

# Subkinds and anaphoricity: Avoid covert complexity<sup>1</sup>

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**Abstract.** This paper is about the theoretical implications of Despić's (2019) generalization regarding languages without definite articles. Applied to the number-marking Serbian and Turkish, bare plurals and uncountables can refer anaphorically to instances but not to subkinds, while bare singulars can refer anaphorically to both instances and subkinds. The first part poses a puzzle to the view that overt and covert definites are equivalent, along with the fact that overtly-definite plurals and uncountables can refer anaphorically to subkinds. I propose that the lack of equivalence is because subkind-anaphoricity is complex, and its covertness in languages without definite articles causes it to be blocked by the simpler covert operation of reference to kinds.

**Keywords:** kinds, subkinds, anaphoricity, countability, number, definiteness, definite articles, covertness, blocking, meaning preservation, ranking

## 1. Introduction

In languages without definite articles (henceforth *article-less languages*), bare nominals can be definite. However, there is debate regarding whether this reading is equivalent to the that of overt definites in languages with definite articles (Heim 2011, Dayal 2018, Šimík & Demian 2020). Recently, Despić (2019) has posed a new puzzle to the view of equivalence: Covertly-definite plurals and uncountables cannot refer anaphorically to subkinds, but overt definites can. Another part of the puzzle, presented in §2, is that covertly-definite singulars can refer anaphorically to subkinds. The latter is not surprising under Dayal (2004), where bare singulars are different from bare plurals and uncountables. However, the first part is surprising under the aspect of her framework where overt and covert definites are equivalent.

§3 presents Dayal's framework, and §4 extends it in a way which weakens the equivalence between overt and covert definites. I propose that subkind-anaphoricity is complex, and its covertness in article-less languages causes it to be blocked by the simpler covert operation of reference to kinds. §5 details the solution to Despić's puzzle, and §6 is the conclusion.

## 2. Despić's (2019) puzzle

This section presents Despić's (2019) puzzle to the view that overt and covert definites are equivalent. The first piece is that in certain article-less languages, bare nominals with cumulative reference can refer anaphorically to instances but not to subkinds. A bare nominal is a nominal without an article, determiner or quantifier, and *cumulative* covers plural and uncountable reference. This generalization manifests differently depending on whether the language is number-marking, as reviewed next.

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Beginning with non-number-marking languages, and focusing on Mandarin (Despić also reports on Japanese), bare nouns in Mandarin have cumulative reference (Rullman & You 2006). The generalization manifests as follows: Bare *shuigo* ‘fruit’ can refer anaphorically to (1) pieces of fruit, e.g. apples,<sup>2</sup> but not to (2) a kind of fruit, e.g. the apple species. *Shuigo* ‘fruit’ in (2) can only refer to fruit in general, hence the paraphrase ‘fruit is our life.’

- (1) *Woba na dai pingguofangdao zhuozi-shang,*  
 I BA that packet apple put toward table TOP  
*danshi shuigo yixia zi jiu diao-chulai le.*  
 but fruit suddenly PTCP fall.out ASP  
 ‘I put the packet with apples<sub>i</sub> on the table, but [the fruit]<sub>i</sub> immediately fell out of it.’
- (2) *Women shidai zhongpingguo. Shuigo jiu shi women de ming.*  
 we generation grow apple fruit PTCP is we GEN life  
 ‘We have been growing apples<sub>i</sub> for generations. (#That<sub>i</sub>) fruit is our life.’

Continuing to number-marking languages, they have two sorts of bare nominals with cumulative reference: Plurals and uncountables. To exemplify with Serbian (Despić also reports on Turkish and Hindi), and beginning with uncountables, bare *voće* ‘fruit’ can refer anaphorically to pieces of fruit (Despić 2019:ex.18), but not to (3) a kind of fruit, parallel to Mandarin bare *shuigo* ‘fruit’ in (1) and (2).<sup>3</sup>

- (3) *Naše mesto već generacijama proizvodi belo grožđe. Sve dugujemo voću.*  
 our town already generations produces white grape everything owe fruit.DAT  
 ‘Our town has been producing [white grape]<sub>i</sub> for generations.  
 We owe everything to (#that<sub>i</sub>) fruit.’

Continuing to plurals, bare *ptice* ‘birds’ can refer anaphorically to (4) bird specimens, but not to (5) kinds of birds. *Ptice* ‘birds’ in (5) can only refer to birds in general, hence the paraphrase ‘birds were exterminated.’ The parentheses in (5) show that anaphoricity is unavailable regardless of whether the antecedent is one or multiple kinds of birds.

- (4) *Dugo smo u našoj bašti imali beloglave orlove.*  
 Long were in our garden had white.headed.PL eagles.  
*Na žalost, ptice su juče nenadano uginule nakon kraće bolesti.*  
 Sadly birds are yesterday unexpectedly died.PL after short illness  
 ‘We had [bald eagles]<sub>i</sub> in our garden for a long time.  
 Unfortunately, [the birds]<sub>i</sub> unexpectedly died yesterday after a short illness.’
- (5) *Ceo život proučavam beloglavog orla (i zlatnog orla).*  
 whole life study-1.PRS white.headed eagle (and golden eagle).  
*Na žalost, pre deset godina ptice su istrebljene.*  
 Sadly before ten years birds are exterminated

<sup>2</sup> Here and throughout, when I write that a nominal can be anaphoric, I do not mean that it is the best choice; it is often better to use a demonstrative determiner (Despić 2019).

<sup>3</sup> Despić (2019) classifies *voće* ‘fruit’ (Serbian) as uncountable due to generally requiring a classifier phrase or a measure phrase for counting.

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‘I have been studying [the bald eagle (and the golden eagle)]; my whole life.  
Unfortunately, ten years ago (#the<sub>i</sub>) birds were exterminated.’

The second piece of the puzzle is that *the fruit* and *the birds* in English can refer anaphorically to subkinds, (6) and (7).

- (6) Where do **kiwifruit**<sub>i</sub> originate from? [...] Kiwifruit seeds were introduced into New Zealand in the 20th century [...]. At this time [**the fruit**]<sub>i</sub> was known as Chinese gooseberry. (COCA, Davies 2008–)
- (7) Last month, with little fanfare, the U.S. Fish and Wildlife Service removed two tropical birds, [**the Mariana mallard and the Guam broadbill**]<sub>i</sub>, from its list of species that are endangered. [**The birds**]<sub>i</sub> are extinct, having joined a growing list of animals that have disappeared from the face of the Earth.<sup>4</sup>

The preceding data pose a puzzle to the view that overt and covert definites are equivalent. Specifically, if the licenser of instance-anaphoricity in (1) by bare *shuigo* ‘fruit’ (Mandarin) is a covert version of *the*, then why does it not license subkind-anaphoricity in (2), which is possible with *the fruit* in (6)? Similarly, if the licenser of instance-anaphoricity in (4) by bare *ptice* ‘birds’ (Serbian) is a covert version of *the*, then why does it not license subkind-anaphoricity in (5), which is possible with *the birds* in (7)?

The last piece of the puzzle is that in Serbian and Turkish, bare singulars can refer anaphorically to subkinds, e.g. (8) (Serbian). There is thus a minimal contrast where bare *ptice* ‘birds’ in (5) cannot refer anaphorically to subkinds, but bare *ptica* ‘bird’ in (8) can.<sup>5</sup>

- (8) *Ceo život proučavam beloglavog orla.*  
whole life study-1.PRS white.headed eagle  
*Na žalost, pre deset godina ptica je istrebljena.*  
Sadly before ten years bird is exterminated  
‘I have been studying [the bald eagle]<sub>i</sub>; my whole life.  
Unfortunately, ten years ago [the bird]<sub>i</sub> exterminated.’

Consider the three pieces of the puzzle: (i) Bare singulars in Serbian and Turkish can refer anaphorically to subkinds, (ii) bare plurals and uncountables in the same languages cannot refer anaphorically to subkinds, and (iii) overtly-definite plurals and uncountables in English can refer anaphorically to subkinds. The next section shows that (i–ii) are not surprising under Dayal (2004), where bare singulars are different from bare plurals and uncountables. However, (ii–iii) are surprising under the aspect of Dayal’s framework where overt and covert definites are equivalent. Dayal’s framework is thus both challenged by Despić’s puzzle, and it serves as the basis to the solution in §4–5.

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<sup>4</sup> Retrieved 5 November 2023 from <https://www.pewtrusts.org/en/about/news-room/opinion/2004/03/15/one-by-one-the-world-is-becoming-a-lonelier-place>.

<sup>5</sup> Not all article-less languages allow bare singulars to refer anaphorically to subkinds. In Czech, bare nominals cannot be anaphoric at all (Šimík 2021), which extends to subkinds (Mojmír Dočekal p.c.).

Before proceeding, a terminological note is in order regarding *kind* and *subkind*. In terms of the sort of referent, most of the preceding nominals are kind-denoting. However, there is a difference in how the kinds relate to the nominals. In some cases, the nominal denotes the kind corresponding to the noun, e.g. bare *ptice* ‘birds’ in (5) denotes the bird class (Latin name *Aves*). In other cases, the nominal denotes one or multiple kinds which stand in the subkind relation with the kind corresponding to the noun (Schoenfeld 2022). For example, bare *ptica* ‘bird’ in (8) denotes the bald eagle species. To make this distinction, I say that the former nominals are kind-denoting, and the latter are subkind-denoting.

### 3. Basis for solution

This section presents the aspects of Dayal’s (2004) framework which serve as the basis to the solution of Despić’s puzzle. §3.1 presents Dayal’s argument that number-marking languages have two sorts of kind terms, §3.2 presents Dayal’s two operations for kinds, and §3.3 extends Dayal’s framework in a way which accounts for the pattern in article-less languages, but with incorrect predictions for English. §3.4 then introduces Dayal’s ranking between covert operations, which is extended in §4 to solve Despić’s puzzle in §5.

#### 3.1. Number in kind terms

This subsection presents Dayal’s argument that in number-marking languages, singular kind terms are more restricted than plural and uncountable kind terms. For Dayal, a kind term is a nominal which can be kind-denoting, and is analyzed as kind-denoting in cases of generic and existential quantification (Carlson 1980, Chierchia 1998). For example, *snow*, *tigers* and *the tiger* are respectively an uncountable, a plural, and a singular kind term.

In English, singular kind terms are more restricted than plural and uncountable kind terms in three ways: (i) They are restricted to well-established kinds, (ii) they cannot contribute narrow existential quantification, and (iii) their non-definite reference to instances is restricted to representative objects, as reviewed next.

First, a well-established kind is a kind which is well-established in the shared knowledge of the interlocutors (Krifka 1987). Uncountable and plural kind terms are not restricted to such kinds, (9a) and (9b), but singulars are, (9c) (Krifka et al. 1995).

- (9) a. Gold which is hammered flat is usually opaque.  
 b. Green bottles usually have narrow necks.  
 c. ??The green bottle usually has a narrow neck.

Continuing to narrow existential quantification, uncountable and plural kind terms can contribute such quantification, (10a) and (10b), but singulars cannot, (10c).

- (10) Yesterday between four and nine,  
 a. each time snow entered, the police melted it.  
 b. each time thieves entered, the police arrested them.  
 c. #each time the thief entered, the police arrested him.

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Finishing with representative objects, if *the tiger* in (11c) is used to express that the speakers filmed a number of tiger specimens, then they are implied to represent the tiger species (Krifka et al. 1995, Chierchia 1998). This is absent from *tigers* in (11b), which is compatible with the speakers only filming atypical tigers (e.g. ones with three legs), and it is also absent from *snow* in (11a), which is compatible with only atypical snow falling in India.

- (11) a. In India, snow is falling. *compatible with only atypical snow falling*  
 b. In India, we filmed tigers. *compatible with only atypical tigers being filmed*  
 c. In India, we filmed the tiger. *implies representative tigers were filmed*

Based on English, one might suspect that the restrictions of singular kind terms are due to the definite article. However, Dayal argues that the real culprit is number. This argument is based on two sorts of languages where kind terms are uniform with respect to definite articles: (i) Languages without definite articles, e.g. Hindi, and (ii) languages where all kind terms have definite articles, e.g. Italian. This argument utilizes singular and plural kind terms because they more easily form minimal pairs compared to uncountable kind terms.

Beginning with the restriction to well-established kinds, Dayal argues via (12) (Hindi) and (13) (Italian) that between singular and plural kind terms, only the former exhibit the restriction. This is orthogonal to definite articles, because both kind terms in (12) and (13) respectively lack and have a definite article.

- (12) *anu mahangii {\*kitaab, kitaabeN} bectii hai.* (Dayal 1999)  
 Anu sells book books expensive is  
 ‘Anu sells expensive books.’

- (13) a. *#La tigre a tre zampe è facile da cacciare.* (Dayal 2004)  
 the tiger with three legs is easy to Hunt  
 ‘The tiger with three legs is easy to hunt.’  
 b. *Le tigre a tre zampe sono facili da cacciare.*  
 the.PL tigers with three legs are easy.PL to hunt  
 ‘Tigers with three legs are easy to hunt.’

Continuing to narrow existential quantification, Dayal argues via (14) (Russian) and (15) (Italian) that between singular and plural kind terms, only the latter can contribute such quantification. This again is orthogonal to definite articles, because both kind terms in (14) and (15) respectively lack and have a definite article.

- (14) *Vchera, mezhdu 3-myai 5-yu, kazhdyi raz kogda*  
 yesterday between 3 and 5 each time when  
 ‘Yesterday, between 3 and 5, each time...’  
 a. *#vor zaxodil v dom, polizia arrestovyvala ego.*  
 thief enter to house police arrested him  
 ‘...the thief entered the house, the police arrested him.’  
 b. *vory zaxodili v dom, polizia arrestovyvala ix.*  
 thieves enter.PL to house police arrested them  
 ‘...thieves entered the house, the police arrested them.’

- (15) *Ieri tra le 4 e le 9, ogni volta che*  
 yesterday between four.o'clock and nine.o'clock each time that  
 'Yesterday between 4 and 9, each time...'
- a. *#il ladro è entrato, la polizia lo ha arrestato.*  
 the thief is entered the police him has arrested  
 '...the thief entered, the police arrested him.'
- b. *i ladri sono entrati, la polizia li ha arrestati.*  
 the thieves are entered the police them has arrested  
 '...thieves entered, the police arrested them.'

Finishing with representative objects, they have received less cross-linguistic attention than the previous two phenomena. Still, Sağ (2022) argues that the restriction occurs in Turkish, which lacks definite articles, so it too is a potential cross-linguistic restriction of singular kind terms which is orthogonal to definite articles.

Following the argument that number-marking languages have two sorts of kind terms, Dayal posits two operations for kinds, presented next.

### 3.2. Operations for kinds

This subsection presents Dayal's (2004) two operations for kinds. The first, due to Chierchia (1998), maps a property to the function from situations to the maximal instance of the property, if the function is in the interpretation domain of kinds, (16) (abbreviated as  $\overset{\cap}{\cdot}$ ).

$$(16) \lambda P. \begin{cases} \lambda s. \iota P_s & (\text{if } \lambda s. \iota P_s \text{ is in the interpretation domain of kinds,} \\ & \text{undefined otherwise)} \end{cases}$$

Crucially, the two presuppositions of  $\overset{\cap}{\cdot}$  make it undefined for singular properties. The first comes from  $\iota$ , which presupposes that the input set has a maximal element. Consequently,  $\overset{\cap}{\cdot}$  presupposes that every extension of  $P$  has a maximal element. This however fails for non-singleton singular properties, e.g. TIGER; in situations with multiple tiger specimens, TIGER lacks a maximal element. As for singleton properties,  $\overset{\cap}{\cdot}$  is undefined for them due to the presupposition that  $P$  corresponds to a kind, plus Chierchia's (1998) stipulation that singleton properties do not correspond to kinds.

Unlike  $\overset{\cap}{\cdot}$  being undefined for singular properties, it is defined for all plural and uncountable properties which correspond to kinds (a counter-example is *parts of that machine*, cf. §3.4). Thus,  $\overset{\cap}{\cdot}$  is Dayal's operation for plural and uncountable kind terms.

As for singular kind terms, Dayal initially proposes that they utilize  $\iota$  applied to the taxonomic reading of the noun. I assume for concreteness that this reading comes from an operation, notated as TAXON, which applies to an instance-level property. For example, TIGER is the property over tiger specimens, and TAXON(TIGER) is a property over kinds of tigers (cf. Schoenfeld 2022, where TAXON is notated as SUBK). In the countability literature, TAXON is known as the universal sorter (Bunt 1985, Chierchia 2010). Thus, Dayal's initial proposal is that *the tiger* as a kind term denotes  $\iota \circ \text{TAXON}(\text{TIGER})$

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In a later section, Dayal notes that her initial proposal incorrectly predicts that uncountable kind terms in English should be modifiable with the definite article, contra (17). This is because  $\iota \circ \text{TAXON}$  (realized as *the*) is applicable to uncountable properties like WINE.

- (17) (\*The) wine comes in several varieties,  
          (\*the) red wine, (\*the) white wine and (\*the) rosé. (Dayal 2004)

To account for (17), Dayal posits that the operation for singular kind terms is restricted to singular properties. I define the operation in (18), which I abbreviate as  $\iota \sqsupset \text{TAXON}$ , in anticipation of notation introduced in §4.<sup>6</sup>

- (18)  $\lambda P. \iota \sqsupset \text{TAXON}(P)$  (if P is singular, undefined otherwise)

For Dayal,  $\iota \sqsupset \text{TAXON}$  being restricted to singular properties is connected to it resolving a tension which only arises with such properties. On the one hand, kinds are conceptually associated with plurality, i.e. a kind tends to have multiple instances. On the other hand, singular properties exclusively range over atoms, unlike plural and uncountable properties.

The presuppositions of  $\overset{\circ}{\iota}$  and  $\iota \sqsupset \text{TAXON}$  mean that they are respectively restricted to properties which are (i) plural or uncountable, and (ii) singular. This is the first ingredient in Dayal's account of the contrasts in §3.1. The second is that due to the singular morphology of the noun, the output of  $\iota \sqsupset \text{TAXON}$  is an atomic kind, which is responsible for the limitations of singular kind terms (see Dayal 2004 for details).

Lastly, to account for the contrasts in §3.1 being orthogonal to definite articles, Dayal posits that (i)  $\overset{\circ}{\iota}$  and  $\iota \sqsupset \text{TAXON}$  are covert in article-less languages, (ii) the definite article lexicalizes  $\iota \sqsupset \text{TAXON}$ , and (iii) the definite article may or may not also lexicalize  $\overset{\circ}{\iota}$ , which is Dayal's respective analysis of Italian and English. The two operations for kinds are thus mutually-exclusive regardless of whether they are covert or lexicalized as definite articles, thus accounting for the contrasts in §3.1 being orthogonal to definite articles.

In conclusion, Dayal's framework is designed to account for differences between singular vs. plural and uncountable kind terms. Thus, it serves as a good basis to account for the aspect of Despić's (2019) puzzle where in article-less languages, plural and uncountable kind terms are more restricted in subkind-anaphoricity. However, the next subsection shows that Dayal's framework is challenged by the piece of the puzzle where overtly-definite plurals and uncountables can refer anaphorically to subkinds.

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<sup>6</sup> Dayal (2004) notates the operation for singular kind terms as  $*\overset{\circ}{\iota}(\text{SING}) \rightarrow \iota X[\text{P}_{\text{TAXONOMIC}}(X)]$ . This suggests that it applies only after  $\overset{\circ}{\iota}$  fails to apply to a singular property, which in turn suggests that it is in some sense blocked by  $\overset{\circ}{\iota}$ . This however cannot be part of Revised Meaning Preservation (RMP, see §3.4); RMP is a ranking between covert operations, but the operation for singular kind terms is restricted to singular properties regardless of whether it is overt or covert.

### 3.3. Incorrect extension

Despić (2019) argues that the pattern in article-less languages follows from Dayal's (2004) framework. Here I argue that the framework needs to be extended. I show here an incorrect extension, followed by a correct one in §4.

First, a trivial extension of Dayal's framework is that  $\iota \square$  TAXON licenses subkind-anaphoricity (in addition to reference to the maximal subkind). However, to account for the pattern in article-less languages, one should also assume that  $\iota \square$  TAXON is the only licenser of subkind-anaphoricity. Next I detail the account, followed by the incorrect prediction for English.

Beginning with bare plurals and uncountables, recall from §2 that in Serbian, bare *voće* 'fruit' and bare *ptice* 'birds' cannot refer anaphorically to subkinds. Following the extension of Dayal (2004) where  $\iota \square$  TAXON is the only licenser of subkind-anaphoricity, it cannot license that in (3) and (5) (below) due to being restricted to singular properties.  $\overset{\cap}{\iota}$  by contrast is applicable, hence these bare nominals can be kind-denoting but not subkind-anaphoric.

- (3) *Našem mestu već generacijama proizvodi belo grožđe. Sve dugujemo voću.*  
 our town already generations produces white grape everything owe fruit.DAT  
 'Our town has been producing [white grape]<sub>i</sub> for generations.  
 We owe everything to (#that<sub>i</sub>) fruit.'

- (5) *Ceo život proučavam beloglavog orla (i zlatnog orla).*  
 whole life study.1.PRS white.headed eagle (and golden eagle).  
*Na žalost, pre deset godina ptice su istrebljene.*  
 Sadly before ten years birds are exterminated  
 'I have been studying [the bald eagle (and the golden eagle)]<sub>i</sub> my whole life.  
 Unfortunately, ten years ago (#the<sub>i</sub>) birds were exterminated.'

Unlike  $\iota \square$  TAXON being inapplicable in (3) and (5), it is applicable to bare *ptica* 'bird' in (8) (below), hence subkind-anaphoricity is licensed.

- (8) *Ceo život proučavam beloglavog orla.*  
 whole life study.1.PRS white.headed eagle  
*Na žalost, pre deset godina ptica je istrebljena.*  
 Sadly before ten years bird is exterminated  
 'I have been studying [the bald eagle]<sub>i</sub> my whole life.  
 Unfortunately, ten years ago [the bird]<sub>i</sub> exterminated.'

Finishing with non-number marking languages, the precise account of (2) (below) depends on whether bare *shuigo* 'fruit' (Mandarin) is analyzed as basically denoting a kind (Chierchia 1998) or a property (Rullman & You 2006). If the former, then bare *shuigo* 'fruit' denotes the fruit kind, which yields the attested reading of (2). If the latter, then  $\overset{\cap}{\iota}$  but not  $\iota \square$  TAXON is applicable to the property, hence bare *shuigo* 'fruit' can be kind-denoting but not subkind-anaphoric. Note that this data does not distinguish between the two analyses.

- (2) *Women shidai zhongpingguo. Shuigo jiu shi women de ming.*



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we generation grow apple fruit PTCP is we GEN life

‘We have been growing apples<sub>i</sub> for generations. (#That<sub>i</sub>) fruit is our life.’

Alarmingly, the present extension of Dayal (2004) incorrectly predicts that overtly-definite plurals and uncountables in English should lack subkind-anaphoricity, contra (6) (*the fruit*) and (7) (*the birds*). In this extension,  $\iota^{\square}$  TAXON (lexicalized as *the*) is the only licenser of subkind-anaphoricity, but it is inapplicable to plural and uncountable properties.

In general,  $\iota^{\square}$  TAXON is restricted to singular properties regardless of whether it is overt or covert, so it cannot distinguish between overt and covert definites. Thus, although the pattern in article-less languages follows from a minor extension of Dayal (2004), a more major extension is needed for the distinction between overt and covert definites. The next subsection introduces the aspect of Dayal’s framework which allows to make the distinction.

### 3.4. Ranking

This subsection introduces Ranking, which is Dayal’s (2018) redubbing of (Revised) Meaning Preservation (Chierchia 1998, Dayal 2004). Ranking is a relation between covert operations where  $OP_1 > OP_2$  means that  $OP_2$  is applicable only if  $OP_1$  is inapplicable. The remainder of this paper distinguishes between overt and covert definites by introducing a lower-ranked licenser of subkind-anaphoricity, meaning it is more limited as covert.

As background, Chierchia (1998) introduces Ranking to explain which bare plurals in English can contribute wide existential quantification. For example, (19a) *parts of that machine* can, but (19b) *machines* cannot.

- (19) a. John didn’t see parts of that machine.  $\surd \exists > \neg (\surd \neg > \exists)$   
 b. John didn’t see machines.  $\times \exists > \neg (\surd \neg > \exists)$

In Chierchia’s framework, obligatorily-narrow existential quantification as in (19b) is mediated by  $\overset{\square}{\exists}$  (via Derived Kind Predication), whereas scopally-flexible quantification as in (19a) is licensed by covert  $\exists$ . The task is thus to explain why between  $\overset{\square}{\exists}$  and  $\exists$ , only the former can apply to *machines*, while the latter can apply to *parts of that machine*.

Chierchia’s answer is that  $\overset{\square}{\exists}$  is ranked above  $\exists$ . Thus,  $\overset{\square}{\exists}$  being applicable to *machines* blocks  $\exists$ , so *machines* cannot contribute wide existential quantification in (19b). By contrast,  $\overset{\square}{\exists}$  is inapplicable to *parts of that machine* due to the property not corresponding to a kind (cf. §3.1), so  $\exists$  can contribute wide existential quantification in (19b). This ranking is because  $\overset{\square}{\exists}$  is more meaning-preserving, which amounts to it being non-quantificational, unlike  $\exists$ .

Building on Chierchia, Dayal (2004) expands Ranking by positing that  $\overset{\square}{\exists}$  is unranked with  $\iota$  and  $\iota^{\square}$  TAXON, yielding (20). In subsequent works, Dayal advertises Ranking without  $\iota^{\square}$  TAXON, but next I show that it is crucial to her analysis.

- (20)  $\{\overset{\square}{\exists}, \iota, \iota^{\square} \text{ TAXON}\} > \exists$  (Dayal 2004:ex.88)

Dayal uses (20) to account for certain ambiguities in article-less languages. First, the non-ranking between  $\overset{\square}{\exists}$  and  $\iota$  accounts for (21) (Hindi), where the bare plural *kutte* ‘dogs’ denotes

the kind or contextually salient instances. These readings respectively utilize  $\hat{\cdot}$  and  $\iota$ , and neither blocks the other under (20), hence (21) is ambiguous.

(21) *kutte habut bhau Nkte haiN.* (Dayal 2004)

dogs lot bark are

(i) ‘Dogs (in general) bark a lot.’ ~ (ii) ‘The (salient) dogs bark a lot.’

Next, the non-ranking in (20) between  $\iota$  and  $\iota \circ \text{TAXON}$  accounts for bare singulars like *kutta* ‘dog’ exhibiting ambiguity parallel to (21) (Dayal 2004). The readings utilize  $\iota$  and  $\iota \circ \text{TAXON}$ , and neither blocks the other under (20), hence bare singulars are ambiguous between definite (via  $\iota$ ) and kind-denoting (via  $\iota \circ \text{TAXON}$ ).

The Ranking in (20) is derived from Chierchia’s (1998) idea that quantifiers are lower-ranked. However, Dayal (2013) argues that  $\exists$  is not in the domain of Ranking; this would leave three unranked operations, which would call into question the need for Ranking. As a counter-point, Despić’s (2019) puzzle demonstrates the need for Ranking; covert definites are more limited than overt ones in subkind-anaphoricity, which would follow if a licenser of subkind-anaphoricity is lower-ranked. The next section derives Ranking in a way which introduces such an operation, thus solving Despić’s puzzle in §5.

#### 4. Deriving Ranking

This section achieves the quadruple goal of (i) deriving that  $\hat{\cdot}$  is restricted to properties which correspond to kinds (Chierchia 1998), (ii) deriving that  $\iota \circ \text{TAXON}$  is restricted to singular properties (Dayal 2004), (iii) deriving Dayal’s (2004) Ranking, and (iv) deriving an extension to Ranking which solves Despić’s (2019) puzzle in §5.

As the first step towards (i–ii), I conceive of  $\hat{\cdot}$  and  $\iota \circ \text{TAXON}$  as being shaped by Expressibility and Resourcefulness, which respectively state that (i) kind-reference should be accessible to as many sorts of nominals as possible,<sup>7</sup> and (ii) operations for kinds should utilize already-available operations. I formalize the latter operations as being in OP, which includes  $\hat{\cdot}$  (intensionalization),  $\iota$  and TAXON, but not PL (pluralization, see below). OP is closed under function composition, and its relevant subset is in (22).

$$(22) \left\{ \begin{array}{l} \hat{\cdot} \circ \iota \circ \text{TAXON} \\ \hat{\cdot} \circ \text{TAXON} \quad \iota \circ \text{TAXON} \\ \hat{\cdot} \quad \iota \quad \text{TAXON} \end{array} \right\} \text{(subset of OP}^8\text{)}$$

As a brief detour, the solution to Despić’s puzzle in §5 relies on PL (and its compositions) being excluded from OP. This is derivable from the operations in (22) being universal, i.e. they are available in all languages, with variation in whether they are overt or covert. Indeed, Rullman & You (2006) argue that PL is not universal; if it were, then it would be covert in Mandarin, and nouns would be ambiguous between singular and plural, contra the fact.

<sup>7</sup> I am using *kind-reference* as defined in §2, where a nominal denotes the kind corresponding to the noun.

<sup>8</sup> The input of TAXON is an (intensional) property (Schoenfeld 2022 and references therein), so  $\text{TAXON} \circ \hat{\cdot}$  is identical to TAXON, and  $\text{TAXON} \circ \iota$  is illicit. The input of  $\iota$  is a set, so  $\iota \circ \hat{\cdot}$  is illicit.



(24b–c) are part of the generalization that  $\hat{\iota}$  is less restricted than  $\iota \circ \text{TAXON}$ . Thus, the former takes priority as serving as the basis for a duplicate which increases Expressibility. It specifically serves as the basis for  $\hat{\iota}$ , whose only difference from  $\hat{\iota}$  is being restricted to kinds (Chierchia 1998).  $\hat{\iota}$  fails Expressibility because it is not dedicated to kinds, and the restriction of  $\hat{\iota}$  is the minimal difference needed to achieve Expressibility.

An implication of  $\hat{\iota}$  and  $\hat{\iota}$  being distinct is that they can differ in lexicalization. Thus, there can be languages where  $\hat{\iota}$  is lexicalized as the definite article while  $\hat{\iota}$  is covert, e.g. English (Chierchia 1998, Dayal 2004).

$\hat{\iota}$  increases Expressibility for plural and uncountable nominals, but not for singular nominals, because it is inapplicable to singular properties (§3.2). A different operation is needed, and  $\iota \circ \text{TAXON}$  is the next best candidate. However, recall from (23) that it stops short at achieving Expressibility due to not licensing reference to the maximal subkind. It therefore serves as the basis for a duplicate which licenses reference of the maximal subkind.

If the above were the only difference between  $\iota \circ \text{TAXON}$  and its duplicate, then the latter would be applicable to non-singular properties along with  $\hat{\iota}$ . This however would not increase Expressibility;  $\hat{\iota}$  is strictly less restricted than  $\iota \circ \text{TAXON}$  (and any duplicate thereof) among non-singular properties, e.g. only  $\hat{\iota}$  is applicable to human properties.

The purpose of the duplicate of  $\iota \circ \text{TAXON}$  is to achieve Expressibility for singular nominals, which I posit is reflected by the duplicate being restricted to singular properties. This derives Dayal's (2004) operation for singular kind terms, notated here as  $\iota \square \text{TAXON}$ .

The previous paragraph derives that  $\iota \square \text{TAXON}$  is available only in languages with singular properties, i.e. number-marking languages. Non-number-marking languages like Mandarin lack such properties (Rullman & You 2006), so  $\hat{\iota}$  suffices for Expressibility.

After deriving the presuppositions of  $\hat{\iota}$  and  $\iota \square \text{TAXON}$ , which are in the domain of Ranking, I derive the domain itself. I first appeal to DUP, the language-specific set of duplicates of composed operations in OP. DUP includes  $\hat{\iota}$ , plus  $\iota \square \text{TAXON}$  in number-marking languages. With that, I posit that the domain of Ranking is the argumental and covert subset of  $\text{OP} \cup \text{DUP}$ . Based on the subset of OP in (22), and setting aside irrelevant composed operations, we get the domains in (25) for article-less languages with and without number-marking; the only difference is that the former include  $\iota \square \text{TAXON}$ .

- (25) a.  $\{\hat{\iota}, \iota, \iota \square \text{TAXON}, \iota \circ \text{TAXON}\}$  *Serbian, Turkish, Hindi*  
 b.  $\{\hat{\iota}, \iota, \iota \circ \text{TAXON}\}$  *Mandarin, Japanese*

I lastly derive Ranking by positing, using the purposefully vague term *complex*, that complex operations are lower-ranked. Thus, Ranking amounts to avoidance of complex covert operations, if simpler ones are applicable (Avoid Covert Complexity, ACC).

With ACC, one can derive Chierchia's (1998) lower-ranking of  $\exists$  by quantification introducing complexity. If this were the only source of complexity, then the non-quantificational  $\hat{\iota}$  and  $\iota \circ \text{TAXON}$  would be equally-ranked. However, this would incorrectly predict that in article-less

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languages, bare plurals and uncountables would be ambiguous between kind-denoting (via  $\overset{\circ}{\iota}$ ) and subkind-anaphoric (via  $\iota \circ \text{TAXON}$ ). I therefore posit a different source of complexity, namely function composition ( $\circ$ ). Based on (25),  $\circ$  as a source of complexity yields the Rankings in (26). Recall that  $\overset{\circ}{\iota}$  and  $\iota \circ \text{TAXON}$  are duplicates of composed operations, but they themselves are not composed, hence they are higher-ranked. A duplicate is distinct from its original in that it can be lexicalized differently (see earlier on  $\overset{\circ}{\iota}$ ), plus it counts as simplex for the purposes of Ranking.

- (26) a.  $\{\overset{\circ}{\iota}, \iota, \iota \circ \text{TAXON}\} > \iota \circ \text{TAXON}$  *Serbian, Turkish, Hindi*  
 b.  $\{\overset{\circ}{\iota}, \iota\} > \iota \circ \text{TAXON}$  *Mandarin, Japanese*

As an alternative to  $\iota \circ \text{TAXON}$  being lower-ranked in (26) due to composition, recall from (23) that  $\iota \circ \text{TAXON}$  does not license reference to the maximal subkind, unlike  $\iota \circ \text{TAXON}$ . The maximal subkind corresponds to the meaning of a noun in a kind term, so one can say that  $\iota \circ \text{TAXON}$  is more meaning-preserving (Chierchia 1998) than  $\iota \circ \text{TAXON}$ .

Regardless of whether (26) is derived from complexity or meaning-preservation, it derives Dayal's (2004) triple non-ranking between  $\overset{\circ}{\iota}$ ,  $\iota$ , and  $\iota \circ \text{TAXON}$ , in a way which also introduces the lower-ranked  $\iota \circ \text{TAXON}$ . Both of the latter operations license subkind-anaphoricity, but only  $\iota \circ \text{TAXON}$  weakens the equivalence between overt and covert definites, which is needed to solve Despić's puzzle; the overt version is exempted from Ranking, whereas the covert version is blocked by  $\overset{\circ}{\iota}$ . §5 shows how this solves Despić's puzzle.

Beforehand, after identifying  $\iota \circ \text{TAXON}$  and  $\iota \circ \text{TAXON}$  as licensors of subkind-anaphoricity, the question remains of whether there are additional licensors, e.g.  $\iota$ . Specifically, if a nominal is subkind-denoting without TAXON, e.g. a nominal built on *species*, does  $\iota$  license anaphoricity? As background, consider the anaphoric plural *the species* in (27).

- (27) [**A. ocellaris**]<sub>i</sub> is the second most commonly imported marine ornamental fish species worldwide. Its close cousin [**A. percula**]<sub>j</sub>, however, is the clownfish more commonly imported into the United States. [...] [**The species**]<sub>i+j</sub> are almost identical, except for some minor color differences. (COCA)

(27) does not determine whether  $\iota$  licenses subkind-anaphoricity; *the* is three ways ambiguous between  $\iota$ ,  $\iota \circ \text{TAXON}$ , and  $\iota \circ \text{TAXON}$ , and it is unknown which is used in (27). Crucially, this can be settled with Serbian. Recall from §2 that bare *ptice* 'birds' can refer anaphorically to instances but not to subkinds. We assume that the first reading utilizes  $\iota$ , so we predict that if  $\iota$  licenses subkind-anaphoricity, it should license that for bare *vrste* 'species.PL'. This however is not borne out in (28), where *vrste* can only be anaphoric with *ove* 'these' or *obe* 'both'. This plays a role in the next section, which solves Despić's puzzle.

- (28) *Beloglavi sup (Gyps fulvus) je vrsta lešinara srednje veličine koja*  
 white-headed vulture Gyps fulvus is species scavenger middle size which  
*naseljava suptropski klimatski pojas i veoma je popularna u Srbiji. Slična*  
 inhabits subtropical climatic area and very is popular in Serbia similar  
*vrsta je orao krstaš (Aquila heliaca) – to je imponantna grabljivica,*  
 species is eagle cross Aquila heliaca – that is impressive bird.of.prey

<i>koja</i>	<i>je nekada</i>	<i>naseljavala</i>	<i>široke</i>	<i>predele</i>	<i>Evroazije.</i>
which	is sometime	inhabited	wide	areas	Euroasia
<i>#Vrste</i>	<i>su među</i>	<i>veoma</i>	<i>ugroženim,</i>	<i>pre</i>	<i>svega</i>
species.PL	are among	very	endangered	before	everything
<i>zbog</i>	<i>krivolova</i>	<i>i</i>	<i>gubitka</i>	<i>staništa.</i>	
because	poaching	and	loss	habitat	

‘[**The Eurasian griffon vulture**]<sub>i</sub> is a mid-size scavenger species, which inhabits the subtropical climate area and is very popular in Serbia. A similar species is [**the Eastern Imperial Eagle**]<sub>j</sub> – this is a big bird of prey, that used to inhabit wide areas across Eurasia. [**Species**]<sub>#i+j</sub> are among the very endangered ones, primarily because of the loss of habitat and poaching.’

## 5. Solving Despić’s puzzle

This section details how the Ranking in §4 solves Despić’s (2019) puzzle. This is akin to the near-solution in §3.3, except here I account for the difference between overt and covert definites. The next subsection begins with non-number-marking languages.

### 5.1. No number-marking

This subsection accounts for the pattern in non-number-marking languages where bare nominals can refer anaphorically to instances but not to subkinds. As in §3.3, the precise account of (2) (below) depends on whether bare *shuigo* ‘fruit’ (Mandarin) is analyzed as basically denoting a kind (Chierchia 1998) or a property (Rullman & You 2006). If the former, then the denotation of *shuigo* ‘fruit’ yields the attested reading of (2). If the latter, then there is mismatch between *shuigo* ‘fruit’ being argumental and denoting a property. This is resolvable with <sup>∩</sup>, which blocks the lower-ranked  $\iota \circ \text{TAXON}$ , which in turn the only licenser of subkind-anaphoricity in Mandarin (recall that non-number marking languages lack  $\iota \circ \text{TAXON}$ ). Thus, bare *shuigo* ‘fruit’ can be kind-denoting but not subkind-anaphoric in (2).

- (2) *Women shidai zhongpingguo. Shuigo Jiu shi women de ming.*  
 we generation grow apple fruit PTCP is we GEN life  
 ‘We have been growing apples<sub>i</sub> for generations. (#That<sub>i</sub>) fruit is our life.’

Unlike <sup>∩</sup> blocking  $\iota \circ \text{TAXON}$ , it does not block the equally-ranked  $\iota$ , hence bare *shuigo* ‘fruit’ can refer anaphorically to pieces of fruit (§2). Thus, the reason that certain bare nominals can refer anaphorically to instances but not to subkinds is that <sup>∩</sup> blocks  $\iota \circ \text{TAXON}$ , but not  $\iota$ . The next subsection turns to number-marking languages.

### 5.2. Uncountables

This subsection accounts for why covertly-definite uncountables cannot refer anaphorically to subkinds, but overt definites can. Beginning with the former, bare *voće* ‘fruit’ (Serbian) is covertly-definite in that it can refer anaphorically to pieces of fruit (Despić 2019:ex.18). However, it lacks subkind-anaphoricity in (3) (below). (3) has a mismatch between *voće* being

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argumental and denoting a property, which is only resolvable with  $\overset{\circ}{\iota}$ ;  $\iota^\circ$  TAXON is lower ranked, and  $\iota^\square$  TAXON is inapplicable to uncountable properties. Thus, bare *voće* ‘fruit’ can be kind-denoting but not subkind-anaphoric in (3).

- (3) *Naše mesto već generacijama proizvodi belo grožđe. Sve dugujemo voću.*  
 our town already generations produces white grape everything owe fruit.DAT  
 ‘Our town has been producing [white grapes]<sub>i</sub> for generations.  
 We owe everything to (#that<sub>i</sub>) fruit.’

Unlike  $\overset{\circ}{\iota}$  blocking  $\iota^\circ$  TAXON, it does not block the equally-ranked  $\iota$ , hence bare *voće* ‘fruit’ can refer anaphorically to pieces of fruit (Despić 2019:ex.18). As for overt definites,  $\iota^\circ$  TAXON is lexicalized as *the* in English, meaning it is exempted from Ranking, hence *the fruit* can refer anaphorically to subkinds (§2).

As an interim summary, the analysis in §3.3 fails because  $\iota^\square$  TAXON is the only licenser of subkind-anaphoricity; it is inapplicable to uncountable properties regardless of whether it is overt or covert, so it cannot distinguish between overt and covert definites. By contrast, here the distinction is made with  $\iota^\circ$  TAXON as an additional licenser of subkind-anaphoricity, whose lower-ranking means that it is more limited as covert. The next subsection turns to plurals.

### 5.3. Plurals

This subsection accounts for why covertly-definite plurals cannot refer anaphorically to subkinds, but overt definites can. Beginning with the former, bare *ptice* ‘birds’ (Serbian) is covertly-definite in that it can refer anaphorically to bird specimens (§2). However, it lacks subkind-anaphoricity in (5) (below). (5) has a mismatch between *ptice* ‘birds’ being argumental and denoting a property, which as before is only resolvable with  $\overset{\circ}{\iota}$ ;  $\iota^\circ$  TAXON is lower ranked, and  $\iota^\square$  TAXON is inapplicable to plural properties. Thus, bare *ptice* ‘birds’ can be kind-denoting but not subkind-anaphoric in (5).

- (5) *Ceo život proučavam beloglavog orla (i zlatnog orla).*  
 whole life study.1.PRS white.headed eagle (and golden eagle).  
*Na žalost, pre deset godina ptice su istrebljene.*  
 Sadly before ten years birds are exterminated  
 ‘I have been studying [the bald eagle (and the golden eagle)]<sub>i</sub> my whole life.  
 Unfortunately, ten years ago (#the<sub>i</sub>) birds were exterminated.’

Unlike  $\overset{\circ}{\iota}$  blocking  $\iota^\circ$  TAXON, it does not block the equally-ranked  $\iota$ , hence bare *ptice* ‘birds’ can refer anaphorically to specimens (§2). As for overt definites,  $\iota^\circ$  TAXON is lexicalized as *the* in English, meaning it is exempted from Ranking, hence *the birds* can refer anaphorically to subkinds (§2).

The present account of (5) assumes that the mismatch occurs at the level of PL(BIRD), the property over pluralities of bird specimens. Another option is that it occurs with PL(TAXON(BIRD)), the property over pluralities of kinds of birds (Wilkinson 1991). In this case,  $\iota$  could in theory resolve the mismatch by yielding anaphoricity to the plurality of

subkinds (the bald eagle and the golden eagle). In practice however, §4 shows that  $\iota$  does not license subkind-anaphoricity in Serbian, so this derivation is unavailable.

The present account of (5) also relies on PL not being in OP (§4). If it were, then  $\iota \circ \text{TAXON} \circ \text{PL}$  would be a licenser of subkind-anaphoricity, which would be overt in Serbian due to PL being overt, hence it would be exempted from Ranking. One could then assume that the mismatch in (5) occurs at the level of BIRD, which would then be resolvable via  $\iota \circ \text{TAXON} \circ \text{PL}$ . §4 excludes PL from OP on the basis that PL is not universal (Rullman & You 2006), but a different analysis is needed if  $\iota$  is also not universal (Šimík & Demian 2020).

This concludes the account of bare nominals with cumulative reference lacking subkind-anaphoricity in article-less languages. The next subsection turns to bare singulars.

#### 5.4. Singulars

This subsection accounts for why bare singulars in Serbian and Turkish can refer anaphorically to subkinds. (I leave other article-less languages to future research, fn.5.). In (8) (below), there is mismatch between bare *ptica* ‘bird’ (Serbian) being argumental and denoting a property. Unlike the previous subsections,  $\cap$  cannot resolve the mismatch due to being inapplicable to singular properties (cf. §3.2).  $\iota$  is also inapplicable due to yielding a bird specimen, which is mismatched with the kind-level predicate *istrebljena* ‘exterminated’. Between the three non-ranked operations, only  $\iota \circ \text{TAXON}$  is applicable.

$\iota \circ \text{TAXON}$  can in theory resolve the mismatch in (8) by referring to (i) the antecedent subkind (the bald eagle), or (ii) the maximal subkind (the bird class, Latin name *Aves*). (ii) however is less accessible, which I account for next.

- (8) *Ceo život proučavam beloglavog orla.*  
 whole life study.1.PRS white.headed eagle  
*Na žalost, pre deset godina ptica je istrebljena.*  
 Sadly before ten years bird is exterminated  
 ‘I have been studying [the bald eagle]<sub>i</sub>; my whole life.  
 Unfortunately, ten years ago [the bird]<sub>i</sub> exterminated.’  
 (Less accessible: ‘...*Aves* was exterminated.’)

To explain why ‘*Aves*’ is less accessible in (8), I appeal to the aspect of Dayal’s (2004) framework where the output of  $\iota \circ \text{TAXON}$  is an atomic kind. For Dayal, such a kind is limited in the instantiation relation, which for Chierchia (1998) is a parthood relation (an instance of a kind is part of the extension of the kind). I posit that an atomic kind is also limited in the subkind relation, which is also a parthood relation. I posit specifically that the output of  $\iota \circ \text{TAXON}$  is a kind which is contextually atomic (Rothstein 2010). Crucially, this contextualization can be made difficult by mentioning subkinds, which highlight that the kind is not atomic. For example, (8) mentions a kind of bird (the bald eagle), which makes it difficult to contextualize *Aves* as atomic, hence this reading is less accessible. By contrast, (8) does not mention kinds of bald eagles, which allows the bald eagle species to be contextualized as atomic, making this reading accessible in (8).



In conclusion, bare singulars differ from bare plurals and uncountables because only the former can utilize  $\iota$  ° TAXON, which is limited to singular properties. This is the same account as in §3.3, except here I account for the difference between overt and covert definites. I do so by appealing to  $\iota$  ° TAXON as an additional licenser of subkind-anaphoricity, whose lower-ranking means that it is more limited as covert.

## 6. Conclusion

This paper is about the theoretical implications of Despić's (2019) generalization. First, Dayal's (2004) distinction between the two sorts of kind terms is strengthened; they differ not only in (i) well-established kinds, (ii) narrow existential quantification and (iii) representative objects, but also in (iv) subkind-anaphoricity. However, whereas (i–iii) are orthogonal to definite articles, (iv) only occurs in languages without definite articles.

This leads to the second implication: The lack of equivalence between overt and covert definites is strengthened. This adds to Šimík & Demian (2020), who found that bare nominals in Russian can be indefinite in a manner which is unavailable to overt definites. Under Heim (2011), this is captured by overt definites utilizing  $\iota$ , whereas so-called covert definites are in fact indefinites which do not compete with definites, and thus can be strengthened to definite meaning. This however still faces Despić's puzzle: How come non-competing indefinites can be strengthened to instance-anaphoricity, but not to subkind-anaphoricity?

This paper solves Despić's puzzle within a framework where overt and covert definites are basically equivalent in that both utilize  $\iota$ , which can be overt or covert. I weaken the equivalence for subkind-anaphoricity by positing  $\iota$  ° TAXON as a licenser of subkind-anaphoricity, which is more limited as covert due to being ranked below  $\cap$ , the operation for plural and uncountable kind terms. Consequently, bare plurals and uncountables are more limited in subkind-anaphoricity than bare singulars. Despić's puzzle demonstrates the need for Ranking between covert operations (Chierchia 1998), and here I derive and extend Dayal's (2004) Ranking in a way which solves Despić's (2019) puzzle.

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