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Existential free choice items: The case of Farsi *yek -i* DPs*

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Abstract Existential Free Choice Items (EFCIs) are interpreted as existential quantifiers in downward entailing contexts, but contribute stronger truth conditions when embedded under modals. When unembedded, their behavior differs: while Romanian *vreun* is ungrammatical (Fălăuş 2014), other EFCIs are grammatical and convey modality (Alonso-Ovalle & Menéndez-Benito 2015a). Farsi *yek -i* DPs instantiate a new profile: they pattern with other EFCIs in downward entailing and modal contexts, but differ in unembedded contexts, where they are grammatical, but do not convey modality. The paper derives this profile within an alternative- and exhaustification-based analysis of EFCIs (Chierchia 2013). Under this framework, EFCIs introduce two types of alternatives: scalar and (pre-exhaustified) domain alternatives. The behavior of *yek -i* DPs argues for the independence of the two types of alternatives and the splitting of scalar and domain exhaustification.

Keywords: existential free choice items, exhaustification, pruning, Farsi

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1 Introduction

Across languages, we find DPs that live a double life: they contribute plain existential force in downward entailing environments, but, in modal environments, give rise to truth conditions that are stronger than those that plain existential DPs convey. German *irgendein* (Kratzer & Shimoyama 2002) is a case at hand. The sentence in (1), with *irgendein* under the scope of a negative indefinite, conveys that no question was answered, just like its English counterpart in (2), featuring the existential DP *a question*.

(1) Niemand hat irgendeine Frage beantwortet.
Nobody has IRGENDEINE question answered
'Nobody answered a question.' (Aloni & Port 2015: 121)

(2) Nobody answered a question.

In modal environments, *irgendein* and *a* part ways. Consider, for instance, the pair of sentences in (3). Both sentences convey that Mary is required to marry a doctor, but while (3a), with the regular existential *a doctor*, can felicitously describe a scenario where not all doctors are permitted options for Mary to marry, (3b), with *irgendein*, cannot: (3b) requires all doctors to be permitted options. This requirement is known in the literature as a 'free choice effect', and items that trigger this effect, like *irgendein*, are called Existential Free Choice Items (EFCIs) (Chierchia 2013).

(3) a. Mary must marry a doctor.
b. Mary muss irgendeinen Arzt heiraten.
Mary has-to IRGENDEIN doctor marry
'Mary has to marry a doctor — any doctor.'
(Kratzer & Shimoyama 2002: 11)

Different varieties of EFCIs have received attention in the semantics literature. Moving beyond German *irgendein* (Kratzer & Shimoyama 2002, Aloni 2007, 2012, Lauer 2010, Aloni & Port 2015), these include Spanish *algún* (Alonso-Ovalle & Menéndez-Benito 2010, 2011, 2015b) and *un NP cualquiera* (Alonso-Ovalle & Menéndez-Benito 2013, 2018), Italian *un NP qualsiasi* (Chierchia 2013, Aloni & van Rooij 2007) and *un qualche* (Zamparelli 2007, Chierchia 2013, Aloni & Port 2015), Romanian *vreun* and *un oarecare* (Fălăuş 2014, 2015, Farkas 2006), French *un NP quelconque* (Jayez & Tovena 2002, 2006), Greek *kapjos* (Giannakidou & Quer 2013), Sinhala *-hari* (Weerasooriya 2017), the Chinese *wh*-words (Chierchia &

Liao 2015), and Czech *-si* (Šimík 2015). This body of literature reveals differences across items and languages.

EFCIs contrast, for instance, in how they behave in unembedded sentences. Previous literature identified two types of EFCIs. In this paper, we will identify a third type. Some EFCIs, like Romanian *vreun*, are plainly ungrammatical in unembedded sentences, as (4) shows.

(4) *Monica s-a întâlnit cu vreun prieten.
Monica REFL-have.3SG met with VREUN friend.MASC
'Monica met a friend.' (Fălăuş 2014: 122)

In contrast, other EFCIs are grammatical when unembedded, but convey a modal meaning component. Cross-linguistically, the EFCIs of this type can convey two types of modal meaning components: an *epistemic* modal component or an *agent indifference* meaning component (Alonso-Ovalle & Menéndez-Benito 2015b). The EFCIs of the first type make an existential claim and convey that the speaker does not know which individual satisfies the claim. Examples of this type of EFCI include Spanish *algún* (Alonso-Ovalle & Menéndez-Benito 2015b), German *irgendein* (Kratzer & Shimoyama 2002, Aloni & Port 2015), and Italian *un qualche* (Chierchia 2013, Aloni & Port 2015), among others. To illustrate: the sentence in (5), with Spanish *algún*, makes the existential claim that María married a doctor, and additionally conveys that the speaker does not know which doctor María married. For this reason, it cannot be felicitously followed with the naming of the individual that satisfies the existential claim, as in (6).

(5) María se casó con algún médico.
María se married with ALGÚN doctor
'María married some doctor or other.'
(Alonso-Ovalle & Menéndez-Benito 2015b: 2)

(6) … # en concreto con el Dr. Smith.
in particular with the Dr. Smith
'…namely Dr. Smith.'
(Alonso-Ovalle & Menéndez-Benito 2015b: 2)

Agent indifference EFCIs include Spanish *un NP cualquiera* (Alonso-Ovalle & Menéndez-Benito 2018) or Italian *un NP qualsiasi* (Chierchia 2013). In unembedded contexts, these DPs convey that the agent made a random choice. This is illustrated in (7), with *cualquiera*. This sentence makes the existential claim that the agent bought a book, and additionally conveys that the agent made the

choice of book at random. Some EFCIs, like *irgendein*, can convey this type of modality as well as epistemic modality (Kratzer & Shimoyama 2002, Buccola & Haida 2017).

(7) Juan compró un libro cualquiera.
Juan bought UN book CUALQUIERA
≈ 'Juan bought a random book.'
(Alonso-Ovalle & Menéndez-Benito 2018: 2)

How else can EFCIs contrast with each other? Making progress in characterizing this class of items requires enlarging the sample of languages under study. This paper contributes to the growing crosslinguistic literature on EFCIs by probing into the interpretation and distribution of a variety of EFCIs in Farsi (Indo-Iranian), which we call '*yek -i* DPs'. These are DPs formed by combining the determiner *yek* ('one') to NPs marked with the enclitic *-i*, as in (8).[1]

(8) Ye ketab-i xarid-am.
one book-IND bought-1SG
'I bought a book.'

Yek -i DPs share some characteristics with other EFCIs: we will learn that in downward entailing contexts they are interpreted like regular existentials, and that, under modals, they convey interpretations that are stronger than those conveyed by regular existentials. But *yek -i* DPs contrast with all other EFCIs mentioned above in unembedded contexts in three ways. First, as seen above, *yek -i* DPs are grammatical when unembedded. In this, they contrast with Romanian *vreun*. Second, when they are unembedded, *yek -i* DPs have no detectable modal meaning component, unlike the other EFCIs that are grammatical when unembedded: the sentence in (8) can describe a situation where the book that the speaker bought was not chosen randomly, and, as seen in (9), *yek -i* DPs allow for *namely* continuations. Third, as seen in (10a), unembedded *yek -i* DPs contribute a uniqueness meaning component conveying that exactly one individual in the extension of the NP satisfies the existential claim. In this, they contrast sharply

1 Farsi *yek* is realized as *ye* in the informal register. The Farsi data that we report come from the informal register. Judgements come from Moghiseh and seven native speakers of Tehrani Farsi, a dialect spoken in the Tehran province, ranging in age from 24 to 45. All judgments were cross-checked with other informants to ensure consistency. No significant variation in judgments was observed. The following abbreviations are used in glosses: 1: first person; 2: second person; 3: third person; ACC: accusative marker; CL: classifier; EZ: *ezafe* marker, a particle that links a head to its modifier; IND: indefinite; NEG: negation; PL: plural; SG: singular.

with other EFCIs, like *algún*, as (10b) shows. This uniqueness component, we will see, survives embedded under modals.

(9) Forood dirooz ye ketab-i xarid be esm-e Iliad.
Forood yesterday one book-IND bought-3SG to name-EZ Iliad
'Forood bought a book yesterday, namely *The Iliad*.'
(Alonso-Ovalle & Moghiseh 2019: 8)

(10) a. Forood dirooz ye ketab-i xarid: # ye roman va ye ketab-e sher.
Forood yesterday one book-IND bought-3SG, one novel and one book-EZ poetry
'Forood bought a book yesterday: a novel and a poetry book.'

b. Forood compró algún libro ayer: una novela y un libro de poesía.
Forood bought ALGÚN book yesterday: a novel and a book of poetry
'Forood bought some book yesterday, a novel and a poetry book.'

Yek -i DPs instantiate a new profile, since conveying a modal component in unembedded sentences is the hallmark of the previously described EFCIs that are grammatical in such sort of sentences. The lack of this meaning with unembedded *yek -i* DPs is surprising and raises a question: What lies behind the contrast between unembedded *yek -i* DPs and other EFCIs?

In this paper, we present an analysis of *yek -i* DPs within the alternative- and exhaustification-based theory of FCIs developed in Chierchia 2013. Like other EFCIs, we will take *yek -i* DPs to be existential quantifiers that introduce two types of alternatives into the semantic derivation: the so-called scalar and 'pre-exhaustified' domain alternatives. These alternatives are used by covert exhaustification operators, which derive the interpretation of *yek -i* DPs both in modal and downward entailing contexts, in parallel with other EFCIs. As we will see, the particular profile of *yek -i* DPs derive from the following principles: (i) exhaustification is selective, it targets each class of alternatives independently of the others (as anticipated in Chierchia (2013: 133) as a possibility), (ii) for *yek -i* DPs scalar exhaustification is always clause-bounded, and (iii) the insertion of covert modal operators is not universally available.

The paper is organized as follows. Section 2 surveys the distribution and interpretation of *yek -i* DPs. Section 3 lays out the framework by illustrating how it derives the interpretation of *yek -i* DPs in downward entailing and modal

environments, which, as mentioned above, patterns with that of other EFCIs. Section 4 focuses on the behavior of *yek -i* DPs in unembedded sentences, where, as we have mentioned, these DPs depart from other EFCIs. In Section 5, we show that the interpretation of *yek -i* DPs in modal environments provides support for splitting domain and scalar exhaustification. Section 6 concludes.

2 *Yek -i* DPs: A new type of existential free choice item

This section provides an overview of the interpretation and distribution of *yek -i* DPs. We start by contextualizing *yek -i* DPs with respect to some other Farsi DPs in Section 2.1. Next, we show in Sections 2.2–2.3 that, as anticipated above, *yek -i* DPs pattern with EFCIs in downward entailing contexts and in modal contexts. Section 2.4 shows that *yek -i* DPs contrast with other EFCIs in that that they do not convey modality in unembedded contexts. Section 2.5 shows that the modal inferences of *yek -i* DPs embedded under modals and their uniqueness component are both implicatures. Finally, Section 2.6 concludes with an interim summary.

2.1 Farsi DPs

In addition to *yek -i* DPs, other forms of DPs can be formed in Farsi by combining the determiner *yek* with an NP not marked with enclitic *-i*, as in (11). We will call these DPs '*yek* DPs.' As we will see later, *yek -i* DPs and *yek* DPs contrast in some respects.

(11) Ye ketab xarid-am.
one book bought-1SG
'I bought a book.'

Higher numerals can replace *yek* in both *yek -i* DPs and *yek* DPs, as shown in (12) with *do* ('two'). For simplicity, we will not discuss these forms, because they follow the same pattern of *yek* (*-i*) DPs. The only difference, as far as we can tell, is that with higher numerals, as seen in (12), the numeral must be followed by a classifier.

(12) a. Do ta ketab-i xarid-am.
two CL book-IND bought-1SG
'I bought two books.'

b. Do ta ketab xarid-am.
two CL book bought-1SG
'I bought two books.'

Yek -i DPs, like other EFCIs such as *algún* and *irgendein* DPs, also have a plural form, where *yek* combines with a plural NP marked with *-i*, as shown in (13).

(13) Forood ye ketab-a-i xarid.
Forood one book-PL-IND bought-3SG
'Forood bought some books.'

The plural versions of EFCIs sometimes depart from their singular versions significantly. Alonso-Ovalle & Menéndez-Benito (2011) show, for instance, that the plural version of *algún* does not have a modal component. In view of this complexity, we will focus in this paper on the singular version of the *yek -i* DPs and leave the form in (13) for further research.

We will also not discuss 'bare *-i* NPs', NPs marked with *-i*, as in (14). This is so because we have found considerable speaker variation. Farsi has two registers: formal and informal. In the formal register, unembedded bare *-i* NPs are grammatical. However, in the informal register, which we focus on, these items are ungrammatical for some speakers (Jasbi 2016), but grammatical for others. We will briefly address bare *-i* NPs in Section 5, where we speculate about a possible reason for the attested variability across speakers, but focus on *yek -i* DPs which we have found to be clearly acceptable across speakers.

(14) Ketab-i xarid-am.
book-IND bought-1SG
'I bought a book.' (Modarresi & Simonenko 2007: 181)

We will now probe into the interpretation and distribution of *yek -i* DPs.

2.2 Downward entailing contexts

Like Spanish *algún* or German *irgendein*, but unlike Italian *un NP qualsiasi*, *yek -i* DPs are felicitous in downward entailing contexts, where they contribute narrow scope existential force. For instance, the sentence in (15), conveys that the speaker doubts that Forood has watched a movie, and (16) conveys that Forood will a get gift if he reads at least one book.

(15) shak dar-am Forood ye film-i dide bash-e.
doubt have-1SG Forood one film-IND seen be-3SG
'I doubt that Forood has watched any movies.' doubt > ∃
(Alonso-Ovalle & Moghiseh 2019: 5)

(16) age Forood ye ketab-i bexun-e, ye jaize migir-e.
if Forood one book-IND read-3SG one gift take-3SG
'If Forood reads a book, he gets a gift.' if [...∃ ...] then ...
(Alonso-Ovalle & Moghiseh 2019: 5)

Like other EFCIs, *yek -i* DPs show restrictions in the type of downward entailing contexts that they can appear in. Like *algún*, as in (18), or *irgendein*, as seen in (19), *yek -i* DPs cannot be interpreted under sentential negation, as (17) shows.[2,3]

(17) *Forood ye ketab-i na-xarid.
Forood one book-IND NEG-bought-3SG
'Forood did not buy any book.' *¬ > ∃

(18) *No he leído algún libro.
not have read ALGÚN book
Intended: 'I have not read any book.'

(19) *Ich habe nicht irgendein Buch gelesen.
I have not IRGENDEIN book read
'I didn't read any book.' (Chierchia 2013: 250)

2.3 Modal contexts

Yek -i DPs are grammatical when they scope under modals. Like *algún* or *irgendein*, but unlike *vreun*, *yek -i* DPs do not show restrictions with respect to the type of modals that they can combine with: they are grammatical under deontic (20) and epistemic (21) modals, possibility and necessity alike, as seen below.

(20) a. Forood mitun-e ye ketab-i bexar-e.
Forood can-3SG one book-IND buy-3SG
'Forood can buy a book — any book.'

2 If *irgendein* is focused, (19) is interpreted as negating a free choice component, as in *I didn't read just any book* (Kratzer & Shimoyama 2002). This reading, in contrast, is not available for (17) or (18).

3 Unlike *yek -i* DPs and *irgendein*, *algún* must take scope over negation, so (18) is interpreted as conveying that there is some book or books that the speaker hasn't read.

b. Forood bayad ye ketab-i bexar-e.
Forood must one book-IND buy-3SG
'Forood must buy a book and he can buy any book.'
(Alonso-Ovalle & Moghiseh 2019: 5)

(21) a. Forood mitun-e ye ketab-i xaride bash-e.
Forood can-3SG ye book-IND bought be-3SG
'Forood might have bought a book.'
b. Forood bayad ye ketab-i xaride bash-e.
Forood must one book-IND bought be-3SG
'Forood must have bought a book.'
(Alonso-Ovalle & Moghiseh 2019: 6)

EFCIs differ not only with respect to the type of modals that they can combine with, but also with respect to the inferences that they trigger when embedded under modals. We have seen that *irgendein* DPs trigger a free choice effect requiring that *each* individual in the extension of the NP be a possibility. For instance, the sentence in (3b), repeated in (22), with the *irgendein* DP interpreted under the modal, requires, as we saw, that every doctor be a permitted option for Mary to marry. Other EFCIs, like *algún* DPs, trigger a weaker inference, a 'modal variation' effect (Alonso-Ovalle & Menéndez-Benito 2010), requiring that there be *at least two* individuals in the extension of the NP that satisfy the existential claim. For instance, the sentence in (23), with *algún* scoping under the modal, requires at least two doctors to be permitted options for María to marry. Hence, the sentence can felicitously describe scenarios where not all doctors are permitted options.

(22) Mary muss irgendeinen Arzt heiraten.
Mary has-to IRGENDEIN doctor marry
'Mary has to marry a doctor — any doctor.'
(Kratzer & Shimoyama 2002: 11)

(23) María tiene que casarse con algún médico.
María has to marry with ALGÚN doctor
'Mary has to marry some doctor or other.'
(Alonso-Ovalle & Menéndez-Benito 2015b: 10)

We will now probe into the interpretation of *yek -i* DPs under deontic (Section 2.3.1) and epistemic modals (Section 2.3.2).

2.3.1 *Yek -i* DPs with deontic modals

When scoping under deontic modals, *yek -i* DPs differ from *yek* DPs in that they convey a free choice effect, like *irgendein*, but unlike *algún*. For illustration, consider the scenario in (24) where not all books are permitted options:

(24) *Scenario:* There are only five books ($\{b_1, \ldots b_5\}$). Forood is allowed to buy b_1, he is allowed to buy b_2, and he is allowed to buy b_3, but he is not allowed to buy b_4 or b_5.

The sentence in (25) with the regular indefinite *yek* DP under a possibility modal can felicitously describe the scenario in (24). In contrast, its counterpart with a *yek -i* DP, in (26), repeated from (20a), cannot, because it conveys that Forood is allowed to buy any of the five books.

(25) Forood mitun-e ye ketab bexar-e.
Forood can-3SG one book buy-3SG
'Forood can buy a book.' (Alonso-Ovalle & Moghiseh 2019: 6)

(26) Forood mitun-e ye ketab-i bexar-e.
Forood can-3SG one book-IND buy-3SG
'Forood can buy a book — any book.'
(Alonso-Ovalle & Moghiseh 2019: 6)

This observation can be further supported by noting that a continuation incompatible with free choice effect, like (27), is consistent with (25), but inconsistent with (26).

(27) … amma ne-mitun-e ketab-e b_1 o bexar-e
but NEG-can-3SG book-EZ b_1 ACC buy-3SG
'…but he cannot buy b_1.'

When scoping under deontic necessity modals, *yek -i* DPs also trigger a free choice effect. To see this, consider the scenario in (28):

(28) *Scenario:* There are only five books ($\{b_1, \ldots b_5\}$). Forood is required to buy a book and he is allowed to buy b_1, b_2, and b_3, but he is not allowed to buy b_4 or b_5.

The sentence in (29), with a *yek* DP, is true in (28), but its counterpart with a *yek -i* DP, in (30), is not, because it conveys that Forood can buy *any* book.

(29) Forood bayad ye ketab bexar-e.
Forood must one book buy-3SG
'Forood must buy a book.' (Alonso-Ovalle & Moghiseh 2019: 7)

(30) Forood bayad ye ketab-i bexar-e.
Forood must one book-IND buy-3SG
'Forood must buy a book — any book.'
(Alonso-Ovalle & Moghiseh 2019: 7)

Likewise, following (29) with a continuation incompatible with the free choice component, like (27), doesn't lead to a contradiction, but following (30) with it does.

2.3.2 *Yek -i* DPs with epistemic modals

When scoping under epistemic modals, *yek -i* DPs trigger a weaker modal variation effect. In this, they pattern with *irgendein* or *un qualche* DPs, but differ from *uno qualsiasi* DPs (Aloni & Port 2015, Chierchia 2013). For instance, (32), with a *yek -i* DP taking narrow scope below an epistemic possibility modal, can felicitously describe the scenario in (31), where not all books are epistemic possibilities.

(31) *Scenario:* There are only five books ($\{b_1 \dots b_5\}$). The speaker is convinced that Forood hasn't bought b_4 or b_5, but for all he knows, Forood could have bought any of the other books, or even none of the books.

(32) Forood mitune-e ye ketab-i xaride bash-e.
Forood can-3SG ye book-IND bought be-3SG
'Forood might have bought a book.'

In line with this, (32) can be felicitously followed by the sentence in (33), which is incompatible with a free choice component.

(33) … amma ketab-e b_1 o na-xarid-e.
but book-EZ b_1 ACC NEG-bought-3SG
'…but he hasn't bought b_1.'

The modal variation effect is also detectable when *yek -i* DPs take narrow scope under an epistemic necessity modal. The sentence in (35), for instance, is a felicitous description of the scenario in (34), where there are at least two books that Forood could have bought, and can be felicitously followed with (33).

(34) *Scenario:* There are only five books ($\{b_1 \ldots b_5\}$). The speaker is convinced that Forood has bought a book, but knows that he hasn't bought b_4 or b_5. (35) = ✓

(35) Forood bayad ye ketab-i xaride bash-e.
Forood must one book-IND bought be-3SG
'Forood must have bought a book.'
(Alonso-Ovalle & Moghiseh 2019: 6)

To summarize: just as in downward entailing contexts, *yek -i* DPs pattern with other EFCIs in modal contexts.[4]

2.4 Unembedded sentences

We turn now to the behavior of *yek -i* DPs in unembedded contexts, showing first that they are grammatical but have no modal component (Section 2.4.1), and second, that they contribute a uniqueness component that conveys that exactly one individual in the extension of the NP satisfies the existential claim (Section 2.4.2).

2.4.1 Unembedded *yek -i* DPs do not convey modality

We have seen in the introduction that EFCIs differ with respect to their distribution in unembedded sentences: some are grammatical, others, like Romanian *vreun*, are not. Like *algún*, but unlike *vreun*, *yek -i* DPs are grammatical in unembedded sentences, as (36) illustrates.

(36) Forood dirooz ye ketab-i xarid.
Forood yesterday one book-IND bought-3SG
'Forood bought a book yesterday.'
(Alonso-Ovalle & Moghiseh 2019: 7)

As we also discussed in the introduction, the previously described EFCIs that are grammatical in unembedded contexts convey a modal meaning component: some EFCIs, like *algún*, convey an epistemic modal component, others, like *un NP cualquiera*, carry an agent indifference component. In contrast, *yek -i* DPs

4 The previous literature did not classify *yek -i* DPs as EFCIS, although there are some hints. For instance, Jasbi (2016) shows that the extension of their NP must contain more than one entity. If *yek -i* DPs are EFCIs, this anti-singleton constraint is in fact expected: if the extension of the NP were a singleton, the modal variation inference could not be satisfied.

do not convey modality (Alonso-Ovalle & Moghiseh 2019). They do not convey agent indifference: the sentence in (36), for instance, can felicitously describe the scenario in (37), where the agent did not buy a book indiscriminately.

(37) *Scenario:* Forood wanted to buy *The Iliad* and did so. He wouldn't have bought any other book.

Unembedded *yek -i* DPs do not convey epistemic modality, either. Sentences containing a *yek -i* DP can be followed with a *namely* continuation, as (38) illustrates. In contrast, other EFCIs, like *algún*, cannot, as seen in (39).

(38) Forood dirooz ye ketab-i xarid be esm-e Iliad.
Forood yesterday one book-IND bought-3SG to name-EZ Iliad
'Forood bought a book yesterday, namely *The Iliad*.'
(Alonso-Ovalle & Moghiseh 2019: 8)

(39) María se casó con algún médico, # en concreto con el Dr. Smith.
María se married with ALGÚN doctor, in particular with the Dr. Smith
'María married some doctor or other, namely Dr. Smith.'
(Alonso-Ovalle & Menéndez-Benito 2015b: 2)

In the same vein, the dialogue in (40), from Alonso-Ovalle & Moghiseh 2019, where the addressee asks the speaker about the identity of the entity that satisfies the existential claim, is felicitous. Its Spanish counterpart with *algún*, in (41), is, in contrast, deviant.

(40) A: Forood dirooz ye ketāb-i xarid.
Forood yesterday one book-IND bought-3SG
'Forood bought a book yesterday.'
B: Kodum o?
Which ACC
'Which one?'

(41) A: Forood compró algún libro ayer.
Forood bought ALGÚN book yesterday
'Forood bought some book yesterday.'
B: #¿Cuál?
which
'Which one?'

Aloni & Port (2015) show that asking 'guess who?' after a sentence containing *irgendein*, as in (42), is deviant. This is not true for *yek -i* DP, as (43) shows.

(42) Irgendein Student hat angerufen. # Rat mal wer?
some student has called Guess PRT who?
'Some student called. Guess who?' (Aloni & Port 2015: 119)

(43) Forood dirooz ye ketab-i xarid. Hads bezan chi?
Forood yesterday one book-IND bought-3SG guess hit what
'Forood bought a book yesterday. Guess what?'

Finally, Chierchia (2013) shows that discourses like (44), where the individual satisfying the existential claim is previously mentioned, are deviant with *irgendein*, as in (44). In contrast, they are fine with *yek -i* DPs, as we can see in (45).

(44) John hat geschummelt. # Deshalb ist irgendein Student aus
John has cheated. Therefore is IRGENDEIN student from
deiner Klasse ein Betrueger.
your class a cheater
'John cheated. Therefore a student in your class is a cheater.'
(Chierchia 2013: 251)

(45) Forood ketab-e Iliad-o xarid. Bana-bar-in Forood ye ketab-i
Forood book-EZ Iliad-ACC bought-3SG therefore Forood ye book-IND
xarid-e.
bought-3SG
'Forood bought *The Iliad*. Therefore, Forood has bought a book.'
(Alonso-Ovalle & Moghiseh 2019: 8)

From these examples, we conclude that *yek -i* DPs have no detectable modal component when they are unembedded.[5]

2.4.2 Unembedded *yek -i* DPs convey uniqueness

The sentences in (46) show that *yek -i* DPs, unlike *algún*, convey that exactly one individual in the extension of the NP satisfies the existential claim.

5 A reviewer pointed out that there could be another modal meaning component, conveying that the speaker considers the identity of the witness irrelevant for the current discourse. However, as the reviewer also noted, the examples in (38) and (43) rule out this modal meaning component.

(46) a. Forood compró algún libro ayer: una novela y un libro de poesía.
Forood bought ALGÚN book yesterday: a novel and a book of poetry
'Forood bought some book yesterday, a novel and a poetry book.'

b. Forood dirooz ye ketab-i xarid: # ye roman va ye ketab-e sher.
Forood yesterday one book-IND bought-3SG, one novel and one book-EZ poetry
'Forood bought a book yesterday: a novel and a poetry book.'

Further evidence for the uniqueness component of *yek -i* DPs comes from the fact that asking 'how many?' leads to deviance, as (47) shows. The Spanish counterpart of (47) with *algún*, in contrast, is felicitous, as seen in (48).

(47) A: Forood dirooz ye ketab-i xarid.
Forood yesterday one book-IND bought-3SG
'Forood bought a book yesterday.'
B: # Chand ta?
how-many CL
'How many?'

(48) A: Ayer, Forood compró algún libro.
yesterday Forood bought ALGÚN book
'Yesterday, Forood bought some books.'
B: ¿Cuántos?
how-many
'How many?'

Based on the data that we considered so far, we conclude that *yek -i* DPs instantiate a new EFCI profile. This raises the question of how we can account for the contrast between *yek -i* DPs and other EFCIs. To answer this question, first we need to identify the status of the modal inference and the uniqueness component of *yek -i* DPs. The next section is devoted to this issue.

2.5 Both the uniqueness and modal components are implicatures

Kratzer & Shimoyama (2002) claim that the modal component of *irgendein* is an implicature. Alonso-Ovalle & Menéndez-Benito (2010) argue that the same is

true for *algún*. In this section, we argue that both the uniqueness component and modal inference of *yek -i* DPs are implicatures.

What suggests that the uniqueness meaning component of *yek -i* DPs is not part of the lexical meaning of *yek -i* DPs, but is an implicature, is the fact that this meaning component disappears in downward entailing contexts. The infelicity of the sentence in (49) shows this. If the uniqueness meaning component were truth conditional, (49) would be expected to be felicitous. This is, however, not the case. The sentence feels contradictory because it conveys that Forood pays ten dollars whenever he buys one or more books.[6]

(49) Age Forood ye ketab-i bexar-e, $10 mid-e, # amma age do ta
if Forood one book-IND buy-3SG $10 give-3SG, but if two CL
bexar-e, $15 mid-e.
buy-3SG $15 give-3SG
'If Forood buys any book, he pays $10, but if he buys two, he pays $15.'

The modal component of *yek -i* DPs also disappears in downward entailing contexts. The fact that the sentence in (50) cannot be followed with (51) illustrates this. As we have seen before, *yek -i* DPs trigger a free choice effect when they scope under deontic modals. If the free choice effect were truth conditional, (50) would convey that the speaker doubts that Forood is required to buy *just any* books, and, therefore, it would be compatible with the continuation in (51).

(50) Shak dar-am Forood bayad ye ketab-i bexar-e.
doubt have-1SG Forood must one film-IND buy-3SG
' I doubt that Forood must buy any books.'

(51) …, bayad *Oblomov* ro bexar-e.
…, must *Oblomov* ACC buy-3SG
'…he must buy *Oblomov*.'

2.6 Interim summary

Table 1 summarizes the properties of *yek -i* DPs and compares them with other EFCIs. As we can see, *yek -i* DPs show some core properties of EFCIs: they contribute plain existential force in downward entailing contexts, but convey meanings stronger than those of regular existentials in modal contexts. When

6 To rescue the sentence in (49), the numeral *ye* needs to be focused. We assume that focus can mark embedded uniqueness, an issue that we will get back to in Section 5.

	modal contexts		DE	*unembedded*
	epistemic	*deontic*		
irgendein	strengthened		∃	modality
algún	strengthened		∃	modality
vreun	strengthened	*	∃	*
un qualsiasi	strengthened		*	modality
yek -i DPs	strengthened		∃	**uniqueness & no modality**

Table 1 *Yek -i* DPs compared to other EFCIs

they scope under deontic modals, they trigger a free choice effect requiring all individuals in the domain of quantification be permitted options, but a modal variation effect requiring at least two individuals in the domain of quantification be possibilities, when they scope under epistemic modals. None of these properties single *yek -i* DPs out. Their behavior in unembedded contexts does: oddly enough, *yek -i* DPs lose their free choice item status there. Unlike other EFCIs that are grammatical in episodic sentences, unembedded *yek -i* DPs do not convey modality. Like regular existentials, but unlike some EFCIs, like *algún*, unembedded *yek -i* DPs convey uniqueness in unembedded sentences. The uniqueness component of *yek -i* DPs as well as their modal inference are implicatures, since they disappear in downward entailing contexts.

Given the contribution of *yek -i* DPs in downward entailing contexts and their strengthened interpretations under modals, we take *yek -i* DPs to be existentials at core that get strengthened in the process of semantic composition. Due to the contrast between the regular existential *yek* DPs and *yek -i* DPs in their interpretation under modals, one can conclude that the suffix *-i* triggers strengthening of the basic existential claim that *yek -i* DPs make. The strengthening of a basic existential interpretation in modal contexts is a distinctive property of EFCIs. We turn next to the issue of where *yek -i* DPs fit in a theory of EFCIs that relies on strengthening of a core existential interpretation, adopting the exhaustification- and alternative-based theory of EFCIs developed in Chierchia 2013 as basic framework.

3 *Yek -i* DPs in downward entailing and modal contexts

As we saw, EFCIs are interpreted as plain existentials in downward entailing contexts. Taking the interpretation of EFCIs in downward entailing contexts as baseline motivates theories that rely on deriving the contribution of EFCIs in other environments via grammatical strengthening. A theory along such lines is presented in Chierchia 2013. This theory is built to derive the behavior of EFCIs in downward entailing and modal contexts. As we will see in this section, it can extend to *yek -i* DPs in downward entailing contexts effortlessly. The same is true in modal contexts if we restrict our attention to their free choice component. The uniqueness component of *yek -i* DPs in those contexts requires further discussion, and so does the distinctive behavior of *yek -i* DPs in unembedded contexts. We will address these two topics, starting with the latter, in Section 4 and Section 5.

The basic idea in Chierchia's framework is that EFCIs are existential quantifiers that introduce into the semantic derivation two types of propositional alternatives: (i) scalar alternatives and (ii) (pre-exhaustified) domain alternatives. These alternatives must be factored into the meaning via an exhaustivity operator, which takes a proposition ϕ, and strengthens it by conjoining it with the negation of all the relevant alternative propositions to ϕ that are not entailed by it, as defined in (52).[7]

(52) $[\![O_{\text{ALT}}[\phi]]\!] =$
$\lambda w.[\![\phi]\!](w) \wedge \forall p \in [\![\phi]\!]^{\sigma\text{-ALT}} \cup [\![\phi]\!]^{\text{EXH-D-ALT}}[p(w) \rightarrow [\![\phi]\!] \subseteq p]$

For ease of exposition, we will work for now with a single exhaustivity operator, O_{ALT}, which excludes *all* stronger alternatives at once. Chierchia entertains the existence of different exhaustivity operators that are sensitive to different types of alternatives. We will then see in the next two sections that deriving the behavior of *yek -i* DPs actually requires assuming, along these lines, that exhaustification is selective and attends to each type of alternative independently.

7 We use different interpretation functions: $[\![.]\!]$ maps a linguistic expression (and variable assignment g, omitted for clarity) to a semantic object; $[\![.]\!]^{\alpha\text{-ALT}}$ maps linguistic expressions (and a variable assignment) to sets of semantic objects (alternatives), where $[\![.]\!]^{\sigma\text{-ALT}}$ is used for the scalar alternatives, $[\![.]\!]^{\text{D-ALT}}$ for the domain alternatives, and $[\![.]\!]^{\text{EXH-D-ALT}}$ for the so-called 'pre-exhaustified' domain alternatives, which are defined on the basis of the domain alternatives. We use boldface type for the value of variables. For simplicity, we will illustrate for the most part with domains containing two individuals. Nothings changes for larger domains.

Like other EFCIs, we take *yek -i* DPs to be existential quantifiers that introduce scalar and domain alternatives. We assume, as illustrated in (53a), that the extension of NPs can include both atomic and non-atomic individuals, and that singular marking selects the atomic individuals from the extension of the NP (Scontras 2022), as in (53b). The denotation of a *yek -i* DP is given in (53c): it denotes the set of properties that are true of at least one atomic individual in a given contextually determined domain.

(53) a. $[\![[_{\text{NP}}\text{book}]]\!]^w = \{b_1, b_2, b_1 \oplus b_2\}$

b. $[\![\text{SG } [_{\text{NP}}\text{book}]]\!]^w = \{b_1, b_2\}$

c. $[\![\text{ye SG NP-i}(D)]\!]^w =$
$\lambda P_{\langle e,st\rangle}.\lambda w.\exists x[[\![\text{SG NP}]\!]^w(x) \wedge |x| \geq 1 \wedge \mathbf{D}_w(x) \wedge P_w(x)]$

Like other EFCIs, *yek -i* DPs introduce scalar alternatives. *Yek -i* DPs contain the numeral *ye* ('one'). The numeral contributes a set of scalar alternatives. Those, given in (54), are obtained by considering stronger cardinality claims conveying that, for each subdomain $\mathbf{D}'_w$, individuals with larger cardinalities have property P.

(54) $[\![\text{ye SG NP-i}(D)]\!]^{\sigma\text{-ALT}} =$
$\{\lambda P.\lambda w.\exists x[[\![\text{NP}]\!]^w(x) \wedge |x| \geq n \wedge \mathbf{D}'_w(x) \wedge P_w(x)] \mid \mathbf{D}'_w \subseteq \mathbf{D}_w \wedge n > 1\}$

EFCIs activate domain alternatives, and so do *yek -i* DPs. Farsi NPs marked with the suffix *-i* have been linked to the introduction of domain alternatives in previous work. Based on the behavior of *-i* marked NPs in downward entailing contexts, Deal & Farudi (2007) proposed that the suffix *-i* is responsible for introducing domain alternatives. The domain alternatives of *yek -i* DPs, given in (55), are determined by restricting the domain of quantification to subdomains of $\mathbf{D}_w$.

(55) $[\![\text{ye SG NP-i}(D)]\!]^{\text{D-ALT},w} =$
$\{\lambda P.\lambda w.\exists x[[\![\text{SG NP}]\!]^w(x) \wedge \mathbf{D}'_w(x) \wedge P_w(x)] \mid \mathbf{D}'_w \subseteq \mathbf{D}_w\}$

The alternatives in (54) and (55) turn propositional by combining with other expressions in the semantic derivation through pointwise functional application. When they are propositional, they are used up by an exhaustivity operator.

For illustration, consider the LF in (56a). The subscript $[+\sigma,+D]$ signals that both scalar and pre-exhaustified domain alternatives are 'active' and must be exhaustified (Chierchia 2013). Assuming the domain of quantification in (56b) in the world of evaluation w, the IP in (56a) denotes the proposition in (56c) that Forood bought b_1 or b_2 and contributes the set of scalar alternatives in

(56d) and the set of domain alternatives in (56e).[8] The domain alternatives must be exhaustified to determine the pre-exhaustified domain alternatives. These alternatives are determined by strengthening each domain alternative using the notion of innocent exclusion: each domain alternative is conjoined with the negation of as many other domain alternatives as possible while keeping consistency (Fox 2007, Alonso-Ovalle 2008). The set containing the pre-exhaustified domain alternatives is given in (56f).[9]

(56) a. LF: [$_{\text{IP}}$ ye book-i$_{[+\sigma,+D]}$ λ1 Forood bought t_1]

b. $[\![\text{book}]\!]^w =$ $\{b_1, b_2\}$

c. $[\![[_{\text{IP}} \ldots]]\!] =$ $b_1 \vee b_2$

d. $[\![[_{\text{IP}} \ldots]]\!]^{\sigma\text{-ALT}} =$ $\{b_1 \wedge b_2\}$

e. $[\![[_{\text{IP}} \ldots]]\!]^{\text{D-ALT}} =$ $\{b_1,\ b_2\}$

f. $[\![[_{\text{IP}} \ldots]]\!]^{\text{EXH-D-ALT}} =$ $\{b_1 \wedge \neg b_2,\ b_2 \wedge \neg b_1\}$

This setup is built to account for two core properties shared by EFCIs: their behavior in (i) downward entailing contexts, where they are interpreted as plain existentials, and (ii) in modal contexts, where they convey a free choice effect. We will illustrate how, starting with the modal contexts.

Recall that with deontic modals, *yek -i* DPs trigger a free choice effect on their narrow scope reading. Exhaustification derives this. Consider, for instance, the sentence in (57), repeated from (20a), with the LF in (58).

(57) Forood mitun-e ye ketab-i bexar-e.
Forood can-3SG one book-IND buy-3SG
'Forood can buy a book — any book.'
(Alonso-Ovalle & Moghiseh 2019: 5)

(58) LF: $O_{\text{ALT}} \Diamond$ [$_{\text{IP}}$ ye book-i$_{[+\sigma,+D]}$ λ1 Forood buy]

Assuming a domain of quantification with two books, $\{b_1, b_2\}$, the argument of O_{ALT} contributes the existential claim in (59a): that Forood is allowed to buy one of the two books. The scalar alternative, in (59b), conveys that Forood is

8 The way scalar alternatives are defined results in a number of semantically equivalent contradictory scalar alternatives, like (i). Contradictions are, of course, stronger than any contingent proposition, so these alternatives will be consistently negated by the exhaustivity operator, but their negation is a tautology, which will have no detectable effect. For ease of exposition, we will ignore these alternatives.

(i) $\lambda w.\exists x[x \in \{b_1\} \wedge |x| \geq 2 \wedge \text{BUY}_w(F, x)]$

9 Notation: 'b_n' stands for the proposition that Forood bought book$_n$.

allowed to buy both books. The set of domain alternatives, in (59c), contains two propositions: the proposition that Forood is allowed to buy b_1 and the proposition that Forood is allowed to buy b_2. The set of pre-exhaustified domain alternatives is given in (59d).

(59) a. $[\![\Diamond[_{\text{IP}} \ldots]]\!] = \Diamond(b_1 \vee b_2)$
b. $[\![\Diamond[_{\text{IP}} \ldots]]\!]^{\sigma\text{-ALT}} = \{\Diamond(b_1 \wedge b_2)\}$
c. $[\![\Diamond[_{\text{IP}} \ldots]]\!]^{\text{D-ALT}} = \{\Diamond b_1, \Diamond b_2\}$
d. $[\![\Diamond[_{\text{IP}} \ldots]]\!]^{\text{EXH-D-ALT}} = \{\Diamond b_1 \wedge \neg\Diamond b_2, \Diamond b_2 \wedge \neg\Diamond b_1\}$

The scalar alternative and the pre-exhaustified domain alternatives are all stronger than the assertion in (59a), and, therefore, must be excluded. Negating the pre-exhaustified domain alternatives in (59d) yields the propositions in (60a) and (60b). These two propositions, together, entail the proposition in (60c), which conveys that either Forood is permitted to buy b_1 and also permitted to buy b_2, or he is not permitted to buy either book. The assertion in (59a) conveys that Forood is permitted to buy one of the two books, so, together with (60c), it entails that Forood can buy either book. This captures the attested free choice effect.

(60) a. $\neg(\Diamond b_1 \wedge \neg\Diamond b_2) \Leftrightarrow \neg\Diamond b_1 \vee \Diamond b_2 \Leftrightarrow \Diamond b_1 \rightarrow \Diamond b_2$
b. $\neg(\Diamond b_2 \wedge \neg\Diamond b_1) \Leftrightarrow \neg\Diamond b_2 \vee \Diamond b_1 \Leftrightarrow \Diamond b_2 \rightarrow \Diamond b_1$
c. $\Diamond b_1 \leftrightarrow \Diamond b_2$

Yet, exhaustification yields a meaning that is stronger than attested. Negating the scalar alternative conveys, on top of the free choice effect, that Forood is not allowed to buy more than one book, as in (61). This meaning component is, however, not attested: the target sentence in (57) can be felicitously followed with the continuation in (62).

(61) $[\![O_{\text{ALT}}\Diamond[_{\text{IP}} \ldots]]\!] = \Diamond(b_1 \vee b_2) \wedge (\Diamond b_1 \leftrightarrow \Diamond b_2) \wedge \neg\Diamond(b_1 \wedge b_2)$

(62) … va inke mitun-e hadaksar se ta ketab bexar-e.
and that can-3SG maximum three CL book buy-3SG
'…and that he is allowed to buy at most three books.'

We make note of the fact that exhaustifying with respect to all alternatives yields a meaning that is too strong, because of the predicted scalar component. We will come back to this fact in Section 5. For now, we conclude that exhaustification derives the attested free choice effect.

Exhaustification also derives the free choice effect under deontic necessity modals. To illustrate, consider (63), repeated from (20b), with the LF in (64).

(63) Forood bayad ye ketab-i bexar-e.
Forood must one book-IND buy-3SG
'Forood must buy a book and he can buy any book.'
(Alonso-Ovalle & Moghiseh 2019: 5)

(64) LF: O_{ALT} □ [$_{\text{IP}}$ ye book-i$_{[+\sigma,+D]}$ λ1 Forood buy t_1]

The argument of the exhaustification operator denotes the proposition in (65a) and contributes the scalar and domain alternatives in (65b), (65c) and (65d). All those alternatives are again stronger than the assertion. Negating the exhaustified domain alternatives entails the proposition in (66). The assertion, together with this proposition, entails that every book must be a permitted option.[10]

(65) a. $[\![\Box[_{\text{IP}} \ldots]]\!] = \Box(b_1 \vee b_2)$
b. $[\![\Box[_{\text{IP}} \ldots]]\!]^{\sigma\text{-ALT}} = \{\Box(b_1 \wedge b_2)\}$
c. $[\![\Box[_{\text{IP}} \ldots]]\!]^{\text{D-ALT}} = \{\Box b_1, \Box b_2\}$
d. $[\![\Box[_{\text{IP}} \ldots]]\!]^{\text{EXH-D-ALT}} = \{\Box b_1 \wedge \neg\Box b_2, \Box b_2 \wedge \neg\Box b_1\}$

(66) $\Box b_1 \leftrightarrow \Box b_2$

The predicted scalar component merits, again, discussion. Excluding the scalar alternative delivers the meaning in (67), which conveys, on top of the free choice effect, that Forood must buy at least one book. This meaning is actually weaker than attested. The target sentence in (63) is predicted to be true in the scenario in (68), where Forood is permitted to buy more than one book, but the sentence is judged false, because it conveys that Forood must buy *exactly one*.

(67) $[\![O_{\text{ALT}} \Box[_{\text{IP}} \ldots]]\!] = \Box(b_1 \vee b_2) \wedge (\Box b_1 \leftrightarrow \Box b_2) \wedge \neg\Box(b_1 \wedge b_2)$
$\Rightarrow \Box(b_1 \vee b_2) \wedge \Diamond b_1 \wedge \Diamond b_2 \wedge \neg\Box(b_1 \wedge b_2)$

(68) *Scenario:* There are only five books ($\{b_1, \ldots b_5\}$). Forood is required to buy a book, and any book is a permissible option for him to buy. He is allowed to buy one or more than one book.

10 To see this, assume that, for instance, Forood is not permitted to buy b_1. That means that he doesn't buy b_1 in all permitted worlds. But then, given (66), this means that he doesn't buy b_2 in all permitted worlds, either. Since, given the assertion, in all permitted worlds he buys one of the two books, there must be permitted worlds where he buys b_1 (those where he doesn't buy b_2). But this contradicts our assumption that Forood is not permitted to buy b_1. So, if the assertion and (66) are both true, it must be the case that Forood is permitted to buy b_1. Reasoning likewise about b_2, we conclude that he must be permitted to buy b_2 too.

We take note of the fact that the exclusion of the scalar alternative delivers truth conditions that are, this time, too weak. We will revisit this fact in Section 5. We focus, for now, on the derivation of the attested free choice effect.

We have seen above that under epistemic modals, *yek -i* DPs do not trigger a free choice effect, but a modal variation effect, which simply requires that at least two individuals in the extension of the NP be possibilities. Building on the proposals presented in Alonso-Ovalle & Menéndez-Benito 2010 for *algún* and in Fălăuş 2014 for *vreun*, Chierchia 2013 takes the difference between the free choice effect and modal variation to stem from different types of domain alternatives. The *large* domain alternatives used above, which include every possible subset of the domain of quantification, derive the free choice effect. In contrast, a set of *small* domain alternatives, including only the singleton subsets of the domain accounts for the modal variation effect. Let us illustrate this.

Consider again, for instance, the LF in (69) for the sentence in (57).

(69) LF: $O_{\text{ALT}} \Diamond$ [$_{\text{IP}}$ ye book-i$_{[+\sigma,+D]}$ $\lambda 1$ Forood buy t_1]

To see the difference between the large and the small domain alternatives, we need to assume a domain with more than two elements — with domains containing just two individuals (or just one), the modal variation effect and the free choice effect turn out to be equivalent. Let us assume, then, for instance, a domain with three books ($\{b_1, b_2, b_3\}$). With this domain, we get the assertion in (70a). The set of domain alternatives, which include every subset of the domain of quantification, and the set of pre-exhaustified domain alternatives are given in (70b) and (70c), respectively — for the sake of illustration, we will ignore for now the scalar alternatives.

(70) a. $[\![\Diamond [_{\text{IP}} \ldots]]\!] = \Diamond(b_1 \vee b_2 \vee b_3)$

b. $[\![\Diamond [_{\text{IP}} \ldots]]\!]^{\text{D-ALT}} = \left\{ \begin{array}{c} \Diamond b_1, \Diamond b_2, \Diamond b_3, \\ \Diamond(b_1 \vee b_2), \Diamond(b_1 \vee b_3), \Diamond(b_2 \vee b_3) \end{array} \right\}$

c. $[\![\Diamond [_{\text{IP}} \ldots]]\!]^{\text{EXH-D-ALT}} = \left\{ \begin{array}{c} \Diamond b_1 \wedge \neg\Diamond b_2 \wedge \neg\Diamond b_3, \\ \Diamond b_2 \wedge \neg\Diamond b_1 \wedge \neg\Diamond b_3, \\ \Diamond b_3 \wedge \neg\Diamond b_1 \wedge \neg\Diamond b_2, \\ \Diamond(b_1 \vee b_2) \wedge \neg\Diamond b_3, \\ \Diamond(b_1 \vee b_3) \wedge \neg\Diamond b_2, \\ \Diamond(b_2 \vee b_3) \wedge \neg\Diamond b_1 \end{array} \right\}$

The pre-exhaustified domain alternatives in (70c) are all stronger than the assertion in (70a), and, therefore, they need to be excluded. These alternatives are not logically independent, they are related by entailment, so to see the

effect of the exclusion, we only need to consider the negation of the weakest alternatives. Negating those yields the propositions in (71), which, together with the assertion, convey that every book is a permitted possibility.[11]

(71) a. $\neg(\Diamond(b_1 \vee b_2) \wedge \neg\Diamond b_3) \Leftrightarrow \neg\Diamond(b_1 \vee b_2) \vee \Diamond b_3 \Leftrightarrow \Diamond(b_1 \vee b_2) \rightarrow \Diamond b_3$
b. $\neg(\Diamond(b_1 \vee b_3) \wedge \neg\Diamond b_2) \Leftrightarrow \neg\Diamond(b_1 \vee b_3) \vee \Diamond b_2 \Leftrightarrow \Diamond(b_1 \vee b_3) \rightarrow \Diamond b_2$
c. $\neg(\Diamond(b_2 \vee b_3) \wedge \neg\Diamond b_1) \Leftrightarrow \neg\Diamond(b_2 \vee b_3) \vee \Diamond b_1 \Leftrightarrow \Diamond(b_2 \vee b_3) \rightarrow \Diamond b_1$

(72) $[\![O_{\text{ALT}} \Diamond [_{\text{IP}} \ldots]]\!] =$ $\Diamond(b_1 \vee b_2 \vee b_3) \wedge \Diamond b_1 \wedge \Diamond b_2 \wedge \Diamond b_3$ (ignoring the scalar component)

Let us explore now the effect of the small domain alternatives. To do so, consider the Spanish sentence in (73a), with the LF in (73b).

(73) a. Forood puede comprar algún libro.
Forood can buy-INF ALGÚN book
'Forood can buy some book or other.'
b. LF: $O_{\text{ALT}} \Diamond$ [$_{\text{IP}}$ algún book$_{[+\sigma,+D]}$ $\lambda 1$ Forood buy t_1]

Assuming a domain with three books, we get the assertion in (74a), and the domain alternatives in (74b), which include only the singleton subsets of the domain. The pre-exhaustified domain alternatives in (74c) are now only a subset of the pre-exhaustified domain alternatives that we got with the large domain alternatives — the strongest of those. Negating the pre-exhaustified domain alternatives, as in (74c), yields the propositions in (75). These, expectedly, determine a weaker implicature, which, together with the assertion, results in a weaker meaning, in (76), which does not require that *every* book be permitted, just that more than one is.

(74) a. $[\![\Diamond [_{\text{IP}} \ldots]]\!] =$ $\Diamond(b_1 \vee b_2 \vee b_3)$
b. $[\![\Diamond [_{\text{IP}} \ldots]]\!]^{\text{D-ALT}} =$ $\{\ \Diamond b_1, \Diamond b_2, \Diamond b_3\ \}$
c. $[\![\Diamond [_{\text{IP}} \ldots]]\!]^{\text{EXH-D-ALT}} =$ $\left\{ \begin{array}{c} \Diamond b_1 \wedge \neg\Diamond b_2 \wedge \neg\Diamond b_3, \\ \Diamond b_2 \wedge \neg\Diamond b_1 \wedge \neg\Diamond b_3, \\ \Diamond b_3 \wedge \neg\Diamond b_1 \wedge \neg\Diamond b_2 \end{array} \right\}$

11 The assertion conveys that Forood is permitted to buy one of the three books. Suppose he is permitted to buy b_1. In that case, the antecedents of the conditionals in (71a) and (71b) will be true. This, consequently, requires the consequent of the conditionals, $\Diamond b_1$ and $\Diamond b_2$ to be true. But then the antecedent of (71c) is true, and, so, its consequent must be true as well. This means that every book is a permitted option. The same consequence is drawn if we assume that he is permitted to buy b_2 or that he is permitted to buy b_3. Recall that we are ignoring the scalar alternatives and their effect on exhaustification.

(75) a. $\neg(\Diamond b_1 \wedge \neg\Diamond b_2 \wedge \neg\Diamond b_3) \Leftrightarrow \Diamond b_1 \rightarrow (\Diamond b_2 \vee \Diamond b_3)$
b. $\neg(\Diamond b_2 \wedge \neg\Diamond b_1 \wedge \neg\Diamond b_3) \Leftrightarrow \Diamond b_2 \rightarrow (\Diamond b_1 \vee \Diamond b_3)$
c. $\neg(\Diamond b_3 \wedge \neg\Diamond b_1 \wedge \neg\Diamond b_2) \Leftrightarrow \Diamond b_3 \rightarrow (\Diamond b_1 \vee \Diamond b_2)$

(76) $[\![O_{\text{ALT}} \Diamond [_{\text{IP}} \ldots]]\!] =$
$\Diamond(b_1 \vee\ b_2 \vee b_3) \wedge (\Diamond b_1 \wedge \Diamond b_2) \vee (\Diamond b_1 \wedge \Diamond b_3) \vee (\Diamond b_2 \wedge \Diamond b_3)$
$\Leftrightarrow (\Diamond b_1 \wedge \Diamond b_2) \vee (\Diamond b_1 \wedge \Diamond b_3) \vee (\Diamond b_2 \wedge \Diamond b_3)$
(ignoring the scalar component)

If we assume that the domain alternatives of *yek -i* DPs are determined by considering every subdomain of the domain of quantification, as we did above, we expect to get a free choice effect whenever *yek -i* DPs scope under modals. On the other hand, if we assume that the domain alternatives of *yek -i* DPs are determined by considering the singleton subdomains, as illustrated above for *algún*, we would always expect the derivation of a modal variation effect when *yek -i* DPs are interpreted under modals. To get the right match between modals and the interpretation of *yek -i* DPs we need to assume that these items introduce different alternatives in different modal contexts.

One could assume, like Chierchia (2013) does for other EFCIs like *irgendein*, that *yek -i* DPs could switch between large or small domain alternatives. That observation could be supplemented with the claim that different modals induce different types of alternatives to derive the attested variation. Of course this leads one to question how exactly modals can force the relevance of the different types of alternatives. Fălăuş (2014) explores a connection with alternative-based semantics for modals. Under her analysis, different types of modals impose different requirements on which alternatives are true in some accessible world: deontic modals require that all of them be true, but epistemic modals don't (see Aloni 2007). We do not have much more to say about this question. Since the issue is orthogonal to the main point of the paper, and, as far as we can tell, largely still an open one, we will leave it open here.

We turn now to the downward entailing contexts, using the sentence in (77), repeated from (16), as an illustration.

(77) age Forood ye ketab-i bexun-e, ye jaize migir-e.
if Forood one book-IND read-3SG one gift take-3SG
'If Forood reads a book, he gets a gift.' if [...∃ ...] then ...
(Alonso-Ovalle & Moghiseh 2019: 5)

The sentence conveys that if Forood reads at least one book, any book, he will a get gift. This meaning is expected. For illustration, consider the LF in (78a). The

IP in (78a) makes the claim that if Forood reads b_1 or b_2, he will get a gift, in (78b), and activates the scalar alternative, in (78c), and the domain alternatives, in (78d). The set of pre-exhaustified domain alternatives is given in (78e). The scalar alternative, in (78c), is entailed by the assertion, and, therefore it cannot be excluded. The pre-exhaustified domain alternatives are not entailed by the assertion, so they must be excluded. Exhaustification, however, is vacuous. The negation of the alternatives in (78e) yields the propositions in (79a) and (79b). Conjoining them amounts to the biconditional in (79c). The assertion in (78b) entails the conjunction of conditionals in (79c) and, therefore, also the biconditional in (79d). Since the assertion entails the domain implicature, exhaustification has no effect, as shown in (80).

(78) a. LF: $O_{\text{ALT}}[_{\text{IP}}$ if ye book-i$_{[+\sigma,+D]}$ $\lambda 1$ Forood reads t_1, he gets a gift$]$

b. $[\![[_{\text{IP}} \ldots]]\!] = (b_1 \vee b_2) \rightarrow g$

c. $[\![[_{\text{IP}} \ldots]]\!]^{\sigma\text{-ALT}} = \{(b_1 \wedge b_2) \rightarrow g\}$

d. $[\![[_{\text{IP}} \ldots]]\!]^{\text{D-ALT}} = \{b_1 \rightarrow g, b_2 \rightarrow g\}$

e. $[\![[_{\text{IP}} \ldots]]\!]^{\text{EXH-D-ALT}} = \{b_1 \rightarrow g \wedge \neg(b_2 \rightarrow g), b_2 \rightarrow g \wedge \neg(b_1 \rightarrow g)\}$

(79) a. $\neg((b_1 \rightarrow g) \wedge \neg(b_2 \rightarrow g)) \Leftrightarrow \neg(b_1 \rightarrow g) \vee (b_2 \rightarrow g)$
$\Leftrightarrow (b_1 \rightarrow g) \rightarrow (b_2 \rightarrow g)$

b. $\neg((b_2 \rightarrow g) \wedge \neg(b_1 \rightarrow g)) \Leftrightarrow \neg(b_2 \rightarrow g) \vee (b_1 \rightarrow g)$
$\Leftrightarrow (b_2 \rightarrow g) \rightarrow (b_1 \rightarrow g)$

c. $(b_1 \rightarrow g) \wedge (b_2 \rightarrow g)$

d. $(b_1 \rightarrow g) \leftrightarrow (b_2 \rightarrow g)$

(80) $[\![O_{\text{ALT}}[_{\text{IP}} \ldots]]\!] = (b_1 \vee b_2) \rightarrow g$

Chierchia (2013) captures the contrast between FCIs in downward entailing context by assuming that items like Italian *un* NP *qualsiasi*, which are deviant in downward entailing contexts, select a presuppositional exhaustivity operator (O^{PS}) which requires the result of exhaustification to be properly stronger than its argument. This requirement will be always violated in downward entailing contexts, as illustrated above, and, therefore, items that select a presuppositional exhaustivity operator are ruled out in these contexts. In contrast, items which are felicitous in downward entailing contexts and contribute a narrow scope existential force, like *algún* or *irgendein*, select a regular exhaustivity operator which allows vacuous exhaustification. We will pursue the same line of thought by assuming that *yek -i* DPs allow for vacuous strengthening and, so, select the regular exhaustivity operator, as *irgendein* does.

To summarize: Chierchia's alternative-based theory of EFCIs derives the behavior of *yek -i* DPs in downward entailing contexts, and captures their free choice and modal variation components in modal contexts. However, in modal contexts, exhaustification with respect to all alternatives at once yields a meaning that is too strong for possibility modals and too weak for necessity modals. This arises because *yek -i* DPs trigger an embedded uniqueness meaning component when they are interpreted under modals. We address this issue in Section 5. We turn next to the behavior of *yek -i* DPs in unembedded contexts, where *yek -i* DPs depart from other EFCIs.

4 Unembedded *yek -i* DPs

As we saw, *yek -i* DPs are acceptable in unembedded sentences but they have no detectable modal component. What lies behind this behavior? To answer this question, we start with the predictions of the alternative-based theory of EFCIs for unembedded sentences. We will see that the exhaustification of ECFIs in this environment is predicted to deliver a contradiction, contrary to what is attested. To capture the attested interpretation of *yek -i* DPs, the output of exhaustification must then be weakened. We consider two ways of weakening the output of exhaustification. The first way is to assume that *yek -i* DPs allow for selective alternative pruning (alternative 'deactivation'), and, consequently, for exhaustification with respect to some but not all types of alternatives ('partial' exhaustification). The second way is to resort to a contradiction-free exhaustivity operator without partial exhaustification. We conclude this section with the observation that either option can capture the behavior of *yek -i* DPsin unembbeded questions equally well. However, we will then see in the next section that the behavior of *yek -i* DPsin modal contexts argues for partial exhaustification, whether the exhaustification operator is contradiction-tolerating, as we have been assuming, or contradiction-free, and, so, that a contradiction-free exhaustification operator cannot by itself characterize the behavior of *yek -i* DPs.

We will start by noting that when EFCIs are unembedded, exhaustification, as defined above, yields a contradiction. For illustration, consider the German sentence in (81a), with the LF in (81b).

(81) a. Maria hat irgendein Buch gekauft.
Maria has IRGENDEIN book bought.
'Maria bought some book or other.'

b. LF: $O_{\text{ALT}}[_{\text{IP}}$ irgendeinen$_{[+\sigma,+D]}$ book $\lambda 1$ Maria bought $t_1]$

The argument of the exhaustivity operator makes the existential claim in (82a). The scalar and pre-exhaustified domain alternatives, given in (82b) and (82c), are stronger than the assertion and, therefore, they need to be excluded.

(82) a. $[\![[_{\text{IP}} \ldots]]\!] =$ $b_1 \vee b_2$
b. $[\![[_{\text{IP}} \ldots]]\!]^{\sigma\text{-ALT}}$ $\{b_1 \wedge b_2\}$
c. $[\![[_{\text{IP}} \ldots]]\!]^{\text{EXH-D-ALT}} =$ $\{b_1 \wedge \neg b_2, b_2 \wedge \neg b_1\}$

Excluding both pre-exhaustified domain alternatives gives us, together with the assertion, the proposition in (83), which is equivalent to the scalar alternative. Adding the exclusion of the scalar alternative then yields a contradiction, as in (84).

(83) $(b_1 \wedge b_2) \wedge (b_1 \leftrightarrow b_2) \Leftrightarrow b_1 \wedge b_2$

(84) $[\![(81b)]\!] =$ $(b_1 \wedge b_2) \wedge \neg(b_1 \wedge b_2) \Leftrightarrow \bot$

This result serves, within Chierchia's theory, as a motivation for the modal meaning component of those EFCIs that are grammatical in unembedded contexts, since the derivation of a contradiction can be avoided by inserting a covert necessity modal between the exhaustivity operator and the EFCI, as in (85).

(85) LF: O_{ALT} $\Box[_{\text{IP}}$ irgendeinen$_{[+\sigma,+D]}$ book $\lambda 1$ Maria bought $t_1]$

As we have seen in the cases with overt modals, this configuration delivers a contingent meaning. The argument of the exhaustivity operator in (85) makes the claim in (86a). Excluding the alternatives derives the proposition in (87). Under the epistemic reading of the necessity modal, the proposition in (87) conveys that, as far as the speaker knows, Maria might have bought either book. Exhaustification, therefore, derives the detected speaker's ignorance of EFCIs in unembedded contexts.

(86) a. $[\![\Box[_{\text{IP}} \ldots]]\!] =$ $\Box(b_1 \vee b_2)$
b. $[\![\Box[_{\text{IP}} \ldots]]\!]^{\sigma\text{-ALT}} =$ $\Box(b_1 \wedge b_2)$
c. $[\![O_{\text{ALT}}\Box[_{\text{IP}} \ldots]]\!]^{\text{EXH-D-ALT}} =$ $\{\Box b_1 \wedge \neg\Box b_2, \neg\Box b_1 \wedge \Box b_2\}$

(87) $[\![(85)]\!] =$ $\Box(b_1 \vee b_2) \wedge \neg\Box(b_1 \wedge b_2) \wedge (\Box b_1 \leftrightarrow \Box b_2)$
$\Rightarrow \quad \Diamond b_1 \wedge \Diamond b_2 \wedge \Diamond\neg b_1 \wedge \Diamond\neg b_2$

Modal insertion does not derive the behavior of *yek -i* DPs in unembedded contexts, since, as discussed, *yek -i* DPs are grammatical but have no detectable

modal component in these contexts. This raises the question of why unembedded *yek -i* DPs, unlike *irgendein*, have no modal meaning component, and, yet, are grammatical and convey uniqueness.

To answer this question, let us go back to the case of Romanian *vreun*. We have seen above that *vreun* is ungrammatical in unembedded contexts. The example in (88), repeated from (4), shows this.

(88) *Monica s-a întâlnit cu vreun prieten.
Monica REFL-have.3SG met with VREUN friend.MASC
'Monica met a friend.' (Fălăuş 2014: 122)

What causes the contrast between *vreun* and *irgendein*-type EFCIs in unembedded contexts? Fălăuş (2015) suggests that the insertion of a covert modal might not be allowed in Romanian, or at least not with *vreun*, since, in the presence of an intervening modal, unembedded *vreun* would be expected to derive a contingent meaning and be acceptable. If modal insertion is not possible in some languages, or at least with some items, the contrast between *vreun* and *irgendein*-type EFCIs in unembedded contexts could be due to whether modal insertion is available or not: with modal insertion, EFCIs are grammatical, but convey a modal component; without modal insertion, an unavoidable contradiction is derived.

If we grant that modal insertion is not always available across languages or across items, we can suggest that modal insertion is not an option, if not in Farsi, at least not with Farsi *yek -i* DPs. This hypothesis would explain why unembedded *yek -i* DPs have no modal component, since they are not embedded under covert modals in root contexts.

Of course, assuming that modal insertion is not available for *yek -i* DPs only gets us half of the way in understanding their behavior in root contexts. This assumption would *not* explain why *yek -i* DPs are grammatical, since, in the absence of a modal intervening between the exhaustivity operator and the DP, we predict the derivation of a contradiction. To capture the behavior of *yek -i* DPs in unembedded contexts, something else needs to be said: the resulting strengthening needs to be weakened.

How can the output of exhaustification be weakened? We will consider two ways. The first concerns the alternatives. The exhaustification operator introduced in (52), and repeated below in (89), quantifies universally over the whole set of alternatives: it conveys that every alternative (not entailed by its argument) is false.

(89) $[\![O_{\text{ALT}}[\phi]]\!] =$
$\lambda w.[\![\phi]\!](w) \wedge \forall p \in [\![\phi]\!]^{\sigma\text{-ALT}} \cup [\![\phi]\!]^{\text{EXH-D-ALT}}[p(w) \rightarrow [\![\phi]\!] \subseteq p]$

Restricting the domain of quantification of the exhaustivity operator, i.e., restricting the set of alternatives that it ranges over ('pruning' the alternatives) can weaken its output. Furthermore, as we will see, if the alternatives are 'packaged' in the way in which we have been assuming that they are (scalar vs. (pre-exhaustified) domain alternatives), and they can be 'deactivated' depending on their type, we derive the attested interpretation.

Let us illustrate this hypothesis using the sentence in (90a), with the LF in (90b).

(90) a. Forood ye ketab-i xarid.
Forood one book-IND bought-3SG
'Forood bought a book.'
b. LF: $O_{\text{ALT}}[_{\text{IP}}$ ye book-i$_{[+\sigma,+D]}$ $\lambda 1$ Forood bought t_1]

As we have seen, strengthening the assertion in (91a), via the exclusion of the scalar alternative, in (91b), and the pre-exhaustified domain alternatives, in (91c), leads to a contradiction, in (92).

(91) a. $[\![[_{\text{IP}} \ldots]]\!] =$ $b_1 \vee b_2$
b. $[\![[_{\text{IP}} \ldots]]\!]^{\sigma\text{-ALT}} =$ $\{b_1 \wedge b_2\}$
c. $[\![[_{\text{IP}} \ldots]]\!]^{\text{EXH-D-ALT}} =$ $\{b_1 \wedge \neg b_2, b_2 \wedge \neg b_1\}$

(92) $[\![(90b)]\!] = (b_1 \vee b_2) \wedge \neg(b_1 \wedge b_2) \wedge (b_1 \leftrightarrow b_2) \Leftrightarrow \bot$

While exhaustification with respect to both sets of alternatives leads to a contradiction, exhaustification with respect to either set, the scalar or the pre-exhaustified domain alternatives, what we will call 'partial exhaustification', does not. Partial exhaustification yields two distinct potential interpretations. Exhaustification with respect to the scalar alternative alone yields the proposition that Forood bought only one book, in (93a). Exhaustification with respect to the pre-exhaustified domain alternatives alone yields the contingent meaning that Forood bought both books, in (93b). Both propositions are contingent.

(93) a. $(b_1 \vee b_2) \wedge \neg(b_1 \wedge b_2)$
b. $((b_1 \vee b_2) \wedge (b_1 \leftrightarrow b_2)) \Leftrightarrow (b_1 \wedge b_2)$

Taking partial exhaustification as a possible strategy to avoid the derivation of a contradiction immediately gets us the grammaticality of unembedded *yek -i*

DPs, since none of the possible meanings derived this way are contradictory. At the same time, if partial exhaustification is possible, we face an overgeneration problem.

We have seen that unembedded *yek -i* DPs are uppper-bounded and convey a uniqueness component. That means that only one of the two possible partial exhaustification strategies is actually available. To capture the attested interpretation of unembedded *yek -i* DPs, we need to restrict partial exhaustification so that only partial exhaustification with respect to the scalar alternatives is possible.

There is a crucial difference between partial domain exhaustification and partial scalar exhaustification. While both types of partial exhaustification deliver contingent propositions, that delivered by partial domain exhaustification (93b) is logically equivalent to (one of the) scalar alternatives. Chierchia (2013) argues that cases like these should be restricted, on the basis of the principle in (94), which he characterizes as an economy principle. If the principle in (94) is active, we predict that, in the case at hand, only partial scalar exhaustification should be possible, just as attested.

(94) *Chierchia's Exhaustification Economy Principle*
Exhaustification is not allowed if it yields a meaning logically equivalent to one of the potential alternatives. (Chierchia 2013: 129)

Resorting to partial exhaustification to account for unembedded *yek-i* DPs implies that the possibility of partial exhaustification must be determined on an item by item basis. This parallels our assumptions about modal insertion. Given the behavior of Romanian *vreun*, one already needs to assume that modal insertion is regulated in a similar way: it cannot be available in Romanian, or at least not with *vreun*.

The framework that we rely on allows for partial exhaustification as a principled option. As noted above, DPs lexically specify active alternatives. This is indicated in the LFs by means of a subscript: a $[+\alpha,+\beta]$ subscript indicates that both $[\alpha]$ and $[\beta]$ alternatives are active, $[+\alpha,-\beta]$ signals that $[\alpha]$-alternatives are active and $[\beta]$-alternatives are inactive. When alternatives are active, they must be used up by an exhaustivity operator, as we indicated before. The possibility of deactivating alternatives is then anticipated by the framework. With this in mind, we need to note that structures like (95) below, which we relied on to advance our discussion on partial exhaustification, do not allow for partial exhaustification. For partial scalar exhaustification to be possible, domain alternatives need to be

deactivated, as in (96a), and for partial domain exhaustification, it is the scalar alternatives that need to be deactivated, as in (96b).

(95) $O_{\text{ALT}}[_{\text{IP}}$ ye book-i$_{[+\sigma,+D]}$ $\lambda 1$ Forood bought t_1]

(96) a. $O_{\text{ALT}}[_{\text{IP}}$ ye book-i$_{[+\sigma,-D]}$ $\lambda 1$ Forood bought t_1]
b. $O_{\text{ALT}}[_{\text{IP}}$ ye book-i$_{[-\sigma,+D]}$ $\lambda 1$ Forood bought t_1]

We take $[-\alpha]$ to mean that $[\alpha]$-alternatives *need not* be exhaustified, and, as mentioned above, we take the deactivation of alternatives to only be possible as a last resort to avoid the derivation of a pathological meaning. Notice, also, that, under our view, the blocking of partial domain exhaustification depends on a principle that needs to access the scalar alternatives. To allow for partial scalar exhaustification, the principle would need to check that the result of this type of exhaustification is not equivalent to any of the alternatives. And that would require that the inactive domain alternatives be still available for comparison. We then also need assume that inactive alternatives still remain visible in the pragmatics proper, and, therefore, to the Exhaustification Economy Principle.

To conclude, we note that we will assume that partial exhaustification is not freely available, that it is only allowed as a last resort strategy, under the threat of deriving a contradiction, for instance. Since, by hypothesis, modal insertion is not available, partial exhaustification can be seen as an alternative way of preventing a pathological meaning.[12]

A second possible way to weaken exhaustification is to weaken the strengthening performed by the operator itself. The literature on free choice disjunction assumes that, by design, exhaustification avoids delivering a contradiction (see, among others, Fox 2007 and Bar-Lev & Fox 2020). Resorting to this type of exhaustification operation will avoid delivering a contradiction for *yek -i* DPs in unembedded contexts. To see this, we will assume the version of the exhaustification operator proposed in Bar-Lev & Fox 2020, adapted for our purposes as in (97) below. This operator negates a subset of the alternatives (the so-called 'innocently excludable' ones, '$\text{IE}(\text{ALT}_\phi)$' below) and adds to the assertion that another subset of the alternatives are true (the so-called 'innocently includable' ones, '$\text{II}(\text{ALT}_\phi)$' below).

12 In the next section we will argue that alternative pruning is also allowed to prevent global weakening.

(97) $[\![O^{\text{IE}}_{\text{ALT}}[\phi]]\!] = \lambda w.[\![\phi]\!](w) \wedge \begin{pmatrix} \forall p \in \text{IE}(\text{ALT}_\phi)[\neg p(w)] \\ \wedge \\ \forall p \in \text{II}(\text{ALT}_\phi)[p(w)] \end{pmatrix}$

(where $\text{ALT}_\phi =_{\text{def}} [\![\phi]\!]^{\sigma\text{-ALT}} \cup [\![\phi]\!]^{\text{EXH-D-ALT}}$)

When *yek*-i DPs are unembedded, none of the alternatives turn out to be innocently includable, and only the scalar alternative is innocently excludable. That means that the result of exhaustification, without resorting to pruning, will be equivalent to pruning the domain alternatives only. Let's illustrate this.

To determine which alternatives are innocently excludable, we consider every maximal way of conjoining negated alternatives to the assertion while preserving consistency. The alternatives that are negated in *all* those ways of strengthening the assertion are innocently excludable, as captured in (98a). We can now consider every maximal way of adding alternatives to the set consisting of the assertion plus all the innocently excludable alternatives. The alternatives that are added in *all* those sets are innocently includable. This is captured in (98b).

(98) a. $\text{IE}(\text{ALT}_\phi) =$

$$\bigcap \left\{ X' \subseteq \text{ALT}_\phi \;\middle|\; \begin{array}{c} X' \text{ is a maximal subset of } \text{ALT}_\phi \text{ s.t} \\ \{\neg q\colon\ q \in X'\} \cup [\![\phi]\!] \text{ is consistent} \end{array} \right\}$$

b. $\text{II}(\text{ALT}_\phi) =$

$$\bigcap \left\{ X'' \subseteq \text{ALT}_\phi \;\middle|\; \begin{array}{c} X'' \text{ is a maximal subset of } \text{ALT}_\phi \text{ s.t.} \\ \{q\colon\ q \in X''\} \cup [\![\phi]\!] \cup \{\neg q\colon\ q \in \text{IE}(\text{ALT}_\phi)\} \\ \text{is consistent} \end{array} \right\}$$

Now consider again the Farsi sentence in (90a) and its LF in (90b), repeated below with a contradiction-free exhaustivity operator:

(99) a. Forood ye ketab-i xarid.
Forood one book-IND bought-3SG
'Forood bought a book.'

b. LF: $O^{\text{IE}}_{\text{ALT}}[_{\text{IP}}$ ye book-i$_{[+\sigma,+D]}$ $\lambda 1$ Forood bought $t_1]$

The assertion and the alternatives are also repeated in (100) below. There are two sets that contain the assertion and as many negated alternatives as consistency allows for. Those are listed in (101) below. These two sets only have one negated

alternative in common: the scalar alternative. This alternative is then negated by the contradiction-free exhaustivity operator. There are also two sets that result from adding to the sets in (101) as many alternatives as possible while preserving consistency. These are listed in (102). These sets have no non-negated alternatives in common. That means that there are no innocently includable alternatives. Exhaustification then returns the proposition in (103), which corresponds to the attested interpretation of (99a).

(100) a. $[\![[_{\text{IP}} \ldots]]\!] = b_1 \vee b_2$

b. $[\![[_{\text{IP}} \ldots]]\!]^{\sigma\text{-ALT}} = \{b_1 \wedge b_2\}$

c. $[\![[_{\text{IP}} \ldots]]\!]^{\text{EXH-D-ALT}} = \{b_1 \wedge \neg b_2, b_2 \wedge \neg b_1\}$

(101) a. $\{b_1 \vee b_2, \neg(b_1 \wedge \neg b_2), \neg(b_1 \wedge b_2)\}$

b. $\{b_1 \vee b_2, \neg(b_2 \wedge \neg b_1), \neg(b_1 \wedge b_2)\}$

(102) a. $\{b_1 \vee b_2, \neg(b_1 \wedge \neg b_2), \neg(b_1 \wedge b_2), (b_2 \wedge \neg b_1)\}$

b. $\{b_1 \vee b_2, \neg(b_2 \wedge \neg b_1), \neg(b_1 \wedge b_2), (b_1 \wedge \neg b_2)\}$

(103) $[\![(99b)]\!] = (b_1 \vee b_2) \wedge \neg(b_1 \wedge b_2)$

To sum-up: assuming a contradiction-free operator we reach the same interpretation that we reached before without having to appeal to alternative pruning. This is so because the working of the contradiction-free exhaustivity operator makes sure that only the scalar alternative can be excluded. Resorting to a contradiction-free exhaustivity operator means that there is no need to rely on Chierchia's economy principle, since there is only one possible exhaustification output, and there is no need to assume that alternatives can be deactivated either. Finally, while partial exhaustification relies on the 'packaging' of the alternatives into two classes, this is not needed under the contradiction-free exhaustification approach.

Do we have reasons to prefer one way of weakening exhaustification over the other? Not at this point. In the next section, however, we will see that the behavior of *yek -i* DPs in modal contexts argues in favor of the packaging of the alternatives in two classes that can be *independently* targeted by exhaustification, irrespective of which exhaustification operator one adopts. In other words: the contradiction-free approach does not by itself catpture the behavior of *yek -i* DPs in modal contexts.

5 Embedded uniqueness

In Section 3 we saw that, in modal contexts, exhaustification with respect to all alternatives at once yields a meaning that is too strong for possibility modals

cases and too weak for necessity modals. This is so because *yek -i* DPs trigger an embedded uniqueness meaning component when they are interpreted under modals, both possibility and necessity alike. Under necessity modals, *yek -i* DPs convey that in all compatible worlds, exactly one individual in the extension of the NP satisfies the existential claim. We saw this in Section 3 with the help of the scenario in (68), repeated in (104), which is compatible with a free choice interpretation, but not with a uniqueness meaning component.

(104) *Scenario:* There are only five books ($\{b_1, \ldots b_5\}$). Forood is required to buy a book, and any book is a permissible option for him to buy. He is allowed to buy one or more than one book.

While the sentences in (105a), with *algún*, and (105b), with *irgendein*, can be a felicitous description of the scenario in (104), their Farsi counterpart with a *yek -i* DP, in (106), repeated from (20b), is false, because it conveys that in all worlds compatible with what Forood is permitted to buy, he buys *exactly one* book.

(105) a. Forood tiene que comprar algún libro.
Forood has that buy ALGÚN book
'Forood has to buy some book / some books.'
b. Forood muss irgendein Buch kaufen.
Forood must IRGENDEIN book buy
'Forood must buy a book–any book.'

(106) Forood bayad ye ketab-i bexar-e.
Forood must one book-IND buy-3SG
'Forood must buy one book — any book.'
(Alonso-Ovalle & Moghiseh 2019: 7)

If *yek -i* DPs did not necessarily convey uniqueness, the sentence in (106) would be true and appropriate in the context in (104). The same point can be supported with the help of the continuation in (107), which expresses that Forood is allowed to buy one, two, or, at most, three books. Unlike the pair of sentences in (105), which are compatible with this type of continuation, (106) is not.

(107) …, va inke mitun-e hadaksar se ta ketab bexar-3.
and that can-3SG maximum three CL book buy-3SG
'…and that he is allowed to buy at most three books.'

Under possibility modals, *yek -i* DPs yield an embedded uniqueness meaning component, as well. The infelicity of (109) in the scenario in (108) highlights this.

(108) *Scenario:* There are only five books ($\{b_1, \ldots b_5\}$). Forood is required to buy two books, and any book is a permissible option for him to buy.

(109) Forood mitun-e ye ketab-i bexar-e.
Forood can-3SG one book-IND buy-3SG
'Forood can buy one book — any book.'
(Alonso-Ovalle & Moghiseh 2019: 6)

The uniqueness meaning component under possibility modals leads to the prediction that (109) is a felicitous description of scenarios where the addressee is permitted to buy one or more than one book, matching the intuitions. As we noted before in Section 3, this point is supported with the fact that the sentence in (109) can be felicitously followed with the continuation in (107), which conveys that the addressee is allowed to buy one, two, or, at most, three books.

The sentence in (109) is also compatible with the addressee not being permitted to buy more than one book. Hence, (109) can be felicitously followed by the continuation in (110).

(110) … va inke ne-mitun-e bishtar az ye doone ketab bexar-e.
and that NEG-can-3SG more from one CL book buy-3SG
'…and that he is not allowed to buy more than one book.'

Just like we saw with the uniqueness component of unembedded *yek -i* DPs, the uniqueness meaning component that *yek -i* DPs trigger under deontic modals disappears in downward entailing contexts, and, so, we will take it to be derived via exhaustification. The sentence in (111), for instance, conveys that the speaker doubts that Forood must buy any books, and, therefore, it cannot be appropriately continued with (112).

(111) shak dar-am Forood bayad ye ketab-i bexar-e.
doubt have-1SG Forood must one book-IND buy-3SG
' I doubt that Forood must buy any books.'

(112) …, # bayad do ta bexar-e.
must two CL buy-3SG
' …he must buy two.'

What accounts for the data pattern observed? One natural explanation is to assume that the uniqueness meaning component derives from exhaustification

of the scalar alternatives below the modal operators, as suggested in Chierchia 2013: 133 as an *optional* strategy to alter the strength of scalar implicatures. As Chierchia suggests, we will take the alternatives to be exhaustified through separate exhaustivity operators, O_σ, for the scalar alternatives, and $O_{\text{EXH-D}}$ for the pre-exhaustified domain alternatives. We will assume that the first operator scopes under modals and the second over them, as in the LF schema in (113), and that they are both contradiction-tolerating, i.e., that they exclude all stronger alternatives, not just the innocently excludable ones.

(113) LF: $O_{\text{EXH-D}}\ \Diamond/\Box\ O_\sigma\ [_{\text{IP}}$ ye book-i$_{[+\sigma,+D]}\ \lambda 1$ Forood buy $t_1]$

Local exhaustification of scalar alternatives delivers the attested modal and scalar inference triggered by *yek -i* DPs under possibility modals. To illustrate, consider the LF in (114a). The IP in (114a) denotes the proposition in (114b) (that Forood buys b_1 or b_2), and contributes the scalar alternative in (114c) and the domain alternatives in (114d).

(114) a. LF: $O_{\text{EXH-D}}\Diamond\ O_\sigma\ [_{\text{IP}}$ ye book-i$_{[+\sigma,+D]}\ \lambda 1$ Forood buy $t_1]$
b. $[\![[_{\text{IP}} \ldots]]\!] =$ $b_1 \vee b_2$
c. $[\![[_{\text{IP}} \ldots]]\!]^{\sigma\text{-ALT}} =$ $\{b_1 \wedge b_2\}$
d. $[\![[_{\text{IP}} \ldots]]\!]^{\text{D-ALT}} =$ $\{b_1, b_2\}$

Excluding the scalar alternative yields the proposition in (115), conveying that Forood buys exactly one book.

(115) $[\![O_\sigma\ [_{\text{IP}} \ldots]]\!] =$ $(b_1 \vee\ b_2) \wedge \neg(b_1 \wedge b_2)$

We now need to say something about how the alternatives grow past the exhaustivity operator. On this issue, we will assume, following Chierchia (2013: 138), that the domain alternatives of $O_\sigma\ \phi$ result from pointwise application of O_σ to the domain alternatives of ϕ, as in (116).[13]

(116) $[\![O_\sigma\ [\phi]]\!]^{\text{D-ALT}} = \{[\![O_\sigma]\!]\ (p) :\ p \in [\![\phi]\!]^{\text{D-ALT}}\}$

Given (117a), we get the domain alternatives in (117b), and their pre-exhaustified versions in (117c). The complement of $O_{\text{EXH-D}}$ itself denotes the proposition in (118).

13 Additionally, we will assume that the scalar alternatives of $O_{\text{EXH-D}}\ \phi$ are simply the scalar alternatives of ϕ, as given in (i).

(i) $[\![O_{\text{EXH-D}}\ [\phi]]\!]^{\sigma\text{-ALT}} = [\![\phi]\!]^{\sigma\text{-ALT}}$

(117) a. $[\![O_\sigma\ [_{\text{IP}}\ \ldots\ ]]\!]^{\text{D-ALT}} =$ $\{b_1, b_2\}$

b. $[\![\Diamond\ O_\sigma\ [_{\text{IP}}\ \ldots\ ]]\!]^{\text{D-ALT}} =$ $\{\Diamond b_1, \Diamond b_2\}$

c. $[\![\Diamond\ O_\sigma\ [_{\text{IP}}\ \ldots\ ]]\!]^{\text{EXH-D-ALT}} =$ $\{\Diamond b_1 \wedge \neg\Diamond b_2, \Diamond b_2 \wedge \neg\Diamond b_1\}$

(118) $[\![\Diamond\ O_\sigma\ [_{\text{IP}}\ \ldots\ ]]\!] =$ $\Diamond((b_1 \vee\ b_2) \wedge \neg(b_1 \wedge b_2))$

The conjunction of (118) with the negation of the pre-exhaustified domain alternatives in (117c) yields the proposition in (119): that there is at least one permissible world where Forood buys exactly one book, and that he is allowed to buy either book. This is compatible with a scenario where he is allowed to buy one book and he is allowed to buy more than one book, as required.[14]

(119) $[\![O_{\text{EXH-D}}\Diamond\ O_\sigma\ [_{\text{IP}}\ \ldots\ ]]\!] =$ $\Diamond((b_1 \vee\ b_2) \wedge \neg(b_1 \wedge b_2)) \wedge \Diamond b_1 \leftrightarrow \Diamond b_2$

Consider now the LF in (120a), with a necessity modal. The proposition in (120b), denoted by the IP, and the negation of its scalar alternative in (120c), together with the modal, yields the proposition in (120f) as the argument of the top exhaustifier. Exhaustification with respect to the pre-exhaustified domain alternatives in (120g) yields the proposition in (120h), which conveys that in all permitted worlds Forood buys exactly one book and that each book is a permitted option and corresponds to the attested meaning.

(120) a. LF: $O_{\text{EXH-D}}\ \Box\ O_\sigma\ [_{\text{IP}}$ ye book-i$_{[+\sigma,+D]}$ $\lambda 1$ Forood buy $t_1]$

b. $[\![[_{\text{IP}}\ \ldots\ ]]\!] =$ $b_1 \vee b_2$

c. $[\![[_{\text{IP}}\ \ldots\ ]]\!]^{\sigma\text{-ALT}} =$ $\{b_1 \wedge b_2\}$

d. $[\![[_{\text{IP}}\ \ldots\ ]]\!]^{\text{D-ALT}} =$ $\{b_1, b_2\}$

e. $[\![O_\sigma\ [_{\text{IP}}\ \ldots\ ]]\!] =$ $(b_1 \vee\ b_2) \wedge \neg(b_1 \wedge b_2)$

f. $[\![\ \Box\ O_\sigma\ [_{\text{IP}}\ \ldots\ ]]\!] =$ $\Box((b_1 \vee\ b_2) \wedge \neg(b_1 \wedge b_2))$

g. $[\![\ \Box\ O_\sigma\ [_{\text{IP}}\ \ldots\ ]]\!]^{\text{EXH-D-ALT}} =$ $\{\Box b_1 \wedge \neg\Box b_2, \Box b_2 \wedge \neg\Box b_1\}$

h. $[\![O_{\text{EXH-D}}\ \Box\ O_\sigma\ [_{\text{IP}}\ \ldots\ ]]\!] =$ $\Box((b_1 \vee\ b_2) \wedge \neg(b_1 \wedge b_2)) \wedge \Box b_1 \leftrightarrow \Box b_2$
$\Rightarrow\ \Box((b_1 \vee\ b_2) \wedge \neg(b_1 \wedge b_2)) \wedge \Diamond b_1 \wedge \Diamond b_2$

The facts with epistemic modals are parallel. The sentence in (121) contains a possibility epistemic modal. Following this sentence with (122) is deviant, as expected if the first sentence conveyed that Forood might have bought only one book; following the sentence with (123) is not.

14 The predicted meaning is compatible with Forood being permitted not to buy a book. The prediction aligns with intuitions.

(121) Forood mitune-e ye ketab-i xaride bash-e.
Forood can-3SG ye book-IND bought be-3SG
'Forood might have bought a book.'
(Alonso-Ovalle & Moghiseh 2019: 6)

(122) … va inke ne-mitun-e daghighan ye doone xarid-e bash-e.
and that NEG-can-3SG exactly one CL bought-3SG be-3SG
'…and that he couldn't have bought exactly one book.'

(123) … va inke mitun-e ye doone ya do ta xarid-e bash-e.
and that can-3SG one CL or two CL bought-3SG be-3SG
'…and that he might have bought one book or two books.'

The embedded uniqueness meaning component is also detectable with necessity epistemic modals: after uttering (125), Forood can felicitously utter (126b), but not (126a).

(124) *Scenario:* There is a box on the desk. Forood doesn't know what the box contains. He utters the sentence in (125).

(125) Bayad ye ketab-i too jabe bash-e.
must one book-IND in box be-3SG
'There must be a book in the box.'

(126) a. [Forood opens the box and sees three books. He says:] #You see! There are three books.
b. [Forood opens the box and sees one book. He says:] You see! There is one book.

To sum-up: split exhaustification captures the interpretation of *yek -i* DPs in modal contexts. However, on the surface, the sentence in (127), felicitously followed by the continuation in (128), seems to present a possible counterexample to the proposal that scalar alternatives must be exhaustified locally.

(127) Forood bayad ye ketab-i xaride bash-e.
Forood must one book-IND bought be-3SG
'Forood must have bought a book.'

(128) … va inke momkene ye doone ya do ta xaride bash-e.
and that possible one CL or two CL bought be-3SG
'…and that it is possible that he has bought one book or two books.'

We suggest, as a reasonable hypothesis, that this is only an apparent counterexample to obligatory local exhaustification, and that the contrast arises due to a difference in the modal force of the modals. The hypothesis is that *bayad* 'must' in (125) and (127) and *mitune* 'might' in (121) quantify over a similar restricted set of possibilities (the set of best possibilities), but while *bayad* universally quantifies over such set, *mitune* quantifies existentially. The epistemic modal *momkene* 'possible' in (128), in contrast, is an existential quantifier that can, but doesn't have to, quantify over a different set, a less restricted set of possibilities. Modal flavors are determined by the modal base that the modals quantify over. The reason why (127) and (128) seem inconsistent with the embedded uniqueness account is because the modal in the sentences quantify over different sets. Epistemic *bayad* ϕ is true if and only if ϕ is true in all the best worlds consistent with the evidence. Epistemic *momken-e* ϕ is true if and only if ϕ is true in some of the worlds consistent with the evidence. With these assumptions, (127) conveys that in all the best worlds compatible with the evidence, Forood buys exactly one book, and (128) conveys that in some worlds compatible with the evidence, Forood buys one or two books. This explains why (127) can be followed by (128) without oddity, and that they are not against the obligatory local exhaustification hypothesis.

We will then take deontic modals and epistemic modals to pattern alike with respect to the embedded uniqueness meaning component of *yek -i* DPs.

If *yek -i* DPs require local exhaustification of scalar alternatives, then a question arises with embedded *yek -i* DPs in downward entailing contexts. Consider the sentence in (129a), with the LF in (129b).

(129) a. age Forood ye ketab-i bexun-e, ye jaize migir-e.
if Forood one book-IND read-3SG one gift take-3SG
'If Forood reads a book, he gets a gift.'

b. LF: $O_{\text{EXH-D}}$ if $O_{\sigma}[_{\text{IP}}$ ye book-i$_{[+\sigma,+D]}$ $\lambda 1$ Forood reads $t_1]$, he gets a gift

The sentence conveys that Forood gets a gift if he reads any number of books. The challenge is that the sentence is predicted to convey a weaker interpretation: namely, that Forood gets a gift if he reads exactly one book. We will ultimately solve this issue by assuming that the strengthening internal to the *if*-clause is illicit on the basis of leading to the global weakening of the sentence.

Let's check what the predicted interpretation is. Strengthening (130a) by conjoining it with the negation of the scalar alternative in (130b) yields the proposition in (130d). The complement of $O_{\text{EXH-D}}$ denotes the proposition in

(130e), which conveys that if Forood reads exactly one book, he gets a gift. The pre-exhaustified domain alternatives, given in (130f), are not entailed by (130e), so they must be exhaustified. Exhaustification is vacuous. The negation of the alternatives in (130f) amounts to $(b_1 \rightarrow g) \leftrightarrow (b_2 \rightarrow g)$, which is entailed by the proposition in (130e). Exhaustification, therefore, has no effect. It yields the proposition in (130g), conveying a uniqueness meaning component: that if Forood reads exactly one book, he gets a gift. These truth conditions, however, do not correspond to the attested interpretation of the sentence. The proposition in (130g) is weaker than the attested interpretation. As anticipated in footnote 6, this meaning is only possible when the *yek -i* DP is focused.

(130) a. $[\![[_{\text{IP}} \ldots]]\!] = (b_1 \vee b_2)$

b. $[\![[_{\text{IP}} \ldots]]\!]^{\sigma\text{-ALT}} = \{b_1 \wedge b_2\}$

c. $[\![[_{\text{IP}} \ldots]]\!]^{\text{D-ALT}} = \{b_1, b_2\}$

d. $[\![O_\sigma\ [_{\text{IP}} \ldots]]\!] = (b_1 \vee\ b_2) \wedge \neg(b_1 \wedge b_2)$

e. $[\![\text{if } O_\sigma\ [_{\text{IP}} \ldots]]\!] = ((b_1 \vee\ b_2) \wedge \neg(b_1 \wedge b_2)) \rightarrow g$

f. $[\![\text{if } O_\sigma\ [_{\text{IP}} \ldots]]\!]^{\text{EXH-D-ALT}} = \left\{ \begin{array}{l} b_1 \rightarrow g \wedge \neg(b_2 \rightarrow g), \\ b_2 \rightarrow g \wedge \neg(b_1 \rightarrow g) \end{array} \right\}$

g. $[\![(129b)]\!] = ((b_1 \vee\ b_2) \wedge \neg(b_1 \wedge b_2)) \rightarrow g$

Exhaustifying scalar alternatives below the downward entailing operator leads to weakening. The complement of $O_{\text{EXH-D}}$ expresses the proposition in (130e), repeated in (131a), which is weaker than the proposition in (131b), expressed by its counterpart without the scalar exhaustivity operator. But how could we avoid this weak meaning? Chierchia 2013 argues that exhaustification must be constrained in order to avoid weakening. The formulation of such constraint is given in (132).

(131) a. $[\![\text{if } O_\sigma\ [_{\text{IP}} \ldots]]\!] = ((b_1 \vee\ b_2) \wedge \neg(b_1 \wedge b_2)) \rightarrow g$

b. $[\![\text{if } [_{\text{IP}} \ldots]]\!] = (b_1 \vee\ b_2) \rightarrow g$

(132) *Maximize Strength*
Do not exhaustify S in $[_{\text{S}'} \ldots \text{S} \ldots]$ if it leads to weakening S′.
(Chierchia 2013: 106)

To illustrate how *Maximize Strength* works, let us get back to the sentence in (129a), repeated below in (133a). O_σ in (133b) yields the meaning in (133c), which leads to the weakening of S′ : (133d) is entailed by (134). This violates the *Maximize Strength* constraint, and, therefore, O_σ must be avoided.

(133) a. If Forood reads ye book-i, he gets a gift
b. LF: $O_{\text{EXH-D}}$ [$_{S'}$ if O_{σ}[$_{S}$ ye book-i$_{[+\sigma,+D]}$ $\lambda 1$ F. reads t_1], he gets a gift]
c. $[\![[_{S} \ldots]]\!] =$ $(b_1 \vee b_2) \wedge \neg(b_1 \wedge b_2)$
d. $[\![[_{S'}$ if $O_{\sigma}[_{S} \ldots] \ldots]]\!] =$ $((b_1 \vee b_2) \wedge \neg(b_1 \wedge b_2)) \rightarrow g$

(134) $[\![[_{S'}$ if $[_{S} \ldots] \ldots]]\!] =$ $(b_1 \vee b_2) \rightarrow g$

The *Maximize Strength* constraint is checked at each step of derivation. If strengthening leads to weakening, it has to be avoided. In Section 4, we considered the possibility that the alternatives that *yek -i* DPs introduce can be deactivated under the threat of deriving a contradiction. Assuming that *yek -i* DPs tolerate having deactivated alternatives, the violation of *Maximize Strength* can be avoided if we assume that alternatives can be deactivated under the threat of violating *Maximize Strength*. Under this assumption, the LF of the sentence in (133a) would be represented as in (135a). Exhaustification with respect to the pre-exhaustified domain alternatives alone delivers the attested interpretation of *yek -i* DPs in downward entailing contexts. The negation of the alternatives in (135c) amounts to the proposition $(b_1 \rightarrow g) \leftrightarrow (b_2 \rightarrow g)$, which is entailed by the assertion in (135b). Exhaustification, therefore, has no effect: it simply returns the assertion in (135b), as (135d) shows.

(135) a. LF: $O_{\text{EXH-D}}[_{\text{IP}}$ ye book-i$_{[-\sigma,+D]}$ $\lambda 1$ Forood reads t_1], he gets a gift
b. $[\![[_{\text{IP}} \ldots]]\!] =$ $(b_1 \vee b_2) \rightarrow g$
c. $[\![[_{\text{IP}} \ldots]]\!]^{\text{EXH-D-ALT}} =$ $\{b_1 \rightarrow g \wedge \neg(b_2 \rightarrow g), b_2 \rightarrow g \wedge \neg(b_1 \rightarrow g)\}$
d. $[\![O_{\text{EXH-D}}[_{\text{IP}} \ldots]]\!] =$ $(b_1 \vee b_2) \rightarrow g$

As noted in footnote 6, focus can mark embedded uniqueness. In these cases, focus overrides Maximize Strength, enforcing exhaustification of scalar alternatives below the downward entailing operator.

To sum up: split exhaustification, and the assumption that scalar exhaustification is clause bounded and happens before domain exhaustification captures the interpretation of *yek -i* DPs in modal contexts.

Split exhaustification also allows an account of the behavior of unembbeded *yek -i* DPs based on alternative pruning, as presented in the previous section. If exhaustification is split, we have two options in unembedded contexts: either the scalar alternatives are dealt with before the domain alternatives or the other way around. Let us start by discussing the first case. Consider the sentence in (136a) with the LF in (136b).

(136) a. Forood ye ketab-i xarid.
Forood one book-IND bought-3SG
'Forood bought a book.'
b. LF: $O_{\text{EXH-D}}\ O_{\sigma}\ [_{\text{IP}}$ ye book-i$_{[+\sigma,+D]}\ \lambda 1$ Forood bought $t_1]$

Strengthening the meaning of the IP, in (137a), by conjoining it with the negation of the scalar alternative in (137b) yields the proposition in (137d).

(137) a. $[\![[_{\text{IP}} \ldots]]\!] = b_1 \vee b_2$
b. $[\![[_{\text{IP}} \ldots]]\!]^{\sigma\text{-ALT}} = \{b_1 \wedge b_2\}$
c. $[\![[_{\text{IP}} \ldots]]\!]^{\text{D-ALT}} = \{b_1, b_2\}$
d. $[\![O_{\sigma}\ [_{\text{IP}} \ldots]]\!] = (b_1 \vee b_2) \wedge \neg(b_1 \wedge b_2) \Leftrightarrow (b_1 \wedge \neg b_2) \vee (b_2 \wedge \neg b_1)$

The set of pre-exhaustified domain alternatives at this step, determined by applying O_{σ} to the initial set of domain alternatives in (137c) in a pointwise fashion, is given in (138a). The proposition in (137d) implies that one of the pre-exhaustified domain alternatives in (138b) must be true.

(138) a. $[\![O_{\sigma}\ [_{\text{IP}} \ldots]]\!]^{\text{D-ALT}} = \{b_1, b_2\}$
b. $[\![O_{\sigma}\ [_{\text{IP}} \ldots]]\!]^{\text{EXH-D-ALT}} = \{b_1 \wedge \neg b_2, b_2 \wedge \neg b_1\}$
c. $[\![O_{\text{EXH-D}}\ O_{\sigma}\ [_{\text{IP}} \ldots]]\!] = (b_1 \vee b_2) \wedge \neg(b_1 \wedge b_2) \wedge b_1 \leftrightarrow b_2 \Leftrightarrow \bot$

As discussed in the previous section, deactivating the domain alternatives avoids deriving a contradiction and yields the attested meaning. Deactivating the scalar alternatives is an option blocked by the Exhaustification Economy Principle.

Excluding the pre-exhaustified domain alternatives before the scalar alternatives does not yield an equivalent meaning: it results in a contingent proposition. Consider the LF in (139) for the sentence in (136a).

(139) LF: $O_{\sigma}\ O_{\text{EXH-D}}\ [_{\text{IP}}$ ye book-i$_{[+\sigma,+D]}\ \lambda 1$ Forood bought $t_1]$

The assertion conjoined with the negation of the pre-exhaustified domain alternatives in (140d) yields the proposition in (140e).

(140) a. $[\![[_{\text{IP}} \ldots]]\!] = b_1 \vee b_2$
b. $[\![[_{\text{IP}} \ldots]]\!]^{\sigma\text{-ALT}} = \{b_1 \wedge b_2\}$
c. $[\![[_{\text{IP}} \ldots]]\!]^{\text{D-ALT}} = \{b_1, b_2\}$
d. $[\![[_{\text{IP}} \ldots]]\!]^{\text{EXH-D-ALT}} = \{b_1 \wedge \neg b_2, b_2 \wedge \neg b_1\}$
e. $[\![O_{\text{EXH-D}}\ [_{\text{IP}} \ldots]]\!] = ((b_1 \vee b_2) \wedge (b_1 \leftrightarrow b_2)) \Leftrightarrow (b_1 \wedge b_2)$

The scalar alternative at this step, as defined in (141), is simply the scalar alternative of the complement of $O_{\text{EXH-D}}$, given in (142a). The proposition in (140e)

is equivalent to (and, so it entails) the scalar alternative in (142a); hence, this alternative cannot be excluded. Exhaustification, therefore, gives the contingent proposition in (142b), conveying that Forood bought both books.

(141) $[\![O_{\text{EXH-D}}\ [\phi]]\!]^{\sigma\text{-ALT}} = [\![\phi]\!]^{\sigma\text{-ALT}}$

(142) a. $[\![O_{\text{EXH-D}} [_{\text{IP}} \ldots]]\!]^{\sigma\text{-ALT}} = [\![[_{\text{IP}} \ldots]]\!]^{\sigma\text{-ALT}} = \{b_1 \wedge b_2\}$

b. $[\![O_{\sigma}\ O_{\text{EXH-D}}\ [_{\text{IP}} \ldots]]\!] = b_1 \wedge b_2$

This derivation violates the Exhaustification Economy Principle. Again, there are two options available: to deactivate the domain alternatives or to deactivate the scalar alternatives. The latter option would result in a meaning that also violates the Exhaustification Economy Principle. Deactivating the domain alternatives is then the only option.

We conclude then that split exhaustification derives the right interpretation of *yek -i* DPs in modal contexts and, given selective alternative pruning and Chierchia's Economy Principle, also in unembedded contexts. With this conclusion in mind, we should now go back to the possibility, discussed in the previous section, that *yek -i* DPs require a contradiction-free exhaustification operator.

While a contradiction-free operator that targets all the alternatives at once delivers the right interpretation in root contexts, it does not in the modal contexts discussed in this section. To illustrate, we will consider again the deontic possibility modal cases. Take, to begin with, the LF in (143a), with only one operator below the modal. The predicted interpretation, in (143e), is too weak, as it fails to capture the free choice effect. Below the modal, the exhaustification operator has access to the alternatives in (143b) and (143c). The proposition that the exhaustification operator delivers below the modal is therefore the one in (143d). This yields for the whole LF the proposition in (143e), which is compatible with there being only book that Forood can buy.

(143) a. LF: $\Diamond\ O^{\text{IE}}_{\text{ALT}}\ [_{\text{IP}}$ ye book-i $\lambda 1$ Forood buy $t_1]$

b. $[\![[_{\text{IP}} \ldots]]\!]^{\sigma\text{-ALT}} = \{b_1 \wedge b_2\}$

c. $[\![[_{\text{IP}} \ldots]]\!]^{\text{EXH-D-ALT}} = \{b_1 \wedge \neg b_2, b_2 \wedge \neg b_1\}$

d. $(b_1 \vee b_2) \wedge \neg(b_1 \wedge b_2)$

e. $[\![(143a)]\!] = \Diamond((b_1 \vee b_2) \wedge \neg(b_1 \wedge b_2))$

Expectedly, the LF in (144a), with a second contradiction-free exhaustifier scoping over the modal, has a stronger interpretation, but one that is *stronger* than the attested interpretation. To see that, note that the top exhaustifier has

now access to the alternatives in (144c) and (144e).[15] All of these alternatives can be negated while keeping consistency with the assertion. That means that all the alternatives are innocently excludable, and none is innocently includable, and that the proposition that (144a) denotes is the conjunction of all the propositions in (145). But this proposition is stronger than it should be: because of the negation of the scalar implicature, it entails that Forood is required not to buy more than one book.

(144) a. LF: $O^{\text{IE}}_{\text{ALT}}\ \Diamond\ O^{\text{IE}}_{\text{ALT}}\ [_{\text{IP}}$ ye book-i λ1 Forood buy $t_1]$

b. $[\![\Diamond\ O^{\text{IE}}_{\text{ALT}}\ [_{\text{IP}}\ \ldots]]\!] = \Diamond[(b_1 \vee b_2) \wedge \neg(b_1 \wedge b_2)]$

c. $[\![\Diamond\ O^{\text{IE}}_{\text{ALT}}\ [_{\text{IP}}\ \ldots]]\!]^{\sigma\text{-ALT}} = \Diamond(b_1 \wedge b_2)$

d. $[\![\Diamond\ O^{\text{IE}}_{\text{ALT}}\ [_{\text{IP}}\ \ldots]]\!]^{\text{D-ALT}} = \{\Diamond b_1, \Diamond b_2\}$

e. $[\![\Diamond\ O^{\text{IE}}_{\text{ALT}}\ [_{\text{IP}}\ \ldots]]\!]^{\text{EXH-D-ALT}} = \{\Diamond b_1 \wedge \neg\Diamond b_2, \Diamond b_2 \wedge \neg\Diamond b_1\}$

(145) $\{\Diamond[(b_1 \vee b_2) \wedge \neg(b_1 \wedge b_2)], \neg(\Diamond b_1 \vee \neg\Diamond b_2), \neg(\Diamond b_2 \vee \neg\Diamond b_1), \neg\Diamond(b_1 \wedge b_2)\}$

Finally, assuming that we only get one exhaustifier above the modal, as in (146a) will also not get us the required interpretation. It's easy to see why: above the modal, as shown below, the alternatives are still the same. The assertion is weaker than before, so the alternatives will still entail it, and they have to be excluded. The exhaustifier will then still negate the scalar alternative in (146c), deriving the problematic strong scalar component.

(146) a. LF: $O^{\text{IE}}_{\text{ALT}}\ \Diamond\ [_{\text{IP}}$ ye book-i λ1 Forood buy $t_1]$

b. $[\![\Diamond\ [_{\text{IP}}\ \ldots]]\!] = \Diamond[(b_1 \vee b_2)$

c. $[\![\Diamond\ [_{\text{IP}}\ \ldots]]\!]^{\sigma\text{-ALT}} = \Diamond(b_1 \wedge b_2)]$

d. $[\![\Diamond\ [_{\text{IP}}\ \ldots]]\!]^{\text{D-ALT}} = \{\Diamond b_1, \Diamond b_2\}$

e. $[\![\Diamond\ [_{\text{IP}}\ \ldots]]\!]^{\text{EXH-D-ALT}} = \{\Diamond b_1 \wedge \neg\Diamond b_2, \Diamond b_2 \wedge \neg\Diamond b_1\}$

Resorting to a contradiction-free exhaustification operator without splitting the alternatives will not get us the right interpretation in the modal cases, then.

What is at issue in the modal cases is the possibility of having partial exhaustification: exhaustification with respect to some but not all alternatives. This is independent of whether we assume a contradiction-free or contradiction-tolerating operator. A contradiction-tolerating operator that excludes all alternatives at once will also not get the right results in the modal contexts. In Section 3 we saw that this is the case when the exhaustifier scopes above a

15 We assume that the alternatives to $\Diamond\phi$ are determined by combining the modal pointwise with the alternatives of ϕ.

modal. Below the modal, a contradiction-tolerating operator that excludes all alternatives at once will of course only derive a contradiction. What is crucial to get the required interpretation is that exhaustification be selective, i.e., that it targets only a subset of the alternatives (and that scalar exhaustification is triggered below the modal, of course).[16]

Before concluding, let us add a brief note about bare *-i* NPs, which we introduced earlier, in Section 2. In the formal register, these DPs behave like *yek -i* DPs in root contexts. When embedded under modals, they do too: they can trigger a free choice or a modal variation effect. They differ from *yek -i* DPs in this register in that they do not necessarily convey an embedded uniqueness component. As noted above, in the informal register, there is speaker variation with respect to unembedded bare *-i* NPs: they are grammatical for some speakers but ungrammatical for others.

The setup that we have been assuming may be useful in understanding this variation. We can assume that in the formal register, bare *-i* NPs are just like *yek -i* DPs, with the difference that bare *-i* NPs allow, but do not require, local exhaustification of scalar alternatives. In the informal register, everything remains the same for all speakers, with one difference for those who find unembedded bare *-i* NPs ungrammatical. We propose that this difference may lie in the unavailability of alternative deactivation. For those who find unembedded bare *-i* NPs ungrammatical, alternative deactivation may not be an option in the informal register. Without alternative deactivation, an unavoidable contradiction is derived. This raises the question of why alternative pruning is available for some speakers only in the formal register and not in the informal register, a question we do not yet have an answer to.

6 Conclusions

We have seen that *yek -i* DPs instantiate a new type of EFCI. Like other EFCIs, these DPs are interpreted as plain existentials in downward entailing contexts.

16 The reader may wonder whether assuming split exhaustification and a contradiction-free operator may dispense us with the need for relying on the economy principle that favors one type of partial exhaustification over another in the unembedded cases. The answer is negative. In parallel to what we saw above for the contradiction-tolerating operator, the LF in (i) derives the attested interpretation, but the LF in (ii) derives the unattested conjunctive interpretation, which still needs to be blocked.

(i) LF: $O^{\text{IE}}_{\text{EXH-D}}\ O^{\text{IE}}_{\sigma}\ [_{\text{IP}}$ ye book-i$_{[+\sigma,+D]}\ \lambda 1$ Forood bought $t_1]$

(ii) LF: $O^{\text{IE}}_{\sigma}\ O^{\text{IE}}_{\text{EXH-D}}\ [_{\text{IP}}$ ye book-i$_{[+\sigma,+D]}\ \lambda 1$ Forood bought $t_1]$

Likewise, when *yek -i* DPs are interpreted under modals, they convey meanings stronger than those of regular existentials. In unembedded sentences, *yek -i* DPs depart from other EFCIs though. On the one hand, unlike *vreun*, they are grammatical. On the other hand, unlike other EFCIs that are grammatical in unembedded contexts, they do not convey modality: instead, they behave like regular existentials and convey a uniqueness component.

Adopting the exhaustification- and alternative-based theory of EFCIs presented in Chierchia 2013, *yek -i* DPs were analyzed as existential quantifiers that introduce scalar and pre-exhaustified domain alternatives which must be obligatorily exhaustified. Under this analysis, EFCIs in unembedded sentences are expected to derive a pathological meaning, a contradiction, resulting from the exclusion of the alternatives that these items introduce. Previous literature relied on the insertion of a covert modal as a last resort strategy to avoid the derivation of a contradiction. This strategy leads to the derivation of a modal meaning component. We proposed that *yek -i* DPs allow for alternative pruning, as another last resort strategy to avoid the derivation of contradiction.

If the analysis presented in this paper is on the right track, EFCIs vary along two parameters, depending on the rescue strategy that they allow for in order to avoid the derivation of a contradiction: (i) whether or not they allow for modal insertion, and (ii) whether or not they allow for partial exhaustification. These parameters of variation lead to the following typology: *vreun* exemplifies a type of EFCI that allows neither for covert modal insertion nor for partial exhaustification; the *irgendein*-type EFCIs (EFCIs which convey a modal meaning component in unembedded contexts) allow for modal insertion, but not for partial exhaustification; finally, *yek -i* DPs allow for partial exhaustification, but not for modal insertion. This is summarized in Table 2.

	modal insertion	partial exhaustification
vreun	–	–
irgendein-type EFCIs	+	–
yek -i DPs	–	+

Table 2 A typology of EFCIs.

The paper has also shown that the behavior of *yek -i* DPs in modal contexts provides support for splitting domain and scalar exhaustification. As we have

seen, unlike other EFCIs, *yek -i* DPs, when interpreted under modals, trigger an embedded uniqueness meaning component. Building upon this observation, we argued that the scalar and domain alternatives must be used up by independent exhaustification operators, and showed that exhaustification of the scalar alternatives, in the case of *yek -i* DPs is always clause-bounded. We have seen that in downward entailing contexts, this leads to global weakening, violating the Maximize Strength constraint. To address this, we proposed that the alternative that *yek -i* DPs induce, in particular the scalar alternatives, can get pruned to avoid global weakening.

Central to the paper has been the observation that *yek -i* DPs in root contexts do not have a modal component. The realization that at least some EFCIs can have non-modal uses observation parallels the observation that *ever* free relatives also have non-modal uses (Lauer 2009, Condoravdi 2015, Šimík 2018). Determining whether there are connections between the two phenomena are left to further research.

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