From zero to bigger things: numerosity, intensification, and NPI licensing*

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CLS54 | April 28, 2018

Big-picture questions

• Are all numerals alike? Can we give them a unified semantics?
• What’s the analytical connection between plural and degree semantics?

Roadmap

• I report novel data which sets zero apart from other numerals in terms of
  ◦ Directly modifying (uncountable) nominal degree predicates
  ◦ Giving rise to intensifying effects
• I offer an analysis of zero as a degree quantifier which
  ◦ Explains its NPI licensing possibilities based on additional syntactic considerations
  ◦ Embarks on a pragmatic account of the intensifying effects
• Finally, I discuss
  ◦ How my account compares with the numeral zero argued in Bylinina & Nouwen (2017)
  ◦ Whether a unified semantics of zero is possible

1 Zero and nominal degree predicates

• Zero can directly modify what I will call nominal degree predicates, which typically denote
  abstract concepts, often have a degree adjective counterpart, and are mostly uncountable:

  (1)   a. Mary has zero/no tolerance for betrayal.
       b. Mary has *one tolerance for betrayal.

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*I thank Roger Schwarzschild for his kind guidance and for having numerous discussions with me on this material. Thank you to E. Matthew Husband for sparking my interest in zero. Thanks also go to Lucas Champollion, Martin Hackl, Irene Heim, Filipe Hisao Kobayashi, Benjamin Spector, and the reviewers and audience of CLS54 for their insightful comments. All remaining errors are mine.

1See the Appendix for more examples from Corpus of Contemporary American English (COCA).
(2)  a. Jack showed zero/no interest in physics.
    b. Jack showed *one interest in physics.

(3)  a. John has zero/no confidence in winning the game.
    b. John has *two confidence(s) in winning the game.

(4)  a. Anne demonstrated zero/no sense of fashion.
    b. Anne demonstrated *three sense(s) of fashion.

◇ No other numerals can directly modify these nouns. This is somewhat surprising if zero is simply a numeral.
◇ In these cases, zero is interchangeable with the negative quantifier no.
◇ Intuitively, zero seems to be expressing the (precise) degree of a nominal predicate.
   We would like to pursue this intuition.

• When modifying nominal degree predicates, zero is subject to different modification possibilities than other numerals.
   ◇ Zero is infelicitous with certain comparative expressions, e.g. more than and over. Other numerals are perfectly fine.

(5)    a. ??Mary has more than zero confidence in this contest.
        b. Susan certainly has more than ten publications!

(6)    a. #Vera has over zero tolerance for betrayal.
        b. Over ten students came to the lecture today.

◇ Zero can be modified by absolutely. Other numerals cannot.

(7)    a. Naomi has absolutely zero interest in physics.
        b. #John purchased absolutely five jackets!

◇ This is consistent with the intuition that zero is contributing to something other than cardinal evaluation.

• Cross-linguistic data also suggests that when zero modifies a nominal degree predicate, it is rather unusual as a numeral.
   ◇ In Brazilian Portuguese\(^2\), zero is the only numeral that can (1) directly modify nominal degree predicate, and (2) appear either before or after the nominal degree predicate it modifies.

\(^2\)I thank Filipe Hisao Kobayashi for providing the data.
a. Oliver tá com (zero) confiança (zero).
Oliver be.3sg with zero confidence zero
‘Oliver has zero confidence.’

b. Maria tem zero publicações (*zero)
Maria have.3sg zero publications zero
‘Maria has zero publications.’

Take-away: Zero behaves as a rather unusual numeral when modifying nominal degree predicates; it patterns with no and adjectives.

2 Zero Intensification: two observations

• Zero shows intensifying effects in a way that no other numerals do.

2.1 Ordering restriction in intensification

• With typical intensifiers, the intensified form must follow the unintensified form:

(9) a. “He is good, very good,” Bercow says. (The Guardian, 25 May 2014)
b. #“He is very good, good.”

(10) a. (The) Iraq vote is close, real close. (Politico, 23 March 2007)
b. #The Iraq vote is real close, close.

• This pattern shows up in various types of intensification strategies, e.g. reduplication:

(11) a. But he was crazy about her. Like crazy crazy. (Discretion: A Novel, p. 323)
b. #But he was crazy crazy about her. Like crazy.

• A parallel observation: the ordering between no-NP and zero-NP also appears to be fixed:

(12) a. There is no chance, zero chance, that the US would be sued on something like our financial regulations. (Barack Obama, 10 May 2015)
b. #There is zero chance, no chance, that the US would be sued ...

◊ There are many naturally-occurring examples in the wild that conform to this pattern:

(13) The justice department revealing it has found no evidence, zero evidence that Donald Trump tower was ever wire-tapped ... (CNN, 2 September 2017)

(14) ... we have no information – zero information – about the base rate prevalence of lying in the general public. (Journal of Law and Health, 2009)

• These data show that zero-NP is somehow more intensified than no-NP. But how?
2.2 Conjunction with antonymous adjectives

- The unintensified form of a degree adjective is compatible with the negation of the intensified form (Beltrama & Bochnak, 2015; Bylinina & Sudo, 2015):

  (15) La torre è alta ma non alt-issima.
      the tower is tall but not tall-intensifier
      ‘The tower is tall but not extremely tall.’ (Beltrama & Bochnak, 2015, p. 848)

  (16) The journalists are honest, but not 100% honest.

- Zero also has an intensifier use, but only with downward monotonic degree adjectives, i.e. “antonymous adjectives” that are on a “reversed” scale (Morzycki, 2009; Rett, 2017):

  (17) McEwen is cautious about the chances of seeing the missing lander this way, giving it a “small but not zero” chance of success. (Nature, May 14th 2008)

  (18) Travelers who ... have no measured fever, and have been determined to have low, but not zero risk will be released. (Virginia Department of Health)

  (19) At this point, we conclude that we find weak, but not zero evidence of a triangular arbitrage role ... (Handbook of Asian Finance, p. 203)

- Numerals don’t conjoin with most adjectives. Why is zero singled out in the above cases?

  (20) #I want five and small cups.

  (21) #This team consists of weak but not two players.

3 Zero: NPI Licensing?

- Numerals normally don’t license NPIs3.

- Based on the following examples from zero and plural count nouns, Bylinina & Nouwen (2017, p. 21) argue that zero does not license even weak NPIs:

  (22) No/*Zero students ever said anything.

  (23) No/*Zero students bought any car.

  ◦ This is not quite empirically adequate.

  ◦ A confound: all of the examples above have zero-NP in the subject and the NPI in the nuclear scope of zero.

3For discussions about exactly n with low numerals licensing NPIs in restricted environments, see Linebarger (1987), Nishiguchi (2004), Rothschild (2006), Gajewski (2008), and Crnić (2014), a.o.
The zero that modifies plural count nouns can actually license NPIs in its restrictor:

\[(24)\]
\begin{align*}
a. & \text{ Julia has } no/zero \text{ publications in anything related to linguistics.} \\
b. & \text{ Adding “write a book” to your to-do list will result in } no/zero \text{ books ever being written.} \\
c. & No/Zero \text{ students from any European country came to the conference.}
\end{align*}

- How about the zero that modifies nominal degree predicates?
  - It seems to be able to license (weak) NPIs in both its restrictor and nuclear scope:

\[(25)\]
\begin{align*}
a. & \text{ There is } no/zero \text{ tolerance for any lying, stealing, or cheating.} \\
b. & \text{ Kara showed } no/zero \text{ interest in anything to do with boys.} \\
c. & \text{ John has } no/zero \text{ chance of ever becoming the President of the United States.}
\end{align*}

\[(26)\]
\begin{align*}
a. & \text{ No/Zero information was ever released to anyone outside the company.} \\
b. & \text{ No/Zero evidence ever existed proving I was wrong.} \\
c. & \text{ There was } no/zero \text{ privacy anywhere in this house.}
\end{align*}

- Why does this zero show more NPI licensing possibilities?
- What do we make of the contrast between the two zeros in terms of NPI licensing?

4 The Analysis

- Treating zero as a regular numeral will leave many of our observations unexplained.
  - Why is zero not sensitive to the countability of the nominal degree predicate?
  - Why can zero be conjoined with adjectives?

- Can we analyze zero as its close cousin, the negative generalized quantifier no?
  - But then what do we do with the ordering restriction between no-NP and zero-NP?

<table>
<thead>
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<th></th>
<th>Zero</th>
<th>Numerals</th>
<th>No</th>
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</thead>
<tbody>
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<td>✓</td>
</tr>
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<td>Combines with absolutely</td>
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<tr>
<td>Conjoins with adjectives</td>
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<td>x</td>
<td>??</td>
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<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Licenses NPIs in the nuclear scope</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
</tr>
</tbody>
</table>

Table 1: Comparison between degree-modifying zero/numerals/no

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4I thank Roger Schwarzschild and Irene Heim for pointing out some of the initial observations and discussing them with me.
4.1 **Zero semantics: a degree quantifier**

- I propose a degree quantifier analysis of zero.
  - Nominal degree predicates have a degree argument as well as some relevant dimension of measurement baked in their semantics (e.g. Larson, 1998; Heim, 2006).
  - Following Morzycki (2009), a gradable noun denotes a measure function from individuals to some degree.

\[(27) \quad \left[ N_{(d,t)} \right] = \lambda d. \lambda x. P(x) \land \mu_S(x) \geq d\]

\[(28) \quad \left[ \text{information} \right] = \lambda d. \lambda x. x \text{ is information and the amount of } x \text{ is no less than } d\]

- **Zero** is a degree quantifier of type \((dt, t)\). The lexical entry of zero:

\[(29) \quad \left[ \text{zero}_{(dt,t)} \right] = \lambda I_{(d,t)} . \forall d > 0 [\sim I(d)]\]

  - The predicate \(I\) is false of all degrees that are greater than 0.

- Taking “zero information was released” as a simple example, I postulate the following syntactic structure for a zero-sentence.

\[\begin{array}{c}
\text{t} \\
\text{QP}_{(dt,t)} \\
\text{\\triangleleft} \\
\text{Zero} \\
\text{1} \\
\text{t} \\
\text{\\exists} \\
\text{\langle e,t \rangle} \\
\text{DP}_{(e,t)} \\
\text{D} \\
\emptyset \\
\text{t}_1 \\
\text{\langle e,t \rangle} \\
\text{NP}_{(e,t)} \\
\text{was released} \\
\text{VP}_{(e,t)} \\
\text{\langle d,t \rangle} \\
\text{N}_{(d,t)} \\
\text{information} \\
\end{array}\]

---

5This degree quantifier analysis of zero relates closely to Alrenga & Kennedy’s (2014) analysis of no, a negative element assumed in their analysis of comparative clauses: \(\left[ \text{NO}_{max} \right] = \lambda P_{(d,t)}. \max(P) = 0\). Thank you to Reviewer #3 for pointing this out.
Since N takes a degree as its argument and zero is a degree quantifier, zero will have to QR, leaving behind a trace of type d.

• Below is one way of implementing the compositional analysis. Compositional rules involved here include: functional application (FA), predicate modification (PM), predicate abstraction (PA), and Existential Closure ($\exists C$) (Heim & Kratzer, 1998; Solt, 2015).

\[
\begin{align*}
\llbracket [DP \emptyset t_1 \text{information}] \rrbracket &= \llbracket N \rrbracket (d_1) \\
&= \lambda x. \text{information}(x) \land \mu_S(x) \geq d_1 & \text{by FA}
\end{align*}
\]

\[
\begin{align*}
\llbracket [IP \emptyset t_1 \text{information was released}] \rrbracket &= (\llbracket t_1 \text{information} \rrbracket)(\llbracket \text{was released} \rrbracket) \\
&= \lambda x. \text{information}(x) \land \mu_S(x) \geq d_1 \land \text{released}(x) & \text{by PM}
\end{align*}
\]

\[
\begin{align*}
\Rightarrow \exists x[\text{information}(x) \land \mu_S(x) \geq d_1 \land \text{released}(x)] & \quad \text{by } \exists C \\
\Rightarrow \lambda d_1. \exists x[\text{information}(x) \land \mu_S(x) \geq d_1 \land \text{released}(x)] & \quad \text{by PA}
\end{align*}
\]

\[
\begin{align*}
\llbracket QP \text{zero} \rrbracket &= \llbracket \text{zero} \rrbracket = \lambda I(d,t). \forall d > 0[\neg I(d)] \\
\llbracket [IP[\text{zero}\emptyset t_1 \text{information was released}]] \rrbracket
&= \lambda I(d,t). \forall d > 0[\neg I(d)](\lambda d_1. \exists x[\text{information}(x) \land \mu_S(x) \geq d_1 \land \text{released}(x)]) \\
&= \forall d > 0[\neg \exists x[\text{information}(x) \land \mu_S(x) \geq d \land \text{released}(x)]] & \text{by FA}
\end{align*}
\]

• Given the truth condition, the sentence zero information was released is true iff the amount of information that was released is 0.

• This requires including 0 as the endpoint of the degree scale.

4.2 Zero syntax: NPI licensing explained

• Observation 1: We observe that the degree quantifier zero seems to license an NPI in both its restrictor and nuclear scope\(^6\).

(30) a. There is no/zero tolerance for any lying, stealing, or cheating  
   b. Kara showed no/zero interest in anything to do with boys.  
   c. John has no/zero chance of ever becoming the President of the United States.

(31) a. No/Zero information was ever released to anyone outside the company.  
   b. No/Zero evidence ever existed proving I was wrong.  
   c. There was no/zero privacy anywhere in this house.

◊ Question 1: How is this captured in our account?  
◊ I will focus on fleshing out some of the key predictions based on the semantics analysis.

\(^6\)Unlike no, the degree quantifier zero never really licenses strong NPIs, e.g. in years. This may suggest that zero is never a sentential negation like no, but I don’t have anything further to add at this point.
Observation 2: The licensing is subject to locality conditions and intervention effects:

(32)  a. Kara showed zero interest in anything to do with boys.  
     b. ??Kara showed zero interest in the lecture which has anything to do with quantum chromodynamics. (Complex NP)  
     c. ??Kara showed zero interest in anything to do with boys and the lecture on quantum chromodynamics. (Coordinate Structure Constraint)  
     d. *Kara showed zero interest in every lecture that has anything to do with quantum chromodynamics. (Intervener: every)

Question 2: Are these restrictions on licensing due to particular requirements of a DE licenser or structural configurations (or both)?

Several existing accounts: a semantic/pragmatic approach (Krifka, 1995; Chierchia, 2004), and a syntactic/movement-based approach (Guerzoni, 2006).

The relevance of intervention effects will become clear later.

4.2.1 The 123 of NPI licensing

- Common/Basic assumptions about the conditions on NPI licensing:
  ◦ (i) It is environment based (Heim, 1984; Zwarts, 1996; Gajewski, 2005).
  ◦ (ii) (Strawson) Downward entailment (DE) is the central notion of a theory of licensing (Ladusaw, 1980; Progovac, 1993; Lahiri, 1998; von Fintel, 1999; a.o.).
  ◦ (iii) DE-ness can be defined across syntactic categories.

- Our semantics for zero predicts that it creates a (non-trivial) DE environment in both its restrictor and nuclear scope:

(33)  [[important information]] ⊆ [[information]]
      a. Zero important information was released.  
         ⇒ Zero information was released.
      b. ∀d > 0[¬∃x[information(x) ∧ µS(x) ≥ d ∧ released(x)]]
         ⇒ ∀d > 0[¬∃x[information(x) ∧ important(x) ∧ µS(x) ≥ d ∧ released(x)]]

(34)  [[student linguists]] ⊆ [[linguists]]
      a. Zero information was released to the linguists.  
         ⇒ Zero information was released to the student linguists.
      b. ∀d > 0[¬∃x[information(x) ∧ µS(x) ≥ d ∧ ∃y[released(y)(x) ∧ linguist(y)]]]
         ⇒ ∀d > 0[¬∃x[information(x) ∧ µS(x) ≥ d ∧ ∃y[released(y)(x) ∧ linguist(y) ∧ student(y)]]]
4.2.2 Sketching a structural analysis for NPI licensing

- I offer a structural analysis for our zero, to be contrasted with the numeral zero.

**Proposal**: The degree quantifier zero itself – rather than zero-NP – is the licensor. It licenses an NPI in the restrictor as well as the nuclear scope at LF, after QR applies.

(35) *Zero* in the subject position: $[TP [DP [Zero [NP ... X ... ]]] [VP ... Y ... [DP ... Z ...]]]$  
NPI licensing position: X, Y, Z

(36) *Zero* in the object position: $[TP [DP ... ] [VP ... [DP [zero [NP ... X ... ]]] ... Y ... ]]]$  
NPI licensing position: X, Y
• QR interacts with NPI licensing. Antecedent-Contained Deletion (ACD) provides independent evidence for this interaction (Merchant, 2000):

\[(37)\]
\[
\begin{align*}
&\text{a. John didn’t admit to being interested in any of the movies that Mary did.} \\
&\text{b. *John denied being interested in any of the movies that Mary did.}
\end{align*}
\]

◇ Both sentences have an ACD site hosted by a DP projected from *any*, an NPI item.

◇ *Any-NP has to QR for ACD resolution: in (a), it can target a landing site right below *not*; in (b), it will have to fall outside the scope of *deny.*

4.3 Zeroing in on the intensifying effects

• What about the intensifying effects?

◇ The ordering restriction: *no-NP, zero-NP*

◇ Conjunction with antonymous adjectives: *small but not zero* chance

4.3.1 Zero as a stronger scalar alternative

• Hypothesis: *Zero* is a stronger scalar alternative to antonymous adjectives and *no.*

• Recall the ordering restriction:

\[(38)\]
\[
\begin{align*}
&\text{a. There is no chance, *zero* chance, that the US would be sued on something like our financial regulations.} \\
&\text{b. *There is zero chance, no chance, that the US would be sued on something like our financial regulations.}
\end{align*}
\]

◇ The above contrast is reminiscent of the ordering restrictions on lexical alternatives (e.g. Levinson, 2000; Chierchia, 2004; Sauerland, 2012); The following (b) example is infelicitous because the stronger alternative entails the weaker alternative:

\[(39)\]
\[
\begin{align*}
&\text{a. The water is cold. In fact, it is freezing.} \\
&\text{b. *The water is freezing. In fact, it is cold.}
\end{align*}
\]

• The conjunction between *zero* and an antonymous adjective also bears interesting similarity with adjectives that are scalar alternatives:

\[(40)\]
\[
\begin{align*}
&\text{a. a *small but not zero* chance, *low but not zero* risk, *weak but not zero* evidence} \\
&\text{b. a *small but not tiny* ball, a *big but not huge* tree, a *weak but not wasted* muscle}
\end{align*}
\]

• *Zero* is a stronger scalar alternative to antonymous adjectives on different dimensions.
4.3.2 **Zero is not subject to domain restriction**

- Can we generalize this idea to explain the ordering between *no*-NP and *zero*-NP?
  - Not quite. *No* and *zero* can’t be scalar alternatives.
  - The difference between *no* and *zero* is not truth conditional.\(^7\) Notice that the following example involves a contradiction:

  (41) #The justice department revealing it has found *no evidence, but not zero* evidence, that Donald Trump tower was ever wire-tapped ...

  - But – there is no contradiction here:

  (42) The justice department revealing it has found *no good evidence, but not zero* evidence, that Donald Trump tower was ever wire-tapped.

  **Idea:** *No* is subject to domain restriction, but *zero* does not have domain selection, because it is not a generalized quantifier.

- “*No evidence*” can pragmatically ambiguous in terms of precision.
  - From the speaker’s perspective, “*no evidence*” and “*zero evidence*” are truth conditionally equivalent.
  - However, the hearer doesn’t have in mind such a non-restrictive context: domain restriction allows *no* to be weakened, such that when a speaker says “*no evidence*”, this could be interpreted by the hearer as “*no good evidence*”.

- In order to be be more precise, the speaker adds “*zero evidence*” – good or bad.
  - There’s no longer any room for pragmatic ambiguity that needs clearing up.
  - That’s how *zero*-NP can be more intensified than *no*-NP – “intensification” in terms of the precision of degree modification.

5 **Two lives of zero?**

- We have looked at the degree quantifier *zero*, which modifies nominal degree predicates and behaves like an unusual numeral.
- There’s also another *zero*, which modifies plural count nouns and behaves rather like a regular numeral.
- Are they Clark Kent and Superman? Is *zero* leading a double life?

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\(^7\)Thank you to Reviewer #1 for pointing this out!
5.1 The numeral *zero*: Bylinina & Nouwen (2017)

- Focusing on plural count nouns, Bylinina & Nouwen (2017) point out several semantic differences between *zero* and *no*.
  - *No* but not *zero* can appear in exceptive licensing and negative inversion (Déprez, 1999; Moltmann, 1995):

(43)  

  \( \text{No/*Zero students but Bill came.} \)

(44)  

  \( \text{On no/*zero occasions did he mention my help.} \)

  ◇ As we have seen, this *zero* can’t license NPIs in its nuclear scope:

(45)  

  \( \text{No/*Zero students ever said anything.} \)

(46)  

  \( \text{No/*Zero students bought any car.} \)

- Bylinina and Nouwen’s (2017) account:

  ◇ *Zero* shows weaker negative force and more flexible scope compared to *no*. It should be treated as a regular numeral rather than a generalized quantifier.

  ◇ Numeral semantics: a modificational approach to numerals + an *at least* meaning.

(47)  

  \[ \text{[zero]} = \lambda x \ [ \#x \geq 0 ] \]

  ◇ Their analysis for plural count predicates: denoting a full lattice structure, derived by the operator \( \ast \) (distinct from the more familiar semi-lattice operator \( \ast \)) which includes the bottommost element, \( \bot \).

  ◇ Problem: This will generate trivial truth conditions, such that a *zero*-sentence is always trivially true.

(48)  

  \( \text{Any predicate } \ast P \text{ is true of } \bot. \)

  \( \text{If } x \text{ in } \text{zero students} \text{ is } \bot, \text{ then it must be true.} \)

  ◇ Solution: Exh applies obligatorily to *zero*. Exhaustification is required even in DE environments where it is unexpected, because the semantics of *zero* is just as uninformative in DE environments as it is in UE environments.

(49)  

  \[ \text{[Exh Zero students passed the test.]} = \]

  \( \exists x [ \#x \geq 0 \& \ast \text{student}(x) \& \ast \text{pass-the-test}(x)] \)

  \& \( \neg \exists y [\#y > 0 \& \ast \text{student}(y) \& \ast \text{pass-the-test}(y)] \)

- How does B&N’s account explain their NPI licensing data?

  ◇ Stipulating the following two licensing conditions for NPIs:
(50) Given the structure \([\alpha \text{ EXH } [\beta \ldots [\gamma \text{ NPI } \ldots]]]\)

- Condition 1: the environment \(\gamma\) is non-trivially DE in \(\beta\)
- Condition 2: the environment \(\gamma\) is non-trivially DE in \(\alpha\)

- Given an \textit{at least} semantics of \textit{zero}, \(\gamma\) is not non-trivially DE in \(\beta\), before EXH applies.
- Problem: This analysis will incorrectly rule out the cases where \textit{zero} does actually license NPIs in its restrictor.

**New challenge:** Why does the numeral \textit{zero} fails to license NPIs in its nuclear scope?

- Can we rescue B&N’s analysis by making minimal modifications to their proposal?
  - Keeping the \textit{at least} semantics for \textit{zero} and the application of EXH.
  - Recall the licensing between \textit{zero} and an NPI is subject to intervention effects in [32].
  - We may assume that EXH applies at VP level, acting as an intervener between the licensor \textit{zero} and an NPI in its nuclear scope.\(^8\)

(51) \textit{Zero} in the subject position: \([TP [DP [Zero [NP \ldots X \ldots]]] \text{ EXH } [VP \ldots [DP \ldots Y \ldots]]]\)

- Problem: This can explain that the NPIs won’t be licensed in the nuclear scope of the numeral \textit{zero}, but it doesn’t fully capture how NPIs can be licensed in the restrictor, where \textit{zero} still has an \textit{at least} meaning before EXH applies.
- Idea: In order to explain the numeral \textit{zero}’s failure of licensing an NPI in its nuclear scope as intervention effects, we still need an \textit{exactly} semantics for \textit{zero}. A possible candidate for the intervener could be the distributor operator \textit{DIST}.

\(^8\)I thank Yimei Xiang for suggesting this idea to me after the presentation.
Prediction: If \textsc{dist} obligatorily applies to zero, this would predict that the numeral zero cannot combine felicitously with collective predicates:

(52) ??Zero soldiers surrounded the castle.

B&N reported unclear judgements for such examples.

Native speakers that I’ve consulted find these examples ill-formed/only marginally acceptable, and it cannot be judged true in a scenario where no (group) individual satisfies the collective predicate (because collective predicates come with an existential entailment, see Buccola & Spector (2016))

5.2 Open ends

• We now have two meanings for zero: a numeral, and a degree quantifier.
• But postulating two meanings for zero seems like a less parsimonious result.
  • Can the numeral account explain the difference between zero and other numerals?
  • Can the degree quantifier analysis of zero be extended to plural count nouns, if we assume a degree argument for plural predicates (Cresswell, 1976; Rett, 2008)?
• Or perhaps we should keep the two meanings separate?

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<tr>
<th></th>
<th>Degree quantifier zero</th>
<th>Numeral zero</th>
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<tbody>
<tr>
<td>Modifies uncountable nouns</td>
<td>✓</td>
<td>??</td>
</tr>
<tr>
<td>Combines with more than/over</td>
<td>x</td>
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</tr>
<tr>
<td>Combines with absolutely</td>
<td>✓</td>
<td>??</td>
</tr>
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</tr>
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Table 2: Comparison between the degree quantifier zero and the numeral zero

6 From zero to bigger things: some implications

6.1 Scale boundary

• Zero and 100% give rise to similar intensifying effects:

(53) Google is good, but not 100% perfect.

\footnote{Most recently, Nouwen (2018, p.4) also points out that “maximizer” like 100% and completely are sensitive to “there being an endpoint to the scale”. See also Kennedy & McNally (2005) for a discussion of the restricted distribution of proportional modifiers, e.g. completely, and in particular the use of the \textit{max} function in their analysis which makes reference to scales with maximal values.}
100% is strikingly similar to zero in terms of the type of degree adjectives they can be conjoined with: 100% + positive degree adjectives, zero + negative degree adjectives.

Such a constraint contrasts with other intensifiers, e.g. very and real, whose scale is contextually determined by the null degree morpheme POS (Cresswell, 1976; Heim, 2006; Kennedy, 2007; von Stechow 2009; a.o.).

- Both zero and 100% are at scale boundary, i.e. zero is the end of the numerical scale, whereas 100% is at the (other) end of the percentage scale.
- Being at scale boundary grants them the ability to function as intensifiers, and to exhibit the constraint on what type of degree adjectives they can conjoin with.
- Related to “bounded scales” (Kennedy & McNally, 2005)
- Demonstrating a close connection between numerosity and degrees.

6.2 Semantics and seemingly ontological oddity

- My analysis for zero as a degree quantifier involves including 0 to the endpoint of a degree scale, analogous to B&N’s move of adding a 0 element in a full lattice.
  - It is a move that has nontrivial consequences on our semantic theory\(^{10}\).
  - B&N (2017, p.2): “... the fact that languages allow ascription of zero quantity to an entity provides evidence that linguistic semantics has access to what at first sight may seem like an ontological oddity: an entity with zero quantity.”
  - We make the same ontological commitment: an entity with zero degrees/amounts.
- Is zero a “semantic virus” (Morzycki, 2017)?
  - Maybe. But the unusual behaviors zero exhibits could be due to there being two zeros: a numeral, and a degree quantifier.
  - What does it mean to be “at the corner of our language”? Do we have a principled way to decide what is at the core of language and therefore deserves theoretical attention?
  - Should I stop losing sleep over the weirdness of zero?

6.3 Take-home messages

- A closer analytical connection between plural and degree semantics
- A structural analysis suggesting that covert movement operations and intervening operators interacts with NPI licensing;
- Moving toward a more general theory of intensification

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\(^{10}\)See also Husband (2018) for applying B&N’s theory of plurality to the domain of events.
Appendix: Occurrences of zero with nominal degree predicates in COCA

(54) The new website now contains zero information that is useful for me.
(55) This position requires zero experience.
(56) ... according to the standard SEL cut score resulted in zero sensitivity.
(57) ... a great number of these titles received low to zero use.
(58) There is zero tolerance for any lying, stealing or cheating.
(59) ... these two separate things, whereas before, I had zero awareness of it.
(60) There is zero evidence that the transmission of this messaging will effectively reduce harmful behavior.
(61) There is no chance, zero chance, that the US would be sued on something like our financial regulations.
(62) There’s absolutely zero doubt that this is the future. It’s that simple.
(63) I have zero problem eating a huge bowl by myself all in one sitting.
(64) ... and their officials make sure to say there is zero tension and no disappointment in their relationship with the American president.
(65) It’s a dramatic monologue that contains zero drama, a series of questions that seek no answer ...
(66) Thundersnow not out of the question. Near zero visibility. At times it will wrap up from west to east ...
(67) Because it was outside the scope of the report, zero data was gathered on the difference in lane-splitting speeds and trauma suffered by people.
(68) The Browns right now have zero credibility – not just with the national media but with the local.
References


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