Indefinites in Negated Intensional Contexts:
An argument for world-skolemized choice functions

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Abstract

This paper introduces a novel scope paradox. I show that indefinites in the surface syntactic scope of negated intensional operators can yield a reading in which the indefinite appears to take wider scope over the negation, and narrow scope with respect to the intensional operator. Genuine generalized quantifiers, in contrast, cannot yield such readings. The uniqueness of indefinites in giving rise to such wide pseudo-scope *de dicto* readings, which can also be found within a simple clause, provides evidence that indefinites differ from generalized quantifiers, not only in their ability to take exceptional scope out of clause boundaries, but also in their local scopal properties. I argue that the existence of such wide pseudo-scope *de dicto* readings not only poses a problem for the generalized quantifier view of indefinites, but also for any approach that takes indefinites to scope via syntactic movement. In-situ accounts of indefinites, on the other hand, can straightforwardly account for the new data, without over-generating genuine wide scope *de dicto* readings (a.k.a. the fourth readings) which are widely believed to be impossible (von Fintel & Heim, 2011; Keshet & Schwarz, 2019; Elliott, 2020). However, I argue that an account in terms of world-skolemized choice functions is more successful in accounting for the full pattern of the wide pseudo-scope *de dicto* reading in Farsi as well as cross-linguistic variations in the availability of such readings.

Keywords Indefinite, Scope, Choice function, Skolemization, Intensionality, World variable, Neg-raising, the fourth reading

1 A scope paradox

With an empirical observation in Farsi[1], I present a novel scope paradox in which an indefinite under the surface syntactic scope of a negated intensional operator yields a reading in which the indefinite appears to take wider scope than the negation, but narrower than the intensional operator. I will refer to this interpretation as wide pseudo-scope *de dicto* readings. The example (1) illustrates this paradox. The indefinite DP *some of the books* in the complement clause of a negated neg-raising predicate *think* can take a reading such that it is interpreted under the scope of *think*, but above the matrix negation.

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[1]The judgments reported in this paper come from the native speaker judgments of the author that have been confirmed in consultation with other native speakers, both linguists and non-linguists.

Context: Rodica knows that Carl has to read five books for his exam. She also knows that it takes 1 hour for Carl to read a book. She learns that Carl has started reading books 3 hours ago. Given Carl's speed in reading a book, Rodica believes that there are at least two books that he didn't have time to read but she doesn't know which books.[2]

(1) Rodica fekr   ne-mi-kon-ad   ke Carl čand-ta/ye   ketab ro xunde
Rodica thought NEG-IMPF-do-3SG that Carl some.PL-CL/some book RA studied
bash-ad.
SUB.be-3SG
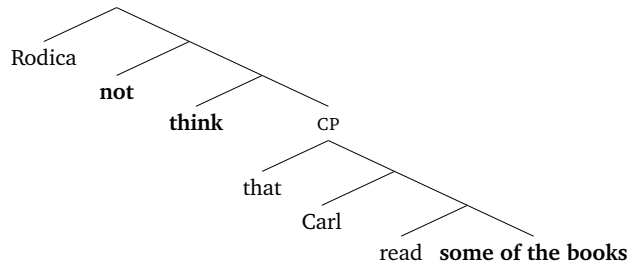*"Rodica doesn't think that Carl read some of the books."*   *think ≫ some ≫ ¬*[3]

In the intended reading of (1), the indefinite is interpreted under the scope of intensional verb *think* (*de dicto*), since there is no specific book(s) x such that Rodica has formed the belief that Carl didn't read x. Rather, Rodica has a literal belief that there are some books that Carl didn't read. In other words, the witness of the indefinite can vary across Rodica's belief worlds. To clarify this reading, the sentences can be continued with *"but she doesn't know which books."* At the same time, the indefinite takes wide scope over negation. The low scope reading of the indefinite with respect to negation, which is equivalent to "Rodica thinks that it is not the case that Carl read any of the books", is clearly false in this scenario. As shown in (2), both negation and *think* reside in the matrix clause, and the indefinite *some of the books* is syntactically below both of them. The intended reading is such that the indefinite is interpreted within the scope of *think* but outside the scope of negation. Assuming the scope of an element is determined by its syntactic position, (1) is predicted to give rise to two readings, none of which is the intended reading. Under the first reading, the indefinite stays in its base-generated position, as in (2), and thus it is interpreted below both negation and *think*. The corresponding reading is one in which Rodica thinks that it is not the case that Carl read any of the books. Alternatively, the indefinite can move to the higher clause, as in (3), in which case it is interpreted above both negation and *think*. This yields a reading in which there are some specific books x such that Rodica has formed the belief that Carl didn't read x. Although (1) can in principle have these readings, neither (2) nor (3) can illustrate the reading of (1) in the given scenario. In the intended reading of (1), the embedded indefinite appears to take narrow scope with respect to *think*, but wide scope with respect to negation. Therefore, the indefinite has to be simultaneously under *think*, and above negation. This is impossible because there is no such syntactic

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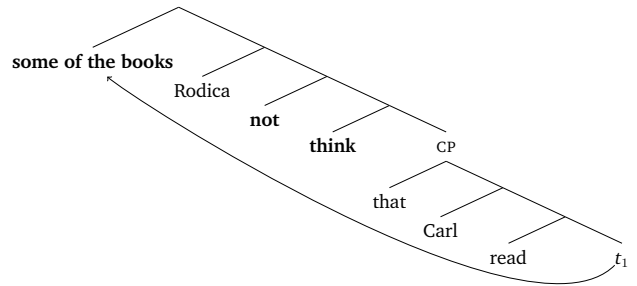[2]I thank Ekaterina Vostrikova for the context and helpful discussion.

[3]The intended reading is available to both singular (*ye*) and plural (*čand*) indefinites alike. In this paper, I only focus on indefinite constructions that are made with indefinite determiners (INDEFINITE NP). For accounts of indefinite readings of other DPs in Farsi that contain the suffix *-i* ((determiner) NP-i) see (Jasbi, 2016; Alonso-Ovalle & Moghiseh, 2019a,b). Note, however, that the suffix *-i* can also attach to ((universal) NP-i), e.g. *har rahehal-i* in (19).

position available. Therefore, we have a scope paradox.

(2)

Rodica
not
think CP
that
Carl
read **some of the books**

(3)

some of the books
Rodica
not
think CP
that
Carl
read t_1

Let us first establish that such readings are not limited to indefinites in the object position, in order to rule out the possible hypothesis that in Farsi, the object marker RA plays a role in giving rise to such readings (for an extensive review of different accounts of RA, and arguments against analyzing RA as marking definiteness or specificity, see Jasbi (2014, 2019)). Consider the example (4) in the following scenario:

Context: Rodica is the instructor of a big class. She has observed that there is at least two submissions missing in every assignment. She expects the same in the next assignment, but she has no clue which students will not submit their assignment this time.

(4) Rodica fekr   ne-mi-kon-ad   ke čand-ta/ye   daneshju mašq-esh(un)
     Rodica thought NEG-IMPF-do-3SG that some.PL-CL/some student   assignment-their
     ro tahvil be-dah-and/ad.
     RA submit SUB.give-3PL/SG
     "*Rodica doesn't think that some student(s) will submit their assignment.*"

Here again, the indefinite *some students* is interpreted under the scope of intensional verb *think* (*de dicto*), since there are no specific students x such that Rodica has formed the belief that x will not submit their assignments. Rather, Rodica has a literal belief that there are some students who will not submit their assignments. To clarify this reading, the sentences can be continued with "*but she doesn't know which students*." At the same time, the indefinite takes wide scope over negation. The low scope reading of indefinite with respect to negation, which is equivalent to "Rodica thinks that it is not the case that any students will submit their assignmnets", is clearly false in this scenario.

One might argue that the wide pseudo-scope *de dicto* reading of the indefinite in (1), arises because negation can be interpreted lower than its surface position, due to the special properties of the predicate *think* as a *neg-raiser*. Such readings, however, can also be observed outside of neg-raising environments. Indefinites under other negated modals can also give rise to such wide pseudo-scope *de dicto* readings. In the same context as for

(1), one can utter (5a), where the indefinite is under a negated universal modal which is not a typical neg-raising predicate: the sentence does not have a reading equivalent to " Rodica is sure that Carl didn't read some of the books".

> *Context: Rodica knows that Carl has to read five books for his exam. She thinks that it should take at least an hour to read a book. She learns that Carl has started reading books 3 hours ago. Rodica suspects that there are at least two books that he didn't have time to read but she doesn't have a clue which ones.*

(5) a. Rodica motmaen nist   ke   Carl čand-ta/ye   ketab ro xunde
        Rodica sure   NEG-be-3SG that Carl some.PL-CL/some book RA studied
        bash-ad.
        SUB.be-3SG
        "Rodica isn't sure that Carl read some of the books."

   b. False paraphrase in the scenario: *Rodica entertains the possibility that Carl read none of the books.*
      ✗ ¬ ≫ □ ≫ *some of the books* ⟺ ◇ ≫ ¬ ≫ *some of the books*

   c. Possible paraphrase: *Rodica entertains the possibility that some of the books are such that he didn't read.*
      ✓ ◇ ≫ *some of the books* ≫ ¬

In this context, the indefinite is interpreted *de dicto*, as there are no specific books such that Rodica is not sure whether or not Carl read them. The indefinite is interpreted above negation, because the sentence (5a), in this context, doesn't mean that Rodica allows for the possibility that Carl read no book, as shown in (5b). Rather, the intended reading of this sentence is equivalent to (5c), which means that Rodica entertains the possibility that there are some books that Carl didn't read.

Unlike the case of neg-raising predicate *think*, which can give rise to the illusion that the observed reading is a scope phenomenon, wide pseudo-scope *de dicto* readings of indefinites under other negated modals cannot be represented in terms of scopal relations. I have illustrated these readings with the help of the duality relations ¬□ ⟺ ◇¬ and □¬ ⟺ ¬◇, as shown in (7). Crucially, however, duality relations are just logical equivalences, and do not have a syntactic manifestation.

(6) **Negated neg-raising *think*:**
     surface syntactic scope: ¬ ≫ *think* ≫ INDEF ⟶ interpreted as: *think*≫ INDEF ≫ ¬

(7) **Other negated modals**:
     a. surface syntactic scope: ¬ ≫ □ ≫ INDEF ⟶ interpreted as: ◇ ≫ INDEF ≫ ¬
     b. surface syntactic scope: ¬ ≫ ◇ ≫ INDEF ⟶ interpreted as: □ ≫ INDEF ≫ ¬

Other indefinites like numerals also give rise to such wide pseudo-scope *de dicto* readings, as shown in (8a).

Context: There are five questions on the exam. Each question has 10 points. To get the full points on the exam (30 points), students only need to answer three questions. Students can pick any three questions to answer. An examiner to students:

(8) a. lazem ni-st do-ta soal ro javab be-d-id
 necessary NEG-be.3SG two-CL question RA answer SUBJ-give-2PL
 You don't have to answer two of the questions.

 b. False paraphrase in the scenario: *it's permissible to answer any number of questions which is not exactly two /more than two.*
 ✗ $\neg \gg \square \gg$ *two questions* $\iff \lozenge \gg \neg \gg$ *two of the questions*

 c. Possible paraphrase: *It is allowed for two of the questions not to be answered.*
 ✓ $\lozenge \gg$ *two of the questions* $\gg \neg$

The indefinite *two questions* in (8a), is interpreted *de dicto*, as there is no specific questions that is marked as a bonus question. The numeral is interpreted above negation, the intended reading of this sentence is equivalent to (8c), which means that students are allowed to not answer (exactly) two questions. The interpretation of the numeral indefinite under negation, (8b), says that it's permissible to answer any number of question which is not more than two or exactly two (corresponding to one-sided or two-sided semantics of numerals). This reading is clearly false in this scenario.

The availability of such readings is not limited to the scope of negated universal modals (which further confirms that they are not due to neg-raising). The sentence in (9a) shows that the numeral indefinite *two of the cards* which is under the negated existential modal *can't* can also get a wide scope *de dicto* reading.

Context: The rule of a card game for two players is such that each player is given five cards in every round. Each player can see any three cards of their choice from the other player's cards. An instructor explaining the rules to players:

(9) a. do-ta kart ro ne-mi-tun-id be-bin-id
 two–CL card RA NEG-IMPF-can-2PL SUBJ-see-2PL
 "You can't see two of the cards."

 b. False paraphrase in the scenario: *it's necessary to see any number of cards which is not exactly two /more than two.*
 ✗ $\neg \gg \lozenge \gg$ *two of the cards* $\iff \square \gg \neg \gg$ *two of the cards*

 c. Possible paraphrase: *It is necessary that two of the cards be such that you don't see them.*
 ✓ $\square \gg$ *two of the cards* $\gg \neg$

Strikingly, genuine quantifiers like modals and universal quantifiers that in principle can scopally interact with negation, do not give rise to wide (pseudo)-scope *de dicto* readings. Let us start with universal quantifiers. (10a) shows that universal quantifiers can scope

above negation in simple sentences. The sentence (10a), when the universal quantifier *all of the children* is accented, cannot be true in a scenario in which some children came and some didn't. It's rather true in a scenario where no children came. This indicates that the sentence is interpreted with the universal quantifier scoping above negation. However, when embedded under negated neg-raising predicate *think*, as in (10b), universal quantifiers can only take narrow scope with respect to negation. The sentence (10b) can only be true in a situation in which the speaker thinks some children came and some didn't. This indicates that the sentence cannot be interpreted with the universal quantifier scoping above negation.

(10) a. [Hame-ye bache-ha]$_F$ na-yam-ad-and.
          all-EZ   child-PL   NEG-come-PST-3.PL
          All of the children didn't come.   *all of the children* $\gg \neg$

      b. fekr   na-konam   hame-ye bache-ha oumade baš-and.
          think NEG-do-1SG all-EZ   child-PL   come-PP SUB-be-3.PL
          I don't think all of the children came.   *$\ast$think$\gg$ all of the children* $\gg \neg$

Similarly, universal quantifiers under other negated modals cannot give rise to a reading where they are interpreted *de dicto* with respect to the negated modal, but take wide scope over negation at the same time. The unavailability of such readings to universal quantifiers is shown in (11)-(13).

(11) a. Rodica motmaen nist   ke   Carl hame-ye ketab-ha ro xunde bash-ad.
          Rodica sure   NEG-be-3SG that Carl all-EZ   book-PL RA studied SUB.be-3SG
          "Rodica is not sure that Carl read all of the books."

      b. Possible paraphrase: *Rodica entertains the possibility that not all of the books are such that Carl read.*
          ✓ $\neg \gg \Box \gg$ *all of the books* $\Longleftrightarrow \Diamond \gg \neg \gg$ *all of the books*

      c. Impossible paraphrase: $\ast$*Rodica entertains the possibility that all of the books are such that Carl didn't read.*
          $\ast \Diamond \gg$ *all of the books* $\gg \neg$

(12) a. lazem   ni-st   hame-ye soal-ha   ro javab   be-d-id
          necessary NEG-be.3SG all-EZ   question-PL RA answer SUBJ-give-2PL
           You don't have to answer all of the questions.

      b. Possible paraphrase: *it's permissible to not answer all of question.*
          ✓ $\neg \gg \Box \gg$ *all of the questions* $\Longleftrightarrow \Diamond \gg \neg \gg$ *all of the questions*

      c. Impossible paraphrase: $\ast$*It is allowed for all questions not to be answered.*
          $\ast \Diamond \gg$ *all of the questions* $\gg \neg$

(13) a. hame-ye kart-ha ro ne-mi-tun-id   be-bin-id
          all-EZ   card-PL RA NEG-IMPF-can-2PL SUBJ-see-2PL
          You can't see all of the cards.

b. Possible paraphrase: *it's necessary that not all cards be such that you see them.*

✓ ¬ ≫ ◇ ≫ *all of the cards* ⟺ □ ≫ ¬ ≫ *all of the cards*

c. Impossible paraphrase: *It's necessary that all cards be such that you don't see them.*

∗□ ≫ *all cards* ≫ ¬

Now let us look at the interaction of modals and negation in Farsi. The modal *must* in Farsi is not a PPI, and can take both narrow and wide scope over negation in a simple clause. [4]

Context: Disagreeing with someone's argument:

(14) a. lozuman   na-bayad in   tor baš-ad.
     necessarily NEG-must this way SUBJ.be-3SG
     It does not necessarily have to be the case.   ¬ ≫ *must* (weak disagreement)

   b. manteqan na-bayad in   tor baš-ad.
     logically   NEG-must this way SUBJ.be-3SG
     Logically, it must not be the case.   *must* ≫ ¬ (strong disagreement)

Under a negated neg-raising predicate, only the narrow scope of must with respect to negation is available.

Context: Disagreeing with someone's argument:

(15) a. fekr na-kon-am   lozuman   bayad in   tor baš-ad.
     think NEG-do-1.SG necessarily must   this way SUBJ.be-3SG
     I don't think it necessarily has to be the case.   *think* ≫ ¬ ≫ *must*

   b. #fekr na-kon-am   manteqan bayad in   tor baš-ad.
     think NEG-do-1.SG logically   must   this way SUBJ.be-3SG
     I don't think it must logically be the case.   ∗*think* ≫ *must* ≫ ¬

In sum, I have shown that the availability of the wide pseudo-scope *de dicto* reading is only available to indefinites[5]. Other scope-taking elements embedded under negated modals do not enter into a similar scopal interaction with the negation. Having ruled out the role of neg-raising in giving rise to such readings, I conclude that the special scopal properties of indefinites must be responsible for the existence of wide pseudo-scope *de dicto* readings. In this paper, I argue that the paradox at hand provides a strong case in favor of in-situ accounts of the scope of indefinites. I show that movement-based accounts irrespective of

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[4]I thank Masoud Jasbi for pointing out to me that *logically* can enforce the wide scope of *must*.

[5]An anonymous reviewer pointed out that the quantifier "xeili" (roughly, many) can generate a similar reading. Specifically, in the example (i), "xeili" can have both narrow and wide scope relative to negation.

(i)   fek   na-kon-am   xeili   az bache-ha ro da'vat karde bashe
     think NEG-do-1SG many of child-PL   RA invite do-PP SUB-be-3.SG
     I do not think that s/he invited many of the kids.

   I agree with the judgment. However, it is hard to show that the two readings are independent, as the construal with high scope of negation relative to xeili "it is not the case that she invited many kids" is always true when "many kids are such that s/he did not invite them" is.

whether or not island-escaping movements are syntactically allowed, fail to capture the availability of wide pseudo-scope *de dicto* readings for indefinites without over-generating unattested genuine wide scope *de dicto* readings (a.k.a. the fourth readings).

The rest of this paper is structured as follows. In section 2, I compare movement-based (Charlow, 2014; Demirok, 2019) and in-situ approaches (Reinhart, 1997; Winter, 1997; Kratzer, 1998; Matthewson, 1999) to the scope of indefinites in their handling of the new data. I argue that only in-situ accounts of indefinites can account for the availability of the wide pseudo-scope *de dicto* of indefinites. I will then discuss a problem for in-situ accounts in terms of intensional choice functions (Heim, 1994; Winter, 1997; Romero, 1999). The problem is reminiscent of the *fixed set* problem familiar from the literature on choice functions which arises when there needs to be variation in the output of choice function that applies to a fixed set (Winter, 1997; Kratzer, 1998; Geurts, 2000; Abels & Martí, 2010). Section 3 is aimed to solve this problem. I propose a modification to the choice functional analysis such that an indefinite determiner denoting a choice function can introduce a world variable (Schwarz, 2012). This proposal, which amounts to skolemizing choice functions with a world variable, can solve the fixed-set problem. Finally, I argue that an account in terms of world-skolemized choice functions is more successful than other in-situ accounts in explaining the full pattern of indefinites' scope in Farsi as well as cross-linguistic variation in the availability of the wide pseudo-scope *de dicto* of indefinites. Section 4 concludes the paper.

2   "Scope" of indefinites

Indefinites have been shown to differ from generalized quantifiers in their scope-taking behavior. It has been widely claimed that the scope of quantifiers is clause-bounded (May, 1977), as the unavailability of the given paraphrase for (16) show.

(16)   A colleague believes that every paper of mine contains an error.
       # 'For ever paper of mine there is a potentially different colleague who believes that it contains an error.'   ✗ every paper ≫ if

Indefinites, in contrast, can scope out of islands (Fodor & Sag, 1982), as shown in (17).

(17)   Each teacher overheard the rumor that a student of mine had been called before the dean.
       'There is a student of mine, say Mary, and each teacher overheard the rumor that Mary was called before the dean.'   ✓ a student ≫ if

It is also shown that indefinites can take intermediate scope out of islands (Farkas, 1981; Ludlow & Neale, 1991; Abusch, 1993). In (18), for instance, the indefinite *some condition*

proposed by Chomsky can take scope out of the relative clause, which is a scope island, and be interpreted as scoping under each student. When the indefinite takes intermediate scope, (18) means that for each student x, there is some condition y proposed by Chomsky such that x has to hunt down every paper showing that y is wrong.

(18)   Each student has to hunt down every paper which shows that some condition proposed by Chomsky is wrong.

Indefinites in Farsi can also escape island boundaries. In addition to the narrow scope, the indefinite *'a syntactic puzzle'* in (19) can take wide and intermediate scope corresponding to (20a) and (20b), respectively.

(19)   hame-ye danešju-ha har   rahehal-i   ke   baraye yek mas'ale-ye nahvi
       all-EZ   student-PL every solution-INDF that for   a   puzzle-EZ syntactic
       vojood   dar-ad   ra motale'e kar-d-and
       existence have-3.SG RA study   do-PST-3PL
       All students studied every solution that exists for a syntactic puzzle.

(20)   a. There is some syntactic puzzle y such that each student x has read every solution that exists for y.

       b. For each student x, there is some syntactic puzzle y such that x has read every solution that exists for y.

This unique island-escaping behavior of indefinites led to approaches that take indefinites as inherently different from generalized quantifiers (Abusch, 1993; Reinhart, 1997; Winter, 1997; Brasoveanu & Farkas, 2011; Charlow, 2014, 2020). There are two main approaches within this group to explain the exceptional scope of indefinites: (i) movement-based approaches, which posit that indefinites have access to special movement-based scope taking mechanisms, unavailable to generalized quantifiers (Charlow, 2014, 2020; Demirok, 2019), and (ii) in-situ approaches, which posit that indefinites do not depend on syntactic movement in order to take scope (Reinhart, 1997; Winter, 1997; Kratzer, 1998; Brasoveanu & Farkas, 2011).

In this paper, I have shown that differences between scopal properties of indefinites and generalized quantifiers can be also observed within a clause. While an indefinite under negated modals can give rise to wide pseudo-scope *de dicto* readings, generalized quantifiers cannot. The contrast between the behavior of the indefinite in (9a) and the universal quantifier in (13), repeated here as (21a) and(21b), is particularly important, as it shows that the asymmetry between indefinites and quantifiers can also be observed within clause boundaries. Therefore, indefinites are not only unique in their ability to take exceptional scope, but also in their local scopal properties. This provides further evidence for the view that indefinites are inherently different from generalized quantifiers.

(21) a. do-ta   kart ro ne-mi-tun-id   be-bin-id
      two–CL card RA NEG-IMPF-can-2PL SUBJ-see-2PL
      "You can't see two of the cards."   ✓$\square \gg$ *two of the cards* $\gg \neg$

    b. hame-ye kart-ha ro ne-mi-tun-id   be-bin-id
      all-EZ   card-PL RA NEG-IMPF-can-2PL SUBJ-see-2PL
   *You can't see all of the cards.*   ✗ $\square \gg$ *all of the cards* $\gg \neg$

In the rest of this section, I will discuss the predictions of the two approaches that take indefinites to be unique regarding the availability of the wide pseudo-scope *de dicto* reading of indefinites. I will argue that a movement-based approach fails to account for such readings. Under this approach, the indefinite takes wide scope over negation via moving a position above negation. Such a position, however, unavoidably outscopes the intensional operator. Therefore, the indefinite can no longer be construed *de dicto*. I take this as an argument in favor of in-situ accounts of indefinites' scope. I will then show that while it has remained noticed, the existence of the wide pseudo-scope *de dicto* readings is predicted by all in-situ approaches that separate the existential quantification and the descriptive content of indefinites.

2.1   Scoping via movement

In this section, I focus on the movement-based accounts in terms of pied-piping (Charlow, 2014, 2020; Demirok, 2019). The innovation of this approach is that it relies only bona fide scope mechanisms to explain indefinite scope. At the same time, this approach takes indefinites to be different from generalized quantifiers by treating them as alternative-generating expressions, in line with alternative semantic (Ramchand, 1997; Kratzer & Shimoyama, 2002, 2017) and inquisitive treatments of indefiniteness (Ciardelli et al., 2017). I argue that despite its obvious appeal, the movement-based approach fails to account for the new data, leaving the in-situ accounts the only tenable approach to explain wide pseudo-scope *de dicto* readings of indefinites.

Recently, new movement-based accounts have been developed to derive the exceptional scope of indefinites out of island via a sequence of island obeying movements (a.k.a *pied-piping*), (Charlow, 2014, 2020; Demirok, 2019). The essential parts of these accounts are: (i) there is a scope position at the island edge to which the indefinite DP can move; and (ii) subsequently the island can be type-shifted into a scope taking expression, which itself moves to higher position in the structure. Under this approach, the structure of (22a) would roughly be (22b).

(22)   a. If [a rich relative of mine dies], I'll inherit a house.

     b.
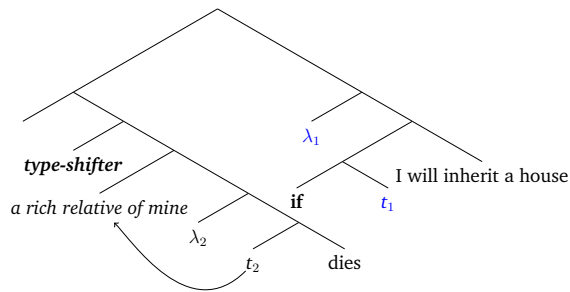
First, the indefinite *a rich relative of mine* would move to the edge of the island. After the island is type-shifted to a scope-taking object, it is pied-piped over the conditional.
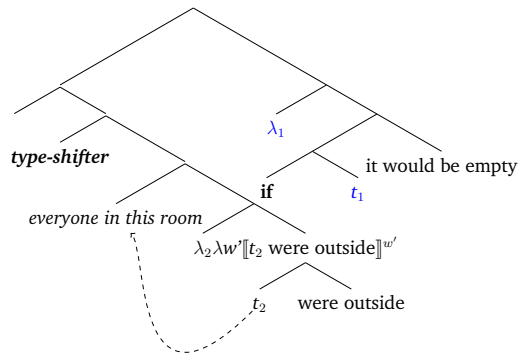
Building on the system proposed by Charlow (2014), an intensionalized version of the system has also been developed by Demirok (2019) and Elliott (2020), which aims to explain the exceptional *de re* readings of quantificational DPs that cannot scope out of islands. For instance, (23) shows that while the quantifier *every* in (23) cannot scope out of the if-clause island, it can get a *de re* reading. The DP *everyone in this room* in (23b) is construed *de re* relative to the intensional operator governing the conditional. As no one can be in this room and outside in the same world, the *de dicto* interpretation of *everyone in this room* creates a non-sensical reading.

(23)   a. If [every rich relative of mine dies], I'll inherit a house.   ∗every>if
       b. If everyone in this room were outside, it would be empty.

This system assumes a scope analysis of intensionality, according to which a DP embedded under an intensional operator can only get a *de re* construal if it moves to a position higher than the intensional operator in the structure (Keshet, 2008, 2010a,b; Charlow, 2014, 2020; Demirok, 2019; Elliott, 2020). The special pied-piping mechanism introduced in this system (Charlow, 2020; Demirok, 2019; Elliott, 2020), however, allow DPs to take exceptional *de re* interpretation, without violating island constraints.

Under this view, quantificational DPs can take *de re* readings out of syntactic islands via movement to the edge of the island. Then, the island itself can move to a higher position, as shown in (24). Unlike indefinites, however, quantificational DPs like *every* leave a higher order trace of type $\langle\langle e,t\rangle,t\rangle$ behind, forcing it to semantically reconstruct into the syntactic position of the trace. The crucial point here is that the syntactic position of the higher order trace marks the scope of quantifiers, capturing the fact that they cannot outscope an island. The intensionality of quantifiers, on the other hand, is determined by their final syntactic position with respect to the intensional operator. Therefore, quantifiers can outscope an intensional operator, even when embedded in an island, to be construed *de re*, but their quantificational scope can never escape an island.

(24)

type-shifter λ_1

it would be empty

if t_1

everyone in this room

$\lambda_2 \lambda w'\llbracket t_2 \text{ were outside}\rrbracket^{w'}$

t_2 were outside

The existence of wide pseudo-scope *de dicto* readings of indefinites creates a serious problem for this approach. To get the intended reading, the indefinite has to move to a position higher than negation in the matrix clause, and yet under the intensional verb *think* in order to be interpreted *de dicto*. However, there are only two licit movements: (i) moving the indefinite to the edge of the embedded clause, but this position is not above negation. (ii) shifting the embedded clause to a scope taking object and then moving it to a higher position. This movement puts the indefinite above negation, but as the indefinite now outscopes the intensional operator, it cannot be interpreted *de dicto* anymore. This is illustrated in (25b).

(25) a. Rodica doesn't think that Carl read some of the books.

　　　b.

type-shifter λ_1

Rodica

some of the books **not**

λ_2 *think* t_1

Carl

read t_2
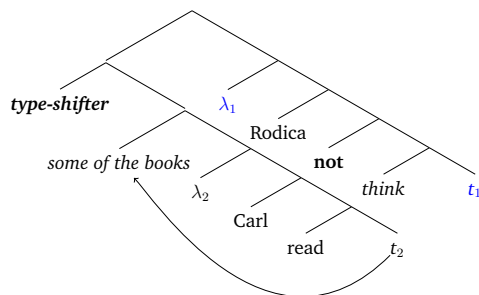
In a system, which takes the syntactic position of indefinites to determine their quantificational scope, the observed reading of (25a) constructs a case of a wide scope *de dicto* reading (*the fourth reading*), which is excluded by the main theories of intensionality (Percus, 2000; von Fintel & Heim, 2011; Keshet & Schwarz, 2019; Elliott, 2020). As we saw in (24), *de re* construal of DPs does not necessarily come with wide quantificational scope. However, wide quantificational scope necessarily comes with a *de re* interpretation, as the intensionality of a DP is still determined by its final syntactic position with respect to an intensional operator. According to all of these theories, a DP can only get a *de dicto* reading when it is under the scope of an intensional operator. If a DP moves in order to take wide

scope with respect to the intensional operator, it can no longer be construed *de dicto*.

Finally, the contrast between indefinites and universal quantifiers in (21), repeated here as (26), shows that indefinites can get wide pseudo-scope *de dicto* readings under the scope of a clause-mated negated modal, but universal quantifiers cannot. It is not clear how a movement-based approach to indefinites could distinguish between local movement mechanisms available to universal quantifiers and indefinites in order to capture this asymmetry.

(26)   a. do-ta   kart ro ne-mi-tun-id   be-bin-id
           two–CL card RA NEG-IMPF-can-2PL SUBJ-see-2PL
           "You can't see two of the cards."

$$\neg \gg \lozenge \gg \text{\textit{two of the cards}} \longrightarrow \square \gg \text{\textit{two of the cards}} \gg \neg$$

       b. hame-ye kart-ha ro ne-mi-tun-id   be-bin-id
           all-EZ   card-PL RA NEG-IMPF-can-2PL SUBJ-see-2PL
           You can't see all of the cards.

$$\neg \gg \lozenge \gg \text{\textit{all of the cards}} \nrightarrow \square \gg \text{\textit{all of the cards}} \gg \neg$$

The data above also provides evidence against what Barker (2022) calls *the exceptional scope conspiracy*.

(27)   **The exceptional scope conspiracy** (Barker, 2022)
      Non-QR scoping mechanisms deliver the same truth conditions that QR would have delivered if we ignored islands.

Since the behavior of indefinites and generalized quantifiers differ even within the clause domain where island constraints are irrelevant, the movement-based approach fails to derive wide pseudo-scope *de dicto* readings of indefinites irrespective of whether or not QR is sensitive to islands. In order to take such readings, an indefinite under the scope of a negated modal has to move to a syntactic position which is above negation, but below the intensional operator. Such a position simply does not exist in the syntactic structure.

2.2   In-situ "scope"

The island escaping behavior of indefinites led to a search for an non-movement account of indefinite scope. A major line of thought has been to separate the existential quantification and the descriptive content of indefinites. In line with Heim (1982) and Kamp (1981), many have taken indefinites to only contribute some kind of variable and have relied on the freely available existential closure mechanism to account for the existential power of indefinites (Abusch, 1993; Reinhart, 1997; Winter, 1997; Jäger, 2007; Onea, 2015). There is a huge deal of variation in how this idea is technically implemented. Focusing on the choice functional accounts, I will first show that in-situ accounts of indefinites can straightforwardly account for the existence of wide pseudo-scope *de dicto* readings for

indefinites. Discussing a new variant of the data we have seen in this paper, I will then argue that only in-situ accounts that allow the determiner of indefinite DPs to have an independent world variable can capture the full pattern of the data.

A successful in-situ account of island-free scope of indefinites, within static semantics, takes indefinites to denote choice/skolem functions (Reinhart, 1997; Winter, 1997; Kratzer, 1998; Matthewson, 1999; Steedman, 2012). A *choice function* is a function that maps any non-empty set onto an element of that set. Therefore, it is a function of type $\langle \langle e,t \rangle, e \rangle$, which applies to the property denoted by the nominal predicate of type $\langle e,t \rangle$ and returns an individual of type e that has that property. According to Reinhart (1997) and Winter (1997), an indefinite determiner may introduce a *choice function* variable in-situ, which takes the restrictor of the indefinite as argument. Since the choice function variable is assumed to be bound by an existential quantifier which can freely appear at any level, this analysis predicts that an indefinite may have narrow, intermediate, or wide scope with no sensitivity to scope islands.

(28) Every linguist studied every solution that some problem that intrigued him/her might have.

    a. $\forall x[$ linguist'$(x) \rightarrow \exists f \forall z[$solution-to'$(z, f(\text{problem'})) \rightarrow$ studied'(x,z) $]]$

    b. $\exists f \forall x[$ linguist'$(x) \rightarrow \forall z[$solution-to'$(z, f(\text{problem'})) \rightarrow$ studied' (x,z) $]]$

On the intermediate scope reading in (28a), for every linguist x, there is a way f of choosing a problem such that x studied every solution to the chosen problem by $f(\text{problem})$, so the problem chosen can vary with the linguists. On the wide-scope reading in (28b), there is a way of choosing problem f such that every linguist x studied every solution to the chosen problem by $f(\text{problem})$.

Unlike Reinhart (1997) and Winter (1997), Kratzer (1998) does not posit existential quantifier to bind choice functions. According to Kratzer (1998), choice functions are interpreted as free variables, with values to be provided by the context. So they always act as if they get maximal scope. Because there are no existential quantifier introduced to bind free choice function variables, Kratzer's account does not generate intermediate readings, at least not as freely as existentially closed choice functions proposed by Reinhart (1997) and Winter (1997) do. To account for the intermediate scope of indefinites, she proposes to use *Skolemized choice functions* which are skolem functions that have both set and individual-variable arguments. So, this skolem function applies to the binary relation *some problem* and *the linguist variable x* and returns a problem that intrigued linguist x , as shown in (29a). This is basically equivalent to the reading with the intermediate existential closure over a choice function as given in (29b).

(29) a. $\forall x[$ linguist'$(x) \rightarrow \forall z[$solution-to'$(z, f(x, \text{problem'})) \rightarrow$ studied'(x,z) $]]$

b. ∀x[linguist'(x) → ∃f∀z[solution-to'(z, f(problem')) → studied'(x,z)]]

Skolemization of choice functions with an individual variable also helps to solve a problem for choice functions that arises when the set of elements that the choice function applies to is fixed. In such cases, a choice function, being a function, always picks out the same element from a given set, which might not be the intended reading (Abusch 1993,Kratzer 1998, Chierchia 2001 and Abels & Martí 2010, among others). Consider the example (30a) with the intermediate reading of indefinite, as in (30b).

(30) a. Every linguist studied every solution that some problem that intrigued him/her might have.

     b. ∀x[linguist'(x) → ∃f∀z[solution-to' (z, f (problem')) → studied' (x,z)]]

In a situation in which the members of the set of linguists {A and B} are intrigued by the same set of problems {weak crossover , donkey sentences}, the non-skolemized choice function f applies to the set {weak crossover, donkey sentences} and since it is a function, it has to give a unique value. Therefore, it would go wrong either for linguist A or for linguist B. Skolemization solves this problem. When skolemized, a choice function that applies to a relation between A and the set {weak crossover, donkey sentences} can return a value which is different from the value it returns when it applies on a relation between B and the set {weak crossover, donkey sentences}.

(31) a. f (A, {weak crossover, donkey sentences}) = weak crossover

     b. f (B, {weak crossover, donkey sentences}) = donkey sentences

Winter (1997) proposes a different solution to this problem (Reinhart, 1997; Winter, 1997). He suggests that the choice function's argument can be construed intensionally. An intensional choice function takes an intensional property ($\langle e, \langle s, t \rangle \rangle$) as argument, and returns an individual concept $\langle s, e \rangle$ (Heim, 1994). Instead of applying to the set of problems, for instance, f applies to an intensional property of the form 'being a problem that intrigued x, and since there are possible worlds, presumably, in which linguists A and B are intrigued by different problem, we can now differentiate between 'being a problem that intrigued x with x standing for the linguist A and 'being a problem that intrigued x with x standing for the linguist B, even if in reality they are intrigued by the same problems.

In what follows, I will first show that although it has remained unnoticed, in-situ accounts in terms of a default existential closure over intensional variables predicts the existence of wide pseudo-scope *de dicto* readings of indefinites. I will show case this with intensional choice function (Heim, 1994; Winter, 1997; Romero, 1999; Keshet, 2010a), but the intensional version of in-situ approaches that separate the existential force and the descriptive content of indefinites s(Abusch, 1993; Reinhart, 1997; Winter, 1997; Jäger, 2007; Onea,

2015) generate wide pseudo-scope *de dicto* readings in the same way. I will then argue that the account in terms of the intensional choice function still runs into problem when the set of elements that the choice function applies to is fixed. I propose a different version of intensional choice functions in terms of skolemization with world variables, which can solve the fixed-set problem. I will also argue that this account does a better a job in explaining cross-linguistic variations in the availability of such readings.

Let us start with applying the current choice functional analysis on one of our example in (1), repeated here as (32).

(32) Rodica fekr   ne-mi-kon-ad   ke Carl čand-ta/ye   ketab ro xunde
      Rodica thought NEG-IMPF-do-3SG that Carl some.PL-CL/some book RA studied
      bash-ad.
      SUB.be-3SG
      "Rodica doesn't think that Carl read some of the books."

As the books that Carl didn't have time to read can vary in different worlds, we need a way to get variation in the output of the choice function which applies to the books Carl has to read. In other words, we need the choice function to pick possibly different books Carl didn't read in each world. Following Heim (1994); Winter (1997); Romero (1999), I take the choice function to apply to the intensional property 'being a book x that Carl has to read for his exam'. I also assume the semantic-pragmatic account of neg-raising, according to which negation is in the matrix clause and doesn't move under *think*. Given the denotation of the neg-raising predicate *think*, as a generalized quantifier over world, and the negation of the embedded proposition as a result of the excluded middle presupposition, we will have (33a):

(33)   a. **Assertion:** $\neg[\forall w" \in$ Beliefs(Rodica,w):[read$_{w''}$ (Carl, f (book$_{w''}$))]]

       b. **Presupposition:** $\forall w" \in$ Beliefs(Rodica,w):[read$_{w''}$ (Carl, f (book$_{w''}$))] $\vee$
          $\forall w" \in$ Beliefs(Rodica,w):$\neg$[read$_{w''}$ (Carl, f (book$_{w''}$))]

       c. $\therefore \forall w" \in$ Beliefs(Rodica,w):$\neg$[read$_{w''}$ (Carl, f (book$_{w''}$))][6]

The truth-conditions in (33a) give us the intended reading of (32). For (33a) to be true, Rodica doesn't have to have a specific book in mind. In fact, it might be the case that Rodica and her source are mistaken and Carl doesn't even have an exam to read books for. For every one of Rodica's belief worlds w, the choice function f can pick out an individual concept "being a book x that Carl has to read for his exam but didn't have time to". Therefore, although negation takes wider scope than the indefinite, thanks to the wide pseudo-scope effect of choice functions, the indefinite can appear to take wider scope than

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[6]I have assumed the presupposition account of neg-raising (Gajewski, 2005), but the exact process via which a neg-raising reading is inferred does not concern us here. The indefinite takes a wide pseudo-scope over negation in the assertion level.

negation, without actually moving to a higher position than negation in the structure.

So far we have seen that the movement approaches fail to account for wide pseudo-scope *de dicto* readings of indefinites, but adapting an analysis of indefinites in terms of intensional choice functions can straightforwardly account for the availability of such readings to indefinites. However, an intensional choice function run into problem when the context in which (32) is uttered is changed.

Let us imagine the following context. Rodica and Carl are students of a course on Covid-19. The final exam is tomorrow. Students have to read the only five books ever written on the topic {A,B,C,D,E}. Rodica learns that Carl has started studying for his tomorrow exam 3 hours ago. Rodica is convinced that Carl is reading for the course on Covid. Knowing that it takes at least an hour to read any of those book, Rodica believes that there are at least two books that he didn't have time to read but she doesn't know which books. Unknown to Rodica, Carl has dropped that course and is reading for another exam that happens to also take place tomorrow. For that exam, he does not have to read any book, rather he has to read some articles.

The same sentence in (32), repeated here as (34), is true in this context.

(34) Rodica fekr   ne-mi-kon-ad   ke Carl čand-ta/ye   ketab ro xunde
      Rodica thought NEG-IMPF-do-3SG that Carl some.PL-CL/some book RA studied
      bash-ad.
      SUB.be-3SG
      "*Rodica doesn't think that Carl read some of the books.*"

The indefinite is still interpreted above negation, and under the scope of intensional verb *think*. Here too, there is no specific book(s) x such that Rodica has formed the belief that Carl didn't read x, and the witness of the indefinite can vary across Rodica's belief worlds. However, the truth-conditions given in (33a), repeated here as (35), do not longer give us the intended reading.

(35) $\forall w'' \in$ Beliefs(Rodica,w):$\neg[$ read$_{w''}$ (Carl, f (book$_{w''}$))]

As Rodica knows that there are only five books written on the subject of the exam, there cannot be a world in her belief worlds in which the intensional property of 'being a book Carl has to read for his exam' contains different books other than those five books. The intensional choice function applies to the intensional property 'being a book Carl has to read for his exam', but since the set of books Carl has to read is fixed across all of Rodica's belief worlds, it always returns the same output, say A.

(36) $f($ {A,B,C,D,E}$) =$ A

Therefore, (35) gives rise to the wide pseudo-scope (*de re*) reading of the indefinite, which is not the intended reading of (34). To get the intended reading, the choice function needs to pick different elements from a single set across Rodica's belief worlds. But our current
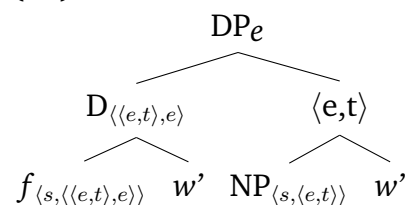
machinery doesn't provide a way to do this. This shows that an intensional choice function can still run into the fixed-set problem (Abels & Martí, 2010).

The question I aim to answer here is how the variation of books across Rodica's belief worlds can be explained? As mentioned before, the variation in the output of the choice function can be captured in terms of skolemization Kratzer (1998). It is obvious, however, that skolemization with an individual variable doesn't help, as there's just one individual "Carl", the output of the choice function will still be a unique element. In the next section, I will show that a similar mechanism which skolemizes choice functions with a world variable can solve this problem (a similar solution has been alluded to in Abels & Martí (2010), Homer (2015), and Onea (2015) who attributes the idea to Ede Zimmermann[7] but the prediction such an account makes with regard to the wide pseudo-scope (*de re*) reading of indefinites has not been discussed before.).

3   World-skolemized choice functions

I follow Schwarz's 2012 proposal that determiners can introduce a world variable (a situation variable in his system). I propose that a choice function introduced by an indefinite determiner can be of type $\langle s, \langle\langle e, t\rangle, e\rangle\rangle$. They take world variables as their first argument, then they apply on a set of type $\langle e,t\rangle$, and return an individual of type e, as shown in (37).

(37)

$$
\begin{array}{c}
\text{DP}_e \\
\diagup\diagdown \\
\text{D}_{\langle\langle e,t\rangle,e\rangle}\langle\text{e,t}\rangle \\
\diagup\diagdown\diagup\diagdown \\
f_{\langle s,\langle\langle e,t\rangle,e\rangle\rangle}w'\text{NP}_{\langle s,\langle e,t\rangle\rangle}w'
\end{array}
$$

This amounts to skolemiziation, whereby a variable that is bound by a higher operator is introduced as an argument of choice functions, in order to trigger variation in the output of choice functions with respect to that variable. Instead of an individual variable (Kratzer, 1998), however, we have a world variable (See Abels & Martí 2010; Homer 2015 for a similar proposal to account for the split scope readings of negative indefinites). Therefore, I propose that in addition to an optional individual argument (Kratzer, 1998), choice functions are always skolemized with a world variable. When this world variable is bound by an intensional operator, the choice function can return a different output for every world. As (37) shows, I take NPs to be of type $\langle s, \langle e, t\rangle\rangle$. Therefore, DPs can contain two world

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[7]I thank an anonymous reviewer to bringing this to my attention.

variables, one introduced with the NP, and one with the determiner. However, as Schwarz (2012) argues, there is not any evidence for intensional independence of NPs. Therefore, I take the world argument of NP to be obligatorily bound locally, thus it is always evaluated relative to the same world as its determiner.[8] This yield two possible configurations:

(i) When the world variables of the choice function's and the NP's are set to the actual world, we will have $f(w_0, (\text{NP } (w_0)))$. The world argument is constant and the effect will be as if there is no skolemization, $f(\text{NP})$.

(ii) When the world variables of the choice function's and the NP's are bound by an intensional operator, we will have $f(w', (\text{NP } (w')))$.

Let us see how this proposal can account for the intended reading of (34). As Rodica is convinced that Carl is studying for the course on Covid, the extension of the set of books Carl is supposed to read (i.e. {A,B,C,D,E }) is fixed across Rodica's belief worlds. The indefinite is interpreted *de dicto*, as Rodica is mistaken about the exam for which Carl is studying. With the new machinery of skolemization with world variables, we have a way of ensuring cross-world variation in the output of the choice function. The world argument of the determiner of the indefinite, i.e. the choice function variable, can be bound by the intensional operator. Given the new semantics of indefinites as a choice function skolemized with a world variable, and the negation of the embedded proposition as a result of the excluded middle presupposition (Bartsch 1973; Horn 1989; Gajewski 2005; Romoli 2013; Homer 2015, and Zeijlstra 2018, among others), we will have (38) as the truth-conditions of (34).

(38) $\forall w'' \in \text{Beliefs}(\text{Rodica},w_0){:}\neg[\text{ read}_{w''} (\text{Carl}, f(w'',(\text{book}(w''))))]$

(38) will give us the intended reading for (34). The function f, which is skolemized with a world variable, can pick different values for different worlds (cross-world variation):[9]

(39)   a. $f (w_1, \{\text{A,B,C,D,E }\}) = \text{A}$

      b. $f (w_2, \{\text{A,B,C,D,E }\}) = \text{C}$

      c. $f (w_3, \{\text{A,B,C,D,E }\}) = \text{E}$

Although both world-skolemized choice functions and intensional choice function (Heim, 1994; Romero, 1999) can account for cross-world variation in cases where the extension

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[8]This is an extension of Schwarz's 2012 account in which only determiners carry an independent situation variable, and produces the same results.

[9]Note that I have only shown atomic individuals for convenience. More precisely, I take NPs in Farsi to denote a set consisting of both atomic and plural entities (See Krifka & Modarresi (2016) for more details on the number neutrality of bare singulars in Farsi). The choice function denoted by the indefinite determiner can choose an atomic or a plural entity, depending on its meaning.

(i)   ⟦ book ⟧={ A,B,C,D,E, A⊕B, A⊕C, A⊕D, A⊕E, B⊕C, B⊕D, B⊕E, C⊕D, C⊕E, D⊕E, A⊕B⊕C, A⊕B⊕D, A⊕B⊕E, A⊕D⊕E, B⊕C⊕D, B⊕C⊕E, B⊕D⊕E, A⊕D⊕E, A⊕C⊕E, C⊕D⊕E, A⊕B⊕C⊕D, A⊕B⊕C⊕E, B⊕C⊕D⊕E, A⊕C⊕D⊕E, A⊕B⊕D⊕E, A⊕B⊕C⊕D⊕E,}

of NP is not a fixed set across worlds, an account in terms of skolemization with world variable has the advantage of solving the fixed-set problem.

Let us apply this machinery to a similar example, now involving a clause-mate modal. Consider the sentence (26a), repeated here as (40).

> *Context: The rule of a card game for two players is such that each player is given five cards in every round. Each player can see any three cards of their choice from the other player's cards. An instructor explaining the rules to players:*

(40) do-ta   kart ro ne-mi-tun-id   be-bin-id
      two–CL card RA NEG-IMPF-can-2PL SUBJ-see-2PL
      "You can't see two of the cards."

As numeral noun phrases behave like other indefinites in their scope-taking properties, they have also been argued to contain a null choice functional determiner (Reinhart 1997; Winter 1997; Kratzer 1998; Ionin & Matushansky 2006, among others). According to this view, numeral noun phrases denote a plural individual e which is the output of a choice function f which applies to the set of all plural individuals x, such that each x is divisible into *number* non-overlapping individuals and returns a single such x. A DP such as *two of the cards* has the structure (41). It is a plural individual of type e which consists of two non-overlapping individuals, each of which is a card. This plural individual is the output of the choice function f applied on the set of all plural individuals consisting of two cards.

(41)
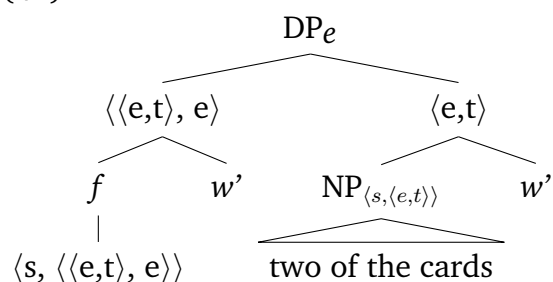
Given the denotation of the numeral noun phrase *two of the cards*, we will have (42) as the truth-conditions of (40).

(42) $\neg\exists w' \in W$ [the game rules in force in w are obeyed in w'] $\wedge$ see' (you, $f(w',($ cards$(w')))$)

This give us the intended reading. The indefinite can appear to take wider scope over negation thanks to the choice function, and as the world variable of the choice function, which is bound by the intensional operator, the indefinite is construed *de dicto*.

3.1 Other in-situ accounts

Note that the main motivation for skolemizing choice functions with a world variable is to explain the intuition that the witness of an indefinite can vary across possible worlds, even though the extension of the restrictor NP is a fixed set. As we saw in the previous section, wide pseudo-scope *de dicto* readings that do not involve a fixed set are predicted to exist under an intentional choice function Winter (1997); Heim (1994); Romero (1999). In fact, all it takes to account for wide pseudo-scope *de dicto* readings is to allow for the descriptive content of indefinite to stay under the intensional operator while the existential quantification is outscoping negation. Other in-situ approaches in terms of a default existential closure can easily generate such readings[10] , and as they do not involve choice functions, they do not even run into the fixed set problem. However, given the ease with which such accounts generate wide pseudo-scope *de dicto* readings of indefinites, we would expect such readings to be cross-linguistically more widespread than they really are.

My English consultants, all linguists, have reported that corresponding English examples also give rise to wide pseudo-scope *de dicto* readings. However, there appears to be variation among English speakers in the possibility of wide pseudo-scope *de dicto* readings of indefinites, as some English speakers reported that they find such readings hard or even impossible. Others share the reported judgments for some, but not all of the key examples. My German and French consultants find the readings impossible in their languages. A native speaker of Japanese reported that the wide pseudo-scope *de dicto* readings are available in Japanese. The judgments in Farsi are quite straightforward. I have not encountered any variations in the availability of the reported readings among my consultants. While more research needs to be done to explore cross-linguistic variation in intensional properties of indefinites that can take exceptional wide scope, the analysis presented in this paper does a better job in accounting for the apparent rarity of such readings. According to our analysis, the wide pseudo-scope *de dicto* reading of indefinites is only available if choice functional indefinite determiners in a given language come with an independent world/situation argument.

Schwarz notes that determiners can vary with respect to whether or not they combine with such a world/situation pronoun. This also opens up a locus of variation across languages. A choice functional determiner may be able to combine with a world pronoun in one language like Farsi, and not in another one, like German or French. As for English, Schwarz (2012) proposes that it can be assumed that there are two variants of the indefinite de-

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[10]The account of wide scope of indefinites in terms of topicality (Cresti, 1995; Ebert, 2009) cannot explain the data. As Ebert (2009) points out, since this account correlates topicality and wide scope, it predicts that purely unspecific *de dicto* scope indefinites cannot be topical (wide scope).

terminer *some*: one that takes a situation pronoun argument, and one that does not. It can be argued that the grammar of English speakers for whom the reported readings are impossible, only has indefinite determiners that lack a situation variable. Others might have both versions in their grammar, but show a preference for one of them.

Before ending this section, I would like to say a few word about an alternative in-situ account proposed by Brasoveanu & Farkas (2011). According to this proposal, the semantics of an indefinite determines whether the witness choice it contributes is dependent on or independent of variables that are syntactically accessible to the existential. This is represented by the choice of the superscript variable set on the existential quantifier as shown below. Given that the indefinite a^y *paper* is evaluated after the universal quantifier *every*^{x} *student*, it can be interpreted relative to the non-empty set of variables $\{x\}$ (i.e. taking narrow scope), or as fixed (i.e. taking wide scope) $\emptyset$.

(43) Every^x student read a^y paper.

    a. $\forall x[\text{STUD}(x)](\exists^{\emptyset} y[\text{PAPER}(y)](\text{READ}(x, y)))$

    b. $\forall x[\text{STUD}(x)](\exists^{\{x\}} y[\text{PAPER}(y)](\text{READ}(x, y)))$

To account for the scopal relation between negation and indefinites, Brasoveanu & Farkas (2011) take negation to be a universal quantifier over possible worlds. For instance, if the superscript on the existential is the singleton set $\{w^{@}\}$ containing the actual world variable, as in (44a), the indefinite *an umbrella* has wide scope relative to negation. If the superscript on the existential is $\{w\}$, as in (44b), the indefinite *an umbrella* has narrow scope relative to negation.

(44) John didn't bring an umbrella.

    a. $\forall w[\exists^{\{w^{@}\}} x[\text{UMBRELLA}(w^{@}, x)](\text{BRING}(w, \text{JOHN}, y))] \ (w \neq w^{@})$

    b. $\forall w[\exists^{\{w\}} x[\text{UMBRELLA}(w, x)](\text{BRING}(w, \text{JOHN}, y))] \ (w \neq w^{@})$

Like choice functional analysis, under this system allows the determiner and its restrictor to have independent world variables. However, (Brasoveanu & Farkas, 2011) do not lay out the predictions of their system about the scopal interaction between negation and modals. It seems that the existential determiner under a negated modal would need to have two world variables, one contributed by the modal and one contributed by negation. To get the wide pseudo-scope *de dicto* reading, the existential would have to be simultaneously interpreted relative to the actual world (to get the wide scope over negation) and *de dicto* with respect to the modal. This does not seem to be a plausible explanation for the availability of wide pseudo-scope *de dicto* readings.

3.2 Binder Roof Constraint

We have seen that the world-skolemized choice functions can derive the full pattern of wide pseudo-scope *de dicto* readings of indefinites in Farsi, while avoiding the overgeneration of such readings cross-linguistically. Before concluding this paper, I need to address one potential worry about choice functional accounts, which Brasoveanu & Farkas (2011) dub as the Binder Roof Constraint. Under the choice functional analysis, no limitation on the exceptional upward scope of indefinites is predicted to exist. As observed by Abusch (1993), and extensively discussed in Chierchia (2001); Schwarz (2001) and Schwarz (2011), this account overgenerates unattested readings. An indefinite cannot scope over a quantifier that binds into its restrictor. The example (45a) by Schwarz (2001) shows this. Consider a scenario where Sue wrote two papers $SP=\{S_1,S_2\}$ but only submitted S_1, and Mary wrote two papers $MP=\{M_1,M_2\}$ but only submitted M_2.

(45) a. No candidate$_1$ submitted *a* paper they$_1$ had written.

b. $(\exists)f$[No candidate$_1$ λ_1[t_1 submitted f [paper they$_1$ had written.]]]

The choice functional account can assign the LF in (45b) to the sentence (45a). This LF conveys that there's a way of choosing among papers that each candidate wrote such that no candidate submitted whatever paper is selected by f for them. As we can find such a function, namely a function that picks S_2 for Sue, and M_1 for Mary, the choice function account predicts that the sentence (45a) should be judged true in this scenario, contrary to the fact. The sentence in (45a) only means that for no candidate there is a paper they wrote that they submitted.

Several solutions in terms of restricting the domain or range of quantification for the choice function have been suggested which I will not discuss here (see (Reinhart, 1997; Kratzer, 2003; Steedman, 2007)). Rather, I would like to highlight that the Binder Roof Constraint is not as worrisome as it may seem. First, not all indefinites are subject to the Binder Roof Constraint. Schwarz (2001, 2011); Kratzer (2003) show that a corresponding sentence containing *a certain* indefinites do in fact have the reading presented in (45b). The sentence (46) is judged true in the scenario described above.

(46) No candidate$_1$ submitted *a certain* paper they$_1$ had written.

The availability of such readings is problematic for accounts that completely rule out violations of the Binder roof constraint. They undergenerate attested readings of *a certain* indefinites. Moreover, the cross-linguistic studies on the scopal properties of indefinites have revealed that the constraint doesn't hold. Renans (2018) and Dawson (2020) show that indefinites in Ga and Tiwa pattern with English *a certain* indefinites in their ability to giving rise to the wide scope reading in downward-entailing contexts. Farsi indefinites

present another case where the Binder Roof constraint doesn't hold. Indefinites in Farsi can easily outscope a downward-entailing quantifier that binds into them. The same sentence can also be true in a scenario where no one has submitted any of their assignments, with a focus on "ye".

(47) hič danešjuy-i   ye mašq-eš   ro tahvil na-dade   ast.
      any student-INDF some assignment-their RA submit NEG-give.PP AUX.3SG
      No student submitted a certain/an assignment of theirs.

This also shows that despite the fact that wide pseudo-scope *de dicto* readings are easily available to Farsi indefinites, in-situ accounts that can generate such readings but rule out violations of the binder roof constraint (Jäger, 2007; Onea, 2015) are not viable accounts for Farsi indefinites. The challenge for all accounts of indefinite scope is to derive the variation among different kinds of indefinites within and across languages. As an anonymous reviewer mentions, we might need multiple scope mechanisms to account for the diversity of indefinite expressions both within and across languages. Despite the claims to the contrary, however, choice functions remain a successful approach to account for a cross-linguistically well-attested group of indefinites.

4   Conclusion

In this paper, I have presented novel data from Farsi that show that indefinites under negated intensional operators can take wide pseudo-scope *de dicto* reading, without movement of either the indefinite or negation. I have argued that the existence of such readings create a problem for movement-based approaches to the scope of indefinites (Charlow, 2014; Demirok, 2019). The existence of true wide scope *de dicto* readings is excluded in all theories of intensionality (Keshet & Schwarz, 2019; Elliott, 2020), as DPs need to be under the scope of an intensional operator to be interpreted *de dicto*. Under a movement-based approach, wide pseudo-scope *de dicto* readings of indefinites would also fall under the category of the fourth reading. To take scope over negation, the indefinite has to move to a position higher than negation in the structure. After this movement, however, the indefinite will no longer be under the scope of the intensional operator to be construed *de dicto*.

Under in-situ accounts of indefinites, on the other hand, indefinites embedded under a negated intensional operator can appear to take wide scope over negation without having to leave their syntactic position under the scope of an intensional operator. Thus in-situ approaches can account for the wide pseudo-scope *de dicto* reading of indefinites while ruling out the existence of genuine wide scope *de dicto* readings for bona fide quantifiers.

I have also shown that such wide pseudo-scope *de dicto* reading also arises when the indefinite and the negated modal are in the same clause. The uniqueness of indefinites in giving rise to such readings provides further evidence that indefinites are inherently different from generalized quantifiers. Unavailability of such readings to generalized quantifiers shows that indefinites are not only unique in their ability to take exceptional scope, but also in their local scopal properties. Finally, I have shown that an account in terms of world-skolemized choice functions can successfully account for the full pattern of the wide pseudo-scope *de dicto* reading in Farsi while avoiding the overgeneration of such readings cross-linguistically, what few in-situ accounts can achieve.

Appendix: Neg-raising

It is worth noting that even if the reading were only observable in neg-raising contexts, the special interaction of indefinites with negation would have remained unexplained under both syntactic and semantic-pragmatic theories of neg-raising. Under the syntactic approach to neg-raising, which goes back to Fillmore (1963) and has recently been revived by Collins & Postal (2014), negation is base-generated in the embedded clause and then raises to the higher clause. The lowest instance of NEG is semantically interpreted and the highest copy of NEG is phonologically realized. This approach predicts negation, originating in the embedded clause, should be able to enter into scopal interaction with other elements in the embedded clause (Romoli, 2013). This seems to provide an easy solution to the wide pseudo-scope *de dicto* interpretation of the indefinite in (1). Negation and the indefinite *some of the books* are located in the embedded clause of *think*. The indefinite can locally move to a position above negation. This yields the intended reading of (1).

(48)
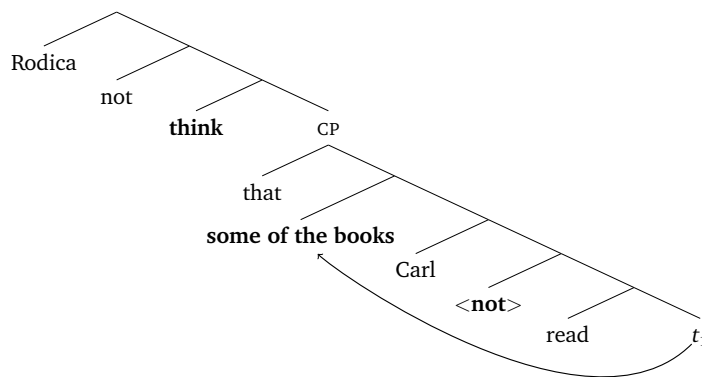
As we saw, however, indefinites are unique in taking apparent wide scope over the negation

of neg-raising predicates. Negation cannot interact scopally with other operators in the embedded clause of neg-raising predicates. In fact, given that the apparent wide scope of indefinites with respect to the negation of neg-raising predicates has gone unnoticed in the neg-raising literature,[11], it has been widely assumed that negation can only take wide scope over the complement of neg-raising predicates (Seuren, 1972; Romoli, 2013; Collins & Postal, 2014; Homer, 2015). In order to account for the unavailability of low scope of negation, which is a problem for the classical syntactic approach to neg-raising, Collins & Postal (2014) had to introduce a stipulative constraint, known as the *highest-operator constraint*, according to which negation can only be raised out of an embedded clause when it is the highest operator (Seuren, 1972; Collins & Postal, 2014). The new observation presented in this paper, makes the problem for the syntactic approach even harder, because now the highest-operator constraint has to be modified in such a way so that it does not apply to indefinites. It is not, however, clear whether the concept of operator can be defined in a way that it includes adverbs, modals, universal quantifiers, to the exclusion of indefinites.

The lack of scopal interaction between negation and operators in the embedded clause of neg-raising predicates have been taken to be an argument, in favor of the semantic-pragmatic approach to neg-raising (Bartsch 1973; Horn 1989; Gajewski 2005; Romoli 2013; Homer 2015, and Zeijlstra 2018, among others) which takes neg-raising predicates (NRP) to come with an excluded middle presupposition (or with an excluded middle alternative (Romoli, 2013)). Under this approach, negation is generated and remains in the matrix clause. The neg-raising reading is a logical consequence of this presupposition and the literal meaning of the sentence. For instance, the sentence *'John doesn't think that Bill left.'* has the presupposition that the speaker either thinks that Bill left or thinks that Bill didn't leave. Taking together the assertion, and the excluded middle presupposition, the neg-raising reading is inferred.

(49) **Assertion:** $\neg$ NRP(s) $\neg$[John thinks Bill left]

 Presupposition: NRP(s) $\vee$ NRP $\neg$(s)

                                          John thinks Bill left $\vee$ John thinks Bill didn't leave.

 $\therefore$ John thinks Bill didn't leave.

The semantics-pragmatics approach, therefore, predicts that negation should always take wide scope over the embedded proposition. As shown in (50), the wide pseudo-scope *de dicto* reading of the indefinite in (1) cannot be inferred from the assertion and the excluded

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[11]The scopal interaction of indefinites with negation under neg-raising predicates is briefly discussed in Homer (2015). He only discusses the narrow scope reading of *some* with respect to the matrix negation, in the context of PPI-hood of *some*.

middle presupposition.

(50) **Assertion:** ¬ NRP(S)   ¬[Rodica thinks [Carl read some of the books]]

Presupposition: NRP(S) ∨ NRP ¬(S)

Rodica thinks [Carl read some of the books] ∨ Rodica thinks ¬ [Carl read some of the books]

∴   Rodica thinks ¬ [Carl read some of the books]

As such, both existing approaches to neg-raising rule out the availability of wide pseudo-scope *de dicto* readings to indefinites and indefinites only. The semantic-pragmatic approach rules out the possibility of negation taking scope under the scope-taking elements within the embedded clause of neg-raising predicates. The syntactic account of neg-raising fails to explain why such readings are only available to indefinites.

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