

The myth of exhaustivity for *all* NPIs

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1 Introduction

In some recent works on negative polarity, ‘exhaustivity’ is taken to be the single defining property that characterizes *all* negative polarity (NPIs) and free choice (FCIs) paradigms. This view is perhaps most clearly expressed in the claim in (1):

- (1) *Exhaustivity-for-all hypothesis*: “in contrast to ordinary or plain indefinites, with NPIs and FCIs we *have* to exhaustify” (Chierchia 2013:8, emphasis in the original)

For Chierchia (and works following him, including Chierchia and Liao 2015) exhaustification is proposed as an axiom of polarity: it is claimed to be the defining ingredient in all NPI/FCI classes. My goal in this paper is to show that this is a mistake.

I present three NPI paradigms in three typologically distinct languages—Greek, Korean, and Mandarin Chinese—that have been described in the literature as non-exhaustive, and which contrast empirically in a number of significant ways with the presumably exhaustified NPI *any*. My first conclusion will therefore be that the *exhaustivity-for-all* position is empirically unjustified as a general theory of polarity. My second conclusion will be that when we actually consider what it means to exhaustify, a Chierchia style implementation—based on the two covert devices of O(nly) and [+Σ]—is undesirable for a number of reasons. First, these devices are posited *ad hoc* without empirical evidence, and while O bears the onus of exhaustification, it is itself *not* sufficient to derive the licensing of NPIs in nonveridical environments, *any* included. Chierchia’s theory stipulates licensing only in downward entailing contexts—and, crucially, it relies on the checking of [+Σ], thus regressing, in essence, to a Klima 1964 type of approach. In other words, application of O(nly) itself cannot constrain the distribution in the appropriate way. Overall, I will show that the Chierchia-style account fails to predict even the distribution of *any*, the very item it is designed for.

Though the idea that there is a single source of all polarity may appeal to our reductionist sense that it would be a good thing to have *one* criterion for all NPIs, my goal here is to show that the reductionist move is not supported by evidence. Worse, (1) goes *against* all available evidence. The only way to maintain it, in view of the numerous contrasts we will see here, would be to complicate the system by adding composition external rules as *dei ex machina* (see, e.g., Chierchia and Liao 2015); and even these additions end up accounting for a very limited set of data. Overall, I will argue, (1) ends up functioning as the *Procrustean bed* of polarity: as in the myth of Procrustes, who forced travellers to fit into his iron bed, and who stretched or trimmed those who did not (an operation the traveller is never reported to have survived), (1) forces us to cut or

stretch the data to fit. Such a Procrustean criterion serves the analyst of polarity phenomena just as poorly as Procrustes' bed did those travellers.

I begin, in section 2, by presenting the paradigms of NPIs to be discussed (including, of course, *any*). I then present, in section 3, the Chierchian implementation of (1) and discuss its foundational analytical shortcomings. In section 4, we see that Greek, Mandarin and Korean NPIs differ from *any* with respect to six widely known diagnostics— and this is a contrast within the NPI class that is *not* predicted by any existing accounts based on (1). Finally, the Chierchian analysis falls short of explaining even the distribution of *any*: *any*, as is well-known, appears in a broad spectrum of nonveridical contexts, and in implicitly negative contexts where there is no negative or nonveridical operator in structure to license it.

2 Two kinds of NPIs in nonveridical contexts: different interpretations

I start with a basic description of three NPIs: English *any* (Klima 1964, Ladusaw 1980, Linebarger 1980 among numerous others), Greek *kanenas* (Giannakidou 1997, 1998, 2011), and Mandarin *shenme* (Cheng 1994, Li 1992, Lin 1996, 1998, J. Lin 2015, J. Lin et al. 2014, Giannakidou and J. Lin 2016). I give indicative examples below:

- (2) a. Nicholas didn't see anybody. [English]
 b. *Nicholas saw anybody.
- (3) a. Dhen idhe kanenan o Janis. [Greek]
 not saw NPI.acc the Janis.nom
 'Janis didn't see anybody.'
 b. *Idhe kanenan o Janis.
 saw NPI.acc the Janis.nom
- (4) a. Yuehan zuotian mei-you mai shenme shu [Mandarin]
 Yuehan yesterday not-have buy NPI book
 'Yuehan didn't buy any books yesterday.'
 b. *Yuehan zuotian mai-le shenme shu.
 Yuehan yesterday buy-PERF NPI book

In (2)-(4), *any*, *kanenas* and *shenme* are sensitive to the presence of negation; without it, they are ungrammatical. *Shenme*, in addition, belongs to the class of 'wh-indeterminates', and can be used either as a NPI as in (4) or as a question word as in (5):

- (5) Yuehan zuotian mai-le shenme shu (ne)?
 John yesterday buy-PERF what book Q
 'What kind of books did John buy yesterday?'

NPIs, including wh-indeterminates, generally appear not only in the scope of negation, but also in the scope of operators that are not negative but merely *nonveridical*, e.g., in

questions, with modal verbs and adverbs, and in imperatives. In such contexts, *any* receives the so-called *free choice* reading, which I indicate below with *whatsoever* ((6), (7)). The Greek NPI *kanenas*, *tipota* lack this reading; in such environments, the FCI *otidhipote* is used instead:

- (6) Sta genethlia tou o Janis bori na fai {otidhipote/#tipota}.
On his birthday, John may eat anything whatsoever.
- (7) Fere {otidhipote/#tipota} to parti tou.
Bring anything whatsoever to his birthday party.

Lacking free choice, the NPI is interpreted as a weak indefinite with a narrow scope anti-specific reading, noted first in Giannakidou 1997, and rendered as *some or other*. The narrow scope reading correlates with the NPI-status.

- (8) O Nikolas bori na milisi me {kanenan/opjondhipote} fititi.
the Nicholas may SUBJ talk with NPI/FCI.Det student
'Nicholas may talk to some student or other/ any student whatsoever.'
- (9) Mila me {kanenan/opjondhpote} fititi.
talk.IMP.2SG with NPI/FCI.Det student.
'Talk to some {student or other/any student} whatsoever!'

In other words, the NPI and FCI uses of *any* are distinguished lexically in Greek, and the Greek NPI receives a non-free choice reading (Giannakidou 1997, 1998; Giannakidou and Quer 2013). Korean *rato*-NPIs and Mandarin *shenme* align with *kanenas* and appear with the same non-free choice anti-specific reading (cf. Lin 1996, J. Lin 2015, Giannakidou and Yoon 2016, Giannakidou and Lin 2016):

- (10) Yuehan haoxiang mai-le shenme shu.
John probably buy-PREF NPI book
'John probably bought a book (some book or other; I don't know which book).'

The anti-specific reading conveys referential indeterminacy, ignorance of the speaker about the exact identity of the book. This is labeled *referential vagueness* in Giannakidou and Quer (2013). Referential vagueness is a reading "where the speaker does not have a particular individual in mind, is not sure about it" (Giannakidou et al. 2014:12). Haspelmath (1997:45) says that "with non-specific phrases, whose referents are not identifiable in principle, the question of identifiability by the speaker does not even arise." Other labels have been used such as 'low referential' (Partee 2008), 'epistemic' (Alonso-Ovalle & Menéndez-Benito 2013), 'modal' (Alonso-Ovalle & Menéndez-Benito 2010), 'irreferential' (Jayez & Tovena 2007), 'extremely non-specific' (Farkas 1998), or generally 'ignorance' indefinite. These indefinites are typically used to

create rhetorically *weak* statements, and have been argued to have a presupposition of *minimal*, not exhaustive variation (Giannakidou and Quer 2013, Giannakidou and Yoon 2016). Referentially vague indefinites need not be NPIs (Spanish *algún* isn't, for example). But NPIs with dependent variables, such as the Greek, Mandarin and Korean NPIs, are typically interpreted as referentially vague. NPIs of this kind are actually quite common across languages, and been identified in Dutch (Hoeksema 1999), Salish (Matthewson 1998), Albanian (Xherija 2014), Bengali (*ka*-indefinites, Ullah, 2016) (see Giannakidou 2011 for more references). English appears to lack this type of NPI.

As mentioned already, the free choice and referentially vague readings are distinguished in modal contexts. To illustrate this further, consider exceptions:

- | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| <p>(11) Bori na mas idhe kanenas.
 can SUBJ us saw NPI-person
 'Someone (no idea who) could have seen us.
 OK: But not John! He can hardly see in the dark.</p> | <p>NPI: <i>referentially vague</i></p> |
| <p>(12) Bori na mas idhe opjosdhipote.
 can SUBJ us saw FCI-person
 'Anybody (whatsoever) could have seen us.'
 # But not John! He can hardly see in the dark.</p> | <p>Any, FCI: <i>free choice</i></p> |

The exceptive is odd with the FCI and *any*: their stronger rhetorical force conflicts with the exceptive. The Greek NPI creates a weaker statement that is compatible with the exceptive. This, along with the earlier data, allows us to see that in *the same contexts*, i.e. with modals, an NPI like *any*, receives an exhaustive, free choice interpretation, different from the Greek type of NPI, for which I will use the label 'non-exhaustive NPI'.

The main question of this paper is whether it makes sense, given this core meaning difference, to treat the non-exhaustive NPI as exhaustified. The Chierchian thesis (1) says that we have to. But then the differences in interpretation, *in the same contexts*, cannot follow. So, (1) must be augmented with stipulations that will 'undo' or supplement exhaustification, in order to explain why, *in the same contexts*, two exhaustive NPIs are interpreted differently. One wonders, then, what role (1) plays in the first place.

The other stance, of course, is to deny that the Greek NPI type is exhaustified. In this view, we give up (1), and we have two kinds of NPIs: exhaustified and non-exhaustified, as I have been suggesting since Giannakidou 1994, 1995, 1997 (when the Greek data were first presented in full). But denying exhaustification for a subclass of NPIs undermines the very goal of the reductionist enterprise— it is therefore no surprise that (1) based accounts typically either ignore the Greek, Mandarin and Korean NPI data, or downplay their relevance for *any* by denying their status as NPIs 'proper'. In the extreme case, the Greek NPI type is analyzed as exhaustified, as in Chierchia and Liao's account of *shenme*. When this happens, the result is a system that explains a remarkably small

number of data with a remarkably large number of stipulations— and one needs to wonder whether going down that path is better than giving up the idea of (1). In Giannakidou and Lin 2016, the exhaustive analysis for *shenme* is refuted, and I will borrow some of the empirical points in section 4 here.

If one looks at the distribution of both the *any* type and the type exemplified by the Greek, Mandarin and Korean NPI, one finds no empirical basis for treating the latter as ‘not proper’. The only reason one might think of *any* as ‘more proper’ than *kanenas*, *shenme* and *rato-NPI* is historical accident: the NPI literature started with, and focused for many years on *any* (since Klima’s 1964 seminal work); it was only in the mid-nineties that the Greek and Mandarin NPIs facts became known, approximately at the same time (Giannakidou 1994, 1995, 1997; Lin 1996, 1998). Thirty years of English-based polarity doctrine may have created the illusion that only *any* deserves the moniker of ‘proper’ NPI; but treating the newly discovered NPIs as ‘not proper’ represents nothing but a highly normative stance — especially given that both *any* and the Greek, Mandarin and Korean NPIs appear in the same contexts, namely nonveridical contexts. These include, crucially, modal contexts, imperatives, and questions, which are not negative and not downward entailing (DE). In the Chierchian tradition, there is a strong tendency to ignore this fact, and to address instead only the distribution of *any* in negative contexts (including DE). This narrow focus misleads us into believing that this is the only relevant set of data, thereby continuing to treat *kanenas*, *shenme*, *rato-NPI* as exceptional in being licensed by nonveridicality. This, sadly, damages our understanding of the sensitivity of *any*, and stands in the way of an accurate understanding of what kinds of polarity sensitivities exist out there and should be accounted for.

As a general pattern, we find NPIs in nonveridical contexts—including, to use Zwarts’ 1995 terminology, *minimally negative* (i.e. DE) and *classically negative* contexts (i.e. anti-additive anti-morphic), as well as non-negative contexts such as questions, modals, imperatives (Bernardi 2002, Hoeksema 1999, 2008, Giannakidou 1998, 2001, 2006, 2011, Zwarts 1995 and others).

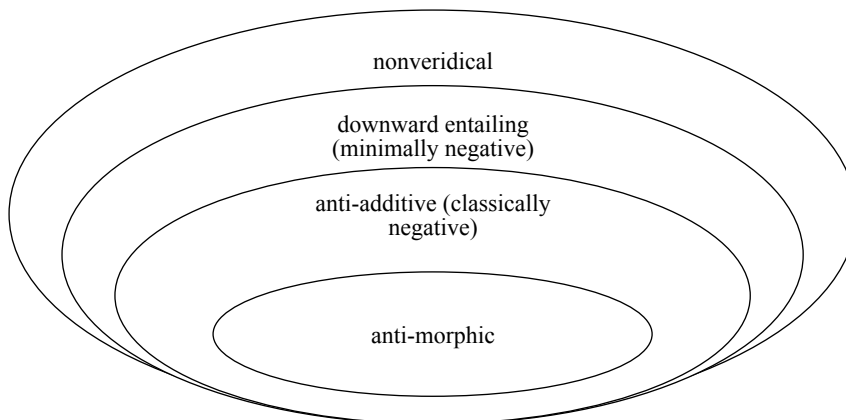


Figure 1: The Giannakidou/Zwarts Nonveridical Hierarchy of polarity contexts

The Greek, Mandarin, and Korean NPI, as well as the *any*-NPI type appear in nonveridical contexts. Since the individual distributions have been exemplified in previous works, we need not review them in detail here. Surprisingly, sometimes nonveridicality is seen *in opposition* to negation and DE, but, as can be seen, and is stressed in Giannakidou (1997, 1998), negative and DE functions are merely a proper subset of the nonveridical (see Zwarts 1995 for a proof). Nonveridicality is therefore an extension of negation and DE, allowing unification of the polarity contexts as a natural class, while also predicting correctly the wider distribution of NPIs in non-negative contexts, consistent with what is generally observed in various languages.

In Table 1 (from Giannakidou and Lin 2016), I list representative distributions of: *any*, Mandarin Chinese *shenme*, Greek *kanenas*, and FCIs such as Greek *opjosdhipote*:

Environments	<i>any</i>	<i>shenme</i>	<i>Kanenas/rato NPI</i>	Greek FCI <i>opjosdhipote</i>
1. Negation, Negative Quantifier	OK	OK	OK	*
2. Questions	OK	OK	OK	OK
3. Conditional (<i>if</i> -clauses)	OK	OK	OK	OK
4. Restriction of <i>every/all</i>	OK, FC	OK	OK	OK
5. DE quantifier (e.g. <i>few</i>)	OK	OK	OK	OK
6. Modal verbs (e.g. <i>may</i>)	OK, FC	OK	OK	OK
7. Nonveridical verbs (e.g. <i>hope</i>)	OK, FC	OK	OK	OK
8. Imperatives	OK, FC	OK	OK	OK
9. Habituals	OK, FC	OK	OK	OK
10. <i>Before</i> -clauses	OK	OK	OK	OK
11. Future	OK	OK	OK	OK
12. Affirmative past	*	*	*	*

Table 1: Distributions of *any*, *shenme*, *rato*-NPI, *kanenas*, and *opjosdhipote* (FCI); FC means ‘free choice reading is possible’

The similarity in distribution is overwhelming. NPIs and FCIs appear in the same nonveridical environments; the only difference between *kanenas*, *shenme*, *rato*-NPI, and *any*/FCIs is that the latter get free choice interpretation in non-negative contexts. For more data illustrating the non-free choice readings of *shenme* see Cheng and Giannakidou (2013). Crucially, what we retain from Table 1 is that *any* and FCIs are not different in distribution than the Greek, Korean and Mandarin NPIs, hence a successful theory of *any* must account for its appearance in *all* of the above. The (1)-based accounts are loudly silent on this issue, and continue to deny that nonveridicality is relevant for *any*.

3 Exhaustification Chierchia style

Chierchia’s program is initiated in his 2006 *Linguistic Inquiry* article, inspired by Kadmon and Landman’s (1993) *domain* widening, and Krifka’s 1995 semantics of

any (see also earlier works by Fauconnier 1974 and Horn 1976 on pragmatic scales). Unlike Chierchia, neither Kadmon and Landman nor Krifka propose their theories as general theories of *all* NPIs; rather, they suggest them with reference to *any* (and Krifka offers also an account of English minimizers). Krifka, in addition, acknowledges *two* versions of *any*, emphatic and non-emphatic *any*. There are additional voices in the recent literature claiming that not all uses of *any* are scalar (Duffley and Larivée 2010, Giannakidou 2011).

Chierchia posits (scalar or domain) alternatives for *any*, and stipulates two additional devices: (a) a phonologically null counterpart of *only* (O) and (b) a syntactic [+Σ] feature on the NPI. As Geurts 2009 and Giannakidou and Quer 2013 point out, no independent evidence of the existence of these devices is provided. Moreover, O and [+Σ] do not follow from the use of alternatives; almost all standard theories of focus (Rooth 1985, 1992, Beaver and Clark 2008) posit alternatives, but exhaustification does *not* characterize all uses of alternatives: it is added only when the focus particle *only* is present in the sentence. O and [+Σ] are thus deviations from the standard theory of focus, and the acceptance of these devices therefore must rest entirely on how successful they are at capturing the distribution of polarity items. Chierchia 2006 (19) defines *only* O as follows:

- (19) a. $O_C [q] = q \wedge \forall p [[p \in C \wedge p] \rightarrow q \subseteq p]$
 (*O* is a mnemonic for *only*: *q* and its entailment are the only members of *C* that hold)¹⁰
 b. $\|\phi\|_s = O_C [\|\phi\|]$, where $C = \|\phi\|^{ALT}$

O is posited to be a syntactic object like the focus particle *only*: when O(nly) applies to a proposition *p*, we have a reading of *p* such that only *p* and its entailments are true, and all alternatives not entailed by *p* are false. This works well with negation, but delivers a contradiction in the positive sentence. Consider first negation:

- (13) a. O [There aren't any cookies]
 b. ALT-D = {D' | D' ⊆ D}; D = cookies in the kitchen
 c. ALT-*p* = {there aren't cookies in the cupboard, there aren't cookies on the shelf, there aren't cookies on the table}.

Application of O is felicitous because all propositions based on the smaller subdomains are entailed by (13a). Scale reversal is always good because the assertion entails the negation of all the (smaller) alternatives. Now notice that this is exactly the reasoning we find with Krifka's Scalar Assert, but without covert ONLY:

- (14) *Scalar NPI triggers Scalar.assert* (Krifka 1995)

- a. $\text{ASSERT}(\langle B, F, A \rangle)(c) = c \cap B(F)$ iff $B(F)$ is assertable wrt c and the speaker has reason not to assert any other alternatives to $B(F)$, and some other alternative is assertable and would make a difference in c .
- b. $\text{ASSERT}(\langle B, F, A \rangle)(c) = \text{SCALAR.ASSERT}(\langle B, F, A \rangle)(c)$ iff the alternatives are informationally ordered with respect to each other
- c. $\text{SCALAR.ASSERT}(\langle B, F, A \rangle)(c) = \{i \in c \mid B(F) \text{ holds in } c \text{ and all stronger [not entailed; clarification mine] alternatives are negated}\}$

This schema is Krifka's rendition of Fauconnier's Scale Principle: a scalar NPI triggers informational ordering and exhaustification (via c). SCALAR.ASSERT is a pragmatic operator, and not a syntactic object like Chierchia's O . Exhaustification, therefore, does not per se necessitate endorsing a silent ONLY —it can be done without it, in a classical neo-Gricean style (for more elaboration on this see Geurts 2009, 2010).

In a positive sentence, application of ONLY creates a contradiction:

- (15) a. * O [There are cookies in the kitchen]
- b. $\text{ALT-}p = \{\text{there are cookies in the cupboard, there are cookies on the shelf, there are cookies on the table}\}$

The propositions in $\text{ALT-}p$ are not entailed, and must therefore be false, by O . This leads to a contradiction: the sentence says that there are cookies in the kitchen but not in any of the subdomains of the kitchen. This type of explanation originates, to my knowledge, in Kadmon and Landman 1993: application of O (exhaustification, widening) is 'pointless' (Chierchia 2006), and leads to contradiction.

However, NPIs are *licensed*; they are not merely felicitous or infelicitous. And as pointed out in Giannakidou 2011 and Giannakidou and Quer 2013, it would be surprising if contradiction alone were to suffice to rule out the unlicensed therefore *ungrammatical* NPIs. Chierchia acknowledges this insufficiency: "So why is a sentence like (47a) (an NPI-licensing violation) ungrammatical? There is an impasse here between the way domain widening explains the distribution of NPIs (using Gricean principles) and the way such principles are typically taken to work...." (Chierchia 2006: 557). He then posits a lexical entry for *any* (his (51)) where *any* is claimed to have an uninterpretable syntactic feature $[+\sigma]$ (Chierchia 2006: 559). The $[+\sigma]$ requires that *any* be in the syntactic agreement (or checking) domain of a negative or DE operator. The $[+\sigma]$ is a syntactic feature, and the grammaticality of *any* depends on checking of $[+\sigma]$, as reflected in the lexical entry Chierchia supplies:

- (16) a. *Lexical entry for any*
 - i. $\|\text{any}_D\| = \lambda P \lambda Q \lambda w [\exists w' \exists x \in D_{w'}(P_{w'}(x)) \wedge Q_w(x)]$
 - ii. $\text{ALT}(\|\text{any}_D\|) = \{ \lambda P \lambda Q \lambda w [\exists w' \exists x \in D'_{w'}(P_{w'}(x) \wedge Q_w(x))] : D' \subseteq D \wedge D' \text{ is large} \}$
 - iii. *Any* has an uninterpretable feature $[+\sigma]$.
- b. $\|\phi\|_S = E_C(\|\phi\|)$, where $C = \|\phi\|^{\text{ALT}}$

The analysis of *any* involves both O and the syntactic feature [+σ]. O exhaustifies, and interacts with the lexical meaning (alternatives) to give an interpretation to sentences that *any* appears in. But this interpretation delivered by O, crucially, does not suffice to restrict the presence of *any* to the nonveridical environments that we saw in Table 1. In the non-negative of these, e.g. in questions, modals, imperatives, or generics the O rationale won't work: e.g. *Any cat hunts mice* should, by O, deliver contradiction. Modals or questions should behave like positive sentences too. O, further, cannot predict when *any* is interpreted with free choice or without, as is typically the case in questions and in negative contexts.

But if O does not suffice to restrict the presence of *any* to nonveridical environments, then it simply *fails* to derive the licensing of *any*. Chierchia's use of O does not supply a semantic theory of *licensing*; instead, he falls back on a syntactic feature, [+σ]; this feature (compare +/-anaphoric in the Binding Theory) has to be checked: but Chierchia never tells us what checking is or, more crucially, what the full set of checkers are. (He claims they are negative or DE, but again a mere look at Table 1 shows that they are more extended.) By relying on [+σ], and without an accurate semantic description of the licensers, Chierchia's theory is thus just a variant of Klima's, and represents a regression in our ability to understanding polarity item distributions. It is, like Klima 1964, a *syntactic* theory of polarity licensing, not a semantic or pragmatic one, despite Chierchia's claim to the contrary. Not only does the theory not work without the magic [+σ] feature, it *only* works because of [+σ]. The semantic-pragmatic part (alternatives, O) does no work in licensing, no more than the meaning of the pronominal part of a reflexive does in the Binding Theory in configurational theories like Chomsky 1986.

Chierchia and Liao further develop the syntactic part, and posit an interplay between the syntactic feature Σ (changed from Chierchia's earlier [σ]) and a *wh*-feature ([WH]). NPI-hood means having the [+Σ] feature, and *shenme*, as well as other *wh*-indeterminates (thus also Korean *rato*-NPIs) are argued to have it. To explain its use as a question word, which *any* lacks, *shenme* is claimed to also have an unconstrained *wh*-feature ([u-WH]). CL is not a full account of *shenme*—in fact, only a glaringly small number of *shenme* data are considered, so it is by no means a theory of *shenme* (see Giannakidou and Lin 2016, for more detailed critique; I will not go into further detail here). I would like to emphasize, however, that one additional flaw of the CL system is that the *wh*-feature and [+Σ] are only accidentally related. On the other hand, if NPIs are dependent variables as Giannakidou 1998, J. Lin 2015, and Cheng & Giannakidou 2013 have argued for Greek and Mandarin, then *wh*-words, as dependent variables, become prime material for NPI-hood, and this explains why *wh*-indeterminates are so often used as NPIs.

To summarize: despite proclamations to the contrary, what actually licenses NPIs in the Chierchia system is *not* the exhaustifying O or the (domain) alternatives coming from the lexical content of *any*, but the syntactic feature [+σ]. O is simply not enough to deliver grammaticality and get the correct distribution in nonveridical contexts. O is thus, from

the licensing perspective, unnecessary or redundant. Chierchia's account of NPI-licensing, then, is merely an update of a syntactic account Klima-style.

4 *Any* versus Greek, Korean, and Mandarin NPI in nonveridical contexts

The Chierchia account is designed with the main goal to predict *any*. Curiously, *any* itself is never characterized as exhaustive; it simply trigger alternatives. Exhaustification comes from O, the application of which somehow is 'triggered' by *any*, though how this exactly happens remains murky. O itself, as we saw, is not enough to predict distribution, it is therefore linked to [+σ]. In this picture, it is hard to see what exactly it means to be exhaustified (O? [+σ]? Both?), and what the empirical prediction is about the behavior of 'exhaustified' NPIs. As described in the previous section, the theory tells us that NPIs should be good with negation and bad without it; but *any* appears in non-negative contexts, as we very well know. How is an exhaustified NPI supposed to be interpreted in these contexts? The null hypothesis is that it will be interpreted like *any*. So, let us take a look. In the non-negative contexts, *any* produces the hallmark reading of free choice.

1. *Any* has free choice readings with modals, conditionals, and imperatives.
2. *Any* can be subtriggered with a relative clause in an otherwise veridical sentence. In this case again a free choice reading arises.
3. *Any* and FCIs have supplementary uses.
4. *Any* and FCIs are implausible with universal modal verbs.

If (1) is right, and exhaustification happens as described in the existing accounts described earlier, the null hypothesis is that NPIs should behave on a par with *any* with respect to the above. But we will see next that *kanena/shenme/rato* have the opposite behavior with respect to the above criteria. Much of the data that I will present next are borrowed from Giannakidou and Quer 2013, Giannakidou and Yoon 2016, and Giannakidou and Lin 2016—and I am reproducing them here with gratitude to my co-authors for their insights and native speaker judgments.

4.1 No indiscriminative readings in conditionals

If-clauses are good environments for NPIs and FCIs. *Any* and FCIs trigger the so-called *indiscriminative, just any* reading (see Haspelmath 1997, Duffley and Larivée 2010), and here is variant of an example due to Larry Horn (2005):

- (17) If you sleep with just anybody you are not being very selective.

Shenme/kanenas/rato-NPI cannot convey the indiscriminative reading, but Greek FCIs can.

- Mandarin
- (18) Ruguo ni neng he *shenme ren shui, na ni hai
 if you can with *NPI person sleep than you yet zhenshi bu
 tai tiaoti.
 really be not very selective
 ‘If you can sleep with any person, then you are not very selective.’¹

- Greek
- (19) An koimasai me {opjondipote/*kanenan}, denise ke poly epilektikos.
 If sleep.2SG with FCI/*NPI, not be.2SG very selective
 ‘If you sleep with (just) anybody you are not being very selective.’

- Korean
- (20) Ney-ka manyak {amwu-hako-na/#amwu-hako-rato} cal-swuiss- tamyen,
 you-Nom hypothetically FCI/RVI-with sleep-can-Cond
 ne-nun acwu kkatalop-cinan-ta.
 you-Top very selective-Neg-Decl
 ‘If you can sleep with any person, then you are not very selective.’

The lack of indiscriminative reading with the Greek, Mandarin and Korean NPIs doesn’t follow from (1) and the existing accounts based on (1).

4.2 Non-exhaustive imperatives

Kanenas/rato-NPIs/shenme are accepted in imperatives.² Crucially, their interpretation contrasts with that of FCIs (Giannakidou and Quer 2013, Giannakidou and Yoon 2016):

- (21) Fae kanena glyko!

¹ If we add *dou*, the difference disappears (thanks to Lisa Cheng for noticing this):

- (i) Ruguo ni you shenme wenti, dou keyilianxi wo.
 if you have NPI question DOU keyi contact me.
 ‘If you have any questions, you can contact me.’
- (ii) Ruguo ni you renhe wenti, dou keyilianxi wo.
 if you have FCI question DOU can contact me
 ‘If you have any questions, you can contact me.’

Following Giannakidou and Cheng (2006), Cheng (2009), and Xiang (2008), Giannakidou and Lin 2016 treat *dou* as a maximality operator, therefore responsible for the universal reading here.

² Lin (1998) claims that in imperatives, *shenme* is only grammatical with the quantifier *dian* (lit. ‘a little bit’). However, Giannakidou and Lin 2016, provide examples of *shenme* without *dian*.

- eat.2sg.imp NPI cookie
 ‘Eat a cookie!’ (some or other)
- (22) Fae opjodhipote glyko!
 Eat.2sg.imp FCI cookie
 ‘Eat any cookie whatsoever!’

The Greek FCI and *any* induce a reading where the addressee comes to the dessert table with a great appetite, and the speaker invites her to try every option if she wishes to. In such a context, the options are exhausted (in whatever manner one chooses to do that). By contrast, with *rato-NPI*, *shenme* or *kanena* we have non-exhausted invitations to eat a cookie. In a context where some cookies are off limits (say, the ones to the left of the table because they are reserved) only the NPI versions are good. This is illustrated in the examples above from Giannakidou and Lin:

- (23) Fae {*kanena*/#*opjodhipote*}glyko; ala oxi afta giati ine gia tin Mary.
 eat NPI/#FCI cookie; but not these because are for the Mary
 ‘Eat a cookie (#any cookie); but not these ones because they are for Mary.’
- (24) Chidian shenme binggan ba; danbie chi na-xie
 eat CL NPI cookie PART but not eat that-CL
 yinwei tamen shi liu gei Mali de.
 because they be reserved for Mary PART
 ‘Eat some cookies (#any cookies); but not those ones as they are for Mary.’

And, of course, the same holds for *any cookies whatsoever*:

- (25) Eat any cookies (whatsoever); #but not those ones as they are reserved for Mary.

Unlike *any*, *shenme/kanenas*, *rato* NPI are fine if we do not exhaust all options. Again, it is impossible to derive this difference from the existing O plus [+Σ] analysis.

4.3 Existential readings in modal contexts

Greek, Mandarin and Korean NPIs appear in modal contexts with purely existential readings. *Any*, as can be seen, is impossible in this reading:

Greek

- (26) I Ariadne {*isos/bori*} na agorase xthes .
 the Ariadne maybe/might SUBJ bought.3SG yesterday
 {*kanena*/#*opjodhipote*} vivlio
 NPI/#FCI book
 ‘Ariadne may have bought {*some*/#*any*} book or other yesterday.’

- (27) I Ariadne {*malon/prepei*} na agorase xthes
 the Ariadne probably/must SUBJ bought.3SG yesterday
 {*kanena/#opjodhipote*} vivlio.
 NPI/#FCI book.
 ‘Ariadne probably bought {*some/#any*} book or other yesterday.

Mandarin

- (28) Yuehan zuotian haoxiang mai-le shenme/*renhe shu.
 John yesterday probably buy-PREF NPI/*FCI book
 ‘John probably bought {*some/#any book*} yesterday.

Korean

- (29) Ariadne-nun ecey eccemyen {*amwu-chayki-rato/#amwu-chayki-na*}
 Ariadne-Top yesterday maybe NPI/#FCI.book
 sa-ulswuiss-ta.
 buy-might-Decl
 ‘Ariadne maybe bought {*some/#any book*} yesterday.
- (30) Ariadne-nun ecey ama {*amwu-chayki-rato/#amwu-chayki-na*}
 Ariadne-Top yesterday probably NPI/#FCI.book
 sa-ssulkesi-ta.
 buy-may-Dec
 ‘Ariadne probably bought {*some/#any book*} yesterday.

The pattern is therefore quite consistent: the Greek, Mandarin and Korean NPIs are weak indefinites that retain existential readings in the modal contexts, whereas *any* is odd in the contexts requiring such a reading. Again, the Chierchia system does not offer us a way to handle this contrast.

But if we assume that the NPIs have referential vagueness, then they are regular existentials, still invoking alternatives, but these alternatives are *not* exhaustified. The presupposition is that there be *some* variation, not exhaustive variation (Giannakidou and Quer 2013, Giannakidou and Yoon 2016):

- (31) *Referential vagueness: presupposition of non-exhaustive variation*
- (i) A sentence with a referentially vague indefinite α will have a truth value iff:
 $\exists w_1, w_2 \in W: \llbracket \alpha \rrbracket^{w_1} \neq \llbracket \alpha \rrbracket^{w_2}$; where α is the referentially vague indefinite.
 - (ii) The worlds w_1, w_2 are epistemic alternatives of the speaker: $w_1, w_2 \in M(\text{speaker})$, where $M(\text{speaker})$ is the speaker’s belief state, the worlds compatible with what she believes/knows.
 - (iii) The speaker does not know which value is the actual value.
 (vagueness, ignorance)

Referential vagueness, as we see, expresses the epistemic indeterminacy of the speaker regarding the value of α . The epistemic state of the speaker is modeled standardly as a set of worlds M (*speaker*) compatible with what she knows or believes in the base world w . Referential vagueness is satisfied if there is a choice between at least two possibilities—it is thus a *minimal* choice, *not* exhaustive choice. If the speaker has a minimal choice, she cannot know which value is the actual one, and this captures the ‘ignorance’ effect—though we do not, strictly speaking, talk about ignorance since speakers have choices between possibly known values. Referential vagueness is more accurately understood as indeterminacy of reference rather than ignorance, which implies complete lack of knowledge. Most importantly, referential vagueness is distinct from free choice, which imposes exhaustive variation (i.e. replacing the existential quantifier with a universal in the definition, as in Giannakidou 1998, 2001, or in any other theory of free choice).

Space prevents me from expanding here, and further technical details are not crucial anyway. What *is* important is that the referential vagueness analysis of Greek, Mandarin and Korean NPIs allows us to see that we can have alternatives *without* exhaustification, thereby allowing the prediction that some NPIs may be just that. In the existing Chierchia-based accounts we cannot predict such NPIs.

4.4 No subtrigging

In veridical simple past sentences, all NPIs are ungrammatical. However, *any* improves with a relative clause— a phenomenon known as *subtrigging* (LeGrand 1975). In this case, *any* is interpreted again universal-like (see discussions in Dayal 1998, Giannakidou 2001, Horn 2005). However, *kanenas*, *rato*-NPI and *shenme*, cannot be subtrigged:

- (32) a. * John bought any book.
 b. John bought any book that he could find.
- (33) *Yuehan mai-le (ta neng zhao-dao de) shenme shu. (Mandarin)
 John buy-PERF he can find-PERFRELNPI book
 Intended: ‘John bought any book he could find.’
- (34) *O Janis aghorase kanena vivlio (pou vrike stin aghora). (Greek)
 the John bought.3SG NPI book REL found.3SG in-the-market
 Intended: ‘John bought any book that he found on the market.’
- (35) *Con-un ku-ka palkyenha-n etten-chayki-rato sa-ss-ta. (Korean)
 John-TOP he-NOM found-REL NPI.book buy-PST-DECL
 Intended: ‘John bought any book that he found.’

Thus, *kanena*, *rato*-NPI and *shenme* contrast again with *any*. Notice, likewise, the contrast with FCIs, which can undergo subtrigging in veridical contexts as expected:

- (36) Yuehan mai-le *(ta neng zhao-dao de) renhe shu. (Mandarin)
 John buy-PERF he can find-PERF RELFCI book
 ‘John bought any book he could find.’
- (37) O Janis aghorase opjodhipote vivlio *(vrike stinaghora). (Greek)
 the John bought.3SG FCI book found.3SG in-the market
 ‘John bought any book that he found on the market.’

Hence, the subtriggering diagnostic reveals another difference between the Greek, Korean, Mandarin NPI class and *any* that doesn’t follow from the Chierchian analysis.

4.5 No supplementary use

Exhaustive NPIs and FCIs exhibit supplementary use (Horn 2005); but non-exhaustive NPIs do not. Regardless of what the proper analysis is, it suffices to see the asymmetry between exhaustive *any* and the Greek, Korean and Mandarin NPIs:

- (38) Pick a card, any card! (English)
- (39) Pare miakarta, {opjadhipe/#kamia} karta! (Greek)
 take.IMP.2SG one card, FCI/#NPI card
 ‘Take a card, any card!’
- (40) Tiao yi-zhang ka ba, {renhe/#shenme} ka! (Mandarin)
 pick one-CL card PART FCI/#NPI card
 ‘Pick a card, any card!’
- (41) Khatu-lul hana kolla-la, {etten-khatu-na/#etten-khatu-rato}. (Korean)
 card-ACC one pick-IMP FCI.card/#NPI.card
 ‘Pick a card, any card.’

It is again difficult to imagine how this contrast can follow from the existing Chierchian analysis.

4.6 Referentially vague NPIs are fine with universal modal verbs

Finally, exhaustive NPIs and FCIs are known to be implausible with universal modal verbs (Giannakidou and Quer 2013, Menéndez-Benito 2010); but and Greek, Korean and Mandarin NPIs are fine in these contexts:

- (42) a. #Ariadne must marry any lawyer. (English)
- b. #I Ariadne prepi na pandrefti opjondhipote dikigoro. (Greek)
 the Ariadne must SUBJ marry FCI lawyer
 Intended: ‘Ariadne must marry any lawyer.’
- c. #Ta bixu dei jia gei renhe lvshi. (Mandarin)
 she must necessarily marry for FCI lawyer
 Intended: ‘She must marry any lawyer.’

- (43) I Ariadne prepī na pandrefti kanena dikigoro. (Greek)
 the Ariadne must SUBJ marry NPI lawyer
 ‘Ariadne must marry a lawyer, some lawyer of other.’
- (44) Ta bixu dei jia gei shenme lvshi cai nen (Mandarin)
 she must necessarily marry for NPI lawyer then can
 jiejuē jingjishangde kunnan.
 solve financial trouble
 ‘She must marry a lawyer, some lawyer of other (to avoid financial trouble).’
- (45) Maria-nun {amwu/etten}-pyenhosa-hako-rato kyelhonhay-yahan-ta. (Korean)
 Maria-TOP NPI.lawyer marry-must-DECL
 ‘Maria must marry a lawyer, some lawyer of other.’

Notice, importantly, the use of supplementary *some or other*— which is intended to again bring about the contrast in meaning with *any*. Menéndez-Benito (2010), Giannakidou and Cheng (2006), Giannakidou (2001), Giannakidou and Quer (2013), and Giannakidou and Yoon (2016) offer accounts of how the exhaustive reading of FCIs may be derived, but the precise details are not crucial here. All we need to see is the empirical contrast between *kanena/shenme/rato* which are grammatical, and *any*. The contrastive behaviors of *any* and the *shenme/kanenas* NPI can be replicated with epistemic universal modals (see Giannakidou and Quer 2013, Giannakidou and Yoon 2016 for the relevant data).

To summarize: we found that empirically NPIs such as *any* that count as ‘exhaustive’ (i.e. trigger alternatives and exhaustification via O, have [+ Σ]), and FCIs (also exhaustive, or as CL put it, conveying the information to ‘not prune’ alternatives) contrast sharply in nonveridical contexts with the Greek, Mandarin and Korean NPIs with respect to six widely used diagnostics. The exhaustivity-for-all hypothesis, as formulated in the existing theories, is unable to predict the differences we identified. The problem is that (1) necessitates alternatives to be exhaustified, but the data presented here, in particular the resistance of Greek, Mandarin and Korean NPIs to obtain free choice readings, suggest that we must allow for the possibility that alternatives are *not* exhaustified (*referential vagueness*).

5 Conclusions: reductionism versus empirical adequacy

The most obvious conclusion from our discussion is that *exhaustivity-for-all* hypothesis cannot be maintained. The number of empirical asymmetries we identified, and the existential, non-free choice readings of Greek, Korean and Mandarin NPIs tell us that, for a significant number of NPIs, it is unreasonable to assume exhaustification. The reductionist position, thus, as stated in (1) and implemented in the current theories inspired by (1), cannot be maintained without abandoning empirical adequacy.

A reductionist theorist might, of course, respond by saying that exhaustification works, but maybe *other factors* produce the empirical differences observed here. What other factors? In Chierchia 2013 and Chierchia and Liao 2015 a number of stipulations are given to derive the differences between *any* and FCIs— but to my knowledge, there is no explanation within the existing system about the six differences within the NPI classes presented here. If the Greek, Mandarin and Korean NPIs trigger alternatives, O, and have [+Σ], there is simply no way to predict their distinctive behavior from *any* we observed. Now, if the Chierchian theorist believes that there are additional constraints, the onus is on them to show us what exactly these constraints are; and I can honestly not see how they can avoid admitting that O doesn't always apply, or that not all NPIs contain [+Σ], which is in fact exactly what the referential vagueness position says (Giannakidou and Yoon 2016, and Giannakidou and Lin 2016). The reductionist position in (1) posits exhaustification whenever we have alternatives, but the Greek, Korean, and Mandarin data (along with the number of languages I mentioned at the beginning) show us that it is possible to have NPIs with alternatives *without* exhaustifying them.

Which brings us back to *any*: is the O plus [+Σ] analysis an adequate and complete analysis of *any*? If it were, i.e. if it explained problems that other theories didn't, or if it explained them with fewer assumptions, maybe then we could accept it at least as the desirable analysis of this type of NPI. Sadly, however, there is no reason to think this is the case. One can compile a long list of problems, but I will only mention here three. First, as we saw in Table 1 the distribution of *any* includes nonveridical, non-negative contexts, where the logic of improvement with negation that characterizes the Kadmon and Landman, Krifka, and Chierchia systems, described in section 3, won't work. Chierchia 2013 does posit additional stipulations, i.e. ad hoc rules that do not follow from the meaning, to take care of the *any* with e.g. imperatives and modals. These rules all derive free choice—so the problem with the non-free choice readings of the Greek, Mandarin, Korean NPI remains. In Chierchia and Liao 2013, more rules are added to account for strikingly small set of data. Overall, the system built around (1) resorts to a proliferation of ad hoc rules— and the need to posit them would lead most researchers to the conclusion that a system that didn't need them was superior to the Rube Goldberg contraption that the O plus [+Σ] analysis ends up constructing around itself.

Second, within non-veridical contexts, the major licensing environment of questions remains problematic for the O plus [+Σ] system. It is hard to see how questions emerge as excellent environments for both kinds of NPIs, while exhaustivity does not play a role in the licensing of *any* in questions, as shown by Hoeksema 2008.

Third, it is entirely unclear how the Chierchia account would handle the well-known contexts involving implicit negation. The environments are prominent in the polarity literature (since, among others, Linebarger 1980). We can illustrate the problem with emotive factive predicates such as *be grateful* and *be glad*:

(46) The thing I am most grateful for is that anyone is asking any questions.

(J. J. Abrams, *Entertainment Weekly* 54, Nov. 20, 2015)

(47) I am glad that she has any friends (at all).

Mong other things, the urgent question that the Chierchian analysis must answer here is the following: what is the negative, DE or nonveridical operator that checks the [+Σ] feature on *any* in (46)-(47)? Emotive factives (positive and negative) are neither negative nor nonveridical; under such predicates we should therefore not expect NPIs on the Chierchian account. We could of course augment it with my theory of two modes of licensing (Giannakidou 2006), which naturally would be welcome. But doing so is admitting that the exhaustivity account has failed to generate the results it needs to. Moreover, there is an empirical contrast again between *any* and the Greek/Mandarin/Korean NPI in that the latter tend not to be licensed (Giannakidou 1997, 2006):

(48) *I Ariadne metaniose pu ipe tipota.
the Ariadne regret.past.3sg that said.3sg anything
'Ariadne regrets that she said anything.'

Why should this contrast exist? The elements of Chierchia's system, again, shed no light on this cross-linguistic contrast. Worse, even if we were to claim that *glad* in (47) bears the requisite [+Σ] checking feature, the exhaustivity account wrongly predicts that (47), analyzed as in (49), should be a contradiction:

(49) I am glad that ONLY (she has any friends)

(50) Alt-p= {she has Dutch friends, she has short friends, she has tall friends, ...}

ONLY requires that all the Alt-p propositions be false: but in fact I cannot be glad she has friends, but not be glad, for every possible subset of friends, that she has such friends. This is indeed a contradiction, and Chierchia's system wrongly predicts that (47) should therefore be ill-formed.

Given all the above, the overall conclusion of our discussion must be that the *exhaustivity-for-all* hypothesis in (1), as formulated in Chierchia's work, is not just unable to handle the Greek, Korean and Mandarin type of NPI—it appears to be unable to handle the distribution of *any* itself.

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