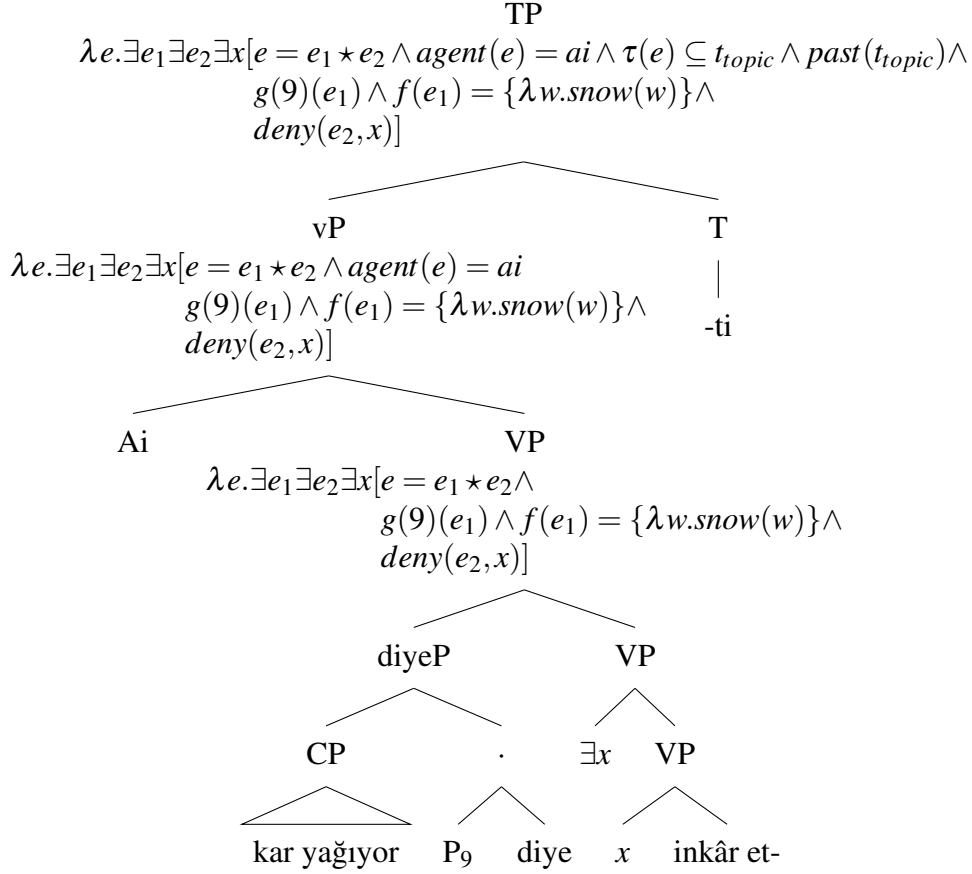
kar yağıyor P_9 diye x inkâr et-

c. After resolution of *diye*'s underspecified components
$$\lambda e.\exists x[agent(e) = ai \wedge \tau(e) \subseteq t_{topic} \wedge past(t_{topic}) \wedge$$
$$utter(e) \wedge content(e) = \{\lambda w.snow(w)\} \wedge$$
$$deny(e,x)]$$

Here, we would additionally like to account for the intuition that with *inkâr et-*, 'deny,' D/T-clauses correspond to the things that were said in order to deny something else, and not to that thing that was denied. To do this, we make use of the result that D/T-clauses provide the content of an event *e* of denying, and that this relationship is distinct from from the relationship between *e* and its theme *x*. To be more specific, we assume that the metalanguage predicate $\lambda e.\lambda x.deny(e,x)$ is associated with the meaning postulate provided in (89), which links the content of the internal argument *x* and the content of *e*. Namely, $content(x)$ and $content(e)$ must entail the negation of each other (or that conjoining the two results in a contradiction). See also Goodhue & Shimoyama (2023) for a similar discussion of 'deny.'[31]

(89) $\forall e\forall x[deny(e,x) \rightarrow [[content(x) \wedge content(e)] \rightarrow \bot]]$

With this additional entailment, we can infer that an utterance of the proposition "that it's snowing" is the denial of a piece of information that says the contrary.

---

[31] Assume for concreteness that *deny*'s internal argument is a contentful individual of tyoe *e*, and that $content(x)$ and $content(e)$ are propositions.

It is possible to extend this kind of account to predicates like *unut-*, 'forget,' as well as to other predicates that D/T-clauses do not combine naturally with. As a proof of concept, let us assume that eventualities of forgetting are not contentful, as imposed by the presupposition in (90).

(90) $\llbracket forget \rrbracket = \lambda x \lambda e : \neg \exists p[content(e) = p].forget(e,x)$

This will ensure that the attempt to compose predicates like 'forget' with a D/T-clause will result in a presupposition failure, *if* we try to identify the eventuality introduced by the D/T-clause and the one introduced by 'forget.'

Thus, the information that predicates encode lexically about $content(e)$ and its relationship to their semantic arguments help explain the restrictions that we have seen on the distribution and the interpretation of D/T-clauses.

6.4   Comparison with Goodhue & Shimoyama (2022, 2023)

At this point, we would like to devote a subsection to a comparison of our analysis with Goodhue & Shimoyama (2022; 2023) (henceforth G&S) analysis of Japanese *to*-clauses.[32] We take the analyses to be very similar in essential respects. Both analyses treat *to*-clauses as involving an adjunctive syntax and as semantically introducing a linguistic production event (an 'utterance event' in G&S's terminology). In addition, at least for some cases, both analyses assume a null pronoun in the internal argument position of the matrix predicate whose value can be identified with the content of the *to*-clause.

We take our contribution and G&S's contribution to be distinct in at least three respects (aside from the obvious point that we, but not G&S, also deal with the Turkish *diye* clauses): (a) the target empirical puzzle, (b) the observations that motivate the analysis, and (c) the precise analysis of the argument-like *to*-clauses. Starting from (a), G&S's analysis and our analysis are developed to account for distinct puzzles. For G&S, the target puzzle concerns the interpretation of biased polar questions under *to*-clauses while our target puzzle concerns factivity alternation and the presence/absence of the answer-oriented inference across nominalized and D/T-clauses. Turning to (b), although G&S and we utilize overlapping empirical data to argue for the respective analysis of *to*-clauses (e.g., unselected *to*-clauses and interrogative clauses embedded by *to* under anti-rogative predicates), we also employ distinct phenomena as motivating evidence. For instance, G&S motivate their analysis based on subtle interpretative contrasts between nominalized and *to*-marked clauses under *kitaisuru* 'hope/expect' (G&S 2023: 13-14), as well as the different hedging effects conditioned by the properties of the clauses embedded by *to* under *omou* 'think' (G&S 2023: 6-8). Among other things, we motivate our analysis based on case alternation under causative predicates

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[32]Our analysis and Goodhue and Shimoyama's analysis were initially developed independently from each other. The first version of our analysis was presented in a seminar at University of Nantes in October 2022, after which the second author has learned about G&S's work as a reviewer for Amsterdam Colloquium 2022. This first version already contained the core element of our proposal, i.e. the adjunction structure for D/T-clauses and the linguistic production inference associated with them. Since the Amsterdam Colloquium, which the first author attended, the precise implementation of the analysis has received influence and inspirations from Goodhue & Shimoyama (2022, 2023), especially with respect to the postulation of an empty NP in the internal argument position of the matrix predicate in sentences that involve argument-like use of D/T-clauses.

(Sect. 3.2) and the interpretation of the nominalized and *to*-clauses under response-stance verbs (Sect. 5.1).

Finally, as for (c), G&S's and our analyses of the argument-like *to*-clauses are different in important details. As discussed in this section above, our analysis allows for the possibility that the event described by the embedding predicate and the linguistic production event are identical, capturing the intuition that some sentences involving an argument-like D/T-clause, such as (87), describe a single event rather than two events. We further propose the principle Pressure to Identify in (85), which prioritizes the single-event interpretation over multiple-event interpretations. In contrast, under G&S's analysis, sentences like (87) are treated as involving two events, one describing a linguistic production event and one describing the attitude corresponding to the matrix predicate (although the contents of these two events can be identified through the pronominal resolution). We think a more constrained analysis along the lines of our proposal is necessary, as pronominal resolution alone wouldn't capture the fact that, in sentences like the following, the content of the belief/think cannot be identified with the contextually salient proposition that it is raining.

(91)   *Context: Taro hears from someone that [it is raining now]$_i$.*

Taro-wa [ame-no oto-ga   suru-to] pro$_{\#i/j}$ sinziteiru/omotteiru.
Taro-TOP rain-GEN sound-NOM do-TO   pro   believe/think
Available: 'Taro believes/thinks that he can hear the sound of the rain'.
Unavailable: 'Taro believes/thinks that it is raining now, saying that he can hear the sound of the rain'.

What this example shows is that, even with a presence of a highly salient proposition, certain predicates seem to prioritise the interpretation where the *to*-clause directly provide the content of the matrix attitude. This effect is captured by our analysis in terms of our Pressure to Identify principle.

Despite the differences, however, G&S's analysis and our analysis overlap in key essential insights—the adjunctive analysis of *to*-clauses and the possibility of identifying the content of the *to*-clause and the content of the matrix attitude through pronominal resolution. Overall, we take the two analyses to provide compelling converging evidence that the *to*-clauses involve the syntax and semantics along the lines of what G&S and we propose.

7   Conclusions and open issues

This paper has dealt with two types of embedded interrogative clauses in Turkish and Japanese: one involving nominalized interrogative complements and the other involving clauses headed by specialized heads, *diye* in Turkish and *to* in Japanese (D/T-clauses). Declarative clauses involving these two embedding strategies have been investigated in the literature, especially in the context of factivity alternations (Özyıldız 2017; Kusumoto 2017). However, less attention has been given to their interrogative counterparts (Özyıldız 2019 being an exception). By providing a detailed analysis of the two types of interrogative clauses, we have shed a new light on the semantics of the two types of embedding strategies. More specifically, we have identified two interpretive contrasts between nominalized and D/T interrogatives. First, while nominalized interrogatives give

rise to answer-oriented inferences, D/T-interrogatives don't. Second, D/T-interrogatives are characterized by a linguistic production inference. Our analysis accounts for the first contrast (i.e., the presence/absence of the answer-oriented inference) and the factivity alternation with declarative clauses in a unified manner. Both of them are accounted for by the idea that the relevant inferences (i.e., factivity and answer-orientedness) arise from the embedding predicates' semantic restrictions on their internal argument, given that nominalized complements are arguments while D/T-clauses are adjuncts. The linguistic production inference with D/T-clauses is accounted for by our analysis of the D/T head, which introduces an additional linguistic production event systematically related to the main attitudinal event. Our analysis of D/T-clauses converges with recent analyses of various embedding strategies in a number of languages (e.g., Shimamura 2018; Demirok et al. 2019; Goodhue & Shimoyama 2023; Bondarenko 2023) in positing an adjunctive structure and a linguistic production event (largely construed) associated with the relevant clause.

We have to leave open several issues concerning the precise analysis of D/T-clauses. Here we mention three of them. The first issue concerns the precise characterization of the relation between the event described by the matrix predicate and the linguistic production event in sentences involving D/T-clauses. Our analysis makes use of the ∼ relation from Özyıldız et al. (2019) to capture the intuition that there must be a causal link between the two events. As noted in Sect. 6, however, we may also need to constrain the two events to be temporally overlapping, as a D/T-clause is infelicitous if it describes a linguistic production event that is not temporally overlapping with the matrix attitudinal event, regardless of the causal link between the two. We have to leave open how to precisely characterise the seemingly disparate set of constraints in a uniform manner.

The second issue concerns the language variation between Turkish and Japanese. In this paper, we have treated the Turkish *diye*-clauses and the Japanese *to*-clauses, as well as the nominalized clauses in the two languages, to be equivalent in the relevant respects. However, we also observe interesting variation between the two languages with respect to the behavior of the relevant constructions. One particular variation that has recurred in the preceding discussion concerns the fact there are verbs that impose factivity even for *to*-complements in Japanese (e.g., *siru* 'know', *oboeru* 'remember') whereas Turkish does not seem to have corresponding verbs that impose factivity for *diye*-complements. Another interesting variation concerns the interpretations of D/T-clauses and nominalized under 'explain'. Under the Japanese *setumee-suru* 'explain', a *to*-clause is obligatorily interpreted as the explanans (i.e. the explanation being offered to explain something) while a nominalized-clause is obligatorily interpreted as the explanandum (i.e. the target of explanation):

(92) Taro-wa densya-ga okureta   { to / koto-o   } setumee-sita.
      Taro-TOP train-NOM was.delayed   TO / NMZ-ACC   explained
      'Taro said that the train was delayed, to explain something else.' (explanans; ✓*to*; #NMZ)
      'Taro offered an explanation for the fact that the train was delayed.' (explanandum; #*to*; ✓NMZ)

This pattern is parallel to the one exhibited by adjunctive and argumental CPs under *objasnit'* 'explain' in Russian, as reported by Bondarenko (2022). As such, we expect Bondarenko's (2022) explanation to carry over to the Japanese case above, given our analysis of *to* vs. nominalized clauses. The situation is different with Turkish *açıkla-*, 'explain.' With this predicate *diye* clauses as well as the ('-DIK') nominalizations that we have focused on in this paper give rise to explanans

readings, in (93a) and (93b).[33] To generate explanandum readings, another nominalization strategy must be used that involves the morpheme '-mA,' in (93c).

(93) a. Taro [tren gecikti   diye] açıkladı.
       Taro train was.delayed DIYE explained

       Taro explained that the train was delayed. (explanans)

      b. Taro [trenin   geciktiğini]   açıkladı.
         Taro train.GEN be.delayed.NMZ explained

         Taro explained that the train was delayed. (explanans, ?explanandum)

      c. Taro [trenin   gecikmesini]   açıkladı.
         Taro train.GEN be.delayed.NMZ explained

         Taro explained the fact that the train was delayed. (explanandum, *explanans)

It is an open question how these variations arises in the interpretation of D/T and nominalized clauses, possibly due to the interaction between the lexical semantics of the relevant predicates and a more fine-grained syntactic/semantic analysis of the relevant clauses.

The final issue concerns the relation between the adjoined D/T-clauses discussed in this paper and other adjunctive uses of interrogative clauses discussed in the literature. In particular, Kim & Tomioka (2014) discuss Korean and Japanese constructions where interrogative clauses (without a D/T-parricle) adjoin to the main clause and conventionally implicate an agent-oriented or speaker-oriented self-addressed question. We have to leave for another occasion a detailed comparison of such constructions and adjoined D/T-interrogatives.

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[33]There might be ways of reading -DIK nominalizations as explananda, which we do not elaborate on here. What matters is that these *can* give rise to explanans readings, in contrast to Japanese.

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