Having at least an iota of talent: a Gradable HPSG Analysis of the Syntactic Distribution and Semantics of the minimizer *an iota*

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1 Introduction

Minimizers such as *a red cent* or *an iota* have been assumed to have the focal operator *even* as part of their syntactic structure (Tubau, 2016, 2020) since they are expected to generate inferences (i.e., exhaustify) about all the possible alternatives in a scale. For example, the sentence *I don't have a red cent* generates entailments regarding all other possible amounts of money: provided that *a red cent* denotes the smallest possible amount of money, it follows that I don't have any significantly larger amount of money if I don't *even* have a red cent.

The strongest forms of downward-entailing (D.E.) contexts facilitate the exhaustification of alternatives which led to the classification of minimizers as negative polarity items (NPIs) almost exclusively possible in anti-aditive and anti-morphic environments (van der Wouden, 1997; Zwarts, 1998). However, the occurrence of minimizers such as *iota* in positive contexts while being modified by focal operators not conductive to exhaustification calls into question the need to enrich the syntax of minimizers with *even*.

In this paper, I want to further the hypothesis that the distribution of minimizers should not be analyzed as satisfying inferences with respect to all their alternatives, but rather as satisfying, or not satisfying, the standard of a scale. An analysis of the distribution of *iota* on these lines will be sketched within an HPSG framework.

2 Focalization of minimizers by *even*

The syntactically covert *even* hypothesis associated with minimizers has had a healthy number of advocates in the last fifty years (Heim, 1984; Horn, 1989; Schmerling, 1971; Tubau, 2016, 2020). This hypothesis provides an account of the scalarity of minimizers, the entailment relations they keep with their alternativities, and their very polarity.

Minimizers such as *(not) a red cent*, or *(not) a drop*, depict elements of small size or value that belong to conceptual hierarchies in which they occupy the lowest position due to their size: in a scale of amounts of money, *a red cent* represents the smallest possible amount, while a similar relation holds between *a drop* and different amounts of liquid. For example, the sentence *I don't have a red cent* conveys a total lack of money. In other words, the proposition in which this minimizer is used entails all the other propositions concerning larger amounts of money. The all-encompassing inferential relation that minimizers keep with their alternatives has been described as being one of *exhaustification* (Krifka, 1994).

Exhaustification can be measured in terms of the informational strength of a proposition concerning its entailments: the more entailments a proposition has, the stronger it is (Krifka, 1994). Since minimizers exhaustify all their alternatives, they are expected to be part of the strongest scalar proposition. Given that minimizers on their own are rather weak due to their only entailing the portion of matter or the extent of the event they depict, they are thus expected to be mostly possible in entailment-reverting contexts, such as anti-additive and anti-morphic contexts, the strongest downward-entailing (D.E.) environments (van der Wouden, 1997; Zwarts, 1998).

Notwithstanding expectations regarding the inferential relations that minimizers keep with their alternatives, as well as their polarity distribution, there is substantial evidence that they can occur in contexts commonly barred to strong NPIs, such as the scope of *weak* D.E. environments like the quantifier *few*, non-veredical sentences (Giannakidou, 2012), and outright positive sentences, while being focalized by operators other than *even* for which exhaustification is not a requirement. This paper will focus on the appearance in positive sentences and focalization of the minimizer *an iota*, an expression belonging to the family of *partitive minmizers*.

3 Partitive Minimizers

Partitive minimizers are items derived from measure nouns that behave like NPIs, and tend to appear in (pseudo) partitive contexts, hence their name. These expressions have received special attention in Portuguese (Pinto, 2015), and Spanish (Cifuentes Honrubia, 2019), particularly thanks to the work of San-Segundo Cachero (2019, 2024), while comparable expressions in English have received more limited attention (Martínez García, 2022, 2023).

Examples of partitive minimizers include noun phrases such as *an iota* or *a crumb*, which are regularly used as NPIs (1, 2), while also appearing in positive contexts (3, 4), from Ententen21 (2021).

(1) Their strings are pulled by ads, corporate media and propaganda financed by corporations and 1%-ers, [and] voters do not get *a crumb* of information on which corporations are manipulating them.

(2) In physics, the destruction of the underlying science was total, as there hasn't been *an iota* of correct physics produced since Newton's laws in 1687.

(3) Business owners are aware that a website at times requires *a crumb* of personal touch.

(4) Each time we read a book or see a movie about this period of history we develop *an iota* more of insight into the plight of the Jewish people (...).

The conceptualization of these expressions as minimizers that appear in positive contexts necessitates the reevaluation of key properties associated with the former; one such property is idiomaticity. There has been a consistent recognition that minimizers are idioms whose idiomaticity is triggered when licensed by appropriate operators (e.g., negation); otherwise, they have to be interpreted literally, or no interpretation is possible (Tubau, 2016, 2020). However, the relation between negation and idiomaticity thus depicted does not define the latter on independent grounds: we simply know that minimizers become idiomatic if licensed.

San-Segundo Cachero (2019) proposes that the idiomaticity of minimizers rests on the ambiguous quantificational readings that these expressions are associated with. For example, *a crumb* can either depict an amount of a certain substance, usually food, that fits on ones fingertips, or an undefined, yet very small, amount of the same substance.

If the ambiguity persists in positive contexts, especially contexts in which no obvious licensor is identifiable, then we can assume that we are in front of a partitive minimizer. However, the use of minimizers in highly metaphorical contexts allows the resolution of this ambiguity towards their interpretation as measure units without clearly defined boundaries. In the examples above, the nouns *iota* and *crumb* quantify over rather small amounts of the substance encoded by the downstairs noun in partitive constructions.

To recapitulate, partitive minimizers are expressions derived from measure nouns that behave like negative polarity items, but whose use in positive contexts is permissible provided that they trigger quantificational readings in such contexts. In this paper, I will propose an analysis of the English partitive minimizer an iota.

4 The distribution of *an iota*:

The minimizer *an iota* is a paradigmatic example of a partitive minimizer: it tends to occur in NPI licensing contexts such as negation, the scope of negative quantifiers, irrealis conditional contexts, as well as positive contexts while only triggering quantificational readings (i.e., it portions a small amount of matter) in positive contexts since the noun cannot be interpreted literally.

The table below shows the proportion of occurrences of *an iota* in NPI licensing contexts and positive contexts of the first hundred randomized hits in the Ententen21 corpus (2021):

Environment	Number of occurrences
Negation	45
Downward Entailing	26
Non-veredical	10
Modals	2
Questions	2
Free choice	1
Positive	7
Irrelevant	6
Total	99

Distribution of *an iota* across different licensing environments

More specifically, this paper intends to focus on the following set of data (Ententen21, 2021):

(5) Good thing someone in the family had *an iota of talent*.

(6) Each individual instructor had *at least an iota of sympathy* for a student who was willing to try and therefore the occasional lenient alternative was given.

(7) Realizing his one hope was to attack Buu with all the power within his body, Vegeta decided to sacrifice himself by unleashing *every iota of his energy* in a massive explosion.

(8) Roy Shapiro, Professor of Operations Management Harvard Business School, states that "companies run into trouble" when they stress "squeezing out *the last iota of inventory*" above the more important goals of quality and process improvement (...).

This collection of data is of interest since it showcases examples in which *an iota* either does not exhaustify its alternatives and is associated with informationally weak propositions (5 and 6), or it exhaustifies alternatives while behaving as a positive polarity item (PPI) (7 and 8).

Although it can be inferred from (5) that someone has a minimum measure of talent, there is a strong implicature that having more than the minimum talent is false or unknown. *Iota* in these contexts is informationally weak since it only safely entails propositions in which its minimal semantics is encoded, while entailments regarding propositions associated to higher points in the scale are not guaranteed. A similar reasoning follows for (6).

Modification by *every* and the embeddedment of *iota* in the superlative *the last* preserves exhaustification but reverses the entailment direction assumed for minimizers. That the relevant propositions in (7) and (8) entail all their alternatives simply follows from their being the strongest propositions, removing the need for scale-inverting licensing contexts.

It is worth noticing that despite the restrictor of *every* being D.E., and thus an acceptable NPI licensor (Sailer, 2009), phrases with *every* and superlative uses of *iota* are scalar positive polarity items (PPIs). Scalar PPIs do not reject negation but adjust the implicatures that can be derived from them. Consider the implicatures associated with the PPI *a ton* when used canonically and when under the scope of negation:

(9) *A ton:*
   a. I have a ton of work for you.
      i. Implicature: I have a lot of work for you.
   b. I don't have a ton of work for you.
      i. Implicature: Im rejecting the notion that I have a lot of work for you. I may have just some work or some work for you.

Similar inferential patterns can be observed when negation is used with *every iota* and *iota* in superlatives:

(10) *Every iota:*
   a. Vegeta unleashed every iota of energy.

i. Implicature: Vegeta used all his energy.

b. Vegeta didn't use every iota of energy.

i. Implicature: Vegeta still has energy.

(11) *The last iota:*

a. They squeezed out the last iota of inventory.

i. Implicature: They used up all the inventory.

b. They didn't squeeze out the last iota of inventory.

i. Implicature: There is still inventory that hasnt been used.

The box below summarizes the polarity tendencies and the exhaustification patterns of *iota*. The symbols "—" and "+" stand for negative and positive polarity, respectively; the arrow pointing to the right (→) represents exhaustification from low to high places on the scale, while the arrow in the opposite direction (←) represents exhaustification from high to low. The symbol "x" stands for "no exhaustification."

Iota	Polarity	Exhaustification
An iota	-	→
(at least) An iota	+	x
Every iota	+	←
The last iota	+	←

Polarity and exhaustification tendencies of *iota*

5 Gradable treatment of *iota*:

Based on the work of Kennedy & McNally (2005) and Greenberg (2018), I want to propose that the scalarity and polarity of *iota* should be analysed in terms of satisfaction of the standard of a scale. The conceptualization of scale I adopt here is slightly more abstract than the hierarchy of entailments usually adduced to in exhaustification-based accounts of the semantics of NPIs. More concretely, I assume a scale to be a vector on which a set of degrees are organized according to an ordering relation depending on how much of a gradable property they possess (i.e., a dimension of measurement) (Kennedy & McNally, 2005).

A standard encodes a degree on a scale that defines truth values for propositions based on the gradable property over which the scale is based. Not satisfying the scale renders a proposition false, while the opposite holds for standard satisfaction. Likewise, standards may be relative or absolute; standards are relative if their definition is context-dependent, while they are absolute in case their definition depends on the semantics of the predicate they return truth values of (Kennedy & McNally, 2005). The following examples illustrate both kinds of standards:

(12) Michael Jordan is tall.

(13) I covered the lesson plan.

In the above examples, whether (12) is true depends on the class of objects against which the height of Michael Jordan is compared. If he is 1.70m. tall, he is tall compared to the average height of jockeys, but he is not tall compared to the height of American basketball players. On the other hand, the truth of (13) depends largely on the semantic attributes of the verb *cover*: covering a lesson plan entails having completed the plan to an end, independently of the contents of the lesson. My analysis of iota is based on the following assumptions:

I. *Iota* denotes a minimal measure.

II. The predicates that *iota* measures out have minimal absolute standards of satisfaction.

III. *Iota* may or may not satisfy the standard. Polarity plays a relevant role in this regard: negative polarity is generally associated with the standard not being satisfied, while positive polarity correlates with its satisfaction.

6 Sketch of an HPSG Analysis

This section will provide an analysis of the lexical items conforming the phrase *an iota of talent*. It will follow Bochnak's (2010; 2013) treatment of the quantificational expression *half* and Van Eynde & Kim's (2023) analysis of pseudo-partitive structures. The lexical entries in this section will propose semantic representations partially based on the combinatoric machinery provided by LRS (Richter & Sailer, 2003; Sailer, 2004).

Certain key elements of the current proposal are missing in the lexical entries below; neither details regarding the standard of satisfaction nor a fully fleshed semantic representation have been included. Information concerning the standard could be integrated within the LRS feature architecture proposed in Rizea & Sailer (2019, 2020) and Sailer & Am-David (2016). Since standard satisfaction is essential to the truth valuation of gradable predicates, an entry on standard satisfaction could be a value of the feature A(T)I(SSUE). Particulars of a proposal in that direction are still being worked out.

The work of Bochnak (2010, 2013) centers on the eventive and quantificational uses of *half*, proposing that such a quantifier works as a scalar operator that measures out a gradable predicate returning a midpoint in its scale. I suggest that *iota* works in a very similar fashion: *iota* is a scalar operator that takes a gradable predicate and returns minimal values on a scale. The semantic import of *iota* will be captured by the operator **min-part**, while its interaction with gradable properties, represented by the variable over properties "G", will be encoded within the feature architecture of LRS as a value of IN(TERNAL)-CONT(ENT).

In the representation in figure 1, "S" stands for the scale associated with the gradable predicate. Van Eynde & Kim (2023) propose the classification of partitive structures depending on headedness. Partitives form complex NPs from two noun phrases articulated by the preposition *of*. The head noun in such constructions can be the first noun (i.e., the *upstairs* noun) or the second one (i.e., the *downstairs* noun). NPs headed by the *upstairs* noun are Type A pseudo-partitves while their counterparts are called Type B. Van Eynde & Kim (2023) propose that each construction has a differentiated syntactic structure: in Type A constructions the upstairs NP takes as a complement a PP headed by *of*, while in Type B structures the preposition adjoints to the second noun as a functor allowing the maximal projection of the noun to NP.

Van Eynde & Kim (2023, p. 287) represent the relation that the preposition establishes with each construction as follows:

(14) Type A: PP[*of*] P[*of*] NP

(15) Type B: NP[*of*] P[*of*] NP

I will take the position that *iota* forms pseudo-partitive structures of type B. I base this decision on the results that the extraction test returns for phrases with *iota*. If a preposition projects to a full PP, the entire phrase is expected to pass an extraction test, this is illustrated in (16); on the other hand, if the preposition is an adjoint, extraction would not be satisfactory (17):

(16) Of cucumbers, Alex doesn't have a pound.

(17) *Of shame, Alex doesn't have an iota.

As a consequence, the preposition *of* will select the *downstairs* nominal as a head instead of a complement. A final relevant assumption regarding *of* is its semantic vacuity. This would allow the passing-up of relevant feature values connected with the interpretation and the combinatorial potential of the subexpressions modeling the semantic import of the *downstars* noun. More concretely, the CONTENT and LRS values of the *downstars* noun will be inherited by *of* to make them accessible for *iota* to interact with. The AVM in figure 2 is a modified version of van Eynde and Kim's lexical entry for *of* associated with Type B phrases. Finally, I will assume that the nouns *iota* quantify over are inherently gradable. *Iota* usually collocates with abstract nouns. In bare sentences, such nouns usually generate degree readings:

(18) Alex has talent.

(19) Alex has energy.

The sentences above are usually interpreted as either exhibiting proficiency in the execution of an activity to a certain degree, or having stamina possibly at a level that surpasses the median. The semantic representation I will adopt for *talent* is an adaptation of Bochnak (2010). It is important to mention that Bochnak's

formalization assumes that *of* takes a noun and returns a gradable predicate. I reject that assumption by directly giving gradable status to the noun *talent* and assuming semantic vacuity for *of*. See figure 3.

7 Conclusions

This paper examines the syntactic distribution and semantic properties of *iota*, focusing on its role as a scalar minimizer within an HPSG framework. While minimizers are generally associated with negative polarity environments, an iota presents a more complex picture, occurring in both positive and negative polarity contexts. The analysis here presented pursues the hypothesis that the polarity tendencies of iota should be evaluated with respect to their satisfaction of the standard of gradable predicates rather than the exhaustification of alternatives. The HPSG analysis proposed here has sketched a formal account of *an iota* as a scalar element, treating it as an operator that selects gradable predicates and returns minimal values on a scale. The basis of this analysis incorporates insights from previous analyses of pseudo-partitives (Van Eynde & Kim, 2023) and gradable expressions (Bochnak, 2010, 2013).

8 Figures

The lexical entries below assume with Rizea & Sailer (2020) that any formula ϕ entered as values of PARTS indicate that ϕ and its sub-expressions are members of the PARTS list.

$$\begin{bmatrix} \textit{phrase} \\ \text{PHON} & \langle\, \textit{an iota} \,\rangle \\ \text{SYNS}\,|\,\text{LOC} & \begin{bmatrix} \text{CAT}\begin{bmatrix} \text{HEAD} & \textit{noun} \end{bmatrix} \\ \text{CONT}\begin{bmatrix} \text{INDEX}\begin{bmatrix} \text{DR} & \textit{me} \end{bmatrix} \\ \text{MAIN} & \textbf{\textit{min-part}} \end{bmatrix} \end{bmatrix} \\ \text{LRS} & \begin{bmatrix} \text{EX-CONT} & \textit{me} \\ \text{IN-CONT} & \boxed{1} \\ \text{PARTS} & \langle\, \boxed{1}\lambda G\lambda x.G(x)(\textbf{min-part}(S_G)) \,\rangle \end{bmatrix} \end{bmatrix}$$

Figure 1. AVM *for 'an iota'.*

$$\begin{bmatrix} \text{PHON} & \langle\, \textit{of} \,\rangle \\ \ldots & \begin{bmatrix} \text{CAT} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{prep} \\ \text{SELECT} & \begin{bmatrix} \ldots & \begin{bmatrix} \text{CAT} & \begin{bmatrix} \text{HEAD} & \textit{noun} \\ \text{COMPS} & \langle\rangle \\ \text{MARKING} & \textit{bare} \end{bmatrix} \\ \text{CONT} & \boxed{1} \end{bmatrix} \\ \text{LRS} & \boxed{2} \end{bmatrix} \end{bmatrix} \end{bmatrix} \\ \text{CONT} & \boxed{1} \end{bmatrix} \\ \text{LRS} & \boxed{2} \end{bmatrix}$$

Figure 2. AVM *for 'of'.*

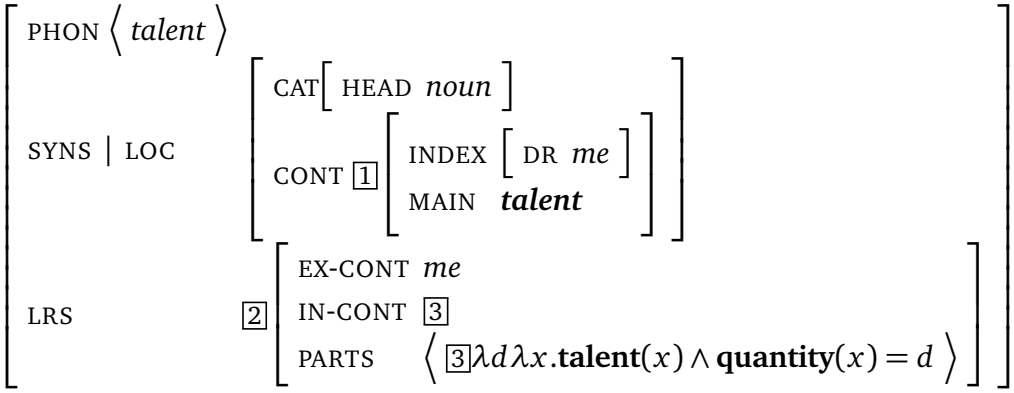

Figure 3. AVM *for 'talent'.*

References ♦ Bochnak, M. Ryan. 2010. Quantity and gradability across categories. *Proceedings of Semantics and Linguistic Theory (SALT) 20* 251–268. ♦ Bochnak, M. Ryan. 2013. Two sources of scalarity within the verb phrase. In Boban Arsenijevi, Berit Gehrke & Raffaella Marín (eds.), *Studies in the composition and decomposition of event predicates*, 99–123. Springer. ♦ Cifuentes Honrubia, José Luis. 2019. Un huevo: subjetivación, cuantificación y negación. *Zeitschrift für romanische Philologie* 135(3). 694–740. ♦ Ententen21. 2021. Ententen21 corpus. Accessed: 2025-03-22. URL `https://app.sketchengine.eu/#dashboard?corpname=preloaded%2Fententen21_tt31`. ♦ Giannakidou, Anastasia. 2012. Negative and positive polarity items. In Klaus von Heusinger, Claudia Maienborn & Paul Portner (eds.), *Semantics: An international handbook of natural language meaning, volume 2*, 1660–1712. De Gruyter Mouton. ♦ Greenberg, Yael. 2018. A revised, gradability-based semantics for even. *Natural Language Semantics* 26(1). 51–83. ♦ Heim, Irene. 1984. A note on negative polarity and downward entailingness. *North East Linguistics Society* 14(1). 98–107. ♦ Horn, Laurence R. 1989. *A natural history of negation*. University of Chicago Press. ♦ Kennedy, Christopher & Louise McNally. 2005. Scale structure, degree modification, and the semantics of gradable predicates. *Language* 81(2). 345–381. ♦ Krifka, Manfred. 1994. The semantics and pragmatics of weak and strong polarity items in assertions. In *Proceedings of the 4th semantics and linguistic theory conference (salt 4)*, 195–219. ♦ Martínez García, Edgar David. 2022. Minimizers as nominal quantifiers. In Mihaela TnaseDogaru, Alina Tigu, Ioana Stoicescu & Mihaela Zamfirescu (eds.), *New insights into linguistic communicative behaviour*, 146–193. Newcastle upon Tyne, UK: Cambridge Scholars Publishing. ♦ Martínez García, Edgar David. 2023. *Towards a grammar of english and spanish minimizers*. Nicosia, Cyprus: University of Cyprus Phd dissertation. ♦ Pinto, Clara. 2015. Para a história da negação: o minimizador lt;igt;homemlt;/igt; no português antigo. *Estudos de Lingüística Galega* 7. ♦ Richter, Frank & Manfred Sailer. 2003. Basic concepts of lexical resource semantics . ♦ Rizea, Monica-Mihaela & Manfred Sailer. 2019. Representing scales: Degree result clauses and emphatic negative polarity items in romanian. In *Proceedings of the 26th international conference on head-driven phrase structure grammar*, 79–99. ♦ Rizea, Monica-Mihaela & Manfred Sailer. 2020. A constraint-based modeling of negative polarity items in result clause constructions in romanian. *Linguisticae Investigationes* 43(1). 129–168. ♦ Sailer, Manfred. 2004. Local semantics in head-driven phrase structure grammar. In O. Bonami P. Cabredo Hofherr (ed.), *Empirical issues in syntax and semantics 5*, 197–214. CSSP. ♦ Sailer, Manfred. 2009. *A representational theory of negative polarity item licensing*: Georg-August-Universität Göttingen dissertation. ♦ Sailer, Manfred & Assif Am-David. 2016. Definite meaning and definite marking. In *Proceedings of the joint 2016 conference on head-driven phrase structure grammar and lexical functional grammar*, 641–661. ♦ San-Segundo Cachero, Rosabel. 2019. ¿son unidades semiléxicas los sustantivos minimizadores? análisis sintáctico-pragmático. *Revista Española de Lingüística* 49(1). 207–232. ♦ San-Segundo Cachero, Rosabel. 2024. Mínimos máximos: el valor enfático de las expresiones minimizadoras. *Onomázein: Revista de lingüística, filología y traducción de la Pontificia Universidad Católica de Chile* 64. 149–166. ♦ Schmerling, Susan F. 1971. A note on negative polarity. *Paper in Linguistics* 4(1). 200–206. ♦ Tubau, Susagna. 2016. On the syntax of english minimizers. *Natural Language Linguistic Theory* 34(2). 1573–0859. ♦ Tubau, Susagna. 2020. *Minimizers and maximizers as different types of polarity items* 407–425. Oxford: Oxford University Press. ♦ Van Eynde, Frank & Jong-Bok Kim. 2023. Pseudo-partitives in english: an hpsg analysis. *English Language and Linguistics* 27(2). 271–302. ♦ van der Wouden, Ton. 1997. *Negative contexts: Collocation, polarity and multiple negation*. New York: Routledge. ♦ Zwarts, Frans. 1998. *Three types of polarity* 177–238. Dordrecht: Springer Netherlands.