THE GRAMMAR OF INDIVIDUATION, NUMBER AND MEASUREMENT

by

Luis Miguel Toquero-Pérez

A Dissertation Presented to the
FACULTY OF THE USC GRADUATE SCHOOL
UNIVERSITY OF SOUTHERN CALIFORNIA
In Partial Fulfillment of the
Requirements for the Degree
DOCTOR OF PHILOSOPHY
(LINGUISTICS)

August 2024

Dedication

To my father and my uncle who, despite boarding Charon's boat too soon, have since been and will always be in my heart.

sunt lacrimae rerum et mentem mortalia tangunt (Virgil, Aeneid, 1.461 ff.)

Acknowledgements

I remember getting a call from an unknown caller on a Monday of March 2018. Upon picking up the phone, the caller, whose name I couldn't fully hear, asked me, were they to buy me a ticket, would I be willing to fly to Los Angeles (California) the next morning to visit the Linguistics department at USC. At the time, I'm thinking, about that whole situation: one part prank, with a dash of "an offer you can't refuse". It was, however, not a prank and not an irrefutable offer, because I turned it down, or rather I bargained to be flown at a different time. Six years, a few months and a broken clavicle later, I find myself writing this rather long document, which, I have been told, puts an end to my time as a USC graduate student. Had that unknown caller not called, I wouldn't have met the people that I did and received the support that I got, both indispensable conditions for this manuscript to exist. This section is an ode to them.

I have always wanted to start this section by repeating Snoop Dogg's inspiring lyrics and speech: "I wanna thank me; I wanna thank me for believing in me; I wanna thank me for doing all this hard work; I wanna thank me for having no days off; I wanna thank me for, for never quitting; I wanna thank me for always being a giver and tryna give more than I receive; I wanna thank me for tryna do more right than wrong; I wanna thank me for just being me at all times". But, the truth is I wasn't the person who always believed in me and encouraged me, not only not to quit but to keep making progress. That was Roumi Pancheva, co-chair of this dissertation and my advisor since the end of my second year of grad school. I have been extremely lucky to have her by my side, and anything I say is probably not going to do justice to how much I owe her academically, professionally and personally.

You get an idea of how enthusiastic Roumi is about syntax when, during the first day of second semester syntax class, she explicitly states "syntax is the queen of cognitive science". But that is just the tip of the iceberg, and at the base is a strong willingness to make her students be as enthusiastic as she is. This is something she achieves by showing an outstanding interest in an idea or puzzle, helping you shape up that idea into a bigger project and constantly reminding you of how exciting the project is. Roumi will gently push your boundaries as much as you let her, suggesting (though really asking you) that you submit an abstract to some conference, submit the squib to a journal, write a grant proposal etc. Throughout the years I experienced this, and it could be a lot to handle at times, but truth be told I am extremely grateful that she pushed me to do all these things and took the time to discuss different aspects of each project. In fact, any class or series of extended discussions I had with her turned into at least a conference proceedings. The point being here that every conversation or interaction I had with Roumi was productive enough to plant the seed for a new project, or push an existing one forward that had been in the doldrums for some time.

Every project, including this dissertation, evolved a great deal after having multiple back-and-forths with her who would give productive and charitable pushback. In fact, most of what I know about the topic of this dissertation is thanks to her. She first introduced me to the empirical domain of measure expressions and comparatives in 2019, and then she slowly transitioned to number and numerals in 2021. When narrowing down the topic of the dissertation, she adamantly said "stay away from the count-mass distinction", which I fully agreed with at the time calling it a "pit of snakes". For some reason I have a tendency to fall into these pits every once in a while (e.g. subextraction, clitics in Romance, pseudo-partitives) and despite her efforts and my original intention, I did not abide by this and ended up writing a dissertation about the count-mass distinction. However, at the defense she expressed that I had managed to say something original, coherent and interesting about it; and she was glad I did not stay away from it. I take this to be a huge compliment. And I want to thank her again for her unconditional support.

On a personal level, I will always be indebted to her. She took care of my advising at the worst possible time for everyone: April 2020. We would have weekly zoom meetings where she would help me deal with some of my personal troubles. I remember a moment in June of that same year when there was a lot of uncertainty with visas and I was really freaking out. Roumi would call me every day or every other day to check on me, get the latest updates and offer to help in any way she could. The simple fact that she did this was so reassuring and validating that I will never forget how much this meant to me. After the pandemic, this support turned into advice about the job market, academia and life in general. And when it came to making a decision about my future, she made sure I understood what was best for me.

Thank you Roumi for everything you have taught me, for all your patience, for all your advice! Thank you for inviting me to Santa Cruz and showing me around! And thank you for coming to LA for both the graduation ceremony and the dissertation defense!

The person co-chairing this dissertation was Alexis Wellwood. Alexis came into my academic life in the fall of 2020 as a committee member of my second screening project and took an advisory role in January 2023. She has been indispensable since! Among the many things that I have learned from her is to be critical. I would come to our meetings with, what I thought were, compelling arguments, and she would challenge every single one of them and propose alternative ways of thinking about the data. I would leave those meetings thinking about every one of those possible alternatives and come to the next meeting with more arguments, which she would also challenge. I found that this charitable and healthy pushback helped me make an incredible amount of progress, especially during the last year.

Alexis has taught me that minute attention to detail is crucial, from checking for typos and punctuation marks to framing the questions and the conclusions in the most compelling way. Alexis is one of the fastest and sharpest thinkers I know. Five minutes into our meetings, she'd already be making the most impressive connections between the data, the formalism and the larger theoretical implications. She has helped me identify where a project is strongest and where it needs the most work, always providing viable lines to

improve it. I have to thank her for her patience in discussing semantics and bearing with me when I did not understand even the most basic concepts or misused the relevant terminology. In fact, she would make sure that I did not leave a meeting or discussion until I had completely understood what was at issue.

Alexis is incredibly busy running a lab, pretty much a department, doing research, mentoring students and teaching and I wanted to be mindful of her time. When I asked her whether she would not mind to be my advisor, her immediate response was “mind?! I’d love to be your advisor, and let’s make it possible that this is in tandem with Roumi!”. I knew that asking her was the right call, but after hearing her say that I knew there was no better choice because she would go to bat and do anything possible to support me at all times, which she did! And despite her busy schedule, she would always find weekly slots for us to meet (usually longer than originally assumed).

Like Roumi, Alexis was an outstanding source of non-academic support and she was always encouraging. We would usually spend the first few minutes of our meetings simply catching up, and during times when I needed it the most, she acted as a friend and would come up with advice that made me feel at ease. Thank you Alexis for always being on board! Thank you for those very uplifting chats over coffee or Korean food! Thanks for having me and my mom over on your rooftop with 360 degree views of LA! I do not think she will ever forget that.

I am also very grateful to the rest of my dissertation committee. Travis Major has acted in many ways as unofficial advisor, from giving feedback on projects and handouts to helping me shape the dissertation in a way that would make sense and also “made my life easier” (as he kept on repeating for the last two years). Thanks to him, I could get started doing fieldwork, a part of which turned into chapter 5 of the dissertation. I will miss those unscheduled meetings around GFS during which we would start talking about topic X only soon to realize we came up with a brand new generalization worth thinking more about. Travis gave me a lot of advice about the job market, and sat through endless research presentations to help me polish my materials. This led to, what I would like to think, a good friendship (though we should probably ask Travis).

I am glad to be around for the time being so we can hang out more and I can see Jack grow up into a fine little man. Deniz Rudin has always been available to sit with me, listen to my ideas and give me very thoughtful comments. He was able to reframe my thinking into a streamlined and organized narrative while pointing out important and exciting predictions but also flaws that I was not aware of. We both came to USC Linguistics in 2018 and since then we joked about how we were part of the same cohort. Now, the 2018 cohort is just you, *nothing beside remains*! Gabriel Uzquiano accepted to be part of this enterprise for my quals and I am happy he decided to be part of the dissertation too. I thank Gabriel for his advice and willingness to help at every point! Plus, he is a Barça fan; could anyone ask for more?

Besides my committee, I am very grateful to all the faculty in the linguistics department at USC. While I will always be grateful to every single one, I would like to give special thanks to the following people. Sandra Disner was the best and most generous person to TA for and thanks to her I was awarded the General Education Graduate Assistant Award in 2022. Elsi Kaiser taught me to build an experiment, manage data and analyze those data when chairing my second screening. Andrew Simpson was involved in my first screening and my quals, and he was always happy to discuss ideas and data when asked. Khalil Iskarous was the person who made that phone call back in 2018 and I am thankful that he did. He also gave me some very valuable advice, which I truly appreciated, during the job interview process in 2024. Maria Luisa Zubizarreta always checked up on me and my progress making sure that it was all good. That trip to Mexico with her, Roumi and Alexis to attend SALT32 was unforgettable. Stephanie Shih taught (and very well so) one of the most practical and useful classes at USC: getting ready for the job market. She provided very good feedback on the job application dossier, making it easier to write. Mary Washburn acted as interim advisor for me (and my cohort) during my first semester of grad school, and for the next six years she would help me navigate the bureaucratic steps and manage important deadlines and paperwork. She was also the instructor for my last class as a TA at USC, and I want thank her for making our TA jobs as smooth and straightforward as possible.

I also want to thank two people who, while not at USC any more, played a very important role in the early stages of my academic development. Rachel Walker, currently at UCSC, gave me very insightful comments on my screening projects. Most importantly, and in the time span of two semesters, she helped me master the art of abstract writing. Rachel had the difficult job at the time to keep everyone in her class calm with everything going on: the start of a global pandemic, the first important milestone in the program and the anxiety of 5 students navigating it all. And she did excellent, reassuring everyone that the department had our backs, while teaching us how to structure a defense and making a safe space for us to express our anxiety at the beginning of every class.

The other person is Stefan Keine, currently at UCLA. Stefan was my first official advisor at USC and he was the one who taught me how to think like a syntactitian and how to write a syntax paper. During the first year of my grad school experience, I was a bit lost and I found in Stefan the best person to steer me in the right direction both personally and research-wise. From Stefan I also learned that "the devil is in the details" (as he used to say), and that special attention should be paid to even the shortest footnote. I was always impressed by Stefan's LaTex skills and I learned about the importance of having a beautiful handout. He helped me get started with some basic templates, and by the end of my second year I was proud that my files compiled with no errors. I am also thankful to him for helping me and giving me advice from the other side of town.

A special shoutout goes to the 2018 cohort: Ian Rigby, Chloe Gfeller, Jesse Johnson, Sung Hwang and Peifen Chen. I still remember the first semester when we met every other weekend for Phon-Friday to work on our phonology assignments in the reading room. We spent so many hours trying to figure out those problem sets. As difficult and frustrating as the problem sets were at the time, I cherish those days with all my heart. And when the semester was over, we went to the arts district for food and beer on a random Tuesday in early December. While there was strong bond between all of us, I am particularly thankful to Ian and Chloe for their friendship: a night at flaming saddles in WeHo, the Blade Runner screening at Hollywood Forever, the

trip to Santa Monica where we ended up at Wetzels Pretzels for Chloe to try it for the first time, beers in my garden, dinner at Alcove in Los Feliz, bowling night at Shatto lanes etc. And while it was sad to say goodbye to Chole because she got a job in Europe, we were happy for her because we both knew how much that meant for her.

Funny thing is that the first time I met Ian, I did not have the best impression of him: he came in late, refused to grab lunch with Chloe and I and then stormed off. Chloe and I both told each other "Who does this guy think he is?". Little did we know at the time that he had just arrived from Seattle and had to rush to sign his lease before it expired, and that is why he could not stay longer. This fact he did not disclose until we asked him about it months later over a beer once we were all friends, which made us all laugh. Ian has always been there for me, helped me through the thick and thin. How much I wish I could have taken the top off of that convertible camaro when I picked him up in the flower district while playing Aqua's *Barbie girl*! I value Ian's friendship with all my heart ever since the beginning of our grad school days and now, we both graduated, got jobs, bought cars and still live in the same city at least for the time being. The simple fact that we can still see each other and make good memories together makes me happy. Thanks for everything!

Outside of my cohort, I am grateful to many: Sarah Lee, Daniel Plesniak, Miran Oh, Jesse Storbeck, Betul Erbasi, Bhamati Dash, Madhu Datta, Anna Besserman, Reed Blaylock, Charlie O'Hara, Yifan Yang, Elango Kumaran, Tommy Tsz-Ming Lee, Yijing Lu and Silvia Kim. In particular, I want to thank Tommy who was always around and ready to talk syntax. We would spend countless hours in that little office with a chalk board trying to make sense of *wh*-movement and head movement facts, phases, unlocking effects and so much more. We would read each other's drafts, gave each other suggestions and ask for data. I was happy to see you graduate on time and move home with Ellie but frankly you were much missed! I am also thankful to Yijing Lu and Silvia Kim who I ended up cohorting with in my last year. While originally on Tommy's cohort (i.e. 2017), we were the most senior students left and we all had the aim to graduate and find a job

by the end of summer 24. One of the funniest moments of this our last year was us playing that bizarre card game over that humongous burrito from La Barca. It was an honor to walk with you both on May 8th.

I also want to thank my collaborators through the years: Antonio Cleani, Colin Davis, Carol-Rose Little and Brian Tsagaadai. When Antonio and I wrote that abstract about *much* and *many*, little did we know that it would receive the highest rating at SALT32 (according to the organizers). I hope we can find some time soon to finish that other project that has been in the back burner for too long now! Colin introduced me to the fascinating world of parasitic gaps and we came up with this novel generalization about rural Iberian Spanish, which is now a WCFFL40 proceedings. Carol-Rose and I met at the virtual LSA in 2021, and we never met in person until June 2022 in Mexico City! She invited me to Chiapas for a 'field experience', and it will say it was unforgettable. I know it was a lot and I am really thankful that she offered to do that. I also want to thank Carol-Rose for sharing a lot of her teaching materials and job market advice, for keeping me in mind when organizing great and fun workshops! It is good that we always have a whatsapp line open. Brian is my Mongolian consultant who spent many days and hours sitting in front of me while I asked him questions like *if Batar bought big apple, did he buy one or several?*. Without his willingness to share his time and language with me, none of chapter 5 would have been possible.

Beyond the world of linguistics, I cannot forget the people from the Normandie house where I lived for almost 6 years. I only thought of Brad Foley and Eliseo Melero as my landlords when I first moved in during the summer of 2018. I had no idea how big of a role they would have in my life here in LA. I was so lucky to find them! They became the family I was missing, and had it not been for them I would have dropped out a semester into the program. That is how important they have been. They took me in, showed me around, shared amazing food with me, increased my spice tolerance, made sure that I was okay, took care of me when I was sick and broke my clavicle. We have made so many memories together and they have helped me grow in such an imaginable way that anything I say about them is never going to be close to enough. So I will just say THANK YOU for giving this "español*ito*" a chance!

In addition to them, I want to thank many of the people who I lived with at the Normandie house during this time. Sam Affif introduced me to bougie coffee making and showed me how to change a tire in the middle of the i-10. He is the kind of person who can show you how to have a fun time, because he was always energetic and full of good energy, and I envied him for that. He would often talk about "the darkness" though and told me I would only understand when writing my dissertation. I guess I did, for some time at least. Sam, Brad, Eliseo and me spent the worst of the pandemic in the house trying our best not to drive each other crazy. Among the ways we coped was watching 80s movies up until 2am in Sam's tv; and let me tell you, most of those movies were bad! We also played Catan, until it got very heated and then we had to stop. Those were dark times, but we made it work as best as we could.

Lacey Schauwecker was the first one from the house I ever met in person after she picked me up from LAX. I have always admired how smart Lacey is and how valuable her advice has ever been. Sometimes I felt that our experiences overlapped very much despite having grown in very different parts of the world. We would sometimes go running (I remember that one time we went to Griffith in March of 2019 which was gorgeous although I could not keep up with her pace) or walking together, and it was always a good time. It was a blast to see her get married and attend her wedding at her parents' yard in Phoenix. Thanks for being understanding and validating of my feelings, and I hope I was, and did, too for you.

Raed Jaffal, alias "Topo", and I became close in the summer of 2023. Every weekend we would go on a date somewhere for food, coffee, a walk or all of the above. And we have been keeping up with that, as much as we can, ever since. Some of those trips have been more fortunate than others, but overall we tend to have fun while we commiserate about life, talk about soccer, play fifa and give each other probably not the best advice you could think of (though it all comes from the bottom our hearts, which is what matters in the end). I want to thank Topo for throwing me a lifeline when I needed it.

Chad Geib and Cynthia Lee did not live in the house, but they spent a lot of time there and I am glad they did! They were around for most events and many Saturday nights, up until very late holding all sorts of

conversations which usually involved Chad and Brad arguing healthily to finally agree to disagree. I want to thank them for including me in their plans, parties and tours of LA in addition to being very considerate and kind at all times. I also want to thanks Shuyi Zhou for always being around with a smile and for teaching me things about Chinese food and culture I had no idea about; Marilyn Schotland for discussions of art, movies, literature and recommendations about trendy LA coffee shops; Kyndra and John who were always fun to be around and showed me some of the current gen Z slang, which I still do not understand.

I cannot forget Dr Christina Mohajerani. She helped me navigate the complicated and eventful (sometimes also eventless) tides that life would bring for four years. And while it took this little nut a bit of time to finally crack open, she uncovered parts of me that I had no idea existed and worked hard towards figuring out who I was and wanted to be. She taught me to be as kind and gentle with myself as I am with others and to distinguish between facts and feelings, and how to process each of them. She is excellent at coming up with metaphors on the spot and a terrific story-teller, and at times she would tell a story to make a point about something that was at issue that day. I will always remember the community garden story and that what we may think is a worry is just a woodchuck in the garden.

Last but not least, I want to thank ALL my family in La Pedraja de Portillo. I know it has not been easy for them to cope with the idea of me being so far away for so long: plenty of missed birthdays, phone-calls, family events, Christmases, summers, more or less special occasions that meant a lot for them. Things became harder during the pandemic, when I could not go see them for two years. And yet, they accepted and supported my decisions all the way, making clear how proud they were of me. In fact, when push came to shove, my mom and my brother flew to LA to take care of me after my surgery. I will forever be grateful! My parents, each in their own way, taught me, as Tennyson perfectly puts it, “to strive, to seek, to find, and not to yield”; and I believe it is this motto that led me to where I am and to accomplishing all that I have until now. I was very happy my mom could make it to my graduation and I wish my dad had been here with her because I know how much he would have loved it and how proud he would have been. As homage, this

dissertation is addressed to you, dad. Dear family, you have always had my back, and I love you yesterday, today and tomorrow.

Table of Contents

List of Tables

List of Figures

Abstract

This dissertation presents a new view on what it means to be 'count' (*book(s)* vs. *water*) and 'countable' (i.e. can the noun in question be measured in terms of cardinality) and their role in the architecture of the grammar. To accomplish this goal, the proposed research aims to develop the basis for a comprehensive theory of individuation and number by probing the distribution of individuation and number features in the nominal domain, as instantiated by the count-mass distinction. I argue that individuation and number are two distinct properties both of which are part of Universal Grammar's inventory of features and they affect the words' ability to occur in different morpho-syntactic environments within and across languages. Individuation is responsible for making discrete units available, i.e. sometimes referred to as atoms, and number is responsible for determining whether the word in question refers to the minimal units (i.e singular) or non-minimal units (i.e. plural). In a nutshell, I make the case that what makes a noun 'count' is markedness for both individuation and number, whereas countable nouns need only be marked for individuation. Variation depends on which of the two features are available. The general picture that emerges is one where being count entails being countable, but being mass does not entail being non-countable. I then go on to show how the proposed theory (i) makes predictions about, and accounts for, different form-meaning mismatches; and (ii) enables us to establish robust cross-linguistic generalizations that link syntactic structure to form and meaning, illuminating our understanding of the interactions between the different modules of the grammar.

Chapter 1

Introduction

1.1 General background

Languages may manifest morpho-syntactic differences in the distribution of Noun Phrases (NPs). For example, the NP *car* can appear in the contexts in (1a) while the NP *blood* in (1b) cannot.

(1) a. Barney saw every light-red car, and Marshall saw a dark red one.

b. * Barney saw every light-red blood and Marshall saw a dark red one.

First NPs such as *car* can occur with universal determiner *every* and be the antecedent of the pronominal form *one*. Second, when someone utters (1a) we understand that they saw every single car. On the contrary, NPs such as *blood* in (1b) cannot occur with *every* or be the antecedent of *one*. Besides, when they utter (1b) we do not understand the utterance to mean that they saw every discrete unit of blood like 'a drop' or 'a vial'. NPs such as those in (1a) are classified as 'count' NPs, whereas those in (1b) are classified as 'mass' NPs. From now on, I will be using the following conventions: '*' to mean an expression is ungrammatical (i.e. it is syntactically ill-formed or it has no interpretation); '#' to mean the expression is semantically odd (i.e. it may be grammatical but does not have the intended interpretation); '?' to indicate my and my consultants' understanding that the sentence is grammatical but slightly marked; '%' to indicate that there is speaker variation.

While the class of count NPs is largely uniform, i.e. every count NP has the same morpho-syntactic properties, there are differences within the class of mass. For example, NPs like *suds* and *dregs* are overtly plural-marked but they lack a singular counterpart and cannot be modified by numerals (Ojeda 2005): **a sud*, **two suds*. While most mass NPs cannot be modified by size adjectives, some like *jewelry* or *furniture* can: *large jewelry*, *large jewels* vs. *#large blood* and **large suds*.

In addition, there are differences across the classes of count and mass across languages. For example, an NP may be count in one language, but mass in another (Chierchia 2010, 2021). The NP *furniture* is mass in English, but the Spanish counterpart is count as evidenced by the possibility of overt plural-marking, as in (2).

(2)

Spanish	*English*
mueble(-s)	furniture
furniture-PL	
'furniture (item)'	

Languages can also differ in their ability to perform count-to-mass shifts and mass-to-count shifts (Kiss et al. 2021). For example, in English *water* is canonically a mass noun but it can shift into a count noun with a container interpretation (Bunt 1985). Other NPs like *blood* are much less unlikely to undergo this class shift, as commented above. There are languages on both sides of the spectrum: a) languages like Nez Perce are more permissive and allow any mass noun to appear in a count frame with a container interpertation as in (3) adapted from Deal (2017); b) languages like Alasha Mongolian do not seem to allow any mass-to-count shifts with the intended interpretation as shown in (4).

(3) *Nez Perce*

a. kike't
blood
'blood' (substance)

b. lepit kike't
two blood
'two drops of blood'

c. kuus
water
'water' (substance)

d. lepit kuus
two water
'two bottles of water'

(4) *Alasha Mongolian*

a. os
water
'water' (substance)

b. # xoirV-n os
two-ATTR water
Int(ended): 'two units of water'

c. tsos
blood
'blood' (substance)

d. # xoirV-n tsos
two-ATTR blood
Int.: 'two units of blood'

In terms of the semantic properties, what largely distinguishes between the two class is the asymmetry in (5), as observed by Bale and Barner (2009). NPs like *cars* can be counted, while NPs like *blood* cannot.

(5) a. Barney saw more cars than Ted did. CARDINALITY, #VOLUME

b. Barney saw more blood than Ted did. #CARDINALITY, VOLUME

We can call the NPs that can be measured in terms of cardinality 'countable'. In contrast, 'non-countable' are NPs that cannot be counted. While the countable/non-countable distinction overlaps to a large extent with the classes of count and mass NPs respectively, there are also well-known exceptions. Those include NPs like *jewelry* or *furniture* which pattern like mass and yet they are countable, as evidenced by (6).

(6) Barney saw more jewelry than Ted did. CARDINALITY, #VOLUME

The data about the count-mass distinction raise important questions about the encoding of 'being count' and 'being countable'. In particular, we can list the following questions:

- What makes an NP count as opposed to mass?
- What do countable NPs, both count and mass, share in common? (i.e. do they form a natural class in any way?)

- What determines variation?

Some have argued that the count-mass distinction is largely lexically encoded (Pelletier 1975; Krifka 1989; Chierchia 1998b). In this approach, nouns are already sorted in the lexicon as mass or count. Languages thus differ idiosyncratically with respect to what goes into the 'count' or 'mass' bin. In addition, it is already determined in the lexical entries of these nouns whether they make reference to discrete units that enable counting or not. The argument for what nominal expression has discrete units comes from the observation that nouns that denote objects or elements with clearly identifiable boundaries are generally countable and those those that denote substances or have less clear boundaries are generally non-countable (Soja et al. 1991; Chierchia 1994; Rips and Hespos 2019). Generally under this family of approaches, plural or number marking is contingent upon the nominal expression having discrete units in its extension. In other words, plural-marking entails countability (i.e. 'the property of being countable').

While it might be the case that there are lexical factors that influence what is count or not and whether a nominal expression is countable or not, a fully lexical approach misses important generalizations. For instance, determiners are sensitive to the syntactic properties of the NPs they occur with (Abney 1987), and ellipsis operations, including *one* replacement (Harley 2005; Merchant 2014), are also syntactically conditioned. In addition, the lexical approach has to stipulate which nouns are subject to shifting classes and which ones are not. There is also an issue with plural-marking: count nouns are just a subset of the NPs that are plural and the other subset of plural-marked NPs is not countable (e.g. *suds, dregs*, Rothstein 2021).

An alternative family of approaches has located the count-mass distinction in the syntax of nominal expressions (Gillon 1999, 2012; Borer 2005a; Bale and Barner 2009; Cowper and Hall 2009, 2012, 2014). I will briefly comment on two proposals. An influential proposal is found in Borer (2005a) who argues that (a) nominal roots denote undivided matter and (b) in the absence of a dedicated functional head that performs division of matter, her Div(ision), the NP will have a mass syntax and semantics. This is schematized in (7).

For Borer, Div is realized by plural-markers in languages like English or classifiers in languages like Chinese. Singular number, sometimes realized as the indefinite determiner *a*, as well as numerals and Quantity Adjectives (QAs) are structurally above Div, in what she labels # (for Quantity).

(7) a. $[_{DP}\ D\ [_{\#P}\ \#\ [_{DivP}\ Div\ [_{NP}\ N\ ]]]]$ = count

b. $[_{DP}\ D\ [_{\#P}\ \#\ [_{NP}\ N\ ]]]$ = mass

Semantically, this operation of division imposes minimal parts that are themselves non-divisive (Cheng 1973) and constitute the basis for counting. That is, having Div, is responsible for making NPs have a count syntax but also for making NPs (semantically) countable. It is unclear, however, how *furniture*-type nouns are to be derived in Borer's system: on the one hand, they are mass and thus lack Div; on the other, they must have an extension which is similar to that of plural-count nouns given that they allow counting. It does not solve the *suds*-problem either: if plural-marking is a divider, why do these NPs have a mass syntax and are non-countable?

A slightly different version from Borer is found in a series of papers by Cowper and Hall (2009, 2012). They propose a theory of Number-marking that can account for the count-mass distinction. Like Borer, the crucial difference between count and mass NPs is the presence or absence of structure. In their case, the key syntactic piece is a Number head. Mass NPs lack Number while count NPs project Number. They propose a feature geometry according to which plural, i.e. [> 1], is contained by what they call an individuator, i.e. [#]. Schematically, this looks like (8), where the ':' on the feature bundle indicates 'contained by'.

(8) a. $[_{DP}\ D\ [_{NumberP}\ [\#]\ [_{NP}\ N\ ]]]$ = singular count

b. $[_{DP}\ D\ [_{NumberP}\ [\#:\ >\ 1]\ [_{NP}\ N\ ]]]$ = plural count

c. $[_{DP}\ D\ [_{NP}\ N\ ]]$ = mass

The individuating feature [#] in (8a) and (8b) acts as Borer's (2005a) divider and it is additionally in charge of singular-marking. Unlike Borer, plural itself does not perform division, but requires the NP to be

already individuated. The proposal suffers from similar issues as Borer's: how are *furniture*-NPs different from count NPs? And if plural-marking is dependent on the NP being count, how do we explain *suds*?

In Cowper and Hall (2014), they propose a revised version of the system. In their new system, singular count NPs are the most featurally unmarked NPs (i.e. unspecified for any number feature), while mass and plural count NPs form a natural class: they are both [Non-Atomic]. According to Cowper and Hall (2014, p.69), if a nominal lacks the feature [Non-Atomic] "it will be interpreted as atomic (i.e. contrastively *not* Non-Atomic) and thus as both count and singular". To further distinguish between mass NPs and plural count NPs they propose that the latter are also marked for a feature [Discrete]. The bundle [Non-Atomic: Discrete] spells-out plural *-s*. A schematic representation of the feature distribution is in (9) from Cowper and Hall (2014, p.69, ex: 10).

(9)

a. Singular Count	b. Mass	c. Plural Count
Ø	[Non-Atomic]	[Non-Atomic: Discrete]

[Non-Atomic] is in charge of introducing the property of divisibility, something that both mass and plural count NPs share (Cheng 1973; Krifka 1989), and [Discrete] makes sure that the NP has separable atoms that can be counted. While the bundling of mass and plural count nouns as a natural class is empirically justified, this new proposal does not solve either puzzle mentioned above. In the case of *furniture*, they speculate that these NPs are lexically specified for [Non-Atomic]. However, given that these NPs are countable, they must also be specified as [Discrete]. This brings us back to the same issues raised above. Second, *suds* spell-out *-s* which in their system is the bundle [Non-Atomic: Discrete], and yet they denote non-discrete undivided stuff. The approach also raises further questions about determiner selection: if singular count NPs are unspecified for any features, how do we explain the fact that some determiners like *every* or *each* require the NP to be both count and singular?

Taking a step back from the specific implementation and assumptions of each proposal, there are some valuable insights that they all share. First, they all share the intuition that individuation, i.e. making discrete units that can be counted available, is encoded syntactically: Div for Borer, [#] or [Discrete] for Cowper and Hall. Second, mass NPs are syntactically impoverished or unmarked compared to count NPs: by virtue of lacking a Number feature or a dedicated syntactic projection encoding Number. For these proposals, however, individuation and Number-marking are fused into one element which leads to certain empirical issues (e.g. *furniture*-NPs, *suds*-NPs, determiner selection). But, what if these two functions, that is individuation and Number-marking, are performed by distinct elements, both of which are syntactically represented? In other words, what if there is an element X that marks the nominal for individuation, and another element Y that marks the nominal for singular or plural? Having both X and Y would entail that the noun is count, whereas having lacking Y (i.e. number) would result in a mass syntax regardless of individuation properties.

This dissertation is concerned with these issues: understanding the grammatical encoding of being count and the grammatical encoding of countability. To accomplish this goal, the proposed research aims to develop a comprehensive theory of individuation and number by probing the distribution of individuation and number features in the nominal domain, as instantiated by the count-mass distinction.

There are a series of morphological, syntactic and semantic asymmetries that are observed in the nominal system of the world's languages. Among the morpho-syntactic properties, we can distinguish the list in (10). In terms of the semantic properties, what largely distinguishes between countable and non-countable NPs is the property in (11).

(10) a. Does the noun make a singular/plural distinction?

b. Can the noun be modified by cardinal numerals?

c. Can the noun be modified by size/shape adjectives?

d. Does the noun allow number mismatches under ellipsis?

e. Can the noun be a target for *one*-substitution?

f. Is the noun (dis)allowed to combine with certain determiners or quantifiers?

(11) Does the noun allow measurement in terms of 'cardinality' (in particular when modified by measure words such as *more, much, many* etc. or numerals)?

By probing these distributional and interpretive properties of NPs, I will argue that the roles of individuation and number-marking are to be separated into two distinct sets of features, both of which are part of Universal Grammar's inventory. The distribution of these features affects the words' ability to occur in different morpho-syntactic environments within and across languages. *Individuation* is responsible for making discrete units available, i.e. sometimes referred to as atoms (Link 1983; Gillon 1992). While similar in spirit to Borer's DIV and Cowper and Hall's individuator, individuation is not to be conflated with number features. The other set of features is subsumed under the umbrella of *number*: *number* is responsible for determining whether the word in question refers to the minimal units (i.e singular) or non-minimal units (i.e. plural), (Link 1983; Krifka 1995; Schwarzschild 1996; Sauerland 2003; Harbour 2007).

I will argue that these units, i.e. individuation and number, serve their own distinct morphological, syntactic and semantic purpose. In a nutshell, I will make the case that what makes an NP count is markedness for both individuation and number; being mass is the absence of a dedicated Number projection hosting singular or plural features. That is, building on insights from previous proposals (Borer 2005a; Cowper and Hall 2009, 2012), Number is at the core of the count-mass distinction. Mass nouns may however be marked for individuation features: this I argue is the case of *furniture*-NPs. Plural-marking need not depend on the NP being individuated: *suds*-NPs are an example of (lexical or low) plural-marked NPs in the sense of Alexiadou (2004, 2011, 2015); Acquaviva (2008) and are not individuated. As a result, by virtue of separating individuation from Number, we have a way of decomposing countability: countable NPs are those that are marked for individuation, whereas non-countable NPs are those that are unmarked for individuation.

The general picture that emerges is one where count NPs are a subset of the NPs that are countable: {count NPs} $\subset$ {count NPs, *furniture*-NPs}. This accounts for the following twofold generalization: (a)

plural-marking on the noun does not universally entail the noun being countable (e.g. Rothstein 2021), and (b) plural-marking on the noun does not entail having count syntax. I then go on to show how the proposed theory (i) makes predictions about, and accounts for, different form-meaning mismatches; and (ii) enables us to establish robust cross-linguistic generalizations that link syntactic structure to form and meaning illuminating our understanding of the interactions between modules of the grammar. Cross-linguistic variation results from the way that the syntax puts terminal nodes together in concert with the satisfaction of the different requirements at the interfaces (both PF and LF). These requirements may vary on a language-by-language basis. In what remains of this chapter, I provide a brief overview of the dissertation by chapter.

1.2 Structure of the dissertation

Chapter 2 focuses on establishing the morpho-syntactic generalizations that distinguish the class of count nouns from the distinct classes of mass nouns. Drawing on data from English and Spanish, I concentrate on 4 major asymmetries: availability of singular/plural contrast, numeral and adjectival modification modification, selectional restrictions by determiners and ellipsis options. I conclude that the class of count nouns is uniform (i.e the answer to the all the questions in (10) is 'yes'), whereas 'mass' is better understood as the absence of 'count' properties. What is more, I establish important differences within the class of mass nouns. Some of these observations are novel including, but not limited to, the fact that plural-marking on mass nouns is structurally different than in count nouns. In addition, I outline a series of empirical generalizations that are concerned with number-marking and countability, and how these two properties play a crucial role in (i) the surface form of QAs such as *much/many* and their Spanish counterparts, (ii) the choice of determiner, and (iii) ellipsis-licensing. The relevant empirical generalizations include the following listed below, which serve to motivate the theory developed in the following chapters.

(12) the Plural-Count generalization (i.e. plural-marking does not entail count syntax);

(13) the Plural-QA-markedness generalization (i.e. Quantity Adjectives such as *much/many* and their counterparts in Spanish are sensitive to number marking);

(14) if a determiner is sensitive to the NP being count, it will also be sensitive to number-marking but not the opposite; and there is no determiner that exclusively selects for mass nouns.

Chapter 3 develops the theory of individuation and number that accounts for the data described and generalizations formulated in Chapter 2. The theory is couched in the framework of generative minimalist syntax (Chomsky 1995, 2000, 2001, *et seq.*) in tandem with the principles of Distributed Morphology (Halle and Marantz 1993). I propose that count nouns are decomposed into an acategorial root, an *n* categorizer marked for [INDIVIDUATED] and a Number head which may be [SINGULAR/PLURAL]. The [INDIVIDUATED] feature is responsible for making available discrete individuals that can be counted later on (i.e. atoms). Number has a complementation feature that requires its complement's *n*-head to be specified for [INDIVIDUATED]. Thus, in the absence of such a feature, Number cannot be merged.

Being 'mass' can come into different shapes and we must distinguish (at least) three classes: canonical mass nouns (i.e. unmarked, *water*), plural mass nouns (e.g. *dregs*) and object mass nouns (e.g. *baggage*). These classes all share the fact that they lack a Number projection. Most of the asymmetries follow from this fact. Despite their not having a Number projection, I will further show that mass nouns differ in whether or not they are marked for individuation. That is, while canonical and plural mass nouns lack the [INDIVIDUATED] feature, and thus discrete individuals, object mass nouns will be specified as [INDIVIDUATED]. This feature is, I propose, what they share in common with count NPs, accounting for the observation that count noun roots and object mass roots overlap giving rise to doublets in many cases. Unlike the count noun counterparts, however, they will not be singular or plural-marked because they do not project Number. Instead, they will be composed of a feature that I call [COLLECTIVE]. Such a feature will be spelled out as *-ery, -ment, -age, -ware* and be located on an outer *n*-head that competes with Number to satisfy its selectional requirements: the two heads

are in complementary distribution.[1] The insight is that object mass nouns are morpho-syntactically complex objects which are built on an individuated constituent. A schematic summary of the relevant structures is in (15).

(15) a. $[[\underbrace{\sqrt{\text{ROOT}}\ n[\text{INDIVIDUATED}]}_{\textit{jewel}}]_{n\text{P}}\ \underbrace{\text{Number}[\text{SG/PL}]}_{\textit{Ø/-s}}\ ]_{\text{NumberP}}$ ‘count’

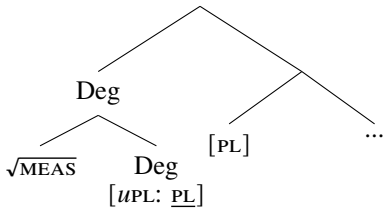
b. $[\underbrace{\sqrt{\text{ROOT}}\ n}_{\textit{water}}]_{n\text{P}}$ ‘mass’

c. $[\underbrace{\sqrt{\text{ROOT}}}_{\textit{dreg}}\ \underbrace{n[\text{PL}]}_{\textit{-s}}]_{n\text{P}}$ ‘plural mass’

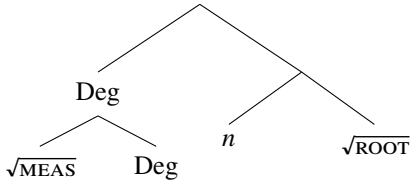
d. $[[\underbrace{\sqrt{\text{ROOT}}\ n[\text{INDIVIDUATED}]}_{\textit{jewel}}]_{n\text{P}}\ \underbrace{n[\text{COLL}]}_{\textit{-ery}}\ ]_{n\text{P}}$ ‘object mass’

I further show that this restrictive theory can account for the generalizations about number-markedness and determiner restrictions. In a nutshell, while features on determiners can enter a dependency with [INDIVIDUATED] and/or [SG/PL], there is no mass specific feature which explains the lack of mass-only determiners. With respect to measure words, I advocate for an analysis that maintains that they are allomorphs of the same underlying measure root (Bresnan 1973; Hackl 2000; Bobaljik 2012; Wellwood 2015; Dunbar and Wellwood 2016): the most marked surface form is conditioned by the presence of a plural feature on the Degree head. See the contrasts in (16). This part of the analysis has important and welcome consequences for the semantic computation in the next chapter.

(16) a. *many/muchos*



b. *much/mucho*



[1] The way I am using complementary distribution is different from the way it is used in phonology. In phonology, two elements *X* and *Y* are in complementary distribution if they occur in different environments. Here I mean two elements X and Y are in complementary distribution if *X* and *Y* can both occur in context *C* and the choice between the two can indicate a difference in meaning. In phonology, this type of distribution is called overlapping or parallel (Bale and Reiss 2018).

Before concluding, I discuss the status of the [COLLECTIVE] feature. I argue that this feature is located on a nominalizing *n*-head instead of Number in English and Spanish, as observed by different nominalization processes and the unacceptability of numeral modification. However, languages might vary as to the location of this feature; if this feature is located on Number, we would expect numerals to be acceptable with [COLLECTIVE]-marked NPs. Based on data from Czech (Grimm and Docekal 2021), I propose that this prediction is in fact borne out. Thus, just like [PL] can be on *n* or Number, so can [COLLECTIVE] giving rise to different morpho-syntactic properties.

Chapter 4 concentrates on a well-known semantic generalization: object mass nouns and plural count nouns are measured in terms of cardinality when modified by measure words (Bale and Barner 2009). I start by casting doubt on (semi-)lexical approaches to the generalization that correlate the surface form of a measure word with a particular semantic interpretation, e.g Uniform Dimensionality (Solt 2009, 2015; Snyder 2021). I show that said approach or set of approaches fails to capture the generality of the observation, which in fact makes it a good candidate for a language universal. Based on this fact, the decompositional approach to measure words and the hypothesis that measure roots are underspecified for the dimension of measurement (Wellwood 2015, 2018, 2019; Cleani and Toquero-Pérez 2022), I propose that the value of cardinality can be predicted from the syntactic structure in concert with the smantic properties of the relevant constituent to be measured. Namely, the universal is better stated as follows: when a Degree-head, i.e. [$\sqrt{\text{MEAS}}$ Degree], has an individuated plurality in its scope, the associated dimension of measurement is cardinality. I refer to the generalization as the Cardinality Generalization Redux, whose structural description is in (17): '>' indicates scope.

(17) a. $[_{\text{Deg}}\ \sqrt{\text{MEAS}}\ \text{Deg}] > [\text{PL}] > n[\text{INDIVIDUATED}] \rightsquigarrow \text{CARDINALITY}$

b. $[_{\text{Deg}}\ \sqrt{\text{MEAS}}\ \text{Deg}] > [\text{COLL}] > n[\text{INDIVIDUATED}] \rightsquigarrow \text{CARDINALITY}$

an *n*P marked for [INDIVIDUATION] denotes an individuated semi-lattice generated from the set of atoms and sums of atoms; [PL] on Number restricts the denotation of the noun to the sums of atoms (atomic non-minimal parts). [COLL] takes an individuated semi-lattice as argument and has a semantics similar to associative plurals (in the sense of Tomioka 2021): it maps the individuated semi-lattice to a property of pluralities for every part of which there is an atomic minimal part that stands in some relation with the member of the plurality. The underspecified relation is meant to capture the intuition that there is a 'cohesion' group relation (Corbett 2000) between the members that qualify as *jewelry* or *footwear*: sometimes it can be 'made of' as in *jewelry*, or 'worn/located in' as in *footwear*. Based on this semantics, these two types of nouns denote individuated pluralities and can be measured along cardinality scales. The other types of mass nouns are not specified for [INDIVIDUATION] and the conditions for the assignment of cardinality are not met: (18).

(18) a. $[_{\text{Deg}}\ \sqrt{\text{MEAS}}\ \text{Deg}] > n[\text{PL}] \rightsquigarrow$ #CARDINALITY

b. $[_{\text{Deg}}\ \sqrt{\text{MEAS}}\ \text{Deg}] > n \rightsquigarrow$ #CARDINALITY

I then discuss how the syntactic and semantic proposal can account for 'shifts' between classes, i.e. nominal flexibility (Pelletier 1979; Bunt 1985; Bach 1986b; Borer 2005a): shifts between classes of NPs can be accounted for by pairing a root with a different categorizer. At the interfaces, the root has to be licensed: at PF it must be mapped to an exponent via a possible Vocabulary Insertion rule; and at LF, the categorizer must select a meaning for the root from the set of root allosemes that matches the conditions imposed by the categorizer. There is no need for shifts to be performed via covert operators; variation thus results from the way that the syntax puts terminal nodes together in concert with the satisfaction of the different requirements at the interfaces.

Last but not least, I provide additional cross-linguistic evidence from Greek and Telugu for the Cardinality Generalization Redux and the hypothesis that the dimension of measurement is not contingent upon the surface form of the measure word.

Chapter 5 focuses on the number system of the understudied language Alasha Mongolian. I present data from Alasha Mongolian (Mongolic) arguing that unmarked inanimate nouns are number neutral whereas their animate counterparts are strictly singular (cp. Bylinina and Podobryaev 2020, for Buriat). Unmarked inanimates, however, can denote a singleton if modified by non-classificatory APs (e.g. *expensive*). In addition, like in English, plural-marked nouns can be exclusively or inclusively plural depending on upward/downward entailingness. I propose that these properties, and number neutrality in particular, can be accomodated within th system I developed in previous chapters. Unmarked number neutral nouns are [INDIVIDUATED] and as such they are true of atomic minimal and non-minimal parts. They, however, lack NumberP, responsible for restricting the denotation of the noun to single atoms (i.e [SG]) or non-singletons (i.e sums [PL]). Their animate counterparts always project Number, and are thus number-marked. I argue that inanimates may project NumberP if there is morpho-syntactic evidence to do so (non-classificatory APs, numerals and overt plural-marking). Having Number enables adjectival modification and the adjunction of numerals higher in the structure, a fact that corroborates our analysis of English and Spanish in Chapter 3. In addition, I propose a new solution for the inclusive/exclusive ambiguity of the plural: it is the result of syntactically conditioned allosemy at LF. Last but not least, the results of the analysis paired with cross-linguistic observations about number give rise to a novel generalization that correlates morphological markedness and semantic interpretation.

Chapter 6 summarizes the main findings of the dissertation and concludes.

Chapter 2

The Count-Mass Distinction in English and Spanish: The Morpho-Syntactic Facts

Nouns across languages are often classified into two major and broad descriptive categories such as 'count' and 'mass'. For example, nouns like *water* or the Spanish equivalent *agua* are mass whereas nouns like *book* or *libro* are considered count. But how can we determines whether a particular noun fits the 'count' or 'mass' description?

It has been generally observed that these two classes of nouns behave differently with respect to grammatical and distributional properties (Doetjes 1997; Borer 2005a; Wiltschko 2012). In other words, the encoding of 'count' or 'mass' is syntactic. For example, there are important morpho-syntactic asymmetries between the two classes. This chapter is concerned with these.

The first asymmetry is related to the availability of overt number marking. 'Count' nouns show singular-plural distinctions, while 'mass' nouns generally resist overt number-marking, thus lacking plural counterparts. A second asymmetry is concerned with modification by some constituents. For instance, 'count' nouns can be modified by numerals and certain adjectives (e.g. *big, large, round* etc.) called Stubbornly Distributive adjectives (Quine 1960; Schwarzschild 2011; Deal 2017), but 'mass' nouns cannot.

There are, however, two paradoxical cases that do not seem to fit these descriptive generalizations. One paradoxical case is exemplified by nouns such as *suds, dregs, hops* etc. These nouns appear to be overtly

plural-marked, and yet they seem to have the same distribution as *water*, e.g. no numeral modification. Due to the overt plural marking, they are sometimes referred to as 'lexical plurals' or 'plural mass nouns' (Alexiadou 2004, 2011, 2015; Acquaviva 2008). The other paradoxical case is exemplified by nouns such as *jewelry, footware* or *furniture*. Like other mass nouns, they resist pluralization, but like count nouns they allow modification by Stubbornly Distributive adjectives: *big/large/round furniture*. Any unified theory of the count-mass distinction must address and explain these paradoxes.

The third asymmetry refers to the nouns' sensitivity to determiners and QAs, e.g. *much, many, few, most*. In particular, while some determiners are 'count-only' determiners (sometimes also showing sensitivity to number-marking on the noun) such as *every, each* or *several*, mass-only determiners are rarely, if ever, reported (Doetjes 1997, 2021; Chierchia 1998a; Bale 2016). What is more, even though distinctions in the domains of QAs like the *much/little-many/few* distinction are sometimes argued to be lexical (*much*+'mass' but *many*+'count', Bresnan 1973; Hackl 2000; Bhatt and Pancheva 2004; Solt 2009, 2015), they have been analyzed as allomorphs of the same underlying morpheme: *many/few* being the marked vocabulary item whose exponence is triggered by the presence of plural feature (Wellwood 2015, 2018, 2019; Bale 2016; Smith 2021; Cleani and Toquero-Pérez 2022).

The fourth and last asymmetry that I will focus on in this chapter is associated with ellipsis. Namely, while 'count' nouns allow number mismatches under ellipsis stranding a numeral or a QA, 'mass' nouns do not. In addition, the former but not the latter allow for a smaller type of ellipsis referred to as *one*-substitution (Bloomfield 1933; Harley 2005; Bale and Gillon 2020): *I bought many Spanish books, and you bought a French one too* vs. **I drank too much Spanish wine, and you drank too much French one too.*

In this chapter, I concentrate on describing the empirical landscape relevant to these morpho-syntactic asymmetries. By the end of the chapter, the picture that will have emerged is one where we seem to have a good descriptive understanding of what it means to be 'count'. Mass, in contrast, seems to be better understood as the absence of 'count' properties. In addition, I will outline a series of empirical generalizations that

are concerned with number-marking and countability, and how these two properties play a crucial role in (i) the surface form of QAs such as *much/many* and their Spanish counterparts, (ii) the choice of determiner, and (iii) ellipsis-licensing.

2.1 Setting the baseline: 'canonical' mass and count nouns.

Number-marking and modification. There are different hallmark properties that distinguish count nouns from 'canonical' or unmarked mass nouns, e.g. Jespersen (1924); Bloomfield (1933); Quine (1960); Pelletier (1975); Bach (1986b); Chierchia (1998a,b); Borer (2005a). These properties include availability of a singular (unmarked) plural (marked) distinction, as in (1); direct modification by cardinal numerals, as in (2); and modification by Stubbornly Distributive adjectives (Schwarzschild 2011), as in (3). In the case of adjectives, I illustrate the situation with adjectives in both attributive (inside the DP) and predicative (predicate of the copula) position. Again, the '#' on the example indicates that the expression does not have the intended interpretation, i.e. a substance interpretation in the case of mass nouns.

(1) singular/plural contrast

   a. Barney dropped the {book/ book**s**}.

   b. Barney drank the {water/ #water**s**}.

(2) direct cardinal numeral modification

   a. Barney dropped {one book/ three book**s**}

   b. # Barney drank {one water/ three waters}.

(3) modification by Stubbornly Distributive adjectives

   a. The book on the shelf is small.

   b. Barney picked the small book.

   c. The books on the shelf are small.

d. Barney picked the small books.

e. # The water on the floor is small.

f. # Barney drank the small water.

The properties in (1) and (2) show that only count nouns have a singular/plural distinction and can be directly modified by cardinal numerals. Other nouns like *water* are mass. While they may be plural marked, their meaning is no longer referencing a substance but rather a unit or a kind (Bunt 1985; Bach 1986b): 'two units of water' or 'two types of water' (e.g. tap vs. sparkling). Subsequent cardinal modification is only possible under the shifted interpretation.[1] The shifted interpretation has been argued to have underlying count noun syntax (Borer 2005a; Mathieu 2012). In order to avoid a container interpretation of substance mass nouns like *wine* or *water*, I will be using verbs that require their complement to be liquids rather than physical containers: *drink* and *pour* are such verbs, Cowper (see 1992).

The same facts illustrated for English also hold in Spanish. Only some nouns have a singular/plural distinction, allow for direct cardinal numeral modification, and modification by stubbornly distributed predicates. This is the class of nouns referred to as count. Relevant examples are in (4)-(6).

(4) singular/plural contrast

a. Barney cogió { el libro/ lo-s libro-s}.
Barney took the.M book/ the.M-PL book-PL
'Barney took the book/books'

b. Barney bebió { el vino/# lo-s vino-s}
Barney drank the.M wine/ the.M-PL wine-PL
'Barney drank the wine/ #wines'

(5) direct cardinal numeral modification

[1]This is similar to the interpretation obtained with an overt measure or container noun in pseudo-partitives (Lehrer 1986; Schwarzschild 2006) such as (i).

(i) pseudo-partitive with mass nouns
Barney drank the two {bottles/ glasses} of water

a. Barney cogió { un libro/ tres libro-s}.
Barney took one.M book/ three book-PL
'Barney took one book/ three books'

b. # Barney bebió { un vino/ tres vino-s}
Barney drank one.M wine/ three wine-PL
'Barney drank one wine/ three wines'

(6) modification by Stubbornly Distributive adjectives

a. El libro en la estantería es pequeño.
the.M book in the shelf is small.M
'The book on the shelf is small'.

b. Barney cogió el libro pequeño.
Barney took the.M book small.M
'Barney took the small book'

c. Lo-s libro-s en la estantería son pequeño-s.
the.M-PL book-PL in the shelf are small.M-PL
'The books on the shelf are small'.

d. Barney cogió lo-s libro-s pequeño-s.
Barney took the.M-PL book-PL small.M-PL
'Barney took the small books'

e. # El vino en la mesa es pequeño
the.M wine in the table is small.M
'The wine on the table is small'

f. # Barney bebió el vino pequeño.
Barney drank the.M wine small.M-PL
'Barney drank the small wine'

As we saw for English, mass nouns like *vino* 'wine' can shift into a container/kind interpretation. In such a case, *vinos* 'wines' in (4b) are acceptable with the plural marker. Again subsequent cardinal numeral modification is possible only in those cases.

Determiner selection. In addition, the choice of determiner is not only sensitive to whether the noun is count or mass, but also to whether the noun is singular or plural-marked (Chierchia 1998a, 2021; Borer 2005a; Gillon 2012; Cowper and Hall 2014; Bale 2016; Bale and Gillon 2020, a.o). Some determiners are only compatible with singular count nouns as in (7), some are only compatible with plural-marked count nouns as in (8) and others are compatible with both mass and (singular/plural) count as in (9).

(7) Singular-count-only determiners: {*a, every, each*}

a. Barney dropped {a/ every/ each} book.

b. * Barney dropped {a/ every/ each} books.

c. # Barney drank {a/ every/ each} water.

(8) Plural-count-only determiners: *several*

a. * Barney dropped several book.

b. Barney dropped several books.

c. * Barney drank several water.

(9) Determiners underspecified for number and the count-mass distinction: {*the, some, any, no, this/these*}

a. Barney dropped {the/ some/ no/ this} book.

b. Barney dropped {the/ some/ no/ these} books.

c. Barney drank {the/ some/ no/ this} water.

To the classes of determiners in (7)-(9) we need to add the following two observations: first of all, there is no determiner that is sensitive to only mass nouns; second of all, QAs like *much, many, more, most* and universal *all* require that the noun they modify be mass or plural count, but not singular count. In the case of QAs, *many* is found when the noun is count and plural but *much* is found elsewhere. This is shown in (10)

(10) Mass and plural count determiners/quantifiers

a. * Barney dropped {all/ much/ many/ more} book.

b. Barney dropped {all/ *much/ many/ more} books.

c. Barney drank {all/ much/ *many/ more} water.

Looking at Spanish, we first need to note that determiners and quantifiers always agree in gender and number with the noun, a process that is generally referred to as 'nominal concord'. Determiners in Spanish are also sensitive to the noun being count and the number properties of the noun in question (Bosque 1999, ch.1). We can identify the same four classes of determiners that we identified for English: singular-count-only determiners in (11), plural-count-only determiners in (12); mass and plural-count determiners in (13), and determiners underspecified for the count-mass distinction in (14).

(11) Singular-count-only determiners: *cada* 'each' *cualquier* 'any'.[2]

a. Barney coge { cada/ cualquier} libro de la biblioteca.
Barney takes each/ any book of the library
'Barney takes {each/ any} book of the library.'

b. * Barney coge { cada/ cualquier} libro-s de la biblioteca.
Barney takes each/ any book-PL of the library
'Barney takes {each/ any} books of the library.'

c. # Barney bebe { cada/ cualquier} vino de España.
Barney drinks each/ any wine of Spain
'Barney takes {each/ any} wine from Spain.'

(12) Plural-count-only determiners: *vari-o/a-s* 'several-M/F-PL'[3]

a. * Barney coge varios libro de la biblioteca.
Barney takes several.M.PL book of the library
'Barney takes several book from the library'

[2] *Cualquier* 'any' is glossed as *any* here, but it should not be understood as Negative Polarity Item (NPI) *any*. It is more of a free choice determiner.

[3] The determiner *varios* 'several' is number-invariant. That is, it is always plural-marked and it lacks an unmarked counterpart: **vario/varia*.

b. Barney coge varios libro-s de la biblioteca.
Barney takes several.M.PL book-PL of the library
'Barney takes several books from the library'

c. * Barney bebe varios vino de España.
Barney drinks several.M.PL wine of Spain
'Barney drinks several wine from Spain.'

(13) Mass and plural-count determiners: *todo el* (lit. 'all the') 'all', QAs (e.g. *mucho* 'much', *tanto* 'as/so much', *más* 'more')

a. * Barney saca { todo el/ mucho/ más} libro de la biblioteca
Barney takes all.M the.M/ much.M/ more book of the library
Lit.: 'Barney takes {all/ much/ more} book from the library.'

b. Barney saca { todo-s lo-s/ mucho-s/ más} libro-s de la biblioteca
Barney takes all.M-PL the.M-PL/ much.M-PL/ more book-PL of the library
'Barney takes {all/ many/ more} books from the library.'

c. Barney bebió { todo el/ mucho/ más} vino de la botella.
Barney drank all.M the.M/ much.M/ more wine of the bottle
'Barney drank {all/ much/ more} wine from the bottle.'

(14) Underspecified for the count-mass distinction: demonstratives and definite article

a. Barney sacó { el/ este} libro de la biblioteca
Barney took the.M/ this.M book of the library
'Barney took {the/ this} book from the library.'

b. Barney sacó { lo-s/ esto-s} libro-s de la biblioteca
Barney took the.M-PL/ this.M-PL book-PL of the library
'Barney took {the/ these} books from the library.'

c. Barney bebió { el/ este} vino de la botella.
Barney drank the.M/ this.M wine of the bottle
'Barney drank {the/ this} wine from the bottle.'

To these four classes, we need to add one more: a class of determiners that only select for count nouns regardless of the number on the noun. These are exemplified in (15). The determiners are unmarked for number if the noun is also unmarked, but they will be overtly plural-marked if the noun is plural-marked.

From now on, and in order to reduce confusion, I will gloss bare *todo(s)* in Spanish as 'every' given that it is a universal that only occurs with count nouns. I will gloss *todo el/ todos los* as 'all the' given their compatibility with both count and mass nouns.

(15) Count-only determiners: *algún/un* 'some/a', *ningún* 'no' *todo* 'every' 'every'[4]

a. Barney sacó { algún/ un/ todo} libro de la biblioteca
Barney took some.M/ a.M/ every.M book of the library
'Barney took {some/ a/ every} book from the library.'

b. Barney sacó { alguno-s/ uno-s/ todo-s} libro-s de la biblioteca
Barney took some.M-PL/ a.M-PL/ every.M-PL book-PL of the library
Lit.: 'Barney took {some/ a/ every} books from the library.'
Int.: 'Barney took {some/ all} books from the library.'

c. # Barney bebió { algún/ un/ todo} vino de España.
Barney drank some.M/ a.M/ every.M wine of Spain
Lit.: 'Barney drank {some/ a/ every} wine from the library.'
Int.: 'Barney drank {a/ every} wine from Spain'

For ease of reference, we can summarize the correspondences between English and Spanish determiners in Table 2.1. The table pairs the determiners based on their distributional properties instead of their literal translation. Thus, while *some* is an existential indefinite, generally translated as *algún/un*, they differ in their distribution and thus occupy different rows on the table. To generalize across languages, I will label each class as "Class #" followed by a descriptive name.

Ellipsis options. Mass and count nouns differ in their ellipsis options. First of all, it has been observed that count nouns allow number mismatches under ellipsis (Lobeck 1995; Merchant 2014; Saab 2019). That is, the antecedent of ellipsis may be singular, while the target may be plural or viceversa. This is shown in (16).

[4]Unless used in the preverbal subject position, *ningún* 'no' is a negative concord item subject to matrix negation (Bosque 1980; Vallduví 1994). Since none of the examples include negation, I have refrained from using *ningún* in them. We can assume that its distribution is identical to *algún* with the additional requirement of negation.

Table 2.1: Determiner correspondences English-Spanish based on the count-mass distinction

Classes of Determiners	**English**	**Spanish**
Class 1: Count-only	–	Todo(s), algún(os), ningún(os), un(os)
Class 2: SG-count only	each, a, every	cada, cualquier
Class 3: PL-count only	several	varios
Class 4: Mass and PL-count	all, QAs	todo el/todos los, QAs
Class 5: Underspecifed	the, this/these, some, no	el/los, este/estos

(16) Number mismatches under ellipsis

a. Barney read {many/ three} books, and Ted read one ~~book~~ too. PL/SG

b. Ted read {one/some book} and Barney read {many/three} ~~books~~. SG/PL

In (16a), the antecedent *books* is plural and the target is singular whereas in (16b) the opposite pattern is found. In both cases, either a numeral (e.g. *one* in 16a or *three* in 16b) or a QA (e.g. *many*) act as ellipsis remnants delimiting the ellipsis site.

This type of ellipsis is independently unavailable for mass nouns given their lack of a singular/plural contrast (modulo the container or kind interpretation which patterns with count nouns). Mass noun ellipsis is still possible though, as long as the the remnant of the ellipsis is a QA. An example is in (17).[5]

(17) NP-ellipsis with mass nouns

a. Barney poured that much water into his soup, but I didn't pour ({so/ that/ as}) much ~~water~~ into mine.

b. Barney drank too much Spanish wine at lunch and Robin drank {as/ too} much ~~Spanish wine~~ too.

[5]It is worth noting that bare *much* in English is an NPI and it cannot occur in positive polarity contexts (Klima 1964; Israel 1996; Doetjes 1997; Solt 2009). Modified *much*, e.g. *too/ that/ as/ so much*, is not an NPI. That is why, *as, too, that* are optional in (17a) but obligatory in (17b).

The data in (17) show that the unmarked QA *much* can demarcate the ellipsis site. What is more, when there is an classificatory adjective like *Spanish*, said adjective cannot survive the ellipsis. If it does, ungrammaticality obtains even if the adjective is contrastive with the one on the antecedent. This is shown in the continuation to the sentence in (17b) in (18).

(18) * …and Robin drank {as/ too} much $\left\{\begin{array}{l}\text{Spanish} \\ \\ \text{Italian}\end{array}\right\}$ ~~wine~~ too.

Apart from full NP ellipsis with cardinal numbers or QAs as remnants, English allows another type of nominal ellipsis: *one*-substitution (Jackendoff 1977; Abney 1987; Harley 2005; Payne et al. 2013). *One*-substitution seems to target a smaller syntactic constituent, i.e. the nominal head itself (Harley 2005). Since Bloomfield (1933), it has been observed that *one*-substitution is sensitive to the count-mass distinction. More specifically, it is sensitive to the noun being count: only count nouns can serve as antecedents and targets for *one*-substitution (Bale and Gillon 2020, p.17). This is shown in (19).

(19) *one*-substitution

a. Barney touched the apple on the table and Ted touched the one(s) on the shelf.

b. * Barney drank the water that Mary poured and Ted drank the one that Marshall poured.

If number mismatches under ellipsis and *one*-substitution are conditioned by the syntax, these facts are tracking an underlying structural difference between mass and count nouns. In particular, for any mismatches to occur under ellipsis, the relevant feature must outside of the ellipsis site. This entails that whatever head encodes number must be present in the syntax of count nouns and survive the ellipsis, (Merchant 2014; Lipták and Saab 2014). Similarly, smaller ellipsis options like *one*-substitution must be sensitive to the selectional and featural properties of the noun (Harley 2005; Merchant 2014): in this case whatever is responsible for grammatically marking the noun as 'count'.

Similar facts obtain in Spanish. Like in English, number mismatches under ellipsis are acceptable (Picallo 2008; Eguren 2010; Lipták and Saab 2014; Toquero-Pérez 2023b): a singular antecedent can license ellipsis of a plural NP constituent, and viceversa. The sentence in (20b) is adapted from Lipták and Saab (2014, p.9), and the one in (20a) is modelled after it to illustrate the parallelism.

(20) Number mismatches under ellipsis

a. Juan compró un libro de Borges y María compró { dos/ mucho-s} ~~libro-s~~ de Cortázar.
Juan bought one book of Borges and María bought two/ much.M-PL book-PL of Cortázar
'Juan bought one book by Borges and María bought {two/ many} by Cortázar' SG/PL

b. Juan compró { dos/ mucho-s} libro-s de Borges y María compró un-o ~~libro~~ de Cortázar.
Juan bought two/ much.M.PL book-PL of Borges and María bought one-M book of Cortázar
'Juan bought {two/ many} books by Borges and María bought one by Cortázar.' PL/SG

When the noun modified by the numeral *uno* is overt as in (20a), the class marker of the numeral, i.e. the masculine gender exponent *-o*, is deleted; but when such noun has undergone ellipsis as in (20b), the class marker is retained (Arregi 2013).

Again, number mismatches under ellipsis are independently ruled out for mass nouns given their lack of a singular/plural contrast. However, as we observed for English, mass noun ellipsis is possible with a QA remnant. As in English, if there is a classificatory adjective like *español* 'Spanish', the adjective cannot be outside of the ellipsis site. This is shown in (21).[6]

(21) Juan bebió mucho vino español...
Juan drank much.M wine Spanish
'Juan drank too much Spanish wine ...'

[6]In Spanish it is possible for the classificatory adjective to survive ellipsis if the adjective in the second conjunct or disjunct is contrastive with the adjective in the antecedent. This is shown in (ii).

(ii) Juan bebió mucho vino español, y María bebió mucho {* español/ francés} también.
Juan drank much.M wine Spanish, and María drank much.M Spanish/ French too
'Juan drank too much Spanish wine and Mary drank as much French ~~wine~~ too'.

One possible explanation is that the AP vacates the ellipsis site as a result of focus movement, e.g. Eguren (2010), prior to the licensing of ellipsis.

a. y María bebió much-o ~~español~~ ~~vino~~ también.
and María drank much-M Spanish wine too
'and María drank (too) much too'

b. * y María bebió much-o español ~~vino~~ también.
and María drank much-M Spanish wine too
'and María drank (too) much Spanish too'

English *one*-substitution has sometimes been correlated with N-gapping in Spanish (Saab 2019), where the noun head is completely absent from the surface string of the DP. However, this is not quite the same, given that N-gapping is not sensitive to the count-mass distinction as the examples in (22) show.

(22) a. El libro de Borges y el ~~libro~~ de Cortázar.
the.M book of Borges and the.M book of Cortázar
'The book by Borges and the one by Cortázar'

b. Lo-s libro-s de Borges y lo-s ~~libro-s~~ de Cortázar.
the.M-PL book-PL of Borges and the.M-PL book-PL of Cortázar
'The books by Borges and the ones by Cortázar'

c. El vino de la botella y el ~~vino~~ de la jarra
the.M wine of the bottle and the.M wine of the jar
'The wine from the bottle and the wine from the jar'

If gapping paralleled *one*-substitution, the sentence in (22c) with the mass noun *vino*, which has a substance reading, would be marked unacceptable. And yet, it is perfectly acceptable for native speakers. Instead of the N-gapping strategy, however, Spanish can make use of the pronominal form *otro* 'other' preceded by a definite article or a demonstrative. This strategy gives rise to the paradigm in (23).[7]

[7]From now on, I will be using the demonstrative to illustrate *otro*-substitution. But it is important to note that if the demonstrative is replaced by the definite article, the same judgments are obtained. See (iii), which is parallel to the one in *one*-substitution.

(iii) *otro*-substitution with definite article
a. Juan leyó el libro de Borges y María leyó el otro de Cortázar.
Juan read the.M book of Borges and María read el.M other.M of Cortázar
Lit.: 'Juan read the book by Borges and María read the other by Cortázar'
Int.: 'Juan read this book by Borges and María read this one by Cortázar'.
b. Juan leyó lo-s libro-s de Borges y María leyó lo-s otro-s de Cortázar.
Juan read the.M-PL book-PL of Borges and María read the.M-PL other.M-PL of Cortázar
Lit.: 'Juan read the books by Borges and María read the others by Cortázar'

(23) *otro*-substitution

a. Juan leyó este libro de Borges y María leyó este otro de Cortázar.
Juan read this.M book of Borges and María read this.M other.M of Cortázar
Lit.: 'Juan read this book by Borges and María read this other by Cortázar'
Int.: 'Juan read this book by Borges and María read this one by Cortázar'.

b. Juan leyó esto-s libro-s de Borges y María leyó esto-s otro-s de Cortázar.
Juan read this.M-PL book-PL of Borges and María read this.M-PL other.M-PL of Cortázar
Lit.: 'Juan read these books by Borges and María read these others by Cortázar'
Int.: 'Juan read these books by Borges and María read these ones by Cortázar'.

c. * Juan virtió este vino de la botella y este otro de la jarra.
Juan poured this.M wine of the bottle and this.M other.M of the jar
Lit.: 'Juan poured this wine from the bottle and this other from the jar'
Int.: 'Juan poured this wine from the bottle and this one from the jar'.

The example in (23a) shows that *otro* can replace a singular count noun *libro* 'book'. Likewise, plural-marked *otro* in (23b) stands for the the plural count noun root *libro* plus overt plural-marking. However, what *otro* cannot replace is a mass noun like *vino*; attempting to do that is considered ungrammatical as shown in (23c). This is the exact parallel of English *one*-substitution: count noun roots, regardless of whether they are unmarked or plural-marked, can be the target of *one/otro*, but mass nouns cannot.[8]

We have now set the baseline for what it means to be a count noun and a canonical mass noun in both English and Spanish at least.[9] The diagnostics are summarized in Table 2.2 and Table 2.3, which will be

Int.: 'Juan read the books by Borges and María read the ones by Cortázar'.

c. * Juan virtió el vino de la botella y el otro de la jarra.
Juan poured the.M wine of the bottle and the.M other.M of the jar
Lit.: 'Juan poured the wine from the bottle and the other from the jar'
Int.: 'Juan poured the wine from the bottle and the one from the jar'.

[8] I am using the label 'noun root' purely descriptively to refer to the (unmarked) bare form of the noun, e.g. *book, water, jewel*. I am not making any claims as to whether roots are categorized in the lexicon. In fact, under DM assumptions, which will be spelled out in Chapter 3, the descriptive term 'nominal/noun root' corresponds to the analytic object $n+\sqrt{\text{ROOT}}$.

[9] Some of these diagnostics may not be applicable to other languages. See Doetjes (1997, 2021); Chierchia (1998b, 2021); Lima (2014); Deal (2017); Rothstein (2017, 2021) among others.

updated section-by-section. We can use these findings to probe the properties of other nouns that seem to lie in the middle or which may share some properties with either class.

Table 2.2: Morpho-syntactic properties of 'canonical' mass & count nouns (to be updated)

	Canonical Mass	**Count**
SG/PL distinction	*	✓
Direct modification by numerals	*	✓
Modification by Stubbornly Distributive adjectives	*	✓
Number mismatches under ellipsis	NA	✓
one/otro-substitution	*	✓

Table 2.3: Restrictions on determiner selection (to be updated)

Class of Determiner	**Canonical Mass**	**Count**	
		SG	PL
Class 1: Count-only	*	✓	✓
Class 2: SG-count only	*	✓	*
Class 3: PL-count only	*	*	✓
Class 4: Mass & PL-count	✓	*	✓
Class 5: Underspecifed	✓	✓	✓

In addition to the two large classes of nouns that have been identified, there are two other types of nouns that are typically discussed: plural mass nouns (e.g. *suds, fumes* etc.) and aggregate or object mass nouns (e.g. *furniture, weaponry, jewelry* etc.).

2.2 Plural mass nouns

Number-marking and modification. A non-exhaustive list of plural mass nouns is in (24a) for English (see Ojeda 2005, p.2: ex.1; and also Wellwood 2019, p.108), and in (24b) for Spanish, (Bosque 1999, ch1, p.29).

(24) Plural mass nouns

a. clothes, oats, hops, guts, brains, fumes, suds, dregs, goods, valuables … (English)

b. agujeta**s** celo**s** vívere**s** baba**s** represalia**s** (Spanish)
muscle sores jealousy.PL provisions drooling.PL reprisals

From the list in (24), it is clear why they are referred to as 'plural': they are overtly plural-marked. In this respect, they differ from canonical mass nouns and resemble plural count nouns. However, unlike plural count nouns, they lack a singular or unmarked counterpart (when used nominally). Thus, the following contrasts in (25) for English and (26) for Spanish obtain.

(25) Lack of a singular/plural contrast in English

a. Barney inhaled the fumes.

b. * Barney inhaled the fume.

(26) Lack of a singular/plural contrast in Spanish

a. El ejército mandó lo-s víver-s desde Madrid.
the army sent the.M-PL provision-PL from Madrid
'The army sent the provisions from Madrid'

b. * El ejército mandó el vívere desde Madrid.
the army sent the.M provision from Madrid
'The army sent the provision from Madrid'

Overt plural-marking on these nouns triggers obligatory plural agreement DP-internally and externally. In English, due to the general lack of nominal concord inside DPs, DP-internal plural agreement is only observed with demonstratives, as shown in (27a). In Spanish, plural concord DP-internally is visible with determiners and adjectival modifiers, e.g. (28a), and DP-externally with the verb and passive participles, e.g. (28b).

(27) Obligatory plural agreement in English

a. Miners shouldn't breathe {*this/ these} fumes.

b. The fumes {*was/ were} produced by the mixture of the spilled chemicals with rain and snow.[10]

(28) Obligatory plural agreement in Spanish

a. El ejército mandó esto-s vívere-s necesario-s desde Madrid.
the army sent this.M-PL provision-PL necessary.M-PL from Madrid
'The army sent these necessary provisions from Madrid'

b. * El ejército mandó este vívere-s necesario desde Madrid.
the army sent this.M provision-PL necessary.M from Madrid
'The army sent these necessary provisions from Madrid'

c. Lo-s vívere-s {* fue enviado/ fueron enviado-s} desde Madrid.
the.M-PL provision-PL was.3SG sent.M/ were.3PL sent.M-PL from Madrid
'The provisions were sent from Madrid'

Despite their overt plural-markedness and the fact that cardinal numerals higher than '1' require that the noun they modify be plural-marked, plural mass nouns cannot be directly modified by numerals (Bosque 1999; Ojeda 2005). Some examples are in (29)-(30). Likewise, these nouns also disallow modification by Stubbornly Distributive adjectives (Ojeda 2005), as illustrated in (31)-(32).

(29) Impossibility of direct numeral modification in English

a. * There are five clothes on the table.

b. * Barney found three dregs at the bottom of the cup.

(30) Impossibility of direct numeral modification in Spanish

a. * Andrés tiene cinco agujeta-s en los cuádriceps.
Andrés has five muscle sore-PL in the quadriceps
'Andrés has five muscle sores in his quadriceps'

b. * Tres baba-s le colgaban de los labios.
three drool-PL CL.3SG hanged of the lips
'Three drools hanged from his lips'

[10] https://www.upi.com/Archives/1986/03/13/Six-treated-for-inhaling-toxic-fumes/4543511074000/

(31) Impossibility of modification by Stubbornly Distributive adjectives in English

a. * The dregs at the bottom of the cup are large.

b. * Barney found the large dregs at the bottom of the cup.

(32) Impossibility of modification by Stubbornly Distributive adjectives in Spanish

a. * La-s baba-s que le colgaban de los labios eran grande-s.
the.F-PL droo-PL that CL.3SG hanged of the lips were big-PL
Int.: 'The drools that hanged from his lips were large'

b. * Yo no paraba de mirar la-s baba-s grande-s en los labios de Andrés.
I NEG stopped of to.stare the.F-PL drool-PL big-PL in the lips of Andrés
'I couldn't stop staring at the drools on Andrés' lips'

With respect to these diagnostics, they behave as unequivocally mass nouns. Thus, their massiness in combination with overt plural markedness has led to the term plural mass nouns.

Determiner selection. As mass nouns, they are also restricted to the type of determiners and quantifiers that they can occur with (Bosque 1999). In particular, they are ungrammatical with count-only determiners in Spanish (i.e. Class 1) such as *algún, un, todo*, e.g. (33); likewise they are also ungrammatical with singular-count-only determiners in both languages like *a, every, each* and *cada, cualquier* (i.e. Class 2). This is so given that they lack a singular counterpart. These restrictions are shown in (34) and (35).

(33) Class 1: count-only determiners in Spanish

a. * El ejército mando { alguno-s/ uno-s/ todo-s} vívere-s desde Madrid.
the army sent some.M-PL/ a.M-PL/ every.M-PL provision-PL from Madrid
Int.: 'The army sent {a/ every} provisions from Madrid'

b. * Andrés sufre { alguna-s/ una-s/ toda-s} agujeta-s en la pierna derecha.
Andrés suffers some.F-PL/ a.F-PL/ every.F-PL muscle sore-PL in the leg right
Lit.: 'Andrés suffers from {a/ every} muscle sores in his right leg'

(34) Class 2: singular-count only determiners in English

a. * Barney found {a/ each/ every} dreg at the bottom of the cup.

b. * {A/ every/ each} fume was coming out of the nuclear station.

(35) Class 2: singular-count only determiners in Spanish

a. * El ejérecito necesita { cada/ cualquier} vívere-s.
the army needs each/ any provision-PL
Lit.: 'The army needs {each/ any} provisions'

b. * Mi fisio te quita { cada/ cualquier} agujeta-s.
my physiotherapist CL.2SG.DAT removes each/ any muscle sore-PL
Lit.: 'My physiotherapist will elminiate {each/ any} muscle sores from you.'

Importantly, despite their being plural-marked, plural mass nouns are also incompatible with determiners like *several* or Spanish *varios*, (i.e. Class 3). Thus, the label 'plural-count-only' seems an appropriate one for this class of determiners. This is shown in (36) for English and (37) for Spanish.

(36) Class 3: plural-count-only determiners in English

a. * Barney found several dregs at the bottom of the cup.

b. * Several fumes were coming out of the nuclear station.

(37) Class 3: plural-count-only determiners in Spanish

a. * El ejército mandó varios vívere-s desde Madrid.
the army sent several.M.PL provision-PL from Madrid
'The army sent several provisions from Madrid'

b. * Tengo varias agujeta-s por ir a correr ayer.
have.1SG several.F.PL muscle sore-PL for to.go to run yesterday
'I have several muscle sores for going running yesterday'

Like mass nouns, and plural count nouns, they are compatible with Class 4 determiners: *all* and Spanish *todos los* 'all the' and QAs. This is shown in (38) and (39).

(38) Class 4: Mass & Plural-count determiners in English

a. Barney removed {all / much/ %many/ more} dregs at the bottom of the cup.

b. {All / Too much/ %Many/ More} fumes were coming out of the nuclear station.

(39) Class 4: Mass & Plural-count determiners in Spanish

a. El ejército mandó { todo-s lo-s/ mucho-s/ tanto-s/ más} vívere-s desde
the army sent all.M-PL the.M-PL/ much.M-PL/ as.much.M-PL/ more provision-PL from
Madrid.
Madrid

Lit.: 'The army sent {all the/ many/ as many/ more} provisions from Madrid.'

Int.: 'The army sent {all/ much/ as much/ more} provisions from Madrid.'

b. Andrés tiene { toda-s la-s/ mucha-s/ tanta-s/ más} agujeta-s en la pierna
Andrés has all.F-PL the.F-PL/ much.F-PL/ as.muchF-PL/ more muscle sore-PL in the leg
derecha.
right

Lit.: 'Andrés has {all the/ many/ as many/ more} muscle sores in the right leg'

Int.: 'Andrés has {all/ much/ as much/ more} muscle sores in his right leg'

Interestingly, the English data in (38) indicate that, despite the noun being overtly marked plural, speakers seem to prefer the unmarked form of the QA, e.g. *much* (Solt 2009). Smith (2021, ch.8, p.234-235) notes that intuitions about choosing *much* over *many* with plural mass nouns are unclear. Smith reports a corpus search showing that (i) few tokens with a plural mass noun modified by a QA were found, and (ii) of those found, there was a preference for *many*. My own elicitations with native English seem to confirm this variation. Thus, the '%' indicates that there is speaker variation.

This situation is completely different from what we observe in Spanish: the QAs *mucho* 'much' and *tanto* 'as/so much' require overt plural-marking. For now, it is simply worth noting that English and Spanish differ in this respect: the former prefers the unmarked form *much* though it does not preclude the more marked one *many*; the latter requires the QA to be marked for number if the noun is plural-marked.[11]

[11]Despite the claims made by Solt (2009, 2015); Snyder (2021) that the surface form *many* is semantically conditioned by the dimension of 'cardinality', the Spanish facts seem to suggest otherwise: the plural-marked form of the QA surfaces, just like with count nouns, and yet the noun is measured in terms of volume or weight. Similar facts are observed in Greek (Tsoulas 2006, 2009) and Telugu (Smith 2021). In Chapter 3 and Chapter 4, I will show that the surface form of the QA is sensitive to there being a plural

Last but not least, plural mass nouns are compatible with the set of determiners that are underspecified for the count-mass distinction, i.e. Class 5. The data is in (40) for English and in (41) for Spanish.

(40) Class 5: Determiners underspecified for the count-mass distinction in English

a. Barney removed {the/ some/ no/ these} dregs at the bottom of the cup.

b. {The/ Some/ No/ These} fumes were coming out of the nuclear station.

(41) Class 5: Determiners underspecified for the count-mass distinction in Spanish

a. { Lo-s/ esto-s} vívere-s llegaron desde Madrid.
the.M-PL/ this.M-PL provision-PL arrived from Madrid
{The/ These} provisions arrived from Madrid.'

b. Juan se limpió { la-s/ esta-s} baba-s de la cara.
Juan SE cleaned the.F-PL/ this.F-PL drool-PL of the face
'Juan cleaned {the/ these} drools off his face.'

It is worth noting that the data about determiner selection indicates the following: the determiners compatible with plural mass nouns track plural-marking, not the noun being count. For instance, they are acceptable with plural demonstratives but are unacceptable with *several* or *varios* which require the noun to be count in addition to plural-marked. This indicates that we need to disentangle being plural-marked from being count. As we will see shortly, the source of number-marking in plural mass nouns differs from differs plural-marked count nouns.

Ellipsis options. Number mismatches under ellipsis with plural mass nouns are independently ruled out given that they lack an unmarked singular counterpart. In this respect, they pattern like canonical mass nouns. As such, they allow noun and classificatory adjective ellipsis with a QA remnant. This is shown in (42) and (43).

(42) This beer company buys too {much/ %many} Spanish hops...

feature, as originally proposed by Wellwood (2015). The dimension of measurement in the semantics, as I argue in Chapter 4, is independent of the surface form. This is in line with proposals such as Wellwood (2015, 2018); Cleani and Toquero-Pérez (2022).

a. and that beer company buys too {much/ %many} ~~Spanish hops~~ as well.

b. * and that beer company buys too {much/ %many} $\left\{\begin{array}{l}\text{Spanish}\\ \\ \text{Chinese}\end{array}\right\}$ ~~hops~~ as well.

(43) Este país recibió mucho-s vívere-s español-es...
this.M country received much.M-PL provision-PL Spanish-PL

Lit. 'The country received many Spanish provisions'

Int. 'The country received (too) {much/ %many} Spanish provisions'

a. y aquel recibió mucho-s ~~vívere-s~~ ~~español-es~~ también
and that received much.M-PL provision-PL Spanish-PL too

Lit.: 'and that one received many too'

Int.: 'and that one received (too) {much/ %many} as well'

b. * y aquel recibió mucho-s ~~vívere-s~~ español-es también
and that received much.M-PL provision-PL Spanish-PL too

Lit.: 'and that one received many Spanish too'

Int.: 'and that one received (too) {much/ %many} Spanish as well'

We can test, however, whether they pattern like canonical mass or count nouns in terms of *one*-substitution. If they are really underlyingly mass despite plural-marking, *one*-substitution will not be acceptable. The relevant data are in (44) and (45).

(44) *one*- substitution

a. Ted saw the bubbles on the sponge and the one(s) on the sink.

b. * Ted saw the suds on the sponge and the ones on the sink.

(45) *otro*-substitution

a. Juan vio esto-s lote-s en el almacén y María vió { esto-s otro-s/ este
Juan saw this.M-PL batch-PL in the storehouse and María saw this.M-PL other.M-PL this.M
otro} en la despensa.
other.M in the pantry

Lit.: 'Juan saw these batches in the storehouse and María saw {these others/ this other} in the pantry.'

Int.: 'Juan saw these batches in the storehouse and María saw {these ones/ this one} in the pantry.'

b. * Juan vio esto-s vívere-s en el almacén y María vió { esto-s otro-s/ este
Juan saw this.M-PL provision-PL in the storehouse and María saw this.M-PL other.M-PL this.M
otro} en la despensa.
other.M in the pantry

Lit.: 'Juan saw these provisions in the storehouse and María saw {these others/ this other} in the pantry.'

Int.: 'Juan saw these provisions in the storehouse and María saw {these ones/ this one} in the pantry.'

The example in (44a) is the baseline with a plural count noun which is semantically similar, e.g. *bubbles*, to the plural mass *suds* as an antecedent. The pronominal form *one*, regardless of whether it is plural-marked or not, can replace the noun in the second conjunct. The sentence contrasts with the one in (44b), where *bubbles* has been replaced with *suds*. *One*-substitution is unacceptable in this context, just like with saw with *water* in (19b). Likewise, in Spanish, *otro* can replace the (count) noun *lote* 'batch' in (45a); but, when *otro* targets the plural mass noun *víveres* 'provisions' for substitution, the result in (45b) is unacceptable.

Up to this point, the summary of the morpho-syntactic properties of plural mass nouns is given in the updated version of Tables 2.2 and 2.3.

The data in Table 2.4 and Table 2.5 indicate that plural mass nouns are really mass and have little in common with count nouns apart from overt plural-marking. This overlap in plural-markedness raises the question of where plural marking is coming from. In other words, does the realization of plural have the

Table 2.4: Morpho-syntactic properties of 'canonical' and plural mass & count nouns (to be updated)

	Canonical Mass	**PL Mass**	**Count**
SG/PL distinction	*	*	✓
Direct modification by numerals	*	*	✓
Modification by Stubbornly Distributive adjectives	*	*	✓
Number mismatches under ellipsis	NA	NA	✓
one/otro-substitution	*	*	✓

Table 2.5: Restrictions on determiner selection (to be updated)

Class of Determiner	**Mass**		**Count**	
	Canonical	PL	SG	PL
Class 1: Count-only	*	*	✓	✓
Class 2: SG-count only	*	*	✓	*
Class 3: PL-count only	*	*	*	✓
Class 4: Mass & PL-count	✓	✓	*	✓
Class 5: Underspecifed	✓	✓	✓	✓

same source in *dregs, fumes, suds* as in *toys, chairs, children*? We can empirically test whether plural in these two different types of noun classes comes from the same syntactic source by looking at Noun-Noun compounds.

The source of plural marking Descriptively, noun-noun compounds in English are right-headed, which means that the rightmost noun is the head of the compound while the leftmost noun is a modifier or complement of that head (Williams and di Sciullo 1987; Snyder 1995, 2012). Number inflection in compounds always surfaces on the head noun, never on the non-head. What is more, the non-head noun can never be plural-marked. This is all shown in Table 2.6.

Table 2.6: Plural marking on noun-noun compounds with two count nouns

unmarked compound	**plural head noun**	**plural non-head noun**	**plural on both nouns**
a. street $\underline{\text{dog}}_{\text{H}}$	street dog**s**	*street**s** dog	*street**s** dog**s**
b. bus $\underline{\text{driver}}_{\text{H}}$	bus driver**s**	*bus**es** driver	*bus**es** driver**s**

The non-head nouns in the examples in Table 2.6 are count nouns which allow overt plural marking outside of compounds: *street-s* and *bus-es*. The fact that they disallow plural marking in the non-head position of compounds is generally taken to indicate that the non-head constituent is syntactically small: it consists of the root and the categorizer, but no additional functional structure such as Number (Wiltschko 2008; Harley 2009).

If the source of plural-marking on plural mass nouns is the same as in count nouns, we expect these nouns to be unmarked for number when occurring as the non-head of noun-noun compounds. If, on the contrary, the source of plural marking is different and has a 'more lexical' source, we expect plural marking to remain unaffected.[12] The relevant data are in (46).[13]

(46) Number marking on noun-noun compounds with a plural mass non-head

a. Suds dispenser(s)	*sud dispenser(s)
b. Dregs filter(s)	*dreg filter(s)
c. Fumes extractor(s)	*fume extractor(s)
d. Hops meter(s)	*hop meter(s)

All the data in (46) are canonical noun-noun compounds: they are right headed as indicated by the possibility of plural-marking. What is crucially different from the examples in Table 2.6 is that plural-marking on the non-head is obligatory. In fact, lack of plural-marking leads to unacceptability. This is a novel observation about plural mass nouns and it has important consequences for the syntactic structure of these nouns:

[12] I am using the expression 'more lexical' purely descriptively to refer to the pieces of morpho-syntax that impose unpredictable idiosyncrasies on certain objects such as roots. Analytically, by 'lexical' in this context, what I have in mind is the role that a certain local morpheme (or syntactic terminal) has in determining the interpretation or form of a root: the closer to the root a syntactic terminal is, the more likely it will be to trigger semantic or phonological changes in that root (see Embick 2015, for an overview). Typically in DM-style syntax, which is assumed throughout this dissertation, categorizers are more local to the root than other functional heads (i.e. Number or D) and may have an impact on the form and/or interpretation of the root if certain locality conditions are met (Marantz 1997, 2001, 2013; Harley 2014; Embick 2015; Moskal 2015; Moskal and Smith 2016; Wood 2016, 2023).

[13] The judgments have been verified by 10 different native speakers of North American English (9 from the US, and 1 from Canada).

the source of plural-marking is structurally closer to the root than the source of regular plural-marking with count nouns.[14]

We can employ the same diagnositcs for Spanish. In Spanish, noun-noun compounds are left-headed as opposed to English (Piera 1995; Snyder 1995, 2012; Toquero-Pérez 2020): in an endocentric compound that has two nouns, the head of the compound is the noun on the left. This noun carries number inflection and triggers agreement with determiners (and modifiers). The non-head can never be inflected for number. This is shown in (47).

(47) Plural marking on noun-noun compounds with two count nouns in Spanish

a. 'bracelet watch' (i.e. watch that has a strap)

i. El reloj$_{H}$ pulsera
the.M watch.M bracelet.F

ii. Lo-s reloj-es pulsera
the.M-PL watch.M-PL bracelet.F

iii. * El reloj pulsera-s
the.M watch.M bracelet.F-PL

iv. * Lo-s reloj-es pulsera-s
the.M-PL watch.M-PL bracelet.F-PL

b. 'bus pumpkin' (i.e. pumpkin that is similar to or functions as a bus)

i. La calabaza$_{H}$ autobús
the.F pumpkin.F bus.M

ii. La-s calabaza-s autobús
the.F-PL pumpkin.F-PL bus.M

iii. * La calabaza autobus-es
the.F pumpkin.F bus.M-PL

iv. * La-s calabaza-s autobus-es
the.F-PL pumpkin.F-PL bus.M-PL

Given that the non-head noun in a compound never inflects for number, as illustrated in (47a-iii) and (47b-iii), there are two potential outcomes for plural mass nouns in compounds: (i) plural mass nouns must be unmarked for number in this syntactic context; (ii) plural mass nouns must retain plural marking in this syntactic context. If (i) is borne out, this is evidence that plural-marking in both *baba-s* 'drooling' and *autobús-es* 'buses' has the same syntactic source; if (ii) is borne out, then we can conclude that the sources

[14] A potential exception to this observation comes from *oats*, which may appear unmarked in the non-head position: *oat milk, oat latte* vs. **oats milk, oats latte.*

of plural-marking are different, just like we did for English. The data in (48) have been accepted by 10 native Spanish speakers from Spain with the meanings indicated in parenthesis.[15]

(48) Number marking on noun-noun compounds with plural mass non-head in Spanish

a. 'drooling boy' (i.e. boy that has/does a lot of drooling)

i. El niño baba-s
the.M kid.M drool.F-PL

ii. Lo-s niño-s baba-s
the.M-PL kid.M-PL drool.F-PL

iii. * El niño baba
the.M kid.M drool.F

iv. * Lo-s niño-s baba
the.M-PL kid.M-PL drool.F

b. 'muscle sores exercise' (i.e. exercise that causes muscle sores')

i. El ejercicio agujeta-s
the.M exercise.M muscle sore.F-PL

ii. Lo-s ejercicio-s agujeta-s
the.M-PL exercise.M-PL muscle sore.F-PL

iii. * El ejercicio agujeta
the.M exercise.M muscle sore.F

iv. * Lo-s ejercicio-s agujeta
the.M-PL exercise.M-PL muscle sore.F

The noun-noun compounds in (48a-i) and (48b-i) show that the plural mass nouns *babas* 'drooling' and *agujetas* 'muscle sores' can be plural-marked when they occur as non-heads in compounds. The acceptability of these compounds is in stark contrast with (48a-iii) and (48b-iii): removing the plural marking from the mass noun results in unacceptability. As (48a-ii) and (48b-ii) and their counterparts in (48a-iv) and (48b-iv) show, plural marking on the non-head is not contingent on the head being plural-marked. The conclusion that we can draw from this is that the source of plural-marking on plural mass nouns differs from the source of plural marking in plural count nouns. This is the same observation that we extracted for English.

[15]It is worth noting that noun-noun compounding in Spanish is not as creative as it is in English, i.e. a process is creative "if it is available for automatic, impromptu use whenever a new word is needed to fit the occasion" (Snyder 2016, p.91). This entails that speakers are less readily open to accept novel noun-noun combinations. In fact, as Toquero-Pérez (2020) shows, few semantic relations underlying noun-noun compounds seem to be readily available in Spanish.

2.3 Object mass nouns.

The last class of nouns that is relevant for the count-mass distinction encompasses those nouns that denote collections or groups of objects that stand in some kind relation with each other. A non-exhaustive list of nouns that have been generally identified as belonging to this class is given in (49). The English data have been taken from Lieber (2016); Cohen (2020).[16]

(49) a. Jewelry, drapery, baggage, luggage, footwear, daywear, carpeting, lighting, furniture …

b. joyería, cubertería, peonaje, follaje, accionariado, profesorado, armamento,
jewelry silverware construction workers foliage shareholders faculty weaponry
bastimento, mobiliario …
supply furniture

A first look at these nouns seems to indicate that they are morphologically complex. For example, certain affixes can be identified in both languages such as *-ery*, *-age*, *-wear* in English and *-ería*, *-aje* or *-ado* in Spanish. While one might be concerned with the possibility that the distributional properties of these nouns differ based on the affix, I will show that this is not the case. Thus, from now on I will use nouns with different affixes as an illustration. We will go back to morphological considerations towards the end of this section.

Number marking and modification. These nouns all trigger singular agreement both DP-internally and externally, as in (50). In addition, they resist plural-marking (Bunt 1985; Gillon 1992, 1999; Doetjes 1997; Chierchia 1998a, 2010, 2021; Borer 2005a; Bale and Barner 2009). This property is illustrated in (51).

(50) Singular agreement

a. {This furniture was/ *these furniture were} brought in this morning.

[16]Nouns ending in *-ería* in Spanish can have a count interpretation when referring to a location. For example, *joyería* in (iv) picks out the store were jewelry is sold. In this section, and in the dissertation, I will not discuss these cases. We can assume that the underlying structures of the location and object mass nouns must differ, despite the fact that the same vocabulary item is used (De Belder 2011; Lieber 2016).

(iv) { La joyería/ la-s joyería-s} de la calle Serrano de Madrid
the.F jewelry the.F-PL jewelry-PL of the street Serrano of Madrid
'The jewelry store(s) in Calle Serrano in Madrid'

b. {This jewelry is/ *these jewelry are} not suitable for piercing.

c. { Este mobiliario llegó/ *Esto-s mobiliario llegaron} por la mañana.
this.M furniture arrived.3SG this.M-PL furniture arrived.3PL for the morning
'{This furniture/ these furniture} arrived in the morning.'

d. { Esta joyería es/ *Esta-s joyería son} solo para punkies
this.F jewelry is.3SG this.F-PL jewelry are.3PL only for punks
'{This jewelry is/ these jewelry are} only for punks.'

(51) Incompatibility with plural-marking

a. * the furniture-**s**, the jewelr-**ies**, the baggage-**s**, the footwear-**s**

b. * Lo-s mobiliario-s, la-s joyería-s, lo-s follaje-s, lo-s profesorado-s
the.M-PL furniture-PL the.F-PL jewelry-PL the.M-PL foliage-PL the.M-PL faculty-PL

The unavailability of plural-marking with these nouns also correlates with the unavailability of cardinal numeral modification. Cardinal numerals cannot directly modify object mass nouns. Numeral modification is only possible via a pseudo-partitive structure (Doetjes 1997; Chierchia 1998b, 2010, 2021; Borer 2005a; Bale and Barner 2009). This is shown in (52) for English and in (53) for Spanish.

(52) Impossibility of direct numeral modification in English

a. * Barney bought three jewelry(-s). ⇝ Barney bought three pieces of jewelry.

b. * Mom can't find one silverware. ⇝ Mom can't find one piece of silverware.

(53) Impossibility of direct numeral modification in Spanish

a. * Barney compró tres joyería(-s). ⇝ Barney compró tres piezas de joyería
Barney bought three jewelry-PL Barney bought three pieces of jewelry
'Barney bought three jewelry(-s) ⇝ Barney bought three pieces of jewelry'

b. * Mamá no encuentra una cubertería. ⇝ Mamá no encuentra una pieza de cubertería
mom NEG finds one silverware mom NEG finds one piece of silverware
'Mom can't find one silverware ⇝ Mom can't find one piece of silverware'

These two properties, i.e. impossibility of overt-plural marking and direct numeral modification, make this class of nouns pattern with the two classes of mass nouns described so far. Nevertheless, unlike these

classes of mass nouns, object mass nouns allow modification by stubbornly distributed adjectives (Schwarzschild 2011; Deal 2016a, 2017; Doetjes 2021). This is shown in (54) for English and in (55) for Spanish.

(54) Modification by Stubbornly Distributive adjectives in English

a. The furniture in this room is large.

b. The large furniture in the room was mounted overnight.

(55) Modification by Stubbornly Distributive adjectives in Spanish

a. El mobiliario en esta habitación es grande.
the.M furniture in this room is large
'The furniture in this room is large'

b. El mobiliario grande de esta habitación se instaló por la noche.
the.M furniture big of this room SE installed for the night
'The large furniture in this room was mounted overnight'

In both (54a) and (55a), the adjective *large/grande* can be used as a predicate of a copula whose subject is the DP *the furniture/el mobiliario*. Likewise, the same adjective can be used DP-internally, to modify the noun *furniture/mobiliario* as in (54b) and (55b). In this respect, they pattern with the class of count nouns.[17]

Determiner selection. Up to this point, the data indicate that nouns like *jewelry, weaponry, furniture, luggage* etc. show mixed properties: on the one hand, they largely pattern with mass nouns; on the other, they do not. Data from determiner selection will help us make a more accurate characterization of this class of nouns. Starting with Class 1, the Spanish data in (56) show that determiners that require the noun to be count cannot combine with the nouns in question.

(56) Class 1: count-only determiners in Spanish

[17] Bale and Barner (2009) observe that object mass nouns pattern with plural count nouns in their semantic interpretation when modified by comparatives: *more furniture* and *more chairs* are both interpreted in terms of cardinality. In Chapter 4 I will concentrate on this property.

a. * Enviaron { algún/ un/ todo} armamento desde la base.
sent.3PL some.M/ a.M/ every.M weaponry from the base
Int.: 'They sent {a/ every} weaponry from the base'

b. * { Algún/ un/ todo} equipaje se perdió en LAX.
some.M/ a.M/ every.M luggage SE lost.3SG in LAX
Int.: '{A/ Every} luggage was lost at LAX'

The unmarked form of Class 1 determiners is not acceptable to occur with *armamento* 'weaponry' and *equipaje* 'luggage' in (56). Similarly, Class 2 determiners are also unacceptable with these nouns as the English and Spanish examples in (57) and (58) show.

(57) Class 2: singular-count only determiners in English

a. * {A/ Every/ Each } jewelry was made of gold.

b. * Mom auctioned {a/ every/ each} silverware.

(58) Class 2: singular-count only determiners in Spanish

a. * { Cada/ Cualquier} joyería de la tienda es de oro.
each/ any jewelry of the store is of gold
'{Each/ any} jewelry in the store is made of gold'

b. * Mamá perdió { cada/ cualquier} equipaje en LAX.
mom lost each/ any luggage in LAX
'Mom lost {each/ any} luggage at LAX'

Determiners that track plural-count nouns, that is Class 3, are also unacceptable with these nouns. As shown in (59) and (60), *several/varios* cannot occur with *jewelry*-type nouns. It is worth noting here that making the noun overtly plural in these context is independently ruled out as already discussed.

(59) Class 3 plural-count only determiners in English

a. * Barney bought several jewelry in Downtown LA.

b. * Several weaponry was found in the back of Barney's truck?

(60) Class 3 plural-count only determiners in Spanish[18]

a. * Compré varias joyería a mi mujer en el Corte Inglés
bought.1SG several.F.PL jewelry DOM my woman in el Corte Inglés
'I bought several jewelry for my wife in *El Corte Inglés*'

b. * La policía incautó varios armamento en la frontera con Francia
the police seized several.M.PL weaponry in the border with France
'The police seized several weaponry at the French border'

The determiner data presented so far are important because they indicate that syntactically these nouns are not count, but actually mass. The "mystery" is then the situation with adjectival modification.

Class 4 determiners are perfectly compatible with these mass nouns. This is shown in the examples in (61) and (62).

(61) Class 4: Mass & Plural-count determiners in English

a. Barney bought {all/ so much/ *many/ more} furniture in Ikea.

b. {All/ So much/ *Many/ More} jewellery is yet to be pawned.

(62) Class 4: Mass & Plural-count determiners in Spanish

a. Barney compró { todo el/ mucho/ tanto/ más} armamento en el mercado negro.
Barney bought all.M the.M/ much.M/ as.much.M/ more weaponry in the black market
'Barney bought {all/ (so) much/ as much/ more} weaponry in the black market.'

b. Últimamente, nadie lleva { toda la/ mucha/ tanta/ más} joyería puesta.
lately nobody carries all.F the.F/ much.F/ as.much.F/ more jewellery put.F
'Lately, nobody wears {all/ (so) much/ as much/ more} jewellery'

If we look at the English data in (61), it is important to note that the marked form of the QA, i.e. *many*, is unacceptable. Only the unmarked form, *much*, is grammatical. In the Spanish data in (62), we see that the lack of overt plural marking on the noun results in a lack of plural marking on the QA and other determiners.

[18] *El Corte Inglés* is a department store in Spain. The equivalent in the US would be something like Macy's or Nordstrom.

Last but not least, all the determiners from Class 5 are acceptable with this class of mass nouns. This is expected if these determiners are underspecifed for the count-mass distinction. The relevant data are in (63) and (64).

(63) Class 5: Determiners underspecified for the count-mass distinction in English

a. Barney stole {the/ some/ no/ this} jewelry from Tiffany's.

b. {The/ Some/ No/ This} stolen luggage has been returned to us.

(64) Class 5: Determiners underspecified for the count-mass distinction in English

a. Robaron { la/ esta} joyería cara de Tiffany's.
stole.3PL the.F/ this.F jewelry expensive of Tiffany's
'They stole {the/ this} expensive jewelry from Tiffany's'

b. { El/ Este} armamento llegó finalmente a su destino.
the.M/ this.M weaponry arrived finally to his destination
'{The/ This} weaponry finally reached its destination.'

Ellipsis options. Turning to ellipsis, the lack of an overt plural counterpart makes number mismatches under ellipsis with these nouns impossible. As illustrated in (17), however, it is possible for the whole mass NP to be deleted under identity stranding a QA. Some examples are in (65).

(65) Mass NP ellipsis under QA

a. Barney bought too much wooden furniture, but Ted didn't buy as much ~~wooden furniture~~.

b. * Barney bought too much wooden furniture, but Ted didn't buy as much wooden ~~furniture~~.

c. Barney compró mucho mobiliario europeo, pero Ted no compró tanto ~~mobiliario europeo~~
Barney bought much.M furniture european but Ted NEG bought as.muchM furniture
european
'Barney bought too much european furniture, but Ted didn't buy as much'

d. * Barney compró mucho mobiliario europeo, pero Ted no compró tanto ~~mobiliario~~
Barney bought much.M furniture european but Ted NEG bought as.muchM furniture
europeo
european
'Barney bought too much european furniture, but Ted didn't buy as much european'

The data in (65) show that a QA can serve to delimit the ellipsis site. Once again, when there is a classificatory adjective like *wooden* or *europeo* 'European', the adjective must be contained in the ellipsis site. Failure to do so results in unacceptability as the sentences in (65b) and (65d) show. This is evidence that what is being elided is larger than just the nominal root itself.

Despite the inability to test for number mismatches under ellipsis, we can apply the *one/otro*-substitution test. This test has proved successful in determining whether a noun is syntactically count or not. None of the classes of mass nouns so far described allow for *one/otro*-substitution, whereas count nouns do. The relevant data for object mass nouns are given in (66) and (67).

(66) *one*-substitution

a. Ted pawned the jewel from his grandmother and the one from his mom.

b. * Ted pawned the jewelry from his grandmother and the one from his mom.

(67) *otro*-substitution

a. Ted empeñó esta joya de su abuela y esta otra de su madre.
Ted pawned this.F jewel of his grandmother and this.F other.F of his mother
Lit.:'Ted pawned this jewel from his grandmother and this other from his mother'

Int.: 'Ted pawned this jewel from his grandmother and this one from his mother'

b. * Ted empeñó esta joyería de su abuela y esta otra de su madre.
Ted pawned this.F jewelry of his grandmother and this.F other.F of his mother
Lit.:'Ted pawned this jewelry from his grandmother and this other from his mother'

Int.: 'Ted pawned this jewelry from his grandmother and this one from his mother'

Once again, we observe that when a count noun root, in this case a singular one (66a) and (67a), is in the first conjunct, its counterpart in the second conjunct can be a target for *one/otro*-substitution. However, when the nominal root in the first conjunct is an object mass noun root, *one/otro*-substitution cannot target such constituent in the second conjunct. This is observed in (66a) and (67a), where the object mass noun *jewelry/joyería* shares the same morphological base as its count counterpart *jewel/joya*.

Up to this point, the summary of the morpho-syntactic properties of object mass nouns is given in the final version of Table 2.2 and Table 2.3, here labeled Table 2.7 and Table 2.8.

Table 2.7: Morpho-syntactic properties of all mass & count nouns (final version)

	Canonical Mass	**PL Mass**	**Object Mass**	**Count**
SG/PL distinction	*	*	*	✓
Direct modification by numerals	*	*	*	✓
Modification by Stubbornly Distributive adjectives	*	*	✓	✓
Number mismatches under ellipsis	NA	NA	NA	✓
one/otro-substitution	*	*	*	✓

Table 2.8: Restrictions on determiner selection (final version)

Class of Determiner	**Mass**			**Count**	
	Canonical	PL	Object	SG	PL
Class 1: Count-only	*	*	*	✓	✓
Class 2: SG-count only	*	*	*	✓	*
Class 3: PL-count only	*	*	*	*	✓
Class 4: Mass & PL-count	✓	✓	✓	*	✓
Class 5: Underspecifed	✓	✓	✓	✓	✓

The nouns under discussion in this section have patterned like all mass nouns except for the fact that they can be modified by stubbornly distributed predicates, which none of the other mass noun classes allowed. In addition, it is worth noting that these nouns, unlike canonical mass nouns, resist pluralization at all costs: while pluralization of canonical mass nouns is unacceptable with a substance interpretation but it is acceptable under a container or a kind interpretation, potentially suggesting count syntax (Borer 2005a; Ott 2011; Mathieu 2012; Mathieu and Dali 2021), pluralization of object mass nouns is always ungrammatical.

Object mass nouns: morphological complexity It is not uncommon to assume that object mass nouns are listed in the lexicon with the same underlying form that they surface with (Chierchia 1998a, 2010, 2021; Bale and Barner 2009; Rothstein 2010, 2017). Under this view, object mass nouns do not have a complex morphological structure: there is a root morpheme $\sqrt{\text{JEWELRY}}$ and that morpheme is mapped to the surface form *jewelry*. However, a closer examination of the data shows that a significant number of object mass nouns, if not all of them, is morphologically complex and falls under the umbrella of productive nominalization processes (De Belder 2011; Alexiadou 2015; Lieber 2004, 2016; Cohen 2020).

First of all, the root morphemes that participate in the class of object mass nouns also participate in the class of count nouns. In other words, the set of count noun roots overlaps with the set of object mass roots. As a result, languages with a productive class of object mass nouns tend to have doublets like the ones in Table 2.9, organized by the morphemes identified in Cohen (2020).

Table 2.9: count and object mass doublets in English

-ware		***-wear***		***-(e)ry***		***-age***		***-ing***	
Count	**Object Mass**	**Count**	**Object Mass**	**Count**	**Object Mass**	**Count**	**Object Mass**	**Count**	**Object Mass**
kitchen	kitchen-ware	foot	foot-wear	jewel	jewel-ry	bag	bagg-age	light	light-ing
table	table-ware	beach	beach-wear	drape	drap-ery	lug	lugg-age	carpet	carpet-ing
silver	silver-ware	day	day-wear	gadget	gadget-ry	word	word-age	bed	bedd-ing
gift	gift-ware	neck	neck-wear	image	imag-ery	sign	sign-age	pipe	pip-ing

Looking at the data in Table 2.9, we observe that the same root morpheme that is found in a count noun is also found in object mass nouns. This is a common pattern across all the 5 morphemes identified. Second of all, the data indicate an additional pattern: the count noun seems to serve as the base for the object mass noun, but not the opposite. This generalization seems too robust to be ignored.

Despite the fact that doublets are common and productive (Lieber 2016; Cohen 2020), it is not always the case that object mass nouns have a count noun counterpart. This is the situation with *furniture*, *cutlery* or *equipment*. There is no vocabulary item **furnish*, **cutle* or **equip* that means 'furniture piece', 'cutting tool' or *equipment piece*respectively. The lack of the count vocabulary item can thus be seen as a lexical gap in the

English lexicon. However, the fact that these prototypical object mass nouns lack a count noun counterpart does not entail that these nouns are morphologically simplex. In fact, vocabulary items like *furniture* and *cutlery* can be decomposed into smaller parts. In the case of the former, the surface form is related to expressions such as *furnish* (verb) and *furnishing* (gerund, noun): all three forms share a root $\sqrt{\text{FURNI(SH)}}$. Similarly, in the case of *cutlery*, the noun is related to the expression *cutlet* (noun) which is also related to *cut* (noun, verb): all three vocabulary items are related by virtue of sharing the same root $\sqrt{\text{CUT}}$. The situation with *equipment* is the same: *equip* (verb) and *equipment* both share the same root $\sqrt{\text{EQUIP}}$. Therefore, it does not seem unreasonable to hypothesize that these object mass nouns are also morphologically complex.[19]

It is also worth noting that some of the morphemes in Table 2.9 (namely *-age, -ing* and *-ery*) may give rise to (at least) two different types of object mass interpretations: (i) a collective interpretation, i.e. 'the collection of X-related things'; and, (ii) an eventive interpretation, i.e. 'the result of doing X or being an X'. The difference between the two has been typically argued to be due to the base to which the object mass morpheme attaches (Alexiadou 2015; Lieber 2016; Cohen 2020): the collective interpretation arises when the base is a noun, whereas the eventive interpretation arises when the base is a verb. As a result some object mass nouns may be ambiguous between the two: *carpeting* 'a collection of carpet-looking items' or 'the result of covering a surface with a carpet'.

The same sets of facts are found in Spanish as well. As seen in Table 2.10, there are several count-object mass doublets. In this case too, the count counterpart is less morphologically complex and the object mass noun seems to be built on top of it. Some morphemes, namely *-aje, -ería* are more productive.

As also observed in Table 2.10, the object mass affix may trigger suppletion on the root: *mueble*$_{\text{[count]}}$ 'piece of furniture' vs *mobil-iario*$_{\text{[object mass]}}$ 'furniture'; *cubierto*$_{\text{[count]}}$ 'piece of silverware' vs *cubert-ería*$_{\text{[object mass]}}$ 'silveware'. In addition, a subset of these object mass affixes can give rise to eventive interpretations. These

[19] We can think about the relation between these forms in parallel to the relation that exists between *sing(s)*, *singer*, *sang* and *song*: they are not lexical primitives, but are all related to the root $\sqrt{\text{SING}}$ (Embick 2015, p.18).

Table 2.10: count and object mass doublets in Spanish

-aje		*-ería*	
Count	**Object Mass**	**Count**	**Object Mass**
peón	peon-aje	joya	joy-ería
‘laborer’	‘collection of laborers’	‘jewel’	‘jewelry’
mestizo	mestiz-aje	chiquillo	chiquill-ería
‘mestizo’	‘collection of mestizos’	‘little kid’	‘collection of little kids’
equipo	equip-aje	cubierto	cubert-ería
‘outfit/utensil’	‘baggage’	‘silverware piece’	‘silverware’
hoja	foll-aje	piel	pele-tería
‘leave’	‘foliage’	‘fur’	‘furriery’

-mento		*-ado*		*-(i)ario*	
Count	**Object Mass**	**Count**	**Object Mass**	**Count**	**Object Mass**
arma	arma-mento	profesor	profesor-ado	mueble	mobil-iario
‘weapon’	‘weaponry’	‘teacher’	‘collection of teachers/faculty’	‘furniture piece’	‘furniture’
carga	carga-mento	accionario	accionari-ado		
‘load’	‘collection of goods’	‘shareholder’	‘collection of shareholders’		
equipo	equipa-miento				
‘outfit/utensil’	‘utensils’				

primarily include *-aje* ‘-age’ and *-mento* ‘-ment’. Thus, an object mass noun like the one in (68) may be ambiguous between the two interpretations described for English.

(68) arma-mento
weapon-MENT
Lit.: ‘weapon-ment’

Int.: ‘weapon-ry’

a. collection of weapons

b. the result or action of equipping with weapons

Based on these observations about the morphological form and the potential interpretive ambiguities that these object mass nouns may give rise to in English and Spanish, we can summarize the generalizations with the pretheoretical structural descriptions in (69).[20]

(69) a. $[[\underbrace{\sqrt{\text{ROOT}}}_{carpet}\ \text{COUNT}]\ \underbrace{\text{OBJECT MASS}}_{\text{-}ing}\ ] \rightsquigarrow$ 'collective'

b. $[[\underbrace{\sqrt{\text{ROOT}}}_{carpet}\ \text{VERB}\ ]\ \underbrace{\text{OBJECT MASS}}_{\text{-}ing}] \rightsquigarrow$ 'eventive'

As the generalizations illustrate, there is more structural complexity to object mass nouns than it is sometimes assumed; and certainly, the nouns of this class are more complex morphologically than the other subclasses of mass nouns described. In particular, (i) the possibility to morphologically decompose nouns belonging to this class and (ii) establishing a connection between count noun (and verb) bases and object mass nouns can shed some light on why these nouns show some degree of overlap between canonical mass nouns and count nouns.

An interesting hypothesis that we may entertain at this point, and that I will ellaborate more on in Chapter 3 Section 3.2.3 is that object mass nouns, at least on the collective interpretation, are always formed on top of count noun bases. That is, a morpheme like *-aje/-ery* etc. always requires a count nominal root as input. This intuition seems to receive support from the semantic interpretation of nouns when modified by QAs. As it has been observed (Bale and Barner 2009), and I will describe as well in Chapter 4, both plural count nouns and object mass must be measured along the same scale: *more jewelry* and *more jewels* are always interpreted in terms of cardinality. If object mass nouns are built on top of a count noun root, then we might have a potential avenue for explaining this parallel: the object mass noun inherits the count structure compositionally.

In addition, another potentially welcome consequence of this hypothesis is the relation between object mass morphemes and number inflection, which is generally hard to explain. If object mass noun morphemes

[20]For more details and similar cross-linguistic patterns, see De Belder (2011, 2013, for Dutch), Alexiadou (2015, for Greek) and Cohen (2020, for French, English and Hebrew).

require a count noun as input, and so does the projection hosting number morphemes, then both types of morphemes need the exact same requirement to be syntactically met. As a result, under this view one can think of the distribution of number morphemes and the object mass morpheme as complementary:[21] when you find one, you do not find the other. Thus, the unacceptability of plural-marking on object mass nouns can be modeled in terms of competition.

2.4 Taking stock

The data discussed so far has served to group nouns into two descriptively adequate categories based on a series of grammatical properties such as number-marking, numeral and adjectival modification, sensitivity to determiners and availability of *one*-substitution. Nouns that show all these are 'count' while those that do not allow any or most of these are referred to as 'mass'. Within 'mass', there are three classes: canonical or unmarked mass, plural mass and object mass. Regarding the last of them, the class shows some overlap with the class of count nouns; namely, stubbornly distributed adjective modification and the existence of count noun root counterparts from which they seem to be derived.

An empirical observation that can be formulated is concerned with being plural-marked and being count. It is summarized in (70).

(70) **The Plural-Count Generalization**

In some languages (e.g. English and Spanish) plural-marking on the noun does not entail count noun syntax.

The generalization captures the fact that plural count nouns are just a subset of pluralizable nouns. This generalization is consistent with Rothstein's (2021) observation that plural-marking on a noun is not contingent upon said noun being count, contrary to what is often presupposed, e.g. Chierchia (1998a, 2010). A

[21] I want to remind the reader that what I mean by 'complementary' is what phonologists refer to as 'overlapping' or 'parallel'. See footnote 1 in Chapter 1 for details.

conclusion from this is that the semantic effect that pluralization has (i.e. sum formation or grouping) needs to be separated from whatever grammatical mechanism is responsible for individuation or the introduction of discrete units that enable count syntax and semantics.

Related to this, we can also concentrate on the classes of nouns identified and their relation to number-marking and the surface form of QAs. This is summarized in Table 2.11.

Table 2.11: Number marking and choice of QA by noun type in English and Spanish

Type of N	**Langs.**	**Agreement**		**QA form**	
		SG	**PL**	**Unmarked** (*much/mucho*)	**PL-Marked** (*many/muchos*)
Canonical Mass	*English*	✓	*	✓	*
	Spanish	✓	*	✓	*
Object Mass	*English*	✓	*	✓	*
	Spanish	✓	*	✓	*
PL Mass	*English*	*	✓	✓	%
	Spanish	*	✓	*	✓
PL Count	*English*	*	✓	*	✓
	Spanish	*	✓	*	✓

Looking at Table 2.11, there is an important observation that deserve attention. There seems to be a very strong correlation between plural-marking as instantiated on the noun, plural agreement with the verb or DP-internally, and the surface form of the QA. I summarize this descriptive generalization, at face value, in (71).

(71) **The Plural-QA-markedness Generalization**

Overt plural marking on the noun

a. forces the QA to be plural-marked in Spanish, and

b. makes it possible for the QA to surface as *many* in English.

The generalization narrows down the contexts in which the more marked forms of QAs can be found: namely, when modifying plural count nouns and plural mass nouns. It is worth emphasizing that there is

a slight difference between the two languages discussed regarding whether markedness in the form of the QA is enforced or simply made possible, given the variation observed in English plural mass nouns (e.g. *much/*$^{?/\circ}$ *many suds*). Nevertheless, such variation can be indicative of the following: while inserting the marked vocabulary item is the default when the noun is plural-marked, failing to do so can be the result of impoverishment. In other words, a morphological rule deletes the relevant plural features before vocabulary insertion of the marked item (Bonet 1991, 2008; Arregi and Nevins 2007, 2012, 2013). Variation can thus be reducible to the availability, or lack there-of, of such a rule prior to vocabulary insertion.

The last set of generalizations is concerned with the selectional requirements that some determiners impose on the noun with which they occur. I summarize the descriptive generalizations in (72):

(72) **Determiner Selection Generalizations**

a. If a determiner is sensitive to the noun being count, it will be also sensitive to number features.

b. If a determiner is sensitive to plural-marking, it need not be sensitive to the noun being count.

c. There is no determiner that is exclusively sensitive to the noun being mass.

These generalizations capture the fact that determiners such as *every, each, several* in English or *todo(s), cada, varios* in Spanish track both the noun being count and it being number-marked. The statements in (72) also appropriately describe that this is not a bidirectional relation: there are determiners that show sensitivity to the noun being plural-marked but not necessarily to the noun being count (e.g. demonstratives, QAs, definite determiners in Spanish etc.). This is very much in line with the Plurality-Count Generalization in (70).

Last but not least, the findings lead to the conclusion that there is no determiner that occurs only with mass nouns. While some might argue that this is not entirely true of QAs given the *much/many* and *little/few* asymmetries (Borer 2005a; Solt 2009), by separating these QAs into a 'mass-only class' and the plural-count-only class respectively, we would loose an important language internal and also cross-linguistic generalization:

the strong correlation between *many/few* and plural-marking. Besides, if *much* requires a mass constituent, regardless of its label, it is unclear why in cases of imperfective telic predicates, which have been argued to roughly correlate with plural count nouns (Mourelatos 1978; Bach 1986a; Krifka 1989; Borer 2005a,b; van Geenhoven 2005; Wellwood et al. 2012), only *much* is acceptable. This is shown in (73).

(73) Barney ran to the store as {much/ *many} as Bill did.

In the next chapter, I propose a theory of individuation and number that derives the 4 morpho-syntactic asymmetries between the classes of count and mass nouns. The proposal also accounts for the descriptive generalizations put forth here. In fact, I will show that these empirical observations are rooted in more abstract morpho-syntactic properties of the nouns in question.

Chapter 3

A Theory of Individuation and Number for the Count-Mass Distinction

In the previous chapter, I surveyed different morpho-syntactic properties along which classes of nouns differed. These asymmetries included number-marking, modification by certain constituents, the choice of determiner and the type of ellipses available. The overall picture that emerged was one where 'being count' is grammatically marked. One of the most compelling pieces of evidence for this was *one/otro*-substitution, and the fact that determiners seem to track the noun being count, but no determiner seems to track the noun being mass. But what does it mean to have 'count' grammatical properties? Or vice versa, what does it mean to lack them? My answer to these questions in this chapter is that individuation and number are at the core of count-noun syntax. In particular, I propose that 'count' and 'mass' nouns differ along two critical dimensions, both of which are syntactically encoded:

- is the nominal root individuated or not?
- is Number projected in the syntax?

With respect to the first question, I propose that the presence of a feature [INDIVIDUATED] on the categorizer, the first syntactic node that an acategorial root adjoins to, is responsible for making discrete individuals as part of the extension of the root available. This feature is what will enable the root to enter a count syntactic frame including enabling Number to project. It is in Number where [SINGULAR] and [PLURAL] are merged (Ritter 1991). The contribution of these features is to mark the predicate as singular or plural. [SINGULAR]

will have the semantic effect of restricting the denotation of the noun to a singleton set of those discrete individuals (Krifka 1989; Gillon 1992; Rothstein 2004; Harbour 2007, 2011); in contrast, [PLURAL] will restrict the denotation to non-singletons, i.e. sums of discrete individuals (Link 1983; Krifka 1995; Schwarzschild 1996; Sauerland 2003; Rothstein 2004; Harbour 2007, 2011). What makes a noun 'count' is the both being marked for [INDIVIDUATED] and [SINGULAR/PLURAL] (i.e. having Number). I will show that most of the asymmetries here described fall out from projecting Number, including, but not limited to, modification by numerals and Stubbornly Distributive adjectives.

In contrast, being 'mass' is better understood as the lack of count properties, in particular a Number projection hosting [SINGULAR/PLURAL]. This claim entails that the while nouns like *dregs* must have a plural feature, the location of said feature cannot be the same as in count nouns. The data from noun-noun compounds is strong evidence for the different source of plural-marking. Despite their not having a Number projection, I will further show that mass nouns differ in whether or not they are marked for [INDIVIDUATED]. That is, while canonical mass nouns and plural mass nouns lack the [INDIVIDUATED] feature, and thus discrete individuals, object mass nouns will be specified as [INDIVIDUATED]. This feature is, I propose, what they share in common with count nouns.

Unlike plural count nouns, however, object mass nouns will be not singular or plural-marked because they do not project Number. Instead, they will be composed of a feature that I call [COLLECTIVE]. Such a feature will be spelled out as *-ery, -ment, -age, -ware* on a root-by-root basis and be located on an outer head that competes with Number to satisfy its selectional requirements. The insight is that object mass nouns are morpho-syntactically complex objects which are built on an individuated constituent. I argue that this explains why languages have count-object mass doublets (e.g. *jewel-jewelry*, *leaf-foliage* or the Spanish counterparts *joya-joyería*, *hoja-follaje*) and why these object mass nouns cannot be plural-marked. Given that both plural count nouns and object mass nouns are countable, (i.e. measured along a cardinality scale)

and they are [INDIVIDUATED]-marked, we can conclude that what makes an NP countable is the presence of this feature.

In what follows, I spell out the pieces of theory in detail. Then, I move on to argue how the theory derives the morpho-syntactic asymmetries described and generalizations identified. When relevant, I will also show that the theory makes important predictions, which I argue are borne out.

3.1 The Proposal

3.1.1 Some necessary basics

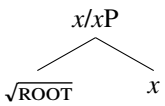
I am assuming a generative approach to syntax as outlined by Chomsky (2000, 2001, 2008) and subsequent work, in tandem with the Distributed Morphology model (Halle and Marantz 1993; Marantz 1997; Embick and Noyer 2001; Embick 2007, 2010, 2015; Embick and Marantz 2008; Bobaljik 2012; Harley 2014). Under DM, the terminal nodes provided and manipulated by the syntax are simply bundles of features. These features may be interpretable or uninterpretable features. The interpretable features will be notated as [F] and will have semantic import on the terminal that bears them. Uninterpretable features will be noted as [*u*F]. *u*Fs can themselves be unvalued or inherently valued (Pesetsky and Torrego 2007): [*u*F:_] ~ [*u*F: *val*].

I further assume that all syntactic operations, including Merge and Move, are feature driven (Svenonius 1994; Adger 2003; Pesetsky and Torrego 2006; Heck and Müller 2007; Müller 2010; Folli and Harley 2020, a.o.). I will represent c-selectional requirements as [•F•] when relevant. Following Adger (2003, p.67), I assume that this c-selectional feature is checked under sisterhood: a feature [•F•] on a syntactic object Y is checked when Y is sister to another syntactic object Z which bears a matching feature F. I will assume that movement of a constituent α to a position β is triggered when an EPP feature is associated with an unvalued feature; also following Adger (2003), I will represent such a movement-triggering EPP property with a '*' on [*u*F].

Following Chomsky (2000) and others, I will assume that there is an operation called Agree between a probe (with unvalued features) and a goal (with a feature that matches the probe's). I further assume, as it has become standard in the literature on Agree, that it involves a two-step process (Benmamoun et al. 2009; Bhatt and Walkow 2013; Arregi and Nevins 2012; Smith 2021): (i) a matching operation establishing a link between the probe and the goal; and (ii) a copying operation, according to which the values of F on the goal are copied onto the unvalued *u*F counterparts that have been previously matched.

Lexical categories such as noun, verb, adjective etc. are decomposed into a category-neutral terminal, i.e. the $\sqrt{\text{ROOT}}$, and a category-determining head, e.g. *n, v, a*. These two terminals form a complex head the label of which is provided by the categorizer (Marantz 1997, 2001; Arad 2003; Levinson 2007, 2014; Embick 2010, 2015; Folli and Harley 2020). From now on, I will represent this complex head as in (1).

(1) Complex head: $\sqrt{\text{ROOT}}$ + categorizer *x*



After spell-out, at PF, the feature bundles on the terminals are mapped to an exponent via Vocabulary Insertion (VI) rules, which are subject to competition as mediated by the Subset Principle (Kiparsky 1973). Following the notation from Embick (2015), VI rules have the format in (2).

(2) VI rule format

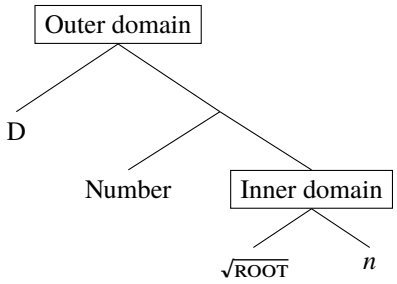
α[F] $\Leftrightarrow$ *X*/__β 'Map F on α to vocabulary item X in the context of β'

α is the syntactic category of the terminal; [F] is the relevant feature or feature bundle on the terminal node; *X*, to the right of the bidirectional arrow, represents the phonological form, i.e. the exponent; and the slash '/' indicates the context of application, which may be more or less specific (see Moskal 2015; Moskal and Smith 2016).

3.1.2 The active players: Individuation and number

It is generally assumed in DM-based approaches that there are two distinct domains for the computation of morphological and semantic processes: an "inner" domain and an "outer" domain. The former is tied to morphological and lexical irregularity or idiosyncrasies (e.g. idiomatic/inherent meanings, root-suppletion etc.), and the latter is tied to morphological and semantic regularity (e.g. regular inflection). The consensus in the literature is that the inner domain is located within the *n*P, i.e. categorizers and below, whereas the outer domain is characterized by functional projections above *n*P, i.e. Number or D, (Marantz 2001, 2013; Arad 2003; Embick 2010; Harley 2014; Wood 2016, 2023): Figure 3.1.

Figure 3.1: Inner vs. outer domains within nominals



I propose that a theory of the count-mass distinction must make reference to at least two types of features, whose syntactic and semantic contribution must differ: individuation and number. We can think of the individuation feature as a sort of classificatory feature: when applied to a root, they will determine whether the root has discrete individuals or not, i.e. atoms.[1] As a result, I assume that this feature must be located within the inner NP domain. In particular, building on insights from Bale and Barner (2009), I propose that the categorizing *n* head that roots occur with determines whether the nominalized root, i.e. $\sqrt{\text{ROOT}} + n$, is or not individuated. Thus, the categorizing *n*s that roots may combine with come into two "flavors", illustrated in (3).

[1] I will refrain from using terms such as 'atom' in this part of the dissertation. For now, it is enough to say that the [IND] feature on *n* makes discrete units available. In technical semantic terms, this means that *n* imposes a semi-lattice on the root that is closed under sum and generated from the set of atoms: if $\text{atom} = \{a, b, c\}$, then $^{*}\text{atom} = \{a, b, c, ab, ac, bc, abc\}$.In Chapter 4, I provide formal definitions for atom and individuated semi-lattice.

(3) Count vs. mass *n*

a. *n*[IND(IVIDUATED)]

b. *n*

One flavor of *n* is specified as [IND], and the other flavor of *n* is underspecified. The role of [IND] on *n* is to perform individuation, understood as described above. That is, it will make available discrete, i.e. individually separable and distinct, elements that can be later on counted. In the absence of such a feature, the nominalized root will simply be underspecified for individuation and will lack separable countable elements. In a nutshell, [IND] makes the NP countable; lack of [IND] makes the NP non-countable.[2]

The presence of the [IND] feature on *n* is conceptually justified. The count-mass distinction is in many ways idiosyncratic, and generally considered a "lexical" property; [IND] is within the inner nominal domain identified in Figure 3.1, which is responsible for such idiosyncrasies. What is more, for the class of nouns that allows a singular-plural contrast, it makes sense that a noun is first set to being count by bearing [IND] and then number-marked, as opposed to the other way around.

The feature is also empirically justified. First, some roots may appear as count in some contexts or mass in others, and viceversa, a property that we can attribute to the type of *n* that the root adjoins to in the syntax. Second, only count nouns (regardless of their number specification) can undergo *one*-substitution; having a feature that is sensitive to the two classes of nouns can facilitate modeling of this ellipsis asymmetry. Third, determiners are sensitive to the noun being count, thus making [IND] (in addition to Number) a possible goal for probes on determiners to enter an Agree relation with. Moreover, having this feature helps us establish a structural and formal parallel between object mass nouns (e.g. *jewelry*) and count nouns (e.g. *jewel*); namely, they both are both individuated, specified as [IND]. Despite this commonality, they must differ in some respect.

[2]The presence or absence of [IND] is similar to Borer's (2005) presence or absence of division: If [IND]/DIV is present, the NP is countable; if it is absent, the NP is non-countable.

Besides [IND] on *n* making the basic distinction between count and mass, I assume that there are two number features: [SG] for singular and [PL] for plural. The location of number features has been argued to vary across and within languages (Alexiadou 2004, 2015; Acquaviva 2008, 2016; Wiltschko 2008, 2021; Kramer 2016; Kouneli 2020), a view commonly referred to as 'split number': lexical or idiosyncratic plurals are located in the inner NP while regular plurals are located in the outer NP domain. Even in languages like English and Spanish, the encoding of number might vary on structural height depending on the class that the noun belongs to. Thus, building on the insights from the prior literature and the observations from the previous chapter, I assume that number features, and specifically plural, might be located on two different syntactic positions: *n* and Number. The former will be the source of lexical and idiosyncratic plurality and need not depend on the *n* being [IND]. This is for example the source of plural-marking on mass nouns. In contrast, I assume that the latter head, i.e. Number, which is above *n* and below D (Ritter 1991; Cowper 2005; Wiltschko 2008; Harbour 2011), is the source of regular singular/plural-marking. This head, I propose, requires complementation by an *n*P specified as [IND]. I encode this with the feature [•IND•] on the Number head.

Despite the differing location, I assume that the meaning of Number features is uniform: [SG] maps a noun to a singularity, i.e. a singleton set of discrete atoms; [PL] maps the noun to a plurality, i.e. non-singletons or sums of discrete atoms. Although the contribution of these number features does not differ depending on the syntactic position, the syntactic (and semantic) input on which they operate will: namely whether the *n*P is or not individuated.

Last but not least, I propose that we need an additional feature which I call [COLL(ECTIVE)] which will be relevant for object mass nouns. Corbett (2000) uses the label 'collective' to refer to nouns denoting a group whose members are conceived of as a unit. He goes on to point out that the members of the collection or group share something in common (what Corbett 2000, p.141 refers to as 'the cohesion of a group'). This is intuitively accurate for the case of object mass nouns. For instance, if we think about what it means

for something to qualify as 'jewelry', we can intuitively say something along these lines: jewelry is a collection/plurality of items that are canonically made from or contain jewels.[3] Similarly, 'footware' can be thought of as 'a collection of items that are worn by someone's feet'. Given the derivational nature of object mass nouns and the observation that these nouns are derived from count noun bases (and in some cases verbal ones), I assume that the feature is located on a nominalizer. However, just like Number, I take *n*[COLL] to require complementation by an *n*P specified as [IND]: [•IND•]. Semantically, the semantic role of this feature is to create a plurality of sorts.

We can summarize the pieces of the theory outlined here as follows:

- Count NPs are [IND]-marked and [SG/PL]-marked (i.e. they have Number)
- Mass NPs lack Number, but may be [IND]-marked.
- There are two number features: [SG/PL].
- [PL] may be located on *n* or on Number. This head requires an [IND] complement.
- *n*[COLL] generates object mass nouns collections (i.e. pluralities) out of [IND] *n*Ps.
- Both *n*[COLL] and Number select for an [IND] complement.

In what remains of the chapter, I will argue the generalizations presented for count and mass nouns can be derived by the interaction of these features with other more general properties of nominal morpho-syntax. By the end of the chapter, we will have the typology of nominal classes that can be summarized as in Table 3.1.

As indicated in the Table 3.1, the three types of mass nouns share in common the fact that they lack Number. In addition, canonical and plural mass form a natural class with respect to the lack of [IND] on the

[3] In the article *This Guide to Jewellery Production* by Dauvit Alexander, the author, a professional jeweler, states the following: "Jewellery is broadly defined as "ornament for the body [...] the majority of jewellery can be described as being wearable ornaments, often made from high-value materials such as precious metals and gemstones" (https://make.works/blog/guide-to-jewellery). Besides, if we look at what is a dictionary definition of 'jewel', Cambridge English Dictionary online defines it as follows: 'a precious stone that is used to decorate valuable objects' (https://dictionary.cambridge.org/us/dictionary/english/jewel). Thus, we can think of the 'made of/contains jewels' relation as the cohesion of the *jewelry* group.

Table 3.1: Typology of features for the mass-count distinction

		n_1	n_2	Number	Example
Mass	*canonical*	Ø	*	*	'water', 'salt'
	plural	[PL]	*	*	'suds', 'dregs'
	object	[IND]	[COLL]	*	'jewelry', 'footware'
Count	*singular*	[IND]	*	[SG]	'jewel', 'foot'
	plural	[IND]	*	[PL]	'jewels', 'feet'

nominalizer. The approach also captures the similarity between object mass nouns and count nouns: they are all [IND]. The two classes, however, differ in whether or not they project Number or an additional *n* layer. Count nouns project Number and are thus singular or plural-marked; object mass nouns project an additional nominalizer. These heads seem to be in complementary distribution.

3.2 Analysis

One set of the morpho-syntactic generalizations that need to be accounted for was summarized in Table 2.7, repeated below. This section is dedicated to these properties. I will start first by establishing the baseline comparison of the (singular/plural) count vs. canonical mass nouns. Then, I will move on to each of the other two classes, namely plural mass nouns and object mass nouns.

2.7: Morpho-syntactic properties of all mass & count nouns (final version)

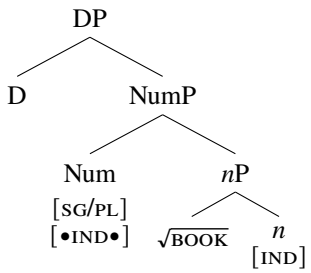
	Canonical Mass	PL Mass	Object Mass	Count
SG/PL distinction	*	*	*	✓
Direct modification by numerals	*	*	*	✓
Modification by Stubbornly Distributed Predicates	*	*	✓	✓
Number mismatches under ellipsis	NA	NA	NA	✓
one/otro-substitution	*	*	*	✓

3.2.1 Count vs. canonical mass

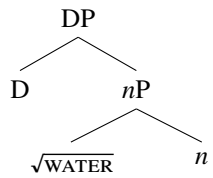
The first asymmetry to be accounted for between count and canonical mass nouns is the availability of overt plural-marking on the former. I propose that this difference falls out from the fact that count nouns always project NumP while mass nouns, disregarding the container/kind reading for a moment, never do.[4] This is in line with previous proposals such as Borer (2005a); Harbour (2007, 2011); Dali and Mathieu (2021) among others for which mass nouns are syntactically more impoverished than count nouns. The basic structure of count and canonical mass nouns is thus as in (4).

(4) The basic syntactic structure for count and canonical mass nouns

a. Singular/Plural Count



b. Canonical Mass



Count nouns have the structure in (4a). The root adjoins to a categorizing *n* that is specified as [IND]. This will introduce discrete individuals in the extension of the noun root. Number requires complementation by [IND], as indicated by the bullet feature, which is satisfied upon merger. Number then projects on top of *n*P. This ensures obligatory number marking in count nouns in languages like Spanish or English. Depending on the feature specification on Num, the noun will be marked singular, e.g. [SG], or plural, e.g. [PL].

The syntax of mass nouns in (4b) is different from that of count nouns in (4a) in two respects. First, the *n* is underspecfied for individuation, which entails that no discrete individuals are introduced. Second, mass nouns lack NumP; and, as a result they cannot be overtly pluralized and maintain their mass interpretation.

[4] In Section 4.4.1, I discuss how to account for shifts between the class of count and mass NPs.

We can attribute the failure to pluralize to the c-selectional requirement on Number: merger of Number on top of the underspecified *n* will not satisfy Number's c-selectional requirement.

We can attribute modification by certain elements such as numerals and Stubbornly Distributive adjectives to the presence of [IND] and Number. If we look at word order patterns, we observe the following: (i) Stubbornly Distributive adjectives precede classificatory adjectives, which are adjoined low in the structure (Alexiadou et al. 2007; Svenonius 2008); (ii) numerals precede both types of adjectives; and Determiners, including possessors, must precede everything. This is shown in (5) for English.

(5) Word orders

a. D > # > Stubbornly Distributive A > Classificatory A > N

{The/ John's/ These} five big Spanish books.

b. D > # > Classificatory A > Stubbornly Distributive A > N

* {The/ John's/ These} five Spanish big books.

c. D > Stubbornly Distributive A > # > Classificatory A > N

* {The/ John's/ These} big five Spanish books.

d. # > D > Stubbornly Distributive A > Classificatory A > N

* Five {the/ John's/ these} big Spanish books.

The data in (5) illustrates that the only possible DP-internal word order when there are multiple modifiers and determiners (or D-like elements) must be as in (5a). In fact, any deviation from that order results in unacceptability. I take the strict order in (5a) to be the result of the structural height at which the different modifiers are introduced. Namely, classificatory adjectives must be introduced lower than Stubbornly Distributive adjectives, which must be introduced lower than numerals. Determiners, demonstratives and possessors occupy the highest part of the DP.

The situation in Spanish is very much the same, with the caveat that adjectives are generally postnominal while numerals are prenominal. Stubbornly Distributive adjectives have to occur further away from the noun than classificatory ones. The reversed order is unacceptable. These patterns are shown in (6).

(6) Word orders for Spanish

a. D > # > N > Classificatory A > Stubbornly Distributive A

Lo-s cinco libro-s español-s grande-s
the.M-PL five book.M-PL Spanish-PL big-PL
'The five big Spanish books'

b. D > # > N > Stubbornly Distributive A > Classificatory A

* Lo-s cinco libro-s grande-s español-s
the.M-PL five book.M-PL big-PL Spanish-PL
'The five Spanish big books'

While Stubbornly Distributive adjectives are generally postnominal, they may occur prenominally in which case they must always follow numerals, as in (7). Thus, the word order facts resemble those for English.

(7) a. D > # > Stubbornly Distributive A > N > Classificatory A

Lo-s cinco grande-s libro-s español-s
the.M-PL five big-PL book.M-PL Spanish-PL
'The five major Spanish books'

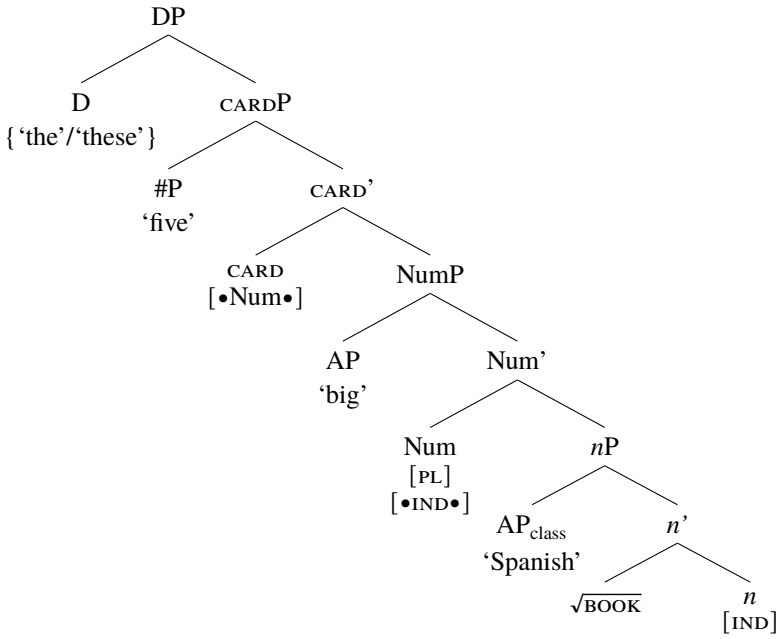
b. D > Stubbornly Distributive A > # > N > Classificatory A

* Lo-s grande-s cinco libro-s español-s
the.M-PL big-PL five book.M-PL Spanish-PL
'The major five Spanish books'

I take these sets of facts as evidence for the following. Classificatory adjectives are adjoined to the domain of class, which is the lowest in the structure (Alexiadou et al. 2007; Svenonius 2008; Wiltschko 2014; Dékány 2021), i.e. *n*P. Given the interaction of Stubbornly Distributive adjectives with number and

individuation, I propose that these must be adjoined higher than the lower *n*P (Cinque 2005, 2010; Svenonius 2008; Deal 2017; Dékány 2021). In particular, when modifying count nouns, they are adjoined to NumP. Numerals are introduced by their own functional head, which I label here as CARD(inlaity) after Scontras (2013). Finally, determiners and demonstratives are introduced as D heads, and possessives are located in D's specifier position (Abney 1987; Corver 1990). The full DP structure for count nouns is in (8).[5]

(8) The articulated structure for count nouns



Not only does this structure derive the desired word order between DP-internal constituents, but it also accounts for why Stubbornly Distributed adjectives are unnaceptable with mass nouns: mass nouns lack a NumP domain and adjunction to that position is therefore precluded. This is very much in line with Deal's (2016a; 2017) analysis of Nez Perce: classificatory adjectives are structurally closer to the nominalized root than Stubbornly Distributed adjectives, which require additional structure making the noun count.[6] In addition, it is consistent with the observation that (some) Stubbornly Distributive adjectives require the presence

[5]I assume that the postnominal position of adjectives in Spanish in (6) and (7) may be achieved via head movement of the *n*/*n*P to a higher projection, as proposed by Cinque (2005, 2010) for instance; or by assuming that the directionality of adjunction differs between English and Spanish.

[6]For Deal (2016a, 2017), this is achieved via a covert functional head above *n* and below Number, where she assumes PL is merged.

of overt classifiers, whose distribution is sometimes paralleled to that of Number (Borer 2005a; Cowper and Hall 2014). Examples include Hungarian in (9) from Dékány (2021) or Teochew, Southern Min in (10), adapted from Biggs and Zhuosi (2022).

(9) *Hungarian*

a. két nagy szem alma
two big CL$_{eye}$ apple
'two big apples'

b. * két szem nagy alma
two CL$_{eye}$ big apple
Int. 'two big apples'

c. két vekni meleg kenyér
two CL$_{loaf}$ warm bread
'two warm loaves of bread'

d. * két meleg vekni kenyér
two warm CL$_{loaf}$ bread
Int.: 'two warm loaves of bread'

(10) *Teochew, Southern Min*

a. Hi sa go dua *(-go) gai tun
that three CL big A.CL N.MOD candy
'those three big pieces of candy'

b. Hi sa go sio (* -go) gai tun
that three CL hot A.CL N.MOD candy
'those three pieces of hot candy'

In both Hungarian it is dimensional adjectives (e.g. size and shape), which are lower than numerals, that must precede the classifier: (9a) vs. (9b). Others like *warm* must follow the classifier: (9c) vs. (9d). Similarly, in Teochew, Southern Min dimensional adjectives require the obligatory presence of the classifier following the adjective, e.g. (10a); but non-dimensional adjectives are ungrammatical with the classifier, e.g. (10b). Dimensional adjectives are a very common type of Stubbornly Distributive adjectives, thus data like (9) and (10) strengthen the argument that there is a structural connection between Number and the position of these adjectives.

The syntax in (8) is also consistent with analyses that have located numerals higher than Number but lower than D, e.g. Pancheva (2021, 2022); Toquero-Pérez (2023a). What is more, we can assume that, at

least for the languages analyzed here, the CARD head is sensitive to there being a NumP. [7] This requirement is enforced by the selectional feature [•Num•] on the CARD head.

There is an additional welcome consequence of this structure regarding classificatory adjectives. These adjectives are acceptable with mass nouns. In fact, when more than one adjective of this class co-occurs, the order is not fixed, as shown in (11). These facts can be accounted for under the assumption that there are no ordering restrictions between adjuncts of the same XP (Alexiadou 1997; Cinque 1999), i.e. *n*P in this case.

(11) a. Mineral sparkling water Sparkling mineral water

b. Agua gasificada mineral Agua mineral gasificada
water carbonated mineral water mineral carbonated
'Carbonated mineral water' 'Mineral carbonated water'

Before proceeding any further, it is necessary to locate the syntactic position that QAs occupy in the DP. This will be relevant when discussing ellipsis and *one/otro*-substitution. With count nouns, QAs must occur higher than Stubbornly Distributive adjectives, but lower than D given the facts in (12).

(12) Word orders with QAs for count nouns

a. D > QA > Stubbornly Distributive A > N

i. The many big books

ii. Lo-s mucho-s grande-s libro-s
the.M-PL much.M-PL big-PL book.M-PL
'The many major books'

b. D > Stubbornly Distributive A > QA > N

i. * The big many books

ii. * Lo-s grande-s mucho-s libro-s
the.M-PL big-PL much.M-PL book.M-PL
'The major many books'

[7] In Chapter 5, we will see further evidence from Alasha Mongolian supporting the hypothesis that Stubbornly Distributive adjectives are located in the NumP domain.

c. QA > D > Stubbornly Distributive A > N

i. * Many the big books

ii. * Mucho-s lo-s grande-s libro-s
much.M-PL the.M-PL big-PL book.M-PL
'Many the major books'

In the case of mass nouns, QAs must enter the structure higher than classificatory adjectives, as in (13). In Spanish classificatory adjectives are always postnominal, and thus the datapoint has not been included because it is not relevant.

(13) Word orders with QAs for mass nouns

a. QA > Classificatory A > N

Too much mineral water

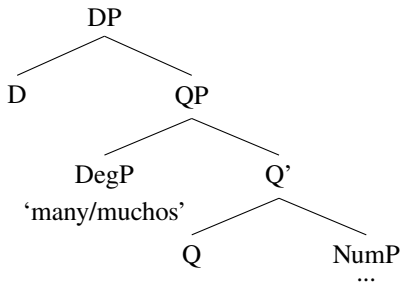
b. Classificatory A > QA > N

* Mineral too much water

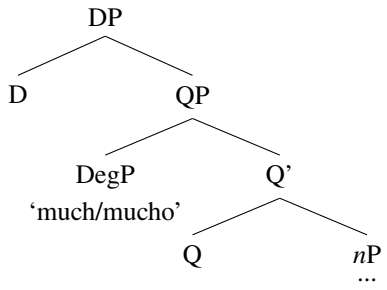
Considering these distributional facts, we can conclude that QAs are higher than NumP in the case of count nouns because they must precede Stubbornly distributed adjectives and are sensitve to the noun being plural-marked. In the case of mass nouns, they must be located higher than the *n*P level at which classificatory adjectives are adjoined. I propose that QAs are merged in the specifier position of a Q-head above NumP for count nouns and above *n*P for mass nouns. This is schematically represented in (14).

(14) The position of QAs

a. Count DPs



b. Mass DPs



The next pieces of data that need to be accounted for involve ellipsis. Namely, we observed that count nouns allowed deletion of the NP under identity. QAs and numerals determine the boundary of the ellipsis site, i.e. they are always remnants. The target of the ellipsis and the antecedent of the ellipsis need not match in number, though. It is generally argued that for ellipsis to allow feature mismatches, the relevant feature has to be outside of the ellipsis site (Merchant 1999, 2004, 2014; Saab 2010; Bobaljik and Zoca 2011; Lipták and Saab 2014; Ranero 2021). I assume insights from Merchant (1999), Aelbrecht (2010) and others that ellipsis marking takes place in the syntax and it is performed by the licensing of a feature [E] to the relevant node and everything that node dominates.[8]

Given the syntactic structure advocated for count nouns in this chapter, I propose that the Q or CARD heads are responsible for licensing ellipsis of their complement. In particular, I propose that there are three possible ellipsis options depending on (i) what licenses ellipsis, (ii) what constituent is marked for ellipsis, and (iii) how the ellipsis-marked constituent is exponed at the time of Vocabulary Insertion. The three options, that I will discuss in turn, are as follows: Option A is the deletion of the Number projection licensed by the functional head introducing QAs or numerals; Option B is the deletion of *n*P licensed by the head introducing

[8]For the purpose of this dissertation, it is not fully relevant how the licensing condition is performed. For Aelbrecht (2010), for example, the relation between licensor and ellipsis site is established via Agree. For other proposals see Rudin (2019); Ranero (2021); Stigliano (2022).

QAs in its specifier; Option C is the replacement of the [IND]-marked *n*-head for *one* in English or *otro* in Spanish in the presence of Number. These are summarized in Table 3.2.

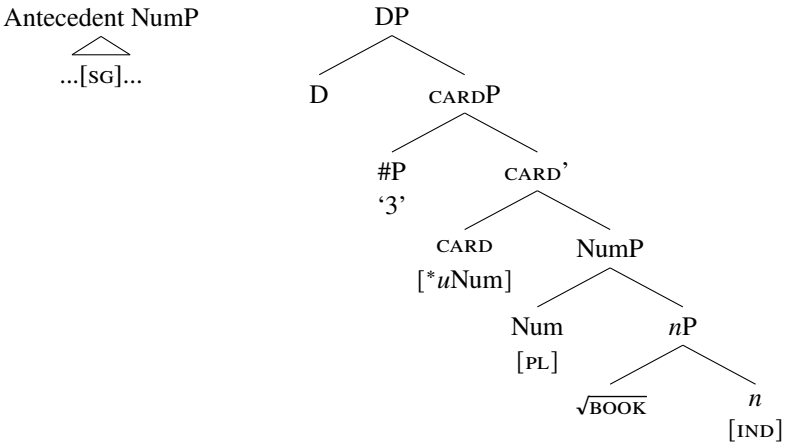
Table 3.2: Ellipsis options: licensors, [E]-bearers and exponence

	Licensor		**[E]-bearer**		**Exponent**
Option A	Q/CARD	→	NumP	→	Ø
Option B	Q	→	*n*P	→	Ø
Option C	Num	→	*n*[IND]	→	*one/otro*

For Option A, the derivation must proceed as follows. When the licensor, in this case Q or CARD, is merged into the structure, Num will undergo head movement onto it.[9] This is how we ensure that the Num head is outside of the ellipsis site. The licensor will then assign NumP, and everything NumP dominates, with an [E] feature. The derivation is shown in (15), where [**u*Num] is a head-movement triggering feature in the spirit of Adger (2003); Folli and Harley (2020). After spell-out, at PF, anything that bears the [E] feature will be mapped to a zero morpheme via the VI rule in (15e).

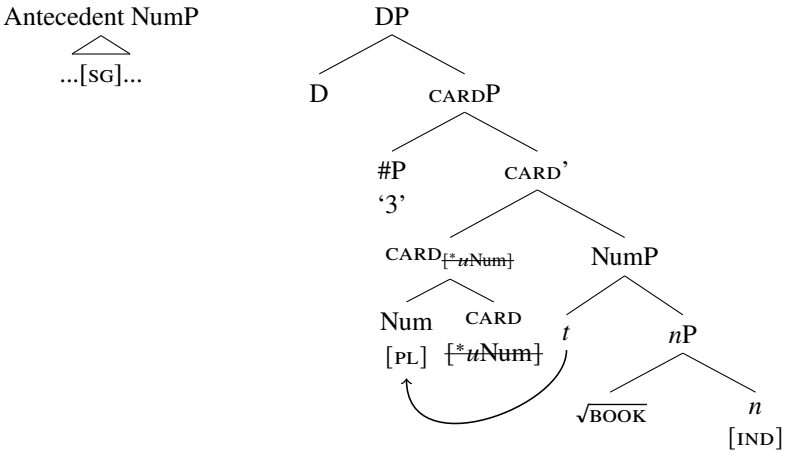
(15) Deriving Number mismatches under ellipsis, e.g. (16) and (20) from Chapter 2

a. The baseline: *one book...three books/ un libro...tres libros*

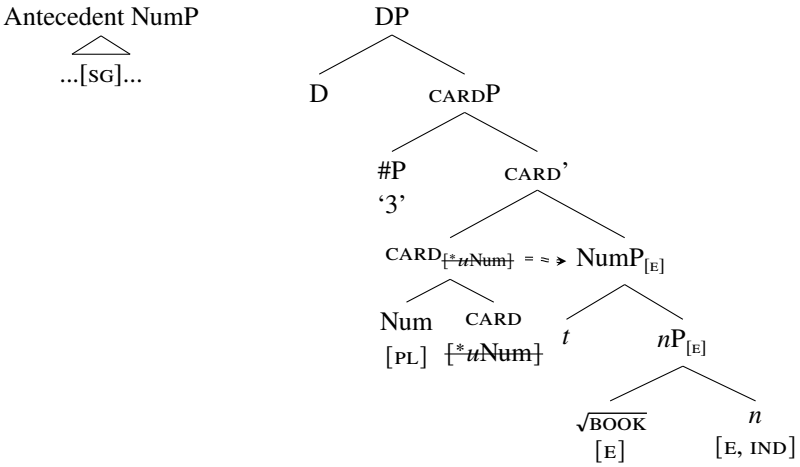


b. Head movement of Num onto CARD

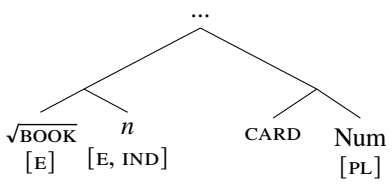
[9] For a proposal in which movement triggering features must be checked or satisfied before ellipsis-triggering features see Stigliano (2022).



c. [E] licensing to NumP



d. The structure after spell-out



e. Vocabulary Insertion rule for Non-pronunciation of [E]-marked terminals

α[E] ⇔ Ø ‘Map any terminal α with the feature [E] to Ø’

As shown in (15a), the antecedent and the target of the ellipsis mismatch in number (e.g. singular vs. plural). The head-movement triggering feature forces the Num[PL] head to incorporate onto CARD, illustrated

in (15b). Next in (15c), CARD licenses the [E] feature to its complement NumP. As a result, anything that NumP dominates is marked for ellipsis as well. The relevant spelled-out structure, after terminal node linearization, is in (15d), where the root and *n* terminals are [E]-marked. At the point of Vocabulary Insertion, any [E]-marked terminal node will be subject to the general rule in (15e): the root and the *n* head are exponed as zeros.

I have illustrated the ellipsis facts with a numeral, but the situation is identical with a QA. The only difference is that instead of dealing with CARD as a licensor and numerals as remnants, we are dealing with Q as a licensor and QAs as remnants.

The proposal that what undergoes ellipsis with count nouns is NumP makes the following prediction: Stubbornly Distributive adjectives in spec,NumP must not survive ellipsis. If anything dominated by NumP undergoes deletion, and these APs occupy the specifier of NumP they will be no exception. The data in (16) from English and (17) from Spanish indicate that the prediction is borne out.

(16) Al bought one big book ...

a. and Mary bought {many/ five} ~~big books~~.

b. * and Mary bought {many/ five} big ~~books~~.

(17) Juan compró un libro grande ...
Juan bought one big book

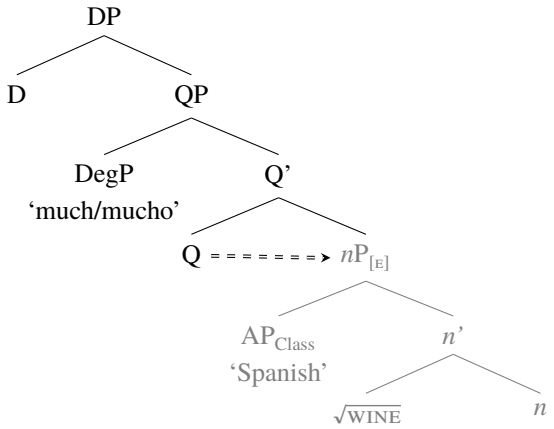
a. y María compró { mucho-s/ tres} ~~libro-s~~ ~~grande-s~~
and María bought much.M-PL three book-PL big-PL
'and María bought {many/ three} ~~big books~~'

b. * y María compró { mucho-s/ tres} ~~libro-s~~ grande-s
and María bought much.M-PL three book-PL big-PL
'and María bought {many/ three} big ~~books~~'

In both English and Spanish, it is possible to utter (16a) and (17a) with the meaning that the 'many/three books Mary bought were also big books'. Failure to elide the Stubbornly Distributive adjective results in ungrammaticality, as the *b*-counterparts show.

Turning to mass nouns, they instantiate Option B in Table 3.2. The lack of number mismatches under ellipsis follows from them not projecting NumP. Nevertheless, mass nouns can undergo ellipsis under identity when there is a QA like *much* in the structure. This was shown with examples like English (17) and Spanish (21) in the previous chapter. Given the proposal, this can be explained if the Q-head that introduces *much* in its specifier licenses ellipsis of its *n*P complement. Evidence for *n*P ellipsis comes from the fact that classificatory adjectives cannot survive the ellipsis, as the continuations to (17b) and (21) in (18) and in (21b) from Chapter 2 respectively indicated. This follows from the proposal: (i) classificatory adjectives are adjoined to *n*P, and (ii) any node dominated by the [E]-marked *n*P is mapped to a zero exponent by the rule in (15e). The relevant structure is provided in (18) where the shaded parts indicate what undergoes deletion, or more accurately zero-exponence.

(18) Mass *n*P ellipsis



The last piece of data that needs to be derived concerns *one/otro*-substitution, i.e. Option C in Table 3.2. Given the sensitivity of these proforms to the noun being count, and the fact that classificatory adjectives must survive what is being substituted, I hypothesize that *one/otro*-substitution targets the *n*[IND] head. Building on insights from Harley (2005), I propose that 'substitution' is in fact the insertion of a non-zero exponent on *n* when a VI rule that is more specific to the one in (15e) wins over. The rule is given in (19).[10]

(19) n[E, IND] ⇔ {*one*/ *otro*}/__Num

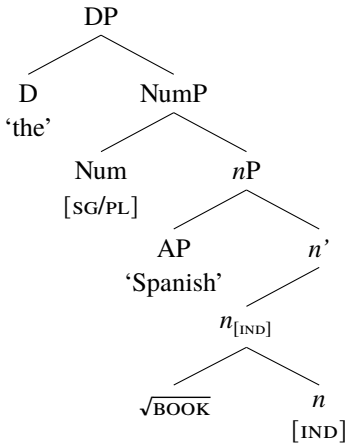
[10]For Harley (2005), the relevant feature on the elided and substituted constituent is [+Identity].

'Map the terminal *n* terminal node with the bundle [E, IND] to vocabulary item *one* (in English) and *otro* (in Spanish) in the context of Number'

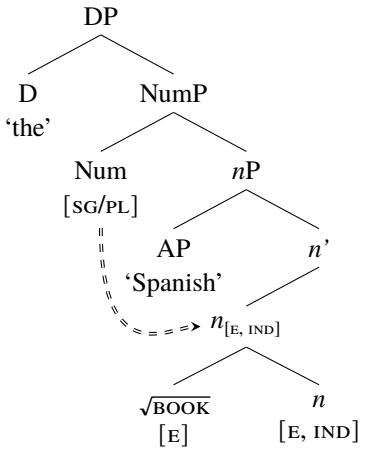
Since the ellipsis site is smaller than in canonical NP-ellipses, I assume that what licenses *one/otro*-substitution is the Number head, and what is [E]-marked is the *n*[IND] head rather than the full *n*P.[11] This accounts for why classificatory APs, located in Spec,*n*P, are outside of the domain of *one/otro*-substitution. The step-by-step derivation of examples involving *one/otro*-substitution is provided in (20).

(20) *the French book on the table and the Spanish one(s) on the shelf*

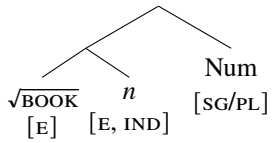
a. *n* and the root are a complex head



b. [E]-licensing to *n*



c. The structure after Spell-Out



The structure in (20a) is what the syntax puts together via merger of the different terminals: [*n* √ROOT] is a complex head projecting the label *n*; the classificatory adjective is introduced in the specifier position of *n*P; and Number takes the *n*P as its complement given its complementation requirement. The next step is for Num to license ellipsis to its complement's head. As a result, everything dominated by *n* is [E]-marked: this includes the *n*[IND] itself, and the root as shown in (20b).

[11] There seems to be variation as to whether full XPs or smaller constituents within XP can be targeted for ellipsis. Arguments for this parametrization can be found in Bošković (2014). It is not unreasonable to think that different heads might have distinct scope in their availability to license ellipsis: some might license ellipsis of their complement while others might only be able to target the complement's head.

After Spell-Out, and linearization of terminals, the structure is as in (20c) where Num is local to *n*. Under the assumption that VI proceeds from the root outwards, the root is mapped to no exponent given the general rule in (15e) repeated as (21b). However, the locality between *n* and Num bleeds the application of this more general rule. Instead, by the Subset Principle, the more specific rule in (19) repeated in (21a) is applied: 'map the *n* specified as [E, IND] to the exponent *one* (in English) or *otro* (in Spanish) in the context of Number'.

(21) VI rules for [E]-marked terminals

a. n[E, IND] ⇔ {*one*/ *otro*}/__Num

b. α[E] ⇔ Ø

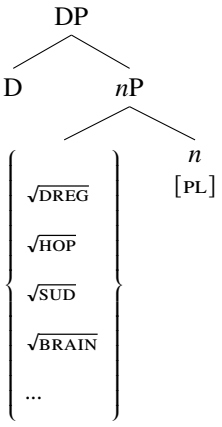
It is not necessary to relativize the locality between *n* and Num to a particular feature: [SG] and [PL] feed *one/otro*-substitution. If Number is [PL], though, it will be exponed as /-z/ in English or /-s/ in Spanish. In the sections to follow, I will show that the rule, as formulated in (21a), correctly applies only in the case of 'count' nouns.

3.2.2 Plural mass nouns

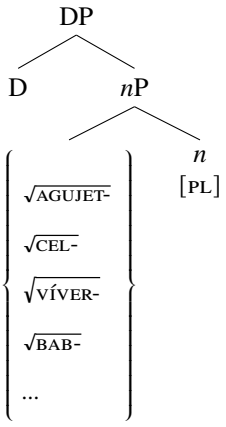
Now that we have established the basic structure and formal properties of mass nouns, namely lack of [IND] and as a result lack of NumP, we are in a position to address the syntax of plural mass nouns. I propose that while plural mass nouns lack both [IND] and NumP, the categorizer that the roots adjoin to in the syntax to form a complex head is speficied as [PL]. This has already been proposed for plural mass nouns in languages like Greek (Alexiadou 2004, 2011, 2015; Kouneli 2019). The syntactic structure is represented in (22).[12]

[12] I represent Spanish roots lacking theme or class vowels, which I assume following Harris (1991); Embick (2010); Kramer (2015) are inserted postsyntactically in *n*, where they bundle with gender features.

(22) a. Plural mass nouns in English

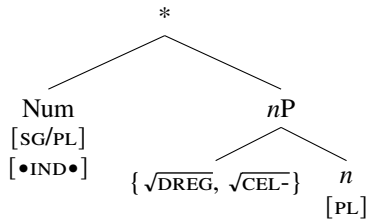


b. Plural mass nouns in Spanish



As mass nouns, they lack reference to discrete individuals. Besides, since there is no [IND] feature Number cannot be merged into the structure: the requirement that its complement be marked individuated, i.e. [•IND•], will not be checked off upon merger resulting in a crash. This is illustrated in (23).

(23) [•IND•] on Num is not checked off via merger

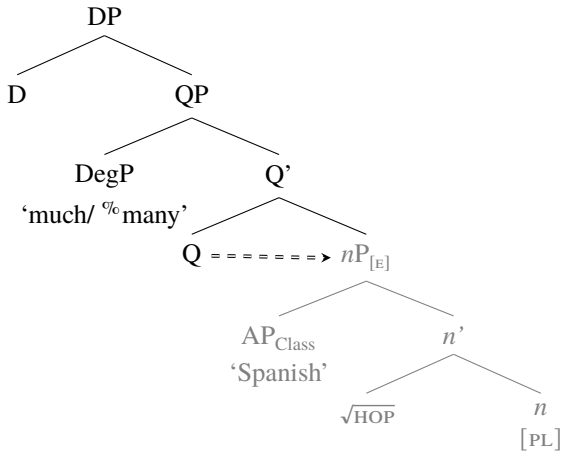


Furthermore, by virtue of these nouns not having NumP, many of their grammatical restrictions follow. First, they have no singular/plural distinction and, by that same token, disallow NumP ellipsis with mismatching features. Second, modification is restricted to classificatory adjectives, adjoined to *n*P. Stubbornly Distributive adjectives which are adjoined higher than the lowest *n*P, at least at the NumP level, are unacceptable. Third, the CARD head that introduces numerals in its specifier cannot be merged into the structure either: this head has a selectional [•Num•] feature that cannot be checked off because NumP is not part of the structure. Therefore, numerals in Spec,CARDP are unnaceptable with plural mass nouns.

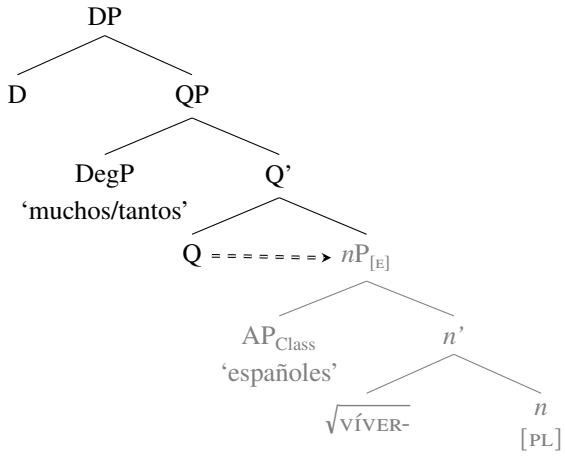
With respect to *n*P ellipsis, given the three options outlined in Table 3.2, the structure of plural mass nouns only makes Option B available: Q, merged on top of *n*, licenses ellipsis of its complement *n*P. The

full *n*P then undergoes deletion, which in the analysis is mapping to a null exponent. This is shown in (24), and it is exactly the same as for canonical mass nouns in (18). Zero exponence on the [E]-marked terminals proceeds via the VI rule in (21b).

(24) a. Plural mass *n*P ellipsis (English)



b. Plural mass *n*P ellipsis (Spanish)



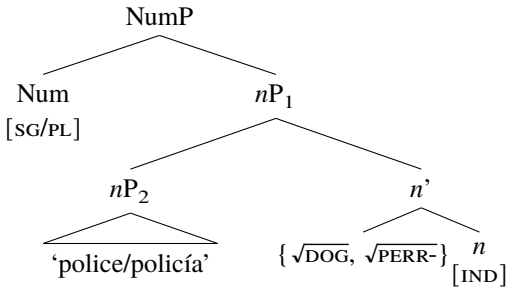
One/otro-substitution is precluded. Again this can be explained by the lack of the relevant licensor, i.e. Number, and the relevant target, i.e. *n*[IND]. Thus, the configuration that needs to be created for the VI rule in (21a) to apply is not met.

This analysis of plural mass nouns is consistent with the intuition that "lexical" plural marking is closer to the root than regular inflectional plural marking (Alexiadou 2004, 2011, 2015; Acquaviva 2008; Kouneli 2019). In other words, despite the feature [PL] being mapped to the same exponent at the point of vocabulary insertion, the terminal node that bears this feature is structurally and categorially different. This way of modeling the distinction between plural-marking on count nouns and mass nouns has a welcome consequence: number-marking on noun-noun compounds.

In Section 2.2 of Chapter 2, I discussed the observation that only the head-noun of a count noun-noun compound can be inflected for number. This restriction is generally attributed to the fact that the non-head noun may be as large as an *n*P, but it does not include NumP (Wiltschko 2008; Harley 2009). Thus, the

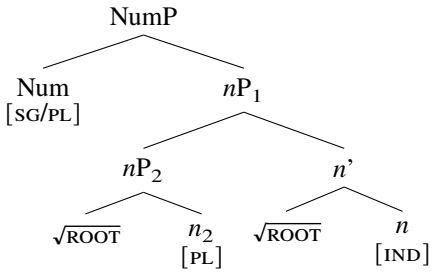
structure for something like *police dog(s)* or *perro(s) policía* is as in (25), ignoring head-directionality, where $n\mathrm{P}_2$ is the non-head member of the compound.

(25) noun-noun compound with count non-head



We also observed that when the noun-noun compound has a plural mass noun as a non-head plural-marking on it survived: *dregs filter* but **dreg filter*, e.g. (46) from Chapter 2, or *niño babas* 'kid drooling.PL' but **niño baba* 'kid drooling', e.g. (48) from Chapter 2. This fact is predicted if [PL] is not located on Number, but on *n*, as I am proposing here. Thus, we can roughly represent the structure of noun-noun compounds as in (26).

(26) noun-noun compound with plural-mass non-head



There is an additional prediction that the account makes: if the [PL] feature is located on the nominalizer, plural-marking on the root is not expected to survive when the root adjoins to a different categorizer such as *v* or *a*. The data in Table 3.3 show that this prediction seems to be borne out.

The verbs and adjectives in Table 3.3 are formed on the basis of roots licensed in plural-mass contexts. Crucially, these verbs and adjectives do not retain the overt plural-marking. That is, it seems that the verb

Table 3.3: Verbs and adjectives based on plural mass noun roots

Language	Bare Plural Mass	Verb	Adjective
English	*fumes*	to fume/ *to fumes	fum-y/ *fumes-y
		'to emit fumes or gas'	'full of fumes'
	dregs		dregg-y/ *dregs-y
			'full of dregs'
	hops	to hop/ *to hops	hopp-y/ *hops-y
		'to flavor with hops'	'full of hops'
	oats		oat-y/ *oats-y
			'of, like, or containing oats'
Spanish	*babas*	bab-ar/ *babas-ar	bab-oso/ *babas-oso
	'drooling'	'to drool'	'drooly'
	celos	cel-ar/ *celos-ar	cel-oso/ *celos-oso
	'jealousy'	'to distrust'	'jealous'
	agujetas	agujet-ear/ *agujetas-ear	agujet-eado/ *agujetas-eado
	'muscle sores'	'to suffer from muscle sores'	'suffering from muscle sores'

and the adjective are formed directly on top of a root that has no /-s/. We can takes this as evidence that plural-marking is the *n*'s doing rather than being lexically part of root.

A potential exception to the class seems to be *suds*. As indicated by Merriam-Webster and Collins dictionaries online, the following forms in (27) are all acceptable. (27a)-(27c) are all taken from the same source.

(27) a. to suds (transitive) 'to wash something in suds'

b. to suds (intransitive) 'to form suds'

c. suds-less 'without suds' (https://www.merriam-webster.com/dictionary/suds)

d. suds-y 'full of suds' (https://www.collinsdictionary.com/us/dictionary/english/suds)

With the exception of *suds*, we can take data like the one in Table 3.3 as evidence that the plural marker is added to the bare root as part of the syntactic derivation. Namely, it encodes nominality, i.e. the root is labeled as a noun.

3.2.3 Object mass nouns

The class of nouns that is left is object mass nouns. An important observation that was extracted at the end of Section 2.3 in Chapter 2 was that the nouns composing this class were morphologically complex giving rise, in most cases, to doublets: one being a count noun and the other being an object mass noun. The structural descriptions that I proposed for the nouns in this class in (69) from Chapter 2 are repeated below.

(69) a. $[[\underbrace{\sqrt{\text{ROOT}}\ \text{COUNT}}_{\textit{carpet}}]\ \underbrace{\text{OBJECT MASS}}_{\textit{-ing}}\ ] \rightsquigarrow$ 'collective'

b. $[[\underbrace{\sqrt{\text{ROOT}}\ \text{VERB}}_{\textit{carpet}}]\ \underbrace{\text{OBJECT MASS}}_{\textit{-ing}}] \rightsquigarrow$ 'eventive'

In this section, I will concentrate on (69a) only leaving aside the eventive cases. I take the morphological facts to be too robust to be ignored, and thus I argue for (28):

(28) Object mass nouns, at least on the collective interpretation, are always formed of top of count noun bases.

Analytically, under the proposal developed in this chapter, (28) entails that object mass nouns are syntactically contain an [IND]-marked *n*P. That is, first the *n* that the root combines with must be *n*[IND]. Then an additional terminal node is added derivationally on top on this *n*P layer: the *n*[IND] is contained, in the sense of Bobaljik (2012), by this outer head.

Note that structure-wise, i.e. the syntactic position that this additional layer occupies, is very much the same that Number occupies. This is schematized in (29).

(29) Number > *n*[IND] > $\sqrt{\text{ROOT}}$
X > *n*[IND] > $\sqrt{\text{ROOT}}$

What is more, the semantic effect that this extra piece of structure contributes is very similar to [PL]; in fact, it is assumed that these nouns denote collections of individuated pluralities (Gillon 1992; Chierchia 1998a, 2010, 2021; Bale and Barner 2009). However, it would be a mistake to call the syntactic terminal X in (29) Num[PL]. For starters, it is never exponed as [PL]. Second, allomorphy (an suppletion in particular)

is conditioned by the features on the terminal nodes, given certain locality requirements, rather than the vocabulary items themselves. Thus, if this terminal node X was in fact Num[PL] it would trigger the same types of root suppletion as Num[PL] does. The data in (30)-(32) indicate that this prediction is not borne out.[13]

(30) a. $\sqrt{\text{LEAF}} \Leftrightarrow$ *leave*/ _PL 'leaves'

b. $\sqrt{\text{LEAF}} \Leftrightarrow$ *foli-*/ _X '*leavage', 'foliage'

(31) a. $\sqrt{\text{FOOT}} \Leftrightarrow$ *feet*/ _PL 'feet'

b. $\sqrt{\text{FOOT}} \Leftrightarrow$ *foot-*/ _X '*feetware', 'footware'

(32) a. $\sqrt{\text{MUEBL-}} \Leftrightarrow$ *mueble*/ _PL 'muebles' (*furniture*$_{count.pl}$)

b. $\sqrt{\text{MUEBL-}} \Leftrightarrow$ *mobil-*/ _X '*muebliario', 'mobiliario' (*furniture*$_{mass}$)

In (30), [PL] triggers the insertion of the vocabulary item *leave*; if we supplant the Number feature with X, a different vocabulary item is inserted: *foli-*. A more compelling case is perhaps (31). The root for *foot* has a suppletive allomorph in the plural: *feet*. In contrast, X, responsible for the object mass counterpart, does not trigger suppletion of the root, which surfaces as the unmarked or elsewhere form, e.g. *foot*. The Spanish case in (32) is similar to the *leave/foliage* contrast: a plural feature does not trigger suppletion of the root, but the object mass counterpart feature does. The *b*-form lacks a diphthong and involves metathesis of the liquid and the vowel, which has shifted in height.

All things considered then, X and Number (specifically [PL]) share a series of properties: they both seem to have the exact same syntactic distribution, they both may trigger suppletion on the root and they both have

[13] When looking at the rules, the reader might be wondering where the categorizing *n*-head is in the contextual specification. For ease of representation, I have left it out of the formulation of the rules here. The full contextual representation is something like the following in (v).

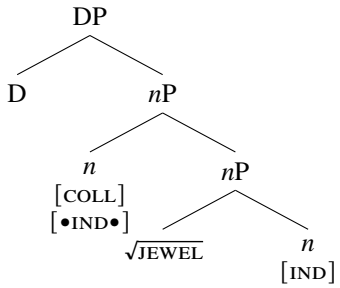
(v) $\sqrt{\text{ROOT}} \Leftrightarrow$ *root*/ _*n*[IND]] PL/X]

For now it is just worth mentioning that any theory of allomorphy must account for the fact that Number may trigger allomorphy on the root past the nominalizer, considering that allomorphy is constrained by locality (Embick 2010; Bobaljik 2012; Moskal 2015; Bobaljik and Harley 2017; Moskal and Smith 2016). In footnote 17, I discuss two approaches to this: the zero-morph approach from Embick (2010) and the Hyper-Contextual VI rule approach from Moskal and Smith (2016). I show that either approach can be made to work with the proposal being developed in this dissertation.

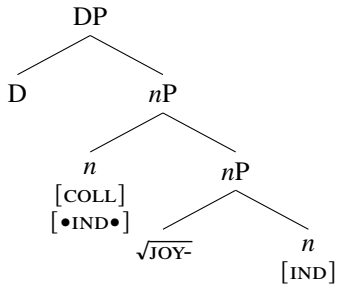
a similar semantic contribution. However, X and Number must be different terminal nodes specified with their own distinct features. Focusing on their distribution, a compelling fact is that they never co-occur. That is, when Number[PL] is present, X (in its many surface forms) cannot be; and when X is present, Number[PL] cannot be: *jewel-s* but not **jewel-s-ery* and *jewel-ery* but not **jewel-ri-es*. Based on these facts, I propose that this is exactly the situation under discussion: X and Number are in complementary distribution, i.e. they both require their complementation by *n*[IND].

I propose that the piece I have been calling X so far is a nominalizer *n*.[14] This *n* bears a feature I refer to as [COLL(ECTIVE)]: when given an individuated item α, it creates a collection (or plurality) of items β which are somehow associated with α.[15] We can think of this association as Corbett's (2000) cohesion relation between the members making up the collection. The structure that object mass nouns have is given in (33).

(33) a. English 'jewelry'



b. Spanish 'joyería' (*jewelry*)



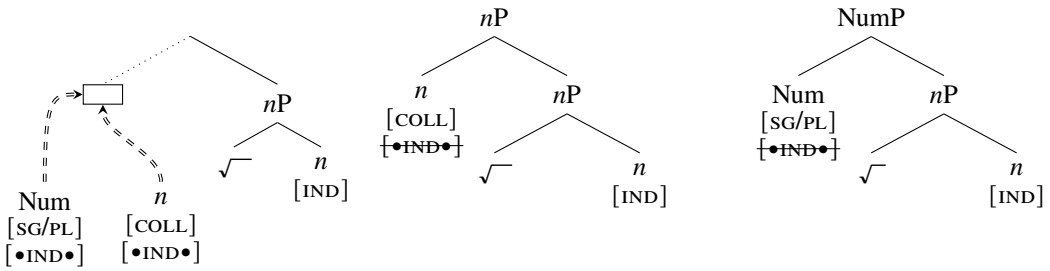
Locating *n*[COLL] immediately c-commanding *n*[IND] is consistent with the observations that this terminal node parallels the distribution of Number. As a result, just like Number can condition allomorphy on the root, so can *n*[COLL], i.e. the locality conditions for allomorphy are the exact same. Moreover, just like Number, this head comes equipped with the merge-triggering feature [•IND•]. This feature is a complementation feature and must be checked-off immediately via merger of *n*'s complement. Given that both Number and *n* have the same complementation feature, which must be obligatorily checked-off by merging the relevant complement, we can account for the unacceptability of their co-occurrence: merger of *n*[COLL] will block

[14] In Section 3.3 I show some evidence for why the [COLL] feature may be located in a nominalizer.
[15] Chapter 4 is devoted to the formal semantic definition and composition of the noun classes.

merger of Number, and viceversa, thus accounting for their complementary distribution. This competition for merger is illustrated in (34).

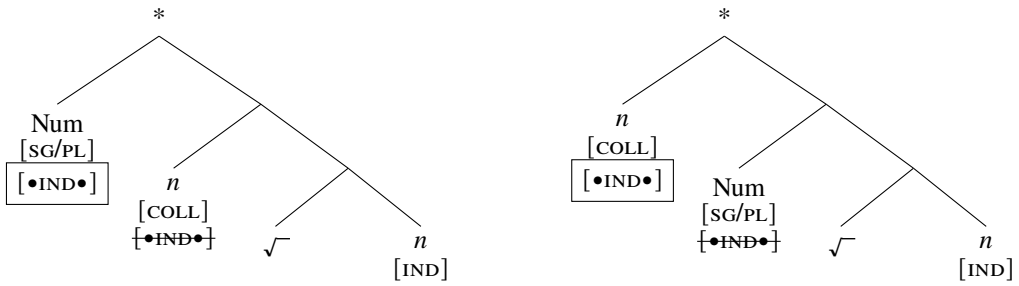
(34) Satisfying [•IND•]

a. Competing for merger b. Merger of *n*[COLL] c. Merger of Number



As illustrated in (34a), Number and *n* compete for merger. If *n* is merged as in (34b), it will write off its complementation feature and project *n*P, blocking merger of Number. The resulting vocabulary item is *jewelry*. If Number is merged instead, as in (34c), its complementation feature will be discharged and NumP will project; this will result in the insertion of vocabulary item *jewel(s)*. Attempting to iterate Number and *n* leads to a crash: only one of the two heads, i.e. the first-merged head, will be able to write its complementation feature off (Adger 2003; Heck and Müller 2007; Müller 2010). This is schematized in (35).

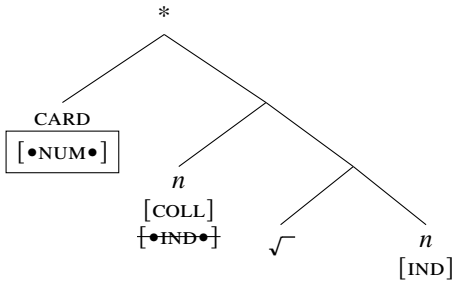
(35) a. Merge(*n*, *n*) > *Merge(Num,*n*) b. Merge(Num,*n*) > *Merge(*n*, Num)



By virtue of not having a NumP, many of the grammatical properties of this class of nouns follow. For instance, the obvious one is no singular/plural contrast, which is also unavailable under ellipsis. Second,

numeral modification is disallowed. This fact follows from the claim that the CARD head that introduces numerals in its specifier requires complementation by Number. Since there is no Number in the structure, merger of CARD is not feature-driven, and the derivation will crash. This is schematized in (36).

(36) Merge(n, n) > *Merge(CARD,n)



The situtation with Stubbornly Distributive adjectives is different. My argument for why these adjectives are not allowed with most mass nouns has been that the syntactic structure of these mass nouns is impoverished and does not provide the room for the adjective to be adjoined. In the case of count nouns, that extra structural piece was Number. Regarding object mass nouns, these are not as syntactically impoverished; in fact, their structure involves an additional layered nP above the lower domain where classificatory adjectives are adjoined. That said and given the geometrical similarity between Number and this layered n, I propose that Stubbornly Distributive adjectives adjoin to the specifier of this outer nP. Besides, if these adjectives impose a semantic requirement on the noun that they modify, as proposed by Deal (2016a, 2017), namely that the noun be individuated, that requirement is satisfied.

With respect to ellipsis, lack of NumP entails that only Option B in Table 3.2 is available. Thus, object mass nouns are no different from the other two subclasses of mass nouns: what undergoes ellipsis is Q's complement which is the highest nP (and everything it dominates). The account also explains why Option C, i.e. *one/otro*-substitution, is not acceptable with object mass nouns. While it is true that *one/otro* targets n[IND] and this head is in fact present in the structure of object mass nouns, the conditions for the VI rule in (21a) are not met since there is no Number. Thus the rule fails to apply. Besides, there is no Number head that can license ellipsis of its complement's head.

The hypothesis that object mass nouns are built on top of an individuated *n*P has a series of welcome consequences, as I have shown here. There is one trade-off of adopting this decompositional account: not every object mass noun has a count noun counterpart. This is most clearly seen in English with the example of *furniture*; but which vocabulary items are missing can be a matter of idiosyncracy across languages. The question is then what licenses the root to occur in one context (the object mass) but not the other (the count one). In more or less lexicalist approaches, this is easily captured by the assumption that object mass noun roots are listed as such in the lexicon: the root $\sqrt{\text{FURNITURE}}$ is mapped to a vocabulary item *furniture* and there is no nominal root $\sqrt{\text{FURNISH}}$ (Chierchia 1998a; Bale and Barner 2009; Rothstein 2010). In DM-style approaches, like the one adopted here, "listedness" and root-specific conditions are grammatically determined instead.

There are two potential reasons for why a root might not be licensed, i.e. paired up with the relevant terminal or sets of terminals (Harley and Noyer 1998, 1999, 2000; Acquaviva 2009; Kramer 2015; Ranero 2021): a semantic condition, and a morpho-phonological one. The semantic condition entails that pairing up a root with a particular terminal leads to uninterpretability. In the case at hand, this would entail that a root like $\sqrt{\text{FURNISH}}$ will lead to a semantic crash if it occurs in the environment in (37).[16] The '↔' is meant to indicate the mapping from structure to interpretation.

(37) [Number[SG/PL] [*n*[IND] $\sqrt{\text{FURNISH}}$]] ↔ 'no meaning'

However, one could argue that attributing the gaps to an inability to assign a certain meaning misses the generalization that I have been attempting to capture all along: object mass nouns are derivationally built on count nouns.

Instead, I hypothesize that the reason why there are lexical gaps in the paradigm is morpho-phonological: the relevant root cannot be mapped to an exponent at the point of Vocabulary Insertion in a particular context. This entails that, in those cases where there is an object mass noun but no count noun counterpart, the root

[16] Remember the discussion in Section 2.3 in Chapter 2 that *furniture* shares the same root as surface forms *furnish* and *furnishing*. This lead to the conclusion that $\sqrt{\text{FURNISH}}$ is a more accurate representation of what the underlying root might be.

can only be licensed in a nominal context where n[COLL] is present. For instance, a root like $\sqrt{\text{FURNISH}}$ may only be exponed in the contexts in (38).

(38) a. $\sqrt{\text{FURNISH}} \Leftrightarrow$ *furnit-*/_ n[IND]] n[COLL]] 'furniture'

b. $\sqrt{\text{FURNISH}} \Leftrightarrow$ *furnish*/_v 'furnish'

If the contexts in (38) are not met, no vocabulary item will be able to be inserted. As Kramer (2015, p.54) notes, this way of thinking is very much in line with the Subset Principle: Vocabulary Insertion cannot proceed if (i) the target contains features that are not present in the syntactic derivation or (ii) the target does not occur in the relevant context specified by the rule.[17]

Pushing the licensing condition to the post-syntax, and in particular to the operation of Vocabulary Insertion, entails that certain combinations of (i) nominalizing features, (ii) number features, and (iii) the $\sqrt{\text{ROOT}}$ yield no phonological output.[18]

[17]The rule in (38b) is what Moskal and Smith (2016) refer to as 'Hyper-Contextual' VI rule: it makes reference to multiple terminal nodes. One may wonder about the specificity of the rule and whether it is a conceptual and/or an empirical issue. I want to briefly comment here that it is not. First, any theory of allomorphy has to account for the observation that terminals like Number can trigger suppletion on the root despite 'not being strictly local' and occupying different cyclic domains (or phase cycles, Chomsky 2000, 2001; Marantz 2001; Embick 2010). This can be cashed out by assuming that in contexts where the intervening terminal, in this case n, is a zero-morpheme then the next higher terminal located in a different cyclic domain can trigger allomorphy on the root. This is similar to what Embick (2010) proposes and it is schematically represented in (vi).

(vi) a. [[$\underbrace{\sqrt{\text{ROOT}}\ n}_{\textit{Cycle A}}$][$\underbrace{\text{Number}}_{\textit{Cycle B}}$]

b. $\sqrt{\text{GOOSE}}\ n$] Number]
goose Ø PL
'geese'

The outer head must have access to the root even if they occupy different cycles. The alternative is Moskal and Smith's (2016) who propose, in a nutshell, that allomoprhy on the root can occur as long as it is triggered by the terminal that immediately c-commands the cyclic head: if n is such a head, Number has then access to the root, which they formulate via VI rules that are hyper-context-sensitive. Given that the location of Number and n[COLL] is structurally identical the same logic applies here. I do not intend to adjudicate between the two proposals here; what I hope to have shown is that the structural description for the licensing of certain roots is not only empirically justified but it can be formalized within current theories of allomorphy. Whether it is preferable to do it via Hyper-Contextual VI rules or via zero-morph exponence (or pruning) is something that I leave open.

[18]This type of approach raises a series of questions about learnability and variation which I cannot fully answer here. With respect to learnability, learners have to figure out two things. The first is the arbitrary licensing conditions for the set of roots in the language. This is not entirely different from the fact that in languages that make grammatical gender distinctions, learners have to figure out what root goes with what n encoding gender. The second thing they need to figure out is that the distribution of certain roots or terminal nodes can be highly restricted to very specific contexts. Regarding variation and "listedness", given the idiosyncrasy of what is an acceptable root-categorizer pairing, we do not expect the licensing conditions to be universal across languages but rather arbitrary. While a root-categorizer pair may be available in language A, the same combination may not be available in language B. This accounts for the variation in the types of gaps we might observe.

3.2.4 Determiner selection

The last set of generalizations that have to be explained involves the requirement that certain determiners and quantifiers impose on the NPs. The five determiner classes and the representative vocabulary items for each class are again repeated below in Table 2.8 and Table 2.1 respectively.

Table 2.8: Restrictions on determiner selection (final version)

Class of Determiner	**Mass**			**Count**	
	Canonical	PL	Object	SG	PL
Class 1: Count-only	*	*	*	✓	✓
Class 2: SG-count only	*	*	*	✓	*
Class 3: PL-count only	*	*	*	*	✓
Class 4: Mass & PL-count	✓	✓	✓	*	✓
Class 5: Underspecifed	✓	✓	✓	✓	✓

Table 2.1: Determiner correspondences English-Spanish based on the count-mass distinction

Classes of Determiners	**English**	**Spanish**
Class 1: Count-only	–	Todo(s), algún(os), ningún(os), un(os)
Class 2: SG-count only	each, a, every	cada, cualquier
Class 3: PL-count only	several	varios
Class 4: Mass and PL-count	all, QAs	todo el/todos los, QAs
Class 5: Underspecifed	the, this/these, some, no	el/los, este/estos

In order to account for the restrictions, I am assuming that D/Q heads can be characterized by the features on Table 3.4, with a rough approximation of their semantic import, building on insights from Beghelli and Stowell (1997) analysis of quantificational determiners and Cowper and Hall (2014) decomposition of determiners. I am assuming that indefiniteness is the lack of definiteness.

In addition to the inherent features on determiners, I propose that features located in the extended projection of the NP may appear on D-heads. When they do, they must have been copied onto the terminal during the syntactic derivation, via Agree: D[*u*F:_]...X[F] → D[*u*F:F]...X[F]. Determiners and quantifiers,

Table 3.4: Inherent features on Determiners

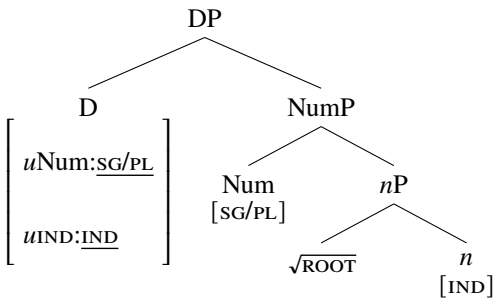
Feature	Meaning	
[DEF]	definite (referentially indexed in the discourse)	(Cowper and Hall 2014)
[SPF]	specific (denoting a particular individual)	(Cowper and Hall 2014)
[PROX]	proximal (near the point of attachment)	
[DIST]	distal (situated away from the point of attachment)	(Cowper and Hall 2014)
[UNIV]	universal (universal, not necessarily distributed)	(Beghelli and Stowell 1997)
[DISTR]	distributed (strongly distributed)	(Beghelli and Stowell 1997)
[GROUP REF]	group reference (existential denoting groups)	(Beghelli and Stowell 1997)

as well as other modifiers, that are not heads but occupy specifier positions may also show uniform (phi-)agreement with the NP and the D-head, i.e. nominal concord. I assume that concord features on these non-head constituents attach in the form of unvalued features which will receive a matching value. This all occurs post-syntactically (Bonet 2013; Norris 2014, 2017a,b; Deal 2016b).

3.2.4.1 Determiner Classes 1, 2, 3 & 5.

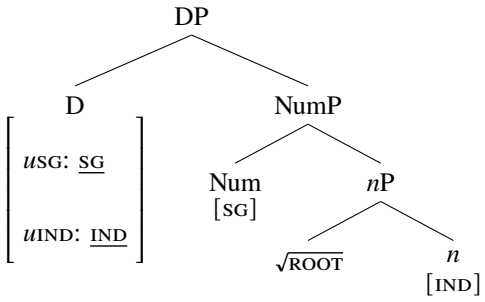
Leaving determiner Class 4 aside for a moment, in this system, we can summarize the other classes with the schematic representations in (39).[19]

(39) a. Class 1: Count-only

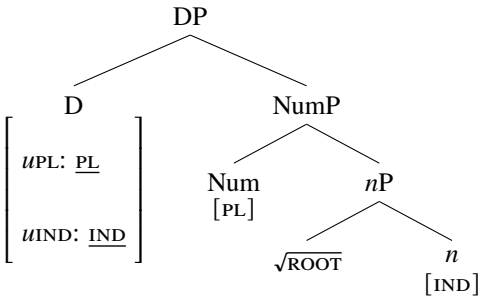


[19] In order to be as general as possible and provide a unified analysis of determiners for both Spanish and English, I am not including unvalued gender features on D. Nothing crucial hinges upon this decision. The represenations could be easily enriched with a [*u*GEND:_] feature on D. The probing feature will establish a dependency with *n*, where I assume gender features are located (Kramer 2015; Kučerová 2018; Adamson and Šereikaitė 2019), and will copy its value onto it.

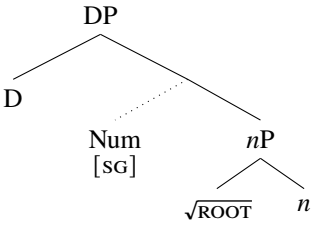
b. Class 2: Singular-count only



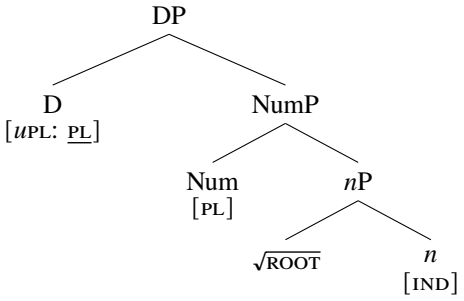
c. Class 3: Plural-count only

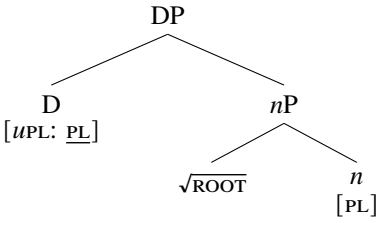


d. Class 5: Underspecified



e. Class 5: Underspecified (but plural)





Determiners are sensitive to the features that are available in the extended projection of the noun. Depending on the (unvalued) feature bundle that each determiner bears, what is copied via Agree will differ. For instance, Classes 1-3 share in common the fact that the determiner is sensitive to individuated properties as well as number features. However, the classes differ in the granularity of the number feature probes. The probing feature in Class 1 is satisfied by any feature on the Number head, regardless of whether it is [SG] or [PL]. The probes on Class 2 and 3 are however relativized to a certain feature specification on Number: [SG] and [PL] respectively. We can imagine a scenario where a Class 2 D is merged with a Number[PL] head. The

probing feature will not be able to establish any Agree-link dependency, and as a result it will be unable to copy a value onto its probe.

Regarding Class 5, the D head is always underspecified for [IND]. This accounts for why these determiners are acceptable with both any mass noun and (singular and plural) count nouns, e.g. (39d). While the D head may also be underspecified for Number, some D heads may show sensitivity to plural-marking both with count and mass nouns: *these/those* and definite determiners in Spanish. Thus, these Ds may optionally bear an unvalued plural feature, as illustrated in (39e).

We are now in a position to discuss matters of determiner exponence. Along with the inherent D features on Table 3.4 and the set of features that each class of D copies in the syntax, the determiners of classes 1, 2, 3 and 5 are spelled out as (40) in English and (41) in Spanish.

(40) VI rules for determiner exponence: English

a. D[UNIV, *u*IND: IND, *u*SG: SG] ⇔ *every* Class 2

b. D[DISTR, *u*IND: IND, *u*SG: SG] ⇔ *each*

c. D[*u*IND: IND, *u*SG: SG] ⇔ *a*(*n*)

d. D[GROUP REF, *u*IND: IND, *u*PL: PL] ⇔ *several* Class 3

e. D[DEF] ⇔ *the*

f. D[SPF] ⇔ *this*

g. D[SPF, DIST] ⇔ *that* Class 5

h. D[SPF, *u*PL: PL] ⇔ *these*

i. D[SPF, DIST, *u*PL: PL] ⇔ *those*

j. D⇔ *some*

k. D[NEG] ⇔ *no*

(41) VI rules for determiner exponence in Spanish

a. D[UNIV, *u*IND: IND, *u*Num: SG/PL] ⇔ *todo*(*s*) Class 1

b. D[*u*IND: IND, *u*Num: SG/PL] ⇔ {*algun*(*os*)/*un*(*os*)}

c. D[NEG, *u*IND: IND , *u*Num: SG/PL] ⇔ *ningun*(*os*)

d. D[DISTR, *u*IND: IND, *u*SG: SG] ⇔ *cada* Class 2

e. D[GROUP REF, *u*IND: IND, *u*PL: PL] ⇔ *varios* Class 3

f. D[DEF] ⇔ {*el*/ *la*} Class 5

g. D[DEF, *u*PL: PL] ⇔ {*los*/ *las*}

h. D[SPF] ⇔ {*este*/ *esta*}

i. D[SPF, PROX] ⇔ {*ese*/ *esa*}

j. D[SPF, DIST] ⇔ {*aquel*/ *aquella*}

k. D[SPF, *u*PL: PL] ⇔ {*estos*/ *estas*}

l. D[SPF, PROX, *u*PL: PL] ⇔ {*esos*/ *esas*}

m. D[SPF, DIST, *u*PL: PL] ⇔ {*aquellos*/ *aquellas*}

3.2.4.2 Determiner Class 4: *all* and QAs.

Class 4 presents a challenge to the analysis of the count-mass distinction developed in this chapter. While the elements of this class only appear with mass nouns (regardless of their subclass) and plural count nouns, these two groups of nouns do not form a syntactic natural class: there is no common set of features between the two. There is, however, one other way of linking these two featurally distinct groups of nouns into a natural class. Both mass and plural count nouns share the semantic property of being cumulative (Quine 1960; Cheng 1973; Bach 1986b; Krifka 1989; Chierchia 1998b,a, 2010; Borer 2005a, among others): a predicate P is cumulative if for every member in P, their sum is also in P. The formal definition of cumulativity is in (42).

(42) $\text{CUM}(P) = \forall x[P(x) \rightarrow \forall y[P(y) \rightarrow P(x \cup y)]]$

Mass nouns are cumulative because if x is water and y is also water, then their sum is also water. Similarly, plural count nouns like *books* are cumulative because adding books to books is still books. In contrast, singular count nouns are not cumulative; the sum of two elements in the singular count noun extension is not in the noun extension: the sum of two book is not a book. That said, we have now a non-syntactic explanation for what makes Class 4 a natural class: the quantificational determiners of Class 4 require that the NP they modify be cumulative. We can then encode the cumulative restriction on the (denotation of the) Q head itself. This is not a novel contribution. Deal (2016a, 2017) reaches the same conclusion when probing the distribution and properties of similar quantifiers in Nez Perce.

There is a slight difference between the universal quantifiers *all* in English and *todos los* 'all.PL the.PL in Spanish, and QAs. The universal quantifier seems to occupy a higher position in the DP given that it must precede determiners and demonstratives. Besides, as originally observed by Sportiche (1988) and subsequent work after him, the universal can also be stranded in the clause. This is shown in (43) and (44)

(43) a. **All** the boys have watched the game.

b. The boys have **all** watched the game.

c. **All** the water has been drained.

d. The water has **all** been drained.

(44) a. **Todo-s** lo-s chico-s han visto el partido
all.M-PL the.M-PL boy.M-PL have seen the game
'All the boys have watched the game'

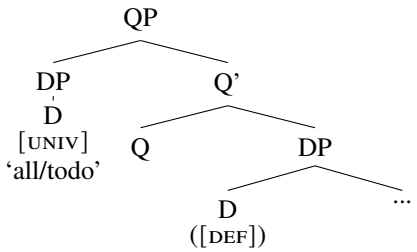
b. Lo-s chico-s han visto **todo-s** el partido
the.M-PL boy.M-PL have seen all.M-PL the game
'The boys have all watched the game'

c. **Toda** la sal se cayó por la mesa
all.F the.F salt.F SE dropped over the table
'All the salt was spilled over the table'

d. La sal se cayó **toda** por la mesa
the.F salt.F SE dropped all.F over the table
'The salt was all spilled over the table'

Based on these facts, I take Class 4 *all* and its Spanish counterpart to occupy a specifier position higher than DP as in (45). In English, the terminal D node that spells out *all* bears no unvalued features and it is thus invariant with respect to number-marking. In Spanish, however, if the NP is plural-marked, so must the Determiner in Spec, QP. Thus, an unvalued [*u*PL:_] must be inserted post spell-out to ensure concord.[20]

(45)



With respect to QAs, I formulated the empirical generalization in (71) from Chapter 2, repeated below. In Spanish, the QA must always be plural-marked if there is a plural-feature on the extended projection of the NP (i.e. plural mass nouns and plural count nouns). In English, the distribution of the more marked-form *many* seems more restricted: some speakers of English only accept *many* with plural count nouns, whereas others accept it anytime there is a plural feature.

(71) **The plural-QA-markedness Generalization**

Overt plural marking on the noun

a. forces the QA to be plural-marked in Spanish, and

b. makes it possible for the QA to surface as *many* in English.

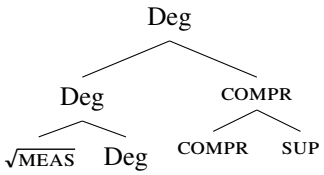
[20] I have decided to represent Class 4 *all* and *todo(s)* as occupying a specifier position of a Q head above the DP. The reason for this decision is based on the Q-float data and the assumption that intermediate projections such as D' or Q' are precluded from movement (Chomsky 1994, 1995). There is potentially one additional reason why these DPs have to be located in the specifier of their own projection above DP. In English, possessors generally assumed to be located in Spec,DP (Abney 1987; Corver 1990) must occur lower than *all*:

(vii) Kavanaugh and Rodriguez group all John's maxims as T*he Sayings of Light and Love*.
(https://contemplativehomeschool.com/2015/11/04/the-writings-of-st-john-of-the-cross/)

While it is in principle possible to hypothesize that there are different lexical items *much* for mass, *many*$_1$ for plural count and *many*$_2$ for plural mass, this comes at the expense of enriching the lexicon and would not establish any intrinsic relation between the listed items. Variation across speakers of English would amount to stipulating that while some speakers have the three forms in their inventory, others only have two: *much* and *many*$_1$. This option would also come at too high a cost if we take into account the cross-linguistic data, in this case from Spanish:[21] QAs track plural-marking if a plural feature is available. This observation has received empirical support from the work of Wellwood (2018, 2019); Smith (2021); Cleani and Toquero-Pérez (2022).[22]

Taken together, I interpret these facts as evidence for the hypothesis that the surface form of the QA is sensitive to number marking. In particular, just like *muchos* is the surface form of a degree morpheme and (gender and) number features, so is *many* (except for the gender part). The surface forms *mucho* and *much* are thus the unmarked cases. Under the account developed here this amounts to saying that the DegP that hosts *much/many* and their Spanish counterparts may also be specified for a plural feature whose value must be copied. In the spirit of Bresnan (1973); Hackl (2000); Bobaljik (2012); Wellwood (2015); Dunbar and Wellwood (2016), I adopt a decompositional approach to QAs according to which positive, comparative and superlative forms of QAs have the internal structure in (46).

(46) The internal structure of QAs



QAs are composed of a measure root $\sqrt{\text{MEAS}}$ and a categorizer Deg. The root is licensed in the context of this head. This structure, built upon insights from Dunbar and Wellwood (2016), entails that Deg and

[21] In Chapter 4, I will show further evidence from Greek and Telugu that suggests that the lexical approach is not empirically supported.

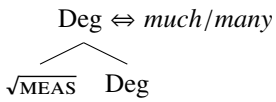
[22] Cleani and Toquero-Pérez (2022) discuss Norwegian. The language is like English with respect to the positive form of the QA: it has a *much/many* distinction. Unlike English, Norwegian also keeps a contrast in the comparative form depending on whether the noun is or not plural-marked. See Cleani and Toquero-Pérez (2022) for more details.

$\sqrt{\text{MEAS}}$ are always syntactically represented in positive, comparative and superlative forms of QAs.[23] Given the fact that Deg projects, the positive can occur without the COMPR and SUP heads, but the latter two cannot occur without the former. This is consistent with Bobaljik's (2012) Containment Hypothesis: the syntactic representation of the superlative contains the comparative which contains the positive.

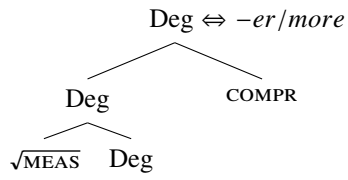
We can assume that the underlying structure of an equative is identical to (46) with the only difference that instead of a COMPR-head, the relevant head is EQ (which does not take SUP as a complement). While in English, the measure root $\sqrt{\text{MEAS}}$ surfaces with the same form as in the positive (including degree questions), in Spanish, the form that $\sqrt{\text{MEAS}}$ surfaces with in equatives and degree questions differs from those in the positive/comparative/superlative: *tanto/cuánto* vs. *mucho/más*. I will assume that these alternations in Spanish are morpho-syntactically conditioned by the local context in which the measure root occurs. Restricting ourselves to the positive forms, $\sqrt{\text{MEAS}}$ surfaces as *tan-/cuan-* in the context of Deg[D (,WH)] and $\sqrt{\text{MEAS}}$ surfaces as *mucho* elsewhere.[24] The structures are summarized in (47) for English and in (48) for Spanish.

(47) English

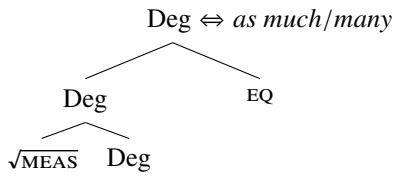
a. Positive



b. Comparative



c. Equative

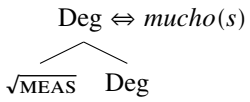


[23]The difference between the structure in (46) and Dunbar and Wellwood's (2016) is the extra step in the decomposition: for Dunbar and Wellwood (2016), the root-Deg compound is collapsed into a single terminal which they label MUCH. The measure morpheme for them is MUCH, whereas for me the measure morpheme is $\sqrt{\text{MEAS}}$.

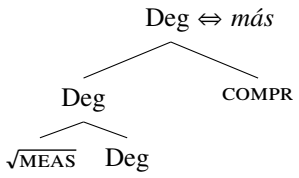
[24]The [D] feature on Deg is intended to indicate a more determiner-like use of *tan/tanto*. For instance, it is the only Deg-word that has a *wh*-counterpart.

(48) Spanish

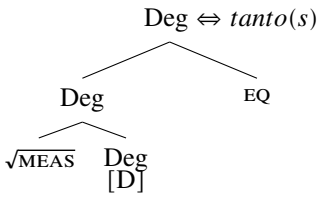
a. Positive



b. Comparative



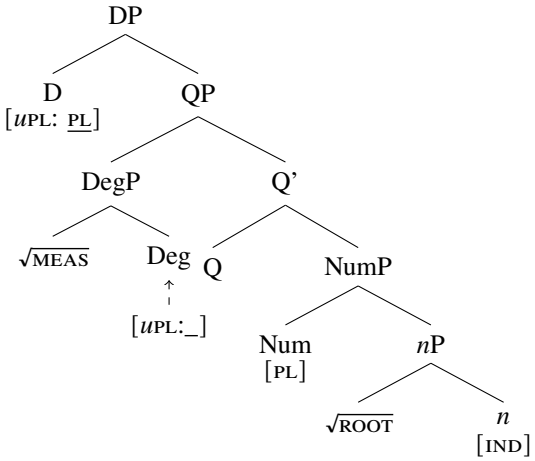
c. Equative



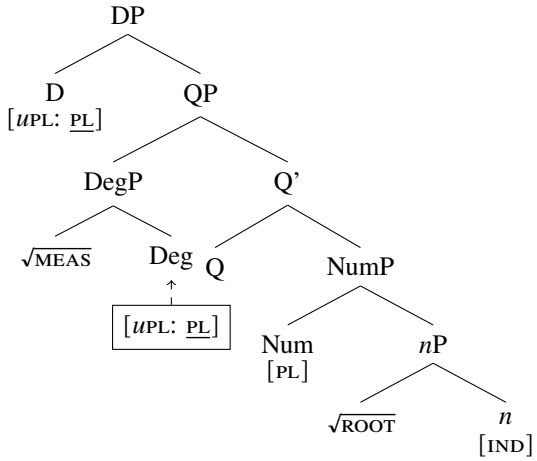
DegPs are not heads in the extended projection of the NP, but they occupy a specifier position (Zabbal 2005; Kayne 2005; Schwarzschild 2006; Nakanishi 2007). Thus, any unvalued feature spelled-out on the Deg-head will not have been copied via Agree, but inserted post-Spell-Out. It is at this point, and crucially before the application of any other post-syntactic operation such as Impoverishment or Vocabulary Insertion, when they will receive a matching value.[25] The syntactic representations of DPs containing a QA are provided in (49) for plural count nouns. For ease of illustration, I will concentrate on the positive form.

(49) Feature copying on QAs: Plural count nouns

a. Insert [*u*PL] on Deg



b. Copy PL value



[25] I want to emphasize here that I am not committing to any particular account of nominal concord. For an overview of concord proposals, see Norris (2017a,b). I am simply assuming that the mechanism that underlies the operation of concord is distinct from the syntactic operation Agree.

The first step in the (post-syntactic) derivation is to insert an unvalued feature [*u*PL] on the Deg-head, e.g. (49a). This feature then gets a PL-value copied via concord as in (49b). At the point of VI, there are two possible insertion rules in English, formulated in (50). The rule in (50a) is more specific and thus is applied according to the Subset Principle. In Spanish, there is no suppletion triggered by plural and instead [PL] surfaces as an affix to the root. The relevant VI rules in Spanish are in (51).

(50) VI rules for $\sqrt{\text{MEAS}}$ (English)

a. $\sqrt{\text{MEAS}} \Leftrightarrow$ *many*/__Deg[*u*PL: PL]

b. $\sqrt{\text{MEAS}} \Leftrightarrow$ *much*

(51) VI rules for $\sqrt{\text{MEAS}}$ and Deg (Spanish)

a. $\sqrt{\text{MEAS}} \Leftrightarrow$ *cuán*/__Deg[D, WH]

b. $\sqrt{\text{MEAS}} \Leftrightarrow$ *tan*/__Deg[D]

c. $\sqrt{\text{MEAS}} \Leftrightarrow$ *mucho*

d. Deg[D, *u*PL: PL] $\Leftrightarrow$ *−tos*

e. Deg[D] $\Leftrightarrow$ *−to*

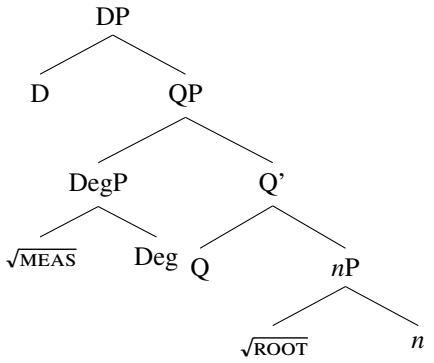
f. Deg[*u*PL: PL] $\Leftrightarrow$ *−s*

In the case of canonical mass nouns and object mass nouns, there is no plural-feature available in the structure. Thus, there is no need for post-syntactic insertion of [*u*PL].[26] Thus, lack of plural-concord blocks the application of the more specific rule in (50a) in English, triggering insertion of the elsewhere case: (50b). In Spanish, the only features that are inserted for concord are gender-features, which I have not included in the representations. This derivation is shown in (52a).

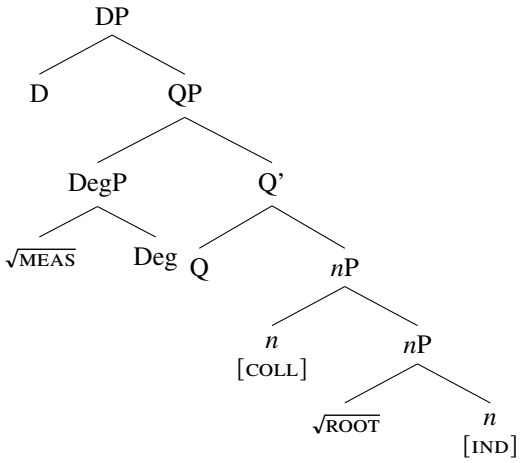
(52) No PL-feature copying: canonical and object mass nouns

[26]Even if the concord feature was inserted after Spell-Out, no value will be copied onto it.

a. canonical mass



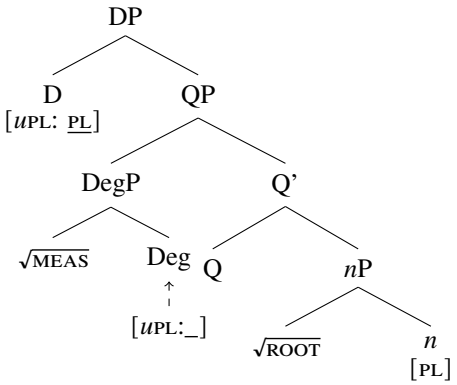
b. Object mass



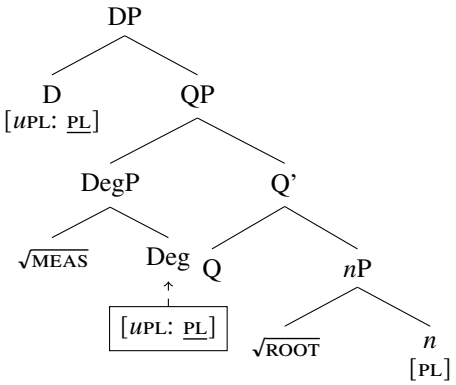
Regarding plural mass nouns, I propose that the derivation in both languages proceeds exactly as in the case of plural count nouns in (49): an unvalued plural feature is inserted and it is subject concord. As in (49b), a value is copied onto this feature. This is shown in the trees in (53).

(53) Feature copying on QAs: Plural mass nouns

a. Insert [*u*PL] on Deg



b. Copy PL value



In the case of Spanish, the VI rules in (51) apply accordingly, thus resulting in overt plural agreement between the QA and the noun: *muchos celos*. In the case of English, something else must be said because the locality between √MEAS and PL on Deg predicts that the rule in (50a) should be triggered univocally, inserting *many* in this context. However, there is variation and most speakers seem to prefer the elsewhere case *much*.

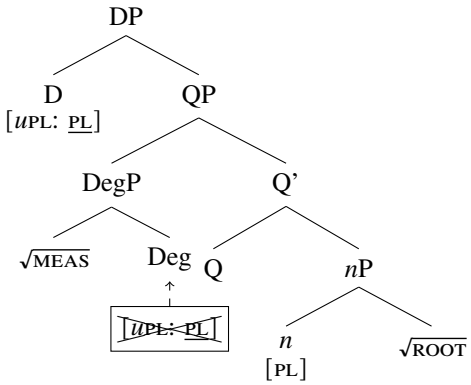
I propose that we can still maintain the uniform representations and VI rules, while still accounting for the variation with plural mass nouns if Impoverishment applies before VI. More specifically, an Impoverishment rule deletes the plural feature on Deg, as in (54).

(54) Deletion rule

Deg[*u*PL: PL] ⇔Deg~~[*u*PL: PL]~~ in the context of plural *n*

Impoverishment deletes syntactic features on terminals prior to Vocabulary Insertion (Bonet 1991, 2008; Embick 2010; Arregi and Nevins 2007, 2012, 2013). As a result, more specific VI rules that would be applied no longer fulfill the insertion conditions determined by the Subset Principle. This triggers the application of the less specific rule instead. This is precisely the case of *much* and plural mass nouns under discussion. The rule in (54) is not universally shared across English speakers. Those speakers who have this rule as part of their grammar will apply (54) after the plural feature has been copied, shown in (55), which will bleed the VI rule in (50a). For those speakers who lack the rule altogether, there is no additional step in the post-syntax and the more specific VI rule in (50a) will win over. This variation can be summarized in Table 3.5.

(55) Impoverishment of PL on Deg



The analysis of QAs proposed here is consistent with a uniform treatment of QAs across languages that show sensitivity to plural-marking, as summarized in Table 2.11. Besides, it pushes the variation away from the lexicon: the surface form of QAs is not lexically determined (Solt 2009, 2015) but morpho-syntactically so (Bobaljik 2012; Wellwood 2015, 2018; Bale 2016; Smith 2021; Cleani and Toquero-Pérez 2022). This

Table 3.5: Variation in $\sqrt{\text{MEAS}}$-exponence (English)

Grammar	PL-concord	Impoverishment	VI rule
$\mathbb{G}1$	✓	✓	(50b) = *much*
$\mathbb{G}2$	✓	*	(50a) = *many*

also has a consequence for thinking about the semantic interpretation of these items. The analysis advocates for the hypothesis that there is no one-to-one mapping between the surface form of the QA and the dimension of measurement they introduce in the semantics.

3.3 Variation in the distribution of [COLL] feature

An important piece of the analysis was the [COLL] feature that I proposed is responsible for generating object mass nouns. But proposing this feature raises several questions. First, it seems that, when given an individuated item α, [COLL] creates a collection of items β which are somehow associated with α. Object mass nouns are not the only types of NPs that have been argued to denote collections or similar aggregates. Nouns like *team, committee, government* also refer to groups that consist of individual members (Link 1984; Landman 1989a,b; Joosten 2010; Pearson 2011; de Vries 2021).

Second, [COLL] seems to be in many ways similar to [PL] on Number: in terms of their selectional features, they both require an individuated *n*P complement; in terms of the semantics, which I have not been yet discussed in (formal) detail, there must also be similarities between [COLL] and [PL] given that the traditional view on object mass nouns has assumed that they are inherently plural-marked (Chierchia 1998a; Bale and Barner 2009; Smith 2021).

Thus, all in all we might wonder (i) whether [COLL] is also responsible for generating group nouns, (ii) whether it is empirically justified to locate [COLL] on *n* instead of Number and (iii) whether [COLL] can ever be located on Number giving rise to languages that have, potentially, [SG/ PL/ COLL] as part of their inventory of Number features. I will show that object mass nouns and group nouns have a different morpho-syntactic

distribution which leads to the conclusion that their underlying syntax must be different too. I will then move on to argue why [COLL] is part of categorizing heads in languages like English or Spanish, but it might be located on Number in other languages such as Czech. Thus, just like [PL] can be located on *n* and Number so can [COLL].

3.3.1 Group nouns do not have [COLL].

One could hypothesize that NPs that refer to a collection (including groups or object mass) are marked for [COLL] in the syntax. However, group nouns like *team, committee, government* do not have the same morpho-syntactic distribution as object mass nouns. In fact, group nouns pattern with count nouns with respect to number-marking, numeral modification, and ellipsis. The relevant data for English is in (56) and the relevant data in Spanish is in (57).

(56) Group nouns English

a. {Each Spanish team/ Several Spanish team**s**} will win a competition. (SG/PL-marking)

b. Two Spanish teams will win a competition. (numeral modification)

c. Messi only played for one big Spanish team, but Figo played for two ~~big Spanish teams~~.

(SG/PL-mismatch)

d. The crowd cheered for the Spanish team and booed the French one. (*one*-substitution)

(57) Group nouns Spanish

a. Cada equipo español ganará una competición.
each.M team Spanish.M win.FUT.3SG a.F competition
'Each Spanish team will win a competition' (SG-marking)

b. Vario-s equipo-s español-es ganarán una competición.
several.M-PL team-PL Spanish.M-PL win.FUT.3PL a.F competition
'Several Spanish teams will wine a competition' (PL-marking)

c. Dos equipo-s español-es ganarán una competición.
two team-PL Spanish.M-PL win.FUT.3PL a.F competition
'Two Spanish teams will win a competition'

d. Messi solo jugó para un equipo español grande, pero Figo jugó para dos ~~equipo-s~~ ~~español-es~~ ~~grand-es~~
Messi only played for one team Spanish.M big but Figo played for two team-PL
Spanish.M-PL big-PL
'Messi only played for one big Spanish team, but Figo played for two ~~big Spanish teams~~.

(SG/PL-mismatch)

e. La gente animaba a este equipo español, y abucheaba a este otro francés
the people cheered to this team Spanish.M and booed to this other.M french.M
'The people cheered for this Spanish team and booed this French one' (*otro*-substitution)

As also evidenced by both sets of examples, group nouns are compatible with Class 2 determiners *each* and *cada*, and with Class 3 determiners such as *several* and *varios*. These are determiners that require the NP to be count (i.e. [IND, SG/PL]). The relevant data are in (56a) for English and (57a) and (57b) for Spanish. All these properties indicate that group nouns have the underlying syntax of regular count NPs. It is also worth noting that if group nouns and object mass nouns were to be treated on a par, we would be loosing the generalization in (28) (i.e. morphologically complex object mass nouns, at least on the collective interpretation, are always formed of top of count noun bases).

Besides, while object mass nouns satisfy the semantic property of cumulativity allowing modification by QAs like *much, mucho, more, más*, the unmarked form of group nouns does not, as illustrated by the following examples in (58).

(58) a. * There was {too much/more} team holding a meeting in that room

b. There were {many/more} teams holding a meeting in that room

c. * Había { mucho/ más} equipo teniendo una reunión en la sala.
there.were much.M/ more team having a meeting in the room

d. Había { muchos/ más} equipo-s teniendo una reunión en la sala.
there.were much.M-PL/ more team-PL having a meeting in the room

A further difference with object mass nouns is related to agreement patterns with verbs when the group NP functions as subject. In varieties of British and Canadian English, when they are morphologically unmarked (e.g. *team, committee*), group nouns may control singular or plural agreement on the verb Sauerland and Elbourne (2002); Pearson (2011); Thoms (2019). This is shown in (59) from Thoms (2019). What is more, when the unmarked group noun in subject position controls plural agreement on the verb, the NP cannot reconstruct for scope.

(59) a. A Spanish team **is** likely to win the Champions League. *likely*>∃

b. A Spanish team **are** likely to win the Champions League. **likely*>∃

While facts like (59b) have been taken as evidence for "semantic agreement" (Wechsler and Zlatić 2003; Corbett 2006), the conditions under which the group NP controls plural agreement on the verb are syntactically conditioned by movement (Sauerland and Elbourne 2002; Nevins and Anand 2003; Thoms 2019). In (60), the group NP remains in-situ, assuming analyses of *there*-existentials such as Chomsky (2000) or Deal (2009), and only singular agreement is possible. Similar facts seem to obtain in Spanish: group nouns control plural agreement when the NP undergoes some (A-bar) movement operation (Suñer 2002; Fernández-Sánchez 2015). The example in (61a) is from (Fernández-Sánchez 2015).

(60) There {was/ *were} a team holding a meeting in the room.

(61) a. Este equipo, yo creo que { juega/ juegan} mejor bajo presión.
this team I think that play.3SG play.3PL better under pressure
'This team, I think that {plays/ play} better under pressure'

b. Yo creo que este equipo { juega/* juegan} mejor bajo presión.
I think that this team play.3SG play.3PL better under pressure
'I think that this team {plays/ play} better under pressure'

None of these facts are possible with object mass nouns which univocally control 3rd person singular agreement on the verb, regardless of whether the relevant NP has undergone movement or remains in-situ.

All in all, we can conclude that syntactically group nouns of the *team* or *committee* type do not form a natural class with object mass nouns in terms of the count-mass distinction.

There are also reasons to think that these classes of nouns are not semantically the same. Group nouns refer to collections that are more than just the sum of their parts (Landman 1989a): for instance, a team is not only a collection of its individual members, it is also an entity in and of itself. Joosten (2010) refers to this property as "non-additivity". On the contrary, an object mass noun is "additive" because it pretty much refers to the sum of its individual parts; in other words, they denote collections of individual entities or items which share some relation or property. Related to this is the observation that group nouns and object mass nouns give rise to different entailment patterns (Joosten 2010). For instance, there is a difference between the following statements in (62) and (63).

(62) a. The old committee members gathered ↛ the old committee gathered

b. The old committee gathered ↛ the old committee members gathered.

(63) a. John gathered the old chairs and tables → John gathered the old furniture.

b. John gathered the old furniture → John gathered the old chairs and tables.

While being a committee member that is old does not entail, or at least not necessarily, that the committee itself is old, being a chair and a table that are old does entail that the furniture itself is old. The same patterns obtain in the other direction as illustrated in (62b) and (63b).

In this section I have shown that group nouns pattern nothing like object mass nouns with respect to the count-mass asymmetries discussed. In fact, they behave like regular count nouns. While it is true that semantically, and in some ways syntactically, they are different from regular count nouns such as *member*, we cannot ascribe these properties to the [COLL] feature. The feature-based account that I have proposed here is able to account for most, if not all, morpho-syntactic asymmetries between the class of (count) group nouns and object mass nouns. It is possible that more is required to formally account for all the special properties

of these group nouns, both syntactically and semantically; but, as of now, I remain neutral about what that might be. All that I can do is point the reader to the relevant semantic analyses like Landman (1989a,b, 2004); Barker (1992); Pearson (2011); Henderson (2017); Zwarts (2020) and syntactic analyses such as Sauerland and Elbourne (2002); Thoms (2019); Smith (2021) among others.

3.3.2 [COLL] on *n* or Number

I proposed that the [COLL] feature, at least in languages like English and Spanish, was located on a nominalizing head that is layered on top of the inner-most nominalizing *n*[IND]. Pretheoretically at least, it is argued that morphemes generating object mass nouns in these languages are 'derivational', rather than 'inflectional' (Lieber 2004, 2016; De Belder 2011, 2013; Cohen 2020). In DM-style approaches to morpho-syntax, derivational morphemes are generally represented by categorizing heads and inflectional morphemes correspond to functional heads such as those encoding number, person, definiteness or case (Marantz 1997, 2001, 2013; Arad 2003; Embick and Marantz 2008). In this regard, locating [COLL] on *n* as opposed to Number is consistent with this view.

In addition, the nominalizing status of [COLL] in these languages is supported by the fact that the same morpheme can create nouns out of other nouns, but also verbs or even adjectives. Some examples are in (64) and (65) for English

(64) *carpeting*

a. $carpet_{verb}$: 'to cover something with a carpet'

$carpet_{verb}$+ [COLL] → $carpeting_{noun}$: 'the result of covering something with a carpet'

b. $carpet_{noun}$: 'floor covering made from some fabric'

$carpet_{noun}$ + [COLL] → $carpeting_{noun}$: 'collection of carpet-related items'

(65) *activewear*

active$_{adjective}$: 'engaged in some (physical) activities'

active$_{adjective}$+[COLL] → *activewear*$_{noun}$: 'collection of items worn when engaging in physical activities'

As observed in the examples above, adding the [COLL] feature can recategorize the base: from *v/n/a* to *n*. In Spanish, similar facts are observed. What is more, adding the [COLL] feature triggers a change in the grammatical gender and declension class of the base. For instance in (66b), the nominal base is feminine and spells out declension class 2 (CLS2), e.g. *-a*, whereas the derived object mass noun is masculine and spells out declension class 1, e.g. *-o*.[27] Another example just focusing on gender and declension class changes is shown in (67).

(66) *armamento*

a. arm-ar
weapon-INF
$\sqrt{\text{ROOT}}$-*v*
'to weapon'

arm-ar +[COLL] → armamento: 'the result of equipping with weapons'
weapon-INF weaponry.M.CLS1
$\sqrt{\text{ROOT}}$-*v* *-n*

b. arm-a
weapon-F.CLS2
$\sqrt{\text{ROOT}}$-*n*
'(a) weapon'

arma +[COLL] → armamento: 'collection of weapon-related items'
weapon.F.CLS2 weaponry.M.CLS1
$\sqrt{\text{ROOT}}$-*n* *-n*

(67) a. grad-a
grandstand-F.CLS2

b. grad-erí-o
grandsand-COLL-M.CLS1
'Collection of grandstands'

[27] Nouns themselves do not generally spell out gender, but class. That is, the word marker attached to the nominal root is a class exponent, not a gender marker. For more information about declension classes in Spanish, see Roca (1989); Harris (1991); Kramer (2015).

If gender is located on *n* (Alexiadou 2004; Kramer 2015) and class markers on the noun are also on *n* (Oltra-Massuet and Arregi 2005; Kramer 2015; Kučerová 2018), the fact that object mass nouns may undergo shifts in both class marker exponence and gender is strong evidence for the *n*-status of the collective feature in Spanish too.[28]

We can take these facts as evidence for the proposal that [COLL], responsible for deriving object mass nouns, is on *n* at least in the two languages that have been discussed in this dissertation. This is not supposed to be a universal claim about the syntactic position of [COLL]. After all, features may appear distributed along different heads within a single language or across languages. In fact, this is the situation with [PL] which may appear on Number or *n* in English, Spanish, Amharic (Kramer 2016) or Greek (Alexiadou 2011, 2015; Kouneli 2019), but also on D in languages like Persian (Ghomeshi 2003). Thus, it would not be surprising to find [COLL] in a different syntactic position. What is more, given the similarities between [COLL] and [PL], we might find languages where [COLL] is actually a feature on the Number head instead of the nominalizer. If that is the case, the theory I have developed in this chapter makes (at least) the predictions in (68).

(68) If [COLL] is on Number,

a. only count noun bases will bear this feature;

b. [COLL]-marked nouns will enable numeral modification; and,

c. [COLL]-marked nouns allow *one*-substitution.

(68a) is expected if only count nouns project Number; (68b) follows from the hypothesis that the head introducing numerals selects for Number; (68c) follows from the analysis of *one*-substitution as insertion of a vocabulary item *one* on the individuated *n*-head in the context of Number. Grimm and Docekal (2021) report some data from Czech showing that predictions (68a) and (68b) are borne out. They do not discuss *one*-substitution in the language, and thus no claims can be made about (68c) based on their data.

[28] See also Fábregas (2013); Kramer (2015) for evidence that changes in declensional class and gender-marking involve renominalization.

Grimm and Docekal (2021) report that in Czech a morpheme *-í* can be affixed to count noun roots resulting in an interpretation that refers to a 'collection of N'.[29] The authors note that this morpheme is not very productive in the language and its distribution is restricted to a limited set of count nominal roots. In fact, in their footnote 5, they indicate the following: they surveyed 22 *-í*-marked nouns, which, the authors report, comprise the majority of *-í*-marked nouns in the language.

The example in (69) shows that the count noun root for *leaf* can either be overtly plural-marked or *-í*-marked. In addition, they show that if a noun is *-í*-marked then it cannot be subsequently plural-marked. This is illustrated in (70). Grimm and Docekal (2021) gloss *-í*, and its allomorphs, as 'í' but I will gloss it as COLL to indicate its collective contribution to the meaning of the noun.

(69) a. list-y
leaf-M.PL
'leaves'

b. list-í
leaf-COLL
'Foliage'

(70) a. list-í-m
leaf-COLL-INSTR
'foliage'

b. * list-í-mi
leaf-COLL-INSTR.PL
'foliages'

In this respect, the distribution of *-í* in Czech seems very similar to that of *-ery* or *-age* in English: it attaches to a count noun stem and it is in complementary distribution with plural-marking. What is more, when describing the meaning of the *-í*-marked forms, they note the following: "the meanings of nouns derived by *-í* contrast strongly with ordinary plural meanings. [...] [T]he resultant meaning of nouns derived by *-í* is not simply a set of, for example, pine trees, but a set in which the members are coherently related" (Grimm and Docekal 2021, p.93). This semantic contribution resembles what [COLL] is doing for English and Spanish.

[29] Grimm and Docekal (2021) indicate that the morpheme *-í* has several allomorphs such as *-ovi*, which, as far as they are aware, make no semantic difference. I want to note the following: (i) Grimm and Docekal (2021) do not consistently gloss the gender on the *-í*-marked nouns; and, when they do, the gender on the *-í*-marked nouns seems to change to 'neuter' (NT). See Grimm and Docekal (2021, p.92: ex.10b), included in this dissertation as (72). (ii) Grimm and Docekal (2021) do not always provide a complete morphological segmentation of the nouns and they do not always provide perfect minimal pairs.

The fact that only count noun bases are compatible with this *-í*-marking is consistent with the prediction in (68a). However, it is not conclusive evidence that *-í* is spelling out a feature on Number as opposed to *n*. The crucial data come from complex numeral modification. Many Slavic languages, Czech included, have simple cardinal numerals, but also morphologically derived complex cardinal numerals, e.g. Ionin and Matushansky (2018). The latter are used to talk about kinds, groups and collections. See the contrast in (71) taken from Grimm and Docekal (2021, p.94: ex.15).

(71) a. tri námořík-i
three sailor-NOM.PL
'three sailors' simple cardinal numeral

b. troj-ice námořík-ů
three-GROUP sailor-GEN.PL
'a group of three sailors' complex cardinal numeral for groups

Simple cardinal numerals like *tři* 'three' in (71a) are morphologically unmarked and, in the case of numerals 1-4, the NP they modify is nominative and plural-marked. When the numeral is morphologically marked with *-ice* as in (71b), (i) the NP is genitive and plural-marked, and (ii) the numeral root shows suppletion. Besides, complex cardinal numerals marked with *-ice* give rise to a group interpretation: 'a group of X-number of sailors'.

Simple cardinals are ungrammatical as modifiers of *-í*-marked nouns, as (72) shows. However, Czech has another complex cardinal numeral which is marked *-oje* (for numerals 2-3) and *-ery* (for numerals above 3) and it translates as '2/3/4...collections'. We can call this numeral 'collective cardinal' and I gloss it as such (COLL.CARD). Crucially, collective cardinal numerals are grammatical with *-í*-marked nouns, but ungrammatical with plural-marked nouns such as *table* as shown in (73).

(72) a. dva list-y
two.M leaf-M.PL
'two leaves'

b. * dvě list-í
two.NT leaf-NT.COLL
Lit.: 'two foliages'

(73) a. ?? dv-oje stol-y
two-COLL.CARD table-PL
'two sets of tables'

b. dv-oje nádob-í
two-COLL.CARD container-COLL
'two sets of dishes'

As the datapoint in (73b) illustrates, an *-í*-marked noun such as *nádobí* 'dishes' can be directly modified by a collective cardinal *dvoje* 'two (collective)'. This fact is what makes this subclass of nouns in Czech different from object mass nouns in English and Spanish. Under the proposal advanced in this dissertation, direct numeral modification is only possible if Number has been projected: CARD introducing numerals in its specifier bears a feature [•Number•]. The fact that *-í*-marked nouns in Czech can be directly modified by a numeral, in addition to their being formed on top of count nouns stems, is therefore evidence that the [COLL] feature responsible for generating the 'collection' interpretation is located on Number, as schematized in (74a).

(74) a. $[_{\text{CARDP}}\ [\#_{[\text{uAGR:}\underline{\text{COLL}}]}\ ]\ [_{\text{CARD}'}\ \text{CARD}_{[\bullet\text{Number}\bullet]}\ [_{\text{NumP}}\ \text{Number}_{[\text{COLL},\ \bullet\text{IND}\bullet]}[_{n\text{P}}\ n_{[\text{IND}]}\ \sqrt{\text{ROOT}}]]]$ = (73b)

b. $[_{\text{CARDP}}\ [\#_{[\text{uAGR:}\underline{\text{PL}}]}\ ]\ [_{\text{CARD}'}\ \text{CARD}_{[\bullet\text{Number}\bullet]}\ [_{\text{NumP}}\ \text{Number}_{[\text{PL},\ \bullet\text{IND}\bullet]}\ [_{n\text{P}}\ n_{[\text{IND}]}\ \sqrt{\text{ROOT}}]]]$ = (72a)

[COLL] is spelled out as /*-í*/, and it surfaces on the noun. *-oje* on the numeral can be analyzed as the result of nominal concord between the numeral and the [COLL] feature on Number (Norris 2014; Ionin and Matushansky 2018).[30] Plural-marked count nouns have a similar underlying structure but differ in the set of features that they bear on Number, e.g. (74b); as a result, a plural morpheme is exponed on the noun and no *-oje* surfaces on the numeral.[31]

If we were to locate the feature on a layered *n* instead, as we did for English and Spanish, we would account for the complementary distribution of [COLL] and [PL] but we would be left with no explanation as to why numerals can modify [COLL]-marked nouns in Czech but not in English or Spanish. That said, we

[30] Contrary to the complex numeral in (71b), Grimm and Docekal (2021) claim that both collective and simple cardinal numerals must agree with the noun they modify in case and number – and given their glossing, gender too. However, this is difficult to determine given that case and number morphology on the numeral are never mapped to an overt exponent (at least in the examples they provide).

[31] Grimm and Docekal (2021, p.97) report that collective cardinals can also modify pluralia tantum nouns and "entities that typically come together in multiples". These two other classes of nouns are not *-í*-marked: *brýle* 'glasses' (pluralia tantum), *hranolky* 'French fries' (multiples).

can conclude that the location of the [COLL] feature is subject to variation, just like [PL] is (Wiltschko 2021, for an overview): in some languages, it will be located on *n*, while in others it will be located on Number. This is how we account for the variation between Czech and English/Spanish summarized in (75): [COLL] is a nominalizing feature in English/Spanish, but it is a Number feature in Czech.

(75) a. English/Spanish: *n*[PL/COLL], Number[SG/PL]

b. Czech: Number[SG/PL/COLL]

3.4 Conclusion

This chapter has focused on setting the bases for the theory of number and individuation that I will develop throughout the dissertation. At an empirical level, the goal of the chapter has been to provide a formal analysis of the different asymmetries between the classes of count and mass nouns: number-markedness, modification by numerals and/or stubbornly distributed adjectives, determiner restrictions, and ellipsis options.

I have proposed that separating the roles of individuation and number helps account for these asymmetries. An important motivation for this analytic move was the Plural-Count Generalization. In particular, mass nouns may not be specified for individuation and do not project Number. Number, as a dedicated functional projection, is contingent upon the noun being marked for individuation. Many of the asymmetries between the classes can be derived by virtue of Number not being projected. The conclusions that we arrive to can be summarized as follows: numerals require Number; (a projection as high as) Number enables modification by Stubbornly Distributive adjectives; and, Number licenses [E]-marking of its complement's head, resulting in *one/otro*-substitution.

There existed two paradoxical cases: plural mass and object mass. The former resemble plural count nouns in morphological markedness, but nothing else. The latter share with count nouns the fact that they can be modified by adjectives like *large* or *round*. Regarding the first paradox, I have argued that despite

them both being plural-marked, there is a structural difference with respect to the source of plural-marking: *n* or Number. Plural mass nouns, though, are still unmarked for individuation.

Regarding the second paradox, I put forth the hypothesis that object mass nouns are built on top of an individuated *n*P shell. What is more, this layered head in languages like English or Spanish is not Number or [PL], and it would be a mistake to label it as such. This head is a nominalizer bearing the feature [COLL], and it is in fact in competition with Number for merger. Therefore, there is nothing lexically special about this class of nouns: their properties are determined by the syntax. This novel analysis does not only account for why there are many count-object mass doublets, but also for other properties, including lack of overt plural-marking, root-allomorphy, and the enabling of adjectival modification. Besides, lacking Number but being [IND]-marked ensures that the noun has discrete separable units in its extension. This, I will argue in the next chapter, will be crucial for their symmetrical behavior with count nouns in terms of their semantics.

With respect to the determiners, the analysis sheds light onto the generalization about determiner distribution more generally and the interaction of this class of syntactic objects, number and invidividuation. The descriptive generalizations in (72) from Chapter 2 can be reformulated in more abstract terms in (76).

(76) a. If a determiner is sensitive to [IND]-marking, it will be also sensitive to Number.

b. If a determiner is sensitive to [PL], it need not be sensitive to [IND].

c. There is no determiner that is exclusively sensitive to the noun being mass.

These facts, in concert with the other properties surveyed, emphasize the hypothesis that there are few, if any, grammatical markers that track or encode 'mass'. Rather, being mass is better instantiated by the lack of count properties. This also brings us back to the situation with QAs. The distribution of the different forms of QAs is not lexically determined, but grammatically so. QAs across many languages are sensitive to φ-features on the extended projection of the noun that they modify. Plural was such a feature in the case of

English and Spanish. Thus, the *much/many* distinction, even in cases where it seems to have been neutralized, is no different than the *mucho/muchos* distinction in Spanish or the *mere/flere* 'more$_{\text{mass}}$/more$_{\text{plural-count}}$' distinction in Norwegian (Cleani and Toquero-Pérez 2022): allomorphy on the measure root at the point of Vocabulary Insertion triggered by a local plural feature. Such a view on QA distribution is not only aligned with the view that QAs are morpho-syntactically complex (Bresnan 1973; Hackl 2000; Bobaljik 2012; Dunbar and Wellwood 2016), but also with the view that measure morphemes are semantically underspecified (Wellwood 2015, 2018, 2019). This way of thinking, in concert with the theory of number and individuation developed, helps us predict the type of alternations that we might observe cross-linguistically and also it will help us predict when the combination 'QA + N' can be interpreted in terms of cardinality uniformly across languages.

Chapter 4

Canonical Dimensions of Measurement: when *more N* means 'cardinality'

The discussion in Chapter 2 and Chapter 3 was concerned with four syntactic asymmetries observed across the classes of count and mass nouns. These chapters served to set the descriptive and analytic basis for what it means to be 'count' like *book* and also 'mass', including its different subtypes. There is one more asymmetry that needs to be addressed and this is concerned with the semantic interpretation of these nouns when modified by QAs. This chapter focuses on this semantic asymmetry.

It has been observed that the interpretation of canonical and plural mass nouns differs from the interpretation of plural count nouns and object mass nouns, when these are modified by QAs (Solt 2009, 2015; Bale and Barner 2009). Namely, while the former are interpreted in terms of 'volume' or 'weight', the latter are univocally interpreted in terms of 'cardinality'. See the contrasts in (1) and (2).

(1) Positive QA + Mass NP

a. much coffee — VOLUME, WEIGHT

b. much/%many suds — VOLUME, WEIGHT

c. much jewelry — CARDINALITY, #VOLUME

(2) Positive QA + plural count NP

a. many coffees — CARDINALITY, #VOLUME

b. many bubbles — CARDINALITY, #VOLUME

c. many jewels — CARDINALITY, #VOLUME

This difference in interpretation also survives when the QA surfaces in its comparative form. This is illustrated in (3) and (4).

(3) *more* + Mass NP

a. more coffee — VOLUME, WEIGHT

b. more suds — VOLUME, WEIGHT

c. more jewelry — CARDINALITY, #VOLUME

(4) *more* + plural count NP

a. more coffees — CARDINALITY, #VOLUME

b. more bubbles — CARDINALITY, #VOLUME

c. more jewels — CARDINALITY, #VOLUME

(Plural) count nouns and object mass nouns are therefore countable: the can be measured along a cardinality scale; the other nouns, i.e. canonical and plural mass nouns, are non-countable. Based on these two sets of facts, two possible empirical generalizations have been identified: Uniform Dimensionality (Hackl 2000; Solt 2009, 2015; Snyder 2021), and the Cardinality Generalization (Bale and Barner 2009; Wellwood et al. 2012; Wellwood 2018).[1]

(5) **Uniform Dimensionality (UD)**

Many is associated with cardinality, while *much* is associated with other dimensions.

(6) **The Cardinality Generalization**

Comparatives with object mass nouns (e.g. *furniture, jewelry, footwear, baggage* etc.) and all plural count nouns permit only cardinality-based interpretations.

There is one way to link the two generalizations and subsume the Cardinality Generalization as a subset of UD. On such a view, comparative morphemes are ambiguous and can be formed on top of two different positive bases: (i) MUCH + COMPR is spelled out as *more* and (ii) MANY + COMPR is also spelled out as *more*. The former would be underspecified for the dimension of measurement it introduces, whereas the latter will select for plural count nouns and be univocally associated with the dimension of cardinality. This explanation conforms to UD.

[1]The formulation of UD in (5) is taken from Solt (2009). The generalization in (6) is based on the original formulations from Bale and Barner (2009); Wellwood (2018). As formulated in (6), it is meant to capture the empirical observations and remain neutral about whether mass nouns like *jewelry* are inherently plural. Besides, I want to note that none of these authors call the generalization in (6) 'the Cardinality Generalization'. Bale and Barner (2009), who made the original observation, do not give it a name; Wellwood (2018, p.79) calls it 'Number' generalization. Since I will be using the label Number for a functional head in the syntax (Ritter 1991), I will refrain from using this name throughout the dissertation.

It should be noted that UD is a generalization about surface forms of QAs. Based on the data discussed in Chapter 2 and the analysis in Chapter 3, it is clear that even for a language like English UD does not make the right predictions. First of all, plural mass nouns may be modified by *many* for some speakers (also Smith 2021); and second of all, object mass nouns, which are measured along a cardinality scale, are unacceptable with *many*.

Besides, this asymmetry in meaning is more generally observed across languages (Lima 2014; Deal 2016a, 2017; Doetjes 2021), which it makes it a good candidate for a language universal. However, stating UD as in (5) misses this generalization. In particular, this is so because, as I hypothesized in Section 3.2.4.2, the surface form of the QA is sensitive to number marking not necessarily semantic interpretation. In fact, in Spanish if the plural-marked noun is count, then a cardinality interpretation obtains as illustrated by the contrast in (7a) and (7b) from Cleani and Toquero-Pérez (2022, p.713). If the plural-marked noun is mass, the QA will still be plural-marked but the dimension of measurement is not cardinality as shown in (8).[2]

(7) a. tanta naranja
as.much.F orange
'(as) much orange' #CARDINALITY, VOLUME

b. tanta-s naranja-s
much.F-PL orange.PL
'(as) many oranges' CARDINALITY, #VOLUME

(8) [*The Spanish government and the US government both sent a provision batch to the affected town: the former sent a truck with 50 kilos of provisions contained in 5 boxes; the latter sent a red truck with 50 kilos contained in 10 boxes*]

a. El gobierno español mandó tanto-s vívere-s como el americano
the government Spanish sent as.much.M-PL provision-PL like the american
Lit.: 'The Spanish government sent as many provisions as the US government'

[2]In Section 4.4.2, I will show data from Greek and Telugu. In both languages, the plural-marked form of the QA is used with plural mass nouns and the interpretation is not in terms of cardinality.

Int.: The Spanish government sent as {much/ %many} provisions as the US government

#CARDINALITY, VOLUME

b. * ... tanto vívere-s como ...
as.much.M provision-PL

Lit.: 'much provisions'

Int.: 'much provisions'

That said, the statement of UD as in (5) entails a one-to-one mapping between surface forms and semantic interpretation which is not supported by the (cross-linguistic) data. In fact, as I argued in Section 3.2.4.2 in Chapter 3, the distribution of the surface forms of QAs could be predicted based on the availability or lack-thereof a plural feature. Besides, by virtue of hard-coding the dimension of cardinality as part of the lexical entry of a putative MANY, and by transitivity its comparative counterpart (e.g. MANY-COMPR), the generalization disregards the interaction between individuation and number, both of which play a core role in determining the count properties of nouns.

A different attempt at unifying the two generalizations is made by Cleani and Toquero-Pérez (2022). Following Wellwood (2015, 2018, 2019), they assume that there is only one underlying and underspecified measure morpheme MUCH that may have different surface forms and they propose a reformulation of UD as in (9).

(9) **Abstract Uniform Dimensionality (AUD)**

If MUCH has (semantic) PL in its scope, the associated dimension of measurement is cardinality.

While their generalization is certainly an improvement over UD and is on the right track to achieve uniformity, this rests on the assumption that the plural feature on mass nouns such as *suds* is uninterpretable. In addition, in order to account for cardinality with object mass nouns, they would probably need to assume that these nouns, like plural count nouns, have [PL] in their extended projection or are lexically specified as such. This is a position which I have argued against on empirical grounds in Section 3.2.3 of Chapter 3.

Thus, the first question that arises at this point is the following:

Q1: What do object mass nouns and plural count nouns have in common that the other subtypes (i.e. canonical mass and plural mass) do not? In other words, what makes the former class countable but the latter non-countable?

Given the in-depth discussion in Chapter 3, the answer is that both types of nouns share the presence of an individuating feature. That is, the key to being countable is being marked for individuation. Since canonical and plural mass nouns are not marked for this feature, they are non-countable. Besides, object mass nouns and plural count nouns both have an additional feature in their extended projection: [PL], in the case of count nouns, and [COLL], in the case of object mass nouns. Both of these features are responsible for creating pluralities.

The second question that arises is formulated below:

Q2: Is it possible to unify both (an empirically accurate version of) UD and the Cardinality Generalization in (6) into a single generalization?

The answer that I will argue for is that unification is indeed possible and empirically justified. In fact, under a decompositional approach to QAs like the one adopted in Chapter 3, based on insights from Bobaljik (2012); Dunbar and Wellwood (2016) according to which comparative and positive forms of QAs stand in a containment relation, whatever is said about the positive will be true about the comparative. The generalization that I propose is stated as in (10), where $\sqrt{\text{MEAS}}$ is the measure root.

(10) **The Cardinality Generalization Redux**

When Deg, i.e. [$\sqrt{\text{MEAS}}$ Deg], has an individuated plurality in its scope, the associated dimension of measurement is cardinality.

As I will argue, there are (at least) two ways of accomplishing an individuated plurality: by having [PL] or [COLL] on top of the *n*[IND] head. When the DegP has either configuration in its syntactic scope, the dimension

that the measure-root $\sqrt{\text{MEAS}}$ will be assigned will be cardinality. I will then show how this generalization also fares better cross-linguistically than UD by looking at languages like Greek and Telugu.

4.1 Meaning asymmetries

Bale and Barner (2009, p.224: ex.10) observe that the interpretation of the sentences in (11) varies according to the denotation of the noun phrase.

(11) a. Esme has more chairs than Seymour has tables. CARDINALITY, #VOLUME

b. Esme has more water than Seymour has juice. #CARDINALITY, VOLUME

c. Esme has more rope than Seymour has string. #CARDINALITY, LENGTH

d. Esme has more gold in her ring than Seymour has silver in his necklace. #CARDINALITY, WEIGHT %

The sentence in (11a) has a plural count noun *chairs* as the object of comparison. What is being compared is the cardinality of chairs that Esme has and the cardinality of tables that Seymour has. All the other sentences in (11) involve a mass noun: *water/juice, rope/string, gold/silver*. In none of these cases is the cardinality interpretation available: (11b) is comparing Esme's volume of water to Seymour's volume of juice; (11c) is comparing the length of Esme's rope to the length of Seymour's string; and, (11d) is comparing the proportion of gold's weight in Esme's ring to the proportion of silver's weight in Seymour's necklace (Bale and Schwarz 2019; Bale et al. 2020).

Bale and Barner (2009) conclude that comparative constructions are a reliable diagnostic to classify NPs as being countable or non-countable. The generalization that arises is that cardinality is the default dimension of measurement for plural count nouns and object mass nouns. Thus, the distinction is between the nouns that require measurement by cardinality and those that do not. These observations are not only applicable to comparatives since, as Solt (2009, 2015) has shown, they can be extended to nouns modified by QAs in their positive form.

In this section, I will apply the dimension of measurement diagnostic to the classes of nouns identified in Chapter 3. I will do that by looking at data from Spanish and English, as I did there. I will focus on the interpretation of the nouns when modified by different forms of QAs, including but not limited to comparatives.

4.1.1 The interpretation of QAs with plural count and canonical mass nouns

We have already seen in (11) that for canonical count and mass nouns the application of the comparative test yields the expected asymmetry between the two classes of nouns. Example sentences in (12) illustrate that the same interpretations are obtained (i) when the context is controlled for and (ii) when the target noun has a "shifted" interpretation.

(12) a. *[Barney has 5 chairs which are small and light. Robin has 2 chairs, but they are large and heavy]*

Barney has more chairs than Robin does. CARDINALITY, #VOLUME, #WEIGHT

b. *[Barney has 5 gallons of beer stored in a single bottle. Robin has 2 gallons of beer stored in 3 bottles.]*

Barney has more beer than Robin does. #CARDINALITY, VOLUME

c. *[Barney broke 2 bottles of beer that each held 1 gallon. Robin broke a single bottle of beer that held a total volume of 5 gallons.]*

Barney broke more beers than Robin did. CARDINALITY, #VOLUME

The sentence in (12a) is true in the context where Barney has a greater number of chairs than Robin does regardless of whether Robin's chairs are heavier and bigger: 5 chairs > 2 chairs. In (12b), the situation is different. Robin has a greater number of beer containers than Barney (i.e. 3 > 1), whereas Barney has a greater volume of beer than Robin (i.e. 5 gallons > 2 gallons). The sentence is true in the context provided because the comparison is being established in terms of volume, not cardinality. If we pluralize *beer* and

make it count with a container interpretation, as in (12c), the opposite holds: the sentence is true because Barney broke a greater number of beer containers than Robin despite hers being more voluminous.

In addition to comparatives, Solt (2009, 2015) observed that the interpretation of count and mass nouns can be differentiated by using the following two diagnostics: (i) degree questions; and (ii) equatives.[3]

According to Solt, degree questions such as (13) force cardinality answers: the addressee can reply to the question with a number (e.g. 5), indicating numerosity, but not with an amount such as $5kgs$ which is suggestive of 'volume' or 'weight'. However, questions like (14) force a non-cardinality answer.

(13) A: How many potatoes did you buy? B: {5 (potatoes)/ #5kgs}

(14) A: How much potato did you buy? B: {#5 (potatoes)/ 5kgs}

There is a caveat with questions: Cleani and Toquero-Pérez (2022) note that degree questions may not be a reliable diagnostic and report that across languages speakers tend to readily accept answers like the ones Solt marks with '#'. That is why they are not a conclusive diagnositc on their own.

Likewise, according to Solt (2009, p.62), equatives (e.g. *as many/much …as*) with a plural count noun only allow for a cardinality interpretation. If *potatoes* could be interpreted along a weight scale, the sentence in (15a) should be interpretable: both Fred and John have a total of $4kgs$. However, the sentence is false in the context provided. The true counterpart is in (15b), which suggests that the only possible dimension of

[3]To this we could add Snyder's (2021) anaphoric *that much/many*. According to Snyder (2021) anaphoric *that much/many* can make reference to the either the relevant number in the context and thus enforce a cardinality interpretation or to the relevant amount and thus enforce a volume or weight interpretation. The difference between anaphorically picking out a cardinality or a weight/volume is determined by the type of noun: plural count and mass noun, respectively. This is illustrated in (viii) and (ix).

(viii) *[John ate 3 potatoes a year]*

a. Ash ate that many potatoes a year too.

b. # Ash ate that much potato a year too.

(ix) *[John ate 3kgs of potatoes a year]*

a. # Ash ate that many potatoes a year too.

b. Ash ate that much potato a year too.

In (viii), *that many potatoes* is felicitous in the context because the the anaphoric degree expression is making reference to the number of individual potatoes. In contrast, *that much potato* in (viii.b) is not felicitous because there is no salient amount/weight of 'potato stuff' that is made available in the context. However, in (ix) the opposite situation obtains. I have decided not to illustrate this diagnositc here, but nothing crucial hinges upon this decision since the result correlates with the other tests. See also Cleani and Toquero-Pérez (2022).

measurement is cardinality: the number of potatoes that Fred has, i.e. 7, is not equal to or greater than the number that John has, i.e. 10.

(15) *[Fred has 7 potatoes weighing 4 kilos in total. John has 10 (smaller) potatoes weighing 4 kilos in total]*

a. # John has as many potatoes as Fred.

b. Fred doesn't have as many potatoes as John.

If on the contrary, the noun *potato* is not pluralized, and *potato* refers to something like 'potato stuff' rather than an 'individual potato', the dimension of cardinality is not available. In fact, the dimension of measurement is something like 'weight' given the context in (16).

(16) *[Fred has 7 potatoes weighing 4 kilos in total. John has 10 (smaller) potatoes weighing 4 kilos in total]*

John has as much potato as Fred.

All these diagnostics indicate that when the noun is a plural count one, it must be interpreted in terms of cardinality when modified by a QA (both in comparative and positive form). However, when the noun is mass, cardinality is not available.

Turning to Spanish, the comparative morpheme is *más* 'more/-er' and the standard of comparison may be introduced by a complementizer *que* 'that' or a preposition *de* 'of'. The choice of one standard over the other depends on whether the constituent inside the standard is a full clause or a Measure Phrase respectively (Toquero-Pérez 2023b). The interpretation of nominal comparatives in the language is like English. This is illustrated in (17), using the same contexts as in (12) for English, with clausal comparatives.

(17) a. Barney tiene más silla-s que Robin.
Barney has more chair-PL that Robin
'Barney has more chairs than Robin does' CARDINALITY, #VOLUME, #WEIGHT

b. Barney tiene más cerveza que Robin.
Barney has more beer that Robin
'Barney has more beer than Robin does' #CARDINALITY, VOLUME

c. Barney rompió más cerveza-s que Robin.
Barney broke more beer-PL that Robin
'Barney broke more beers than Robin did' CARDINALITY, #VOLUME

When the noun is plural and count as in (17a) and (17c) the only possible interpretation is one where the cardinality of chairs or beer-units is being compared. On the contrary, when the noun is mass and unmarked for number, as in (17b), a non-cardinality measurement is the only option.

With respect to the positive form of QAs, we have already seen in Chapter 3 that they obligatorily agree in number and gender with the noun they modify. Thus, the *much/many* distinction is marked by the presence or absence of plural agreement on the QA. Before delving into the relevant diagnostic examples, it is worth reminding ourselves that Spanish has two distinct measure morphemes roughly corresponding to *much/many*: *tant-M/F-PL* 'as/so much' and *much-M/F-PL* 'much'. The distribution of these two morphemes in the language is slightly different. This is illustrated in (18)-(19).

(18) Degree Questions

a. { Cuánto-s/ Qué tanto-s} niño-s …
how.much.M-PL/ what as.much.M-PL kid.M-PL
Lit.: '{How many/ what as many} kids?

Int.: 'How many kids?

b. * { Cuán mucho-s/ Qué tan mucho-s} niño-s …
how.as much.M-PL/ what as much.M-PL kid.M-PL
Lit.: '{How many/ what as many} kids?

Int.: 'How many kids?

(19) Equatives

a. tanto-s niño-s
as.much.M-PL kid.M-PL
'as many kids'

b. * Tan mucho-s niño-s …
as much.M-PL kid.M-PL
'As many kids'

Degree questions in (18) and equatives in (19) are all built using *tanto/a*, and never *mucho/a*.[4] *Mucho/a* is generally found bare, namely in attributive position following a determiner as in (20a), determinerless NPs as in (20b), in the differential position of a comparative as in (20c) or in predicative position (20d).

(20) a. Hablaron de lo-s mucho-s niño-s afectados por el conflicto.
spoke.3PL of the.M-PL much.M-PL kid.M-PL afected.M.PL by the conflict
'They talked about the many children affected by the conflict' (attributive)

b. Hablaron de mucho-s niño-s afectados por el conflicto.
spoke.3PL of much.M-PL kid.M-PL afected.M.PL by the conflict
'They talked about many children affected by the conflict' (determinerless)

c. Mucho-s más niño-s que niña-s
much.M-PL more kid.M-PL that kid.F-PL
'Many more boys than girls' (differential)

d. Los niño-s eran mucho-s
the kid.M-PL be.IPFV.3PL much.M-PL
'The boys were many' (predicative)

[4]With adjectives, *tanto/a* and the interrogative counterpart are syncopated. This is shown in (x).

(x) a. Mi casa es {* tanta/ tan} bonita como la tuya.
my house is as.much.F/ as beautiful like the yours
'My house is as beautiful as yours is'

b. {* Cuánta/ Cuán/ Qué tan} bonita es su casa?
how.as.much.F/ how.as/ what as beautiful.F is his house?
'How beautiful is his house?

With these facts in mind, we can now look at the interpretation of nouns when modified by QAs like *tanto/a* and *mucho/a*. Starting with degree questions, we observe that generally they only accept answers that are interpreted along a cardinality scale when the noun is plural count.[5] This is shown in (21).

(21) *[Manuela goes to the store and buys 100 oranges worth 50lbs. Diego goes to the store and buys 80 oranges worth 50lbs. Manuela asks:]*

a. M: Cuánta-s naranja-s compraste?
how.much.F-PL orange.F-PL bought.2SG
'How many oranges did you buy?'

b. D: Mucha-s naranja-s, pero no tanta-s como tú. De hecho compré 80.
much.F-PL orange.F-PL but NEG as.much.F-PL like you in fact bought.1SG 80
'Many oranges, but not as many as you did. In fact, I bought 80.'

c. D: # mucha-s libra-s, tanta-s como tú: también compré 50 libra-s.
much.F-PL pound.F-PL as.much.F-PL like you also bought.1SG 50 pound.F-PL
#'Many pounds, as many as you did: I also bought 50lbs'

It is possible for Diego to answer the question as in (21b) using *muchas* to indicate a large unspecified number of oranges. As the continuation with both the equative and the numeral indicates, the answer is indeed referring back to the number of oranges and not to the pounds. In fact, Diego cannot answer the question to refer back to the amount/volume of oranges in pounds, as the alternative answer in (21c) shows.

As opposed to plural count nouns, canonical mass nouns do not receive a cardinality interpretation when modified by a QA. For example, the question in (22) probes for the weight of oranges in kilos, and not the individual oranges themselves. In addition, the fact that only the answer in (22b) is felicitous indicates that what is being compared is not the cardinality of oranges but their weight.

(22) *[Manuela has 100 oranges weighing 50kgs in total. Diego has 80 oranges weighing 50kgs total. Manuela asks:]*

[5] Again, see Cleani and Toquero-Pérez (2022) for some cautionary considerations.

a. M: Cuánta naranja tienes?
how.much.F orange.F have.2SG
'How much orange do you have?'

b. D: Mucha, de hecho tanta como tú: 50kgs.
much.F of fact as.much.F as you 50kgs
'Much orange, in fact as much as you: 50kgs.'

c. D: # Mucha(-s), pero no tanta(-s) como tú: 80 naranja-s.
much.F-PL but NEG as.much.F-PL as you 80 orange-PL
#'Much, but not as much as you: 80 oranges'

We can conclude from this subsection that plural count nouns are always interpreted along a cardinality scale when modified by QAs in both English and Spanish. This is compatible with the discussion in Bale and Barner (2009) and Solt (2009, 2015).

4.1.2 The interpretation of QAs with plural mass nouns

When describing the morpho-syntactic properties of plural mass nouns, we concluded that these were no different from canonical mass nouns like *water*. The only difference was the obligatory plural marker located on the *n*. In terms of their interpretation in comparative constructions, we observe that the parallel behavior with canonical mass nouns also holds. For example, this is shown in (23).

(23) *[There are two small heaps of suds in the bathtub, whereas there is a single large heap of suds in the sink.]*

There are more suds in the sink than in the bathtub. #CARDINALITY, VOLUME

(23) is acceptable in a context where what is being measured is the amount or volume of suds covering the tub or sink. However, if the relevant intended dimension of measurement was cardinality, the sentence cannot be interpreted as true in the context.

With respect to the situation with the positive form of the QA, we must be reminded of the variation across English speakers: some only accept *much* with plural mass nouns while others also accept *many*. The choice of QA does not seem to affect the interpretation. This is shown in (24a) and (24b).

(24) a. A: How {much/ %many} suds are in the sink? B: {a large volume/ #a large number}

b. There aren't as {much/ %many} suds in the bathtub as in the sink. #CARDINALITY, VOLUME

The interpretation of plural mass nouns when modified by QAs, regardless of their surface form, is in terms of volume and not cardinality. Thus, an acceptable answer to the question in (24a) has to make reference to the volume but not the number; and similarly, the sentence in (24b) is acceptable in the context from (23); again, the sentence would be unacceptable in that context if the dimension was cardinality.

There are two main points we can draw from these English data. One is that plural mass nouns do not induce a cardinality interpretation when modified by QAs. The other is that the choice of QA in the positive form does not have an impact on the dimension of measurement or semantic interpretation. This piece of data provides support to the analysis developed in Chapter 3 according to which the variation is a matter of exponence, not lexical properties.

Turning to Spanish, we observe that when plural mass nouns occur in comparative constructions, they cannot induce cardinality interpretations either. An example is shown in (25).

(25) *[The government sent batches of provisions in two different trucks: the blue truck has 50 kilos contained in 5 boxes; the red truck has 30 kilos contained in 10 boxes]*

El camión azul llevó más vívere-s que el camión rojo.
the truck blue carried more provision-PL that the truck red
'The blue truck carried more provisions than the red one' #CARDINALITY, VOLUME

The sentence in (25) is acceptable with the interpretation that the blue truck transported a larger volume of provisions than the red truck did: 50ks > 30kgs. If it was the case that the plural mass noun induced a

cardinality interpretation, speakers would reject the sentence on the basis that they would be tracking the number of the individual boxes of provisions instead: 5 < 10.

The same interpretive results obtain with the positive form of QAs. This is shown with the degree question in (26a) and the possible answer to the question in (26b).

(26) a. Cuánto-s vívere-s llevó el camión rojo?
how.much.M-PL provision-PL carried the truck red
'How much/ %many provisions did the red truck carry?'

b. Mucho-s vívere-s, pero no tanto-s como el azul: 30kgs
much.M-PL provision-PL but NEG as.much.M-PL like the blue 30kgs
'Much/ %Many provisions, but not as much/ %many as the blue one: 30kgs.'

We observe again here that what is being picked out is the volume of provisions in kilograms. Assuming that both 50kgs and 30kgs are large quantities, both trucks carried a large volume; thus, it is acceptable to say *muchos víveres* 'many provisions' in (26b). However, since the blue truck carried 50kgs and the red one only 30kgs, the latter truck did not carry as much.

We must note again that all the positive forms of the QA in Spanish must have obligatory plural-marking if there is a plural: {*cuanto/ mucho/ tanto*}-**s**. These facts, in addition to the variation across English speakers, suggest that the surface form of QAs and the dimension of measurement that they introduce need to be kept separate, contrary to what UD in (5) would predict. This conclusion will receive further support from object mass nouns in the next subsection where the opposite situation obtains: the unmarked form of the QA surfaces (e.g. *much, mucho, tanto*) even though the interpretation is a cardinality one.

4.1.3 The interpretation of QAs with object mass nouns

Bale and Barner (2009) observe that mass nouns can be divided into two types depending on the semantic interpretation they support in comparatives: those that do not allow comparison by number (e.g. *water* or

suds) and those that do (e.g. *furniture* or *jewelry*). In particular, they note that the latter type patterns exactly like plural count nouns in this regard. This is illustrated by the example in (27).[6]

(27) a. *[John bought 5 chairs and a dresser; a total volume of approximately 1.5m^3. Mary bought a large chair, a big desk and a large sofa; a total volume of approximately 4m^3.]*

John has more furniture than than Mary. CARDINALITY, #VOLUME

b. *[John owns 4 rings and a bracelet. Mary owns 2 large necklaces and a tiara.]*

John owns more jewlery than Mary. CARDINALITY, #VOLUME

The comparison in (27a) is being established in terms of cardinality: John has 6 pieces of furniture and Mary has 3. Establishing a comparison in terms of volume is unacceptable even if the total of Mary's furniture pieces is larger in volume than the total of John's. Likewise, (27b) is equivalent to 'John owns more pieces of jewelry than Mary' despite the fact that Mary's are heavier or more voluminous.

If we move outside of the comparative and look at degree questions and equatives, we observe that the cardinality interpretation prevails in those syntactic contexts as well. An example for each construction is given in (28) and (29), the context being the same as in (27a).

(28) A: How much furniture did John buy? B: {6 pieces/ #4m^3}

(29) Mary doesn't have as much furniture as John does. CARDINALITY, #VOLUME

As the examples show, it is possible to answer the degree question in (28) with the phrase '6 pieces' which tracks the number of individual furniture items. On the contrary, an answer that refers to the overall volume, e.g. 4 cubic meters, is unacceptable. Likewise, the equative in (29) is acceptable in the context provided because the number of furniture items that Mary has is not as numerous as the number of items that John has. If volume was the relevant dimension of measurement, we would expect the sentence to be unacceptable.

[6]The volume of furniture has been calculated using the 'NAVTRANS Global Relocation Service' (link). The unit of measurement is cubic meters.

As described and discussed in the previous chapter, the QA must be unmarked for number when modifying these nouns. Thus, while object mass nouns pattern like plural count nouns in terms of their semantic interpretation, they pattern like canonical mass nouns in the choice of QA. This reinforces the hypothesis that the surface form of the QA is sensitive to a number feature, not semantic interpretation.

The Spanish data are no different. Comparatives with object mass nouns are interpreted in terms of cardinality, and nothing else. This is shown for the sentence in (30a), which is equivalent to (30b). We can use the same context as in (27).

(30) a. Juan compró más mobiliario que María.
Juan bought more furniture that María
'Juan bought more furniture than María' CARDINALITY, #VOLUME

b. Juan compró más mueble-s que María.
Juan bought more furniture-PL that María
'Juan bought more furniture items than María' CARDINALITY, #VOLUME

Both sentences in (30) indicate that Juan bought a larger number of furniture items than María did. They differ with respect to the syntactic properties of the noun involved in the comparison, though: an object mass noun that resists overt plural marking in (30a) and a count noun that is overtly plural marked in (30b).

The same interpretations are obtained with degree questions and equatives. This is shown in (31).

(31) a. Cuánto mobiliario compró María?
how.much.M furniture bought María
'How much furniture did María buy?' CARDINALITY, #VOLUME

b. Mucho mobiliario, pero no tanto como Juan: 3 piezas.
much.M furniture but NEG as.much.M like Juan 3 pieces
'Much furniture, but not as much as Juan: 3 pieces.' CARDINALITY, #VOLUME

The question in (31a) is probing the number of furniture pieces that Mary bought. This is supported by the answer in (31b) which is making specific reference to the cardinality of the pieces. In both cases, the QA

cannot be plural marked. This is expected given that the object mass noun is not plural-marked, blocking plural nominal concord inside the DP.

4.2 Taking stock

The data discussed so far conform to the generalizations from Bale and Barner (2009), and subsequent literature after them, that plural count nouns and object mass nouns receive a cardinality interpretation when modified by QAs. That is, the interpretation of cardinality is restricted to these two subclasses of nouns. Narrowing it down, the data support the hypothesis that I have been defending all along that the surface form of the QA is sensitive to plural-marking, not semantic interpretation. The lack of a one-to-one mapping between surface form and semantic interpretation is summarized in Table 4.1, which is a more complete version of Table 2.11 in chapter 3. The table lists the 4 types of nouns that were previously identified and contains information about number marking, its relation to the surface form of the QA and the semantic interpretation associated with the nouns when they occur with these QAs or in comparatives.

Table 4.1: Number marking, choice of QA, and semantic interpretation by noun type (not final)

	Lang.	**Agreement**		**QA form**		**Dimension of measurement**	
Type of N		**SG**	**PL**	**Unmarked** (*much/mucho*)	**PL-Marked** (*many/muchos*)	**CARDINALITY**	**OTHER**
Canonical Mass	*English*	✓	*	✓	*	*	✓
	Spanish	✓	*	✓	*	*	✓
Object Mass	*English*	✓	*	✓	*	✓	*
	Spanish	✓	*	✓	*	✓	*
PL Mass	*English*	*	✓	✓	%	*	✓
	Spanish	*	✓	*	✓	*	✓
PL Count	*English*	*	✓	*	✓	✓	*
	Spanish	*	✓	*	✓	✓	*

As shown in Table 4.1, plural-marking on the noun or the QA does not guarantee that the dimension of measurement will be cardinality. Otherwise, plural mass nouns would form a natural class with plural count

nouns. The opposite is also not true, as instantiated by object mass nouns: lack of plural-marking on the noun and QA does not preclude a cardinality interpretation. If that was the case, object mass nouns would pattern with canonical mass nouns.

At this point we must ask ourselves: in what way(s) do the nouns that are interpreted in terms of cardinality form a natural class? In other words, what makes these nouns countable? The theory of number and individuation that I developed consisted of 4 features (IND, SG, PL, COLL) and depending which of these features were available in the syntactic representation, nouns are classified into different categories. The theory proposed argued for the separation of individuation and number. Given the Plural-Count Generalization I formulated in (70) in Chapter 2, repeated below, we know that number-marking is not a required condition for count syntax, and also it looks like it is not a requirement for a noun to be countable either (e.g. *dregs, suds*). That said, the key element that remains is markedness for individuation. I argue for (32), which is also consistent with the Plural-Count Generalization that .

(32) **The Countability Hypothesis**

Being countable means being marked for individuation.

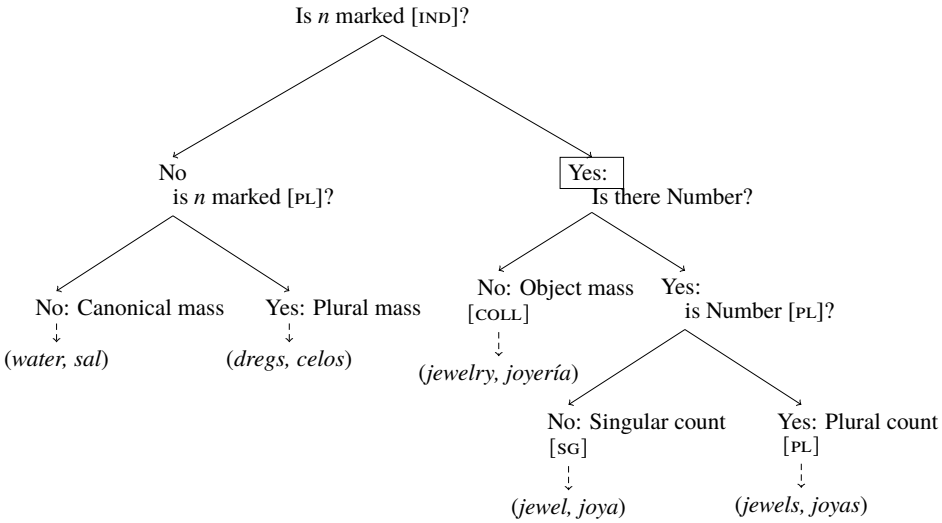
(70) **The Plural-Count Generalization**

In some languages (e.g. English and Spanish) plural-marking on the noun does not entail count noun syntax.

The hypothesis in (32) provides an understanding of what countability is, and how it is different from being count. In particular, it correctly predicts that count NPs are a subset of the NPs that are countable: {count NPs} $\subset$ {count NPs, object mass NPs}. Despite the fact that singular count nouns do not allow QA modification (e.g. **much book*), they can still be counted (i.e. measured along a cardinality scale) via numeral modification: *one book*. I take this as evidence for them being countable. The hypothesis also motivates the separation of individuation from number marking, and more specifically plural-marking: individuation is

the introduction of discrete individuable elements and plural is responsible for sum-formation. Thus, we can represent the countability asymmetries in the dependency tree in Figure 4.1.

Figure 4.1: Predicting countability asymmetries



The dependency tree in Figure 4.1 shows that the dividing feature that groups canonical and plural mass nouns, on the one hand, and object mass and (plural) count nouns, on the other, is [IND] on the nominalizer. QAs require the constituent they modify to be cumulative. Within the natural class of individuated nouns identified in fig. 4.1, there are two ways to satisfy this cumulativity requirement, i.e. by denoting a plurality: via [PL] on Number or [COLL] on *n*. The general picture that arises from this discussion is that the selection of the dimension of measurement as cardinality when the noun is modified by a QA can be predicted by the morpho-syntactic make up of the relevant NP.[7] Against this background, I propose that the actual generalization is what I referred to as the Cardinality Generalization Redux, repeated below.

(10) **The Cardinality Generalization Redux**

When Deg, i.e. [$\sqrt{\text{MEAS}}$ Deg], has an individuated plurality in its scope, the associated dimension of measurement is cardinality.

[7]The generalization extends beyond the NP given that it also holds at the VP level (Wellwood et al. 2012): *Last week John climbed the mountain {as much as/ more than} Mary did* = 'the number of climbing-the-mountain events with John as an agent are as large as/larger than the number of climbing-the-mountain events with Mary as an agent'.

4.3 Analysis

4.3.1 The interpretation of terminal nodes

Roots and categorizers. The decompositional account to syntax adopted in the dissertation entails that nouns are not simple linguistic expressions but are divided into a root and a categorizing head. Each of these pieces provides its own semantic content to the derivation. While the semantics of categorizing heads might be less controversial, i.e. they are functions of some sort: from predicates to predicates (in some cases introducing thematic relations, i.e. Kratzer 1996), there is no consensus regarding the semantics of roots. This is so because root meanings are quite flexible; for example the word for *braid* can refer to a physical object as in *I like Kristen's braids* or an event as in *I braided Kristen a necklace*. That is, in one case the root seems to denote an entity or physical object and in the other it denotes a creation event. For some like Borer (2005a, 2014); Acquaviva (2009), roots are completely void of meaning; for others like Arad (2003); Levinson (2007, 2014) roots are polysemous depending on the environment they occur in; in a similar vein, Pross (2019) proposes that roots are simply mappings from a terminal node to a set of concepts that are compatible with the meaning of the root in a certain (syntactic) context.

What (most of) these proposals share in common, though, is the following two pieces: (i) there must be some degree of flexibility as to what a root actually means; and (ii) the root is required to occur in the context of a categorizer.[8] In this regard, these pieces are not very different from those that are at play during the selection of root allomorphs. That is, a root can have different surface forms and the choice of those surface forms are conditioned by the syntactic context in which the root occurs. We can think of a root as an abstract form that represents a set of possible vocabulary items associated with that root. This is represented in (33).

(33) $\sqrt{\text{ROOT}} = \{vocabulary\ item_1; vocabulary\ item_2; ...vocabulary\ item_n\}$

[8]For example, on the second piece Acquaviva (2009, p.15) writes that roots "have no meanings by themselves but co-occur with category-assigning heads to form interpretable typed grammatical entities".

The vocabulary items in the set are in competition with each other and the one that is selected, i.e. inserted using DM-terminology, must meet the most specific conditions for insertion. This is formalized with VI rules such as the ones in (34) where ⇔ is the function that maps the terminal node to its surface form and κ stands for a categorizer.

(34) a. $\sqrt{\text{ROOT}} \Leftrightarrow$ *vocabulary item*$_1$ / $\_\_\kappa_1$

b. $\sqrt{\text{ROOT}} \Leftrightarrow$ *vocabulary item*$_2$ / $\_\_\kappa_2$

...

According to the rules in (34), the terminal node $\sqrt{\text{ROOT}}$ is mapped to *vocabulary item*$_1$ in the context of head κ_1; it is mapped to *vocabulary item*$_2$ in the context of head κ_2 and so on. We then say that a root is licensed at PF if it has been assigned a vocabulary item in the relevant syntactic context. If no vocabulary item that matches the conditions imposed by the rule, the rule is unlicensed. I propose that the assignment of a meaning to a root is not much different. In particular, building on insights from Pross (2019) and Wood (2023), I propose that root licensing at LF is assigning a meaning to a root from the set of possible meanings that the root is associated with in the context of a categorizer.

I start by assuming that semantics maps syntactic terminals to concepts (Pietroski 2010, 2017; Wellwood 2020). Semantic values (in the sense of Heim and Kratzer 1998) are computed over concepts. We can think of a terminal node root $\sqrt{\text{ROOT}}$ as a set of possible concepts that are compatible with the meaning of that root in a certain syntactic context. We can represent this as in (35).

(35) $\sqrt{\text{ROOT}} = \{\text{CONCEPT}_1; \text{CONCEPT}_2; \text{CONCEPT}_3 ... \text{CONCEPT}_n\}$

Which concept from the set in (35) is selected depends on the categorizer that the root is local to. In this regard a $\sqrt{\text{ROOT}}$ acts as an index and 'fetches' different concepts from the set, e.g. Pietroski (2010), contingent upon the choice of categorizer. We can represent this as in (36) where ↔ is the mapping function.

(36) a. $\sqrt{\text{ROOT}} \leftrightarrow \text{CONCEPT}_1$ / $\_\_\kappa_1$

b. $\sqrt{\text{ROOT}} \leftrightarrow \text{CONCEPT}_2 / \_\_ \kappa_2$

c. ...

The rules in (36) are to be read as 'select this CONCEPT for $\sqrt{\text{ROOT}}$ in the context of this categorizer κ'. The fact that the selection of root meanings at LF requires contextual information as in (36) makes it subject to the Subset Principle (Kiparsky 1973; Halle and Marantz 1993). In this regard, the selection of root-meanings (i) resembles the selection of root-allomorphs and (ii) it is consistent with the other approaches to the meaning of roots: the categorizer and the syntax are crucial in root-meaning selection. Given this parallelism across the interfaces, we can call each of the concepts in the set 'allosemes' of the same root. From now on, I will refer to the mapping rules in (36) as allosemy rules. For more details, see Wood (2023, ch.1).

When it comes to the denotation of count and mass *n*Ps, i.e. [*n*([IND]) $\sqrt{\text{ROOT}}$], the literature has identified an ontological difference between "substance terms" and "object terms" (Soja et al. 1991; Chierchia 1994; Rips and Hespos 2019). We can assume that this ontological difference is reflected in the possible meanings that a root can be associated with. I label these two possible meanings for a root as STUFF and THING.[9] STUFF is to be understood as a placeholder for entities denoting "portions of stuff", "substances", "liquids" and so on; THING is to be understood as a placeholder for entities denoting "physical objects", broadly construed. The STUFF concept seems to correlate well then with non-individuated meanings of $\sqrt{\text{ROOT}}$, whereas the THING concept seems to correlate well with the individuated meaning of $\sqrt{\text{ROOT}}$. Thus, I will refer to each meaning as such.

Suppose then that a root can be associated with the set of concepts in (37). The question is which concept is selected in which context. I propose that the selection of the relevant concept (or alloseme) is triggered by the different categorizing *n*-heads made available by the syntax. In particular, given the hypothesis in (32) that what makes a noun countable is markedness for individuation, I propose the allosemy rules in (38).

(37) $\sqrt{\text{ROOT}} = \{\text{ROOT-THING}; \text{ROOT-STUFF}\}$

[9] I am refraining from using the label object because later on I will use this term with a different meaning.

(38) Allosemy rules for roots in the context of *n*-heads (un)marked for individuation

a. $\sqrt{\text{ROOT}} \leftrightarrow$ ROOT-THING/__n[IND]

b. $\sqrt{\text{ROOT}} \leftrightarrow$ ROOT-STUFF/__n

The $\sqrt{\text{ROOT}}$ associated with the concepts in (37) fetches the individuated root-concept, e.g. ROOT-THING, in the context of n[IND]; otherwise it fetches the non-individuated one, e.g. ROOT-STUFF. To illustrate with a concrete example, let's take the root $\sqrt{\text{APPLE}}$. This root is associated with the set of concepts in (39), and the allosemy rules are in (40).

(39) $\sqrt{\text{APPLE}} = \{\text{APPLE-THING}; \text{APPLE-STUFF}\}$

(40) Allosemy rules for $\sqrt{\text{APPLE}}$ in the context of *n*-heads (un)marked for individuation

a. $\sqrt{\text{APPLE}} \leftrightarrow$ APPLE-THING/__n[IND]

b. $\sqrt{\text{APPLE}} \leftrightarrow$ APPLE-STUFF/__n

APPLE-THING is the things that count as a discrete or atomic apple or apples and APPLE-STUFF is the portions of apple-stuff. The former concept is selected in the context of n[IND], the latter is selected otherwise, i.e. in the context of the n unmarked for [IND]. Given this system, the semantic conditions will be calculated relative to the extensions of the concepts. That is, what goes into the interpretation function $[\![\cdot]\!]$ (in the sense of Heim and Kratzer 1998) is the concept selected by the allosemy rules. For example, this is shown with the model-theoretic denotations in (41) and (42).[10]

(41) a. $[\![\text{ROOT-THING}]\!] = \{x\text{: } x \text{ is an atomic thing or sum of atomic things}\} = \{a, b, c...abc\}$

b. $[\![\text{APPLE-THING}]\!] = \{x\text{: } x \text{ is an atomic apple or sum of atomic apples}\}$

(42) a. $[\![\text{ROOT-STUFF}]\!] = \{x\text{: } x \text{ is a portion of stuff or a sum of portions of stuff}\} = \{a_s, b_s, c_s...abc_s\}$

[10] Under this model, syntactic terminals and non-terminals (phrases or full sentences) are complex concepts as well. Extensional, model-theoretic, semantics then operates on the logical forms of these concepts. Schematically the model looks like in (xi).

(xi) syntax → concepts/thoughts $\overset{[\![\cdot]\!]}{\rightarrow}$world

b. ⟦APPLE-STUFF⟧ = {x: x is a portion of apple-stuff or a sum of portions of apple-stuff}

To continue with the concrete example of the root $\sqrt{\text{APPLE}}$, the extension of ⟦APPLE-THING⟧ is the set in (41) where each lower case letter *a, b, c* is an atomic apple for all *n*-apples there are in the model and their join {*ab, bc, ac, abc*} is the sum of those atomic apples in the model. The extension of ⟦APPLE-STUFF⟧ is then the set in (42) where each lower case letter subscripted with *s* (for stuff) is a portion of apple-stuff, for all *n*-portions of apple-stuff in the model. It has no atoms in its extension. For now on, and as a shortcut, I will use the CONCEPT notation for root-meanings rather than the model-theoretic notation.

Thinking about the selection of root meanings as mappings from a terminal node to a concept unifies the way licensing works at the interfaces: licensing of a root terminal is the insertion of a form or fetching of concept, depending on the interface at work, from a set via a mapping rule. Failure to insert a form or fetch a concept results in the root being unlicensed.

Assuming an algebraic semantics, as established by Link (1983), the concepts denoted by the root $\sqrt{\text{ROOT}}$ in (37) are inherently cumulative (Krifka 1989; Kratzer 2008) via Link's (1983) '*'-operator defined in (43): the '*'-operator maps a set P to a set P' that contains any sum of objects contained in P. I also assuming that that there is a basic relation '≤', defined in (44), which indicates "unstructured parthood" in the sense of Champollion (2010); Champollion and Krifka (2016).[11]

(43) Closure under sum

$^*(P)$ if $\forall x \in P \rightarrow \exists Q[Q \subseteq P \wedge x = \sqcup Q]$

(44) Unstructured Parthood

$\leq = \forall x \forall y, x \leq y$ if and only if $(x \sqcup y) = y$

[11] As Champollion and Krifka (2016, p.369) point out, "unstructured parts need not be cognitively salient parts of the whole but may slice up the whole in arbitrary ways". If X is a set of horses, X' is a subset of them (unstructured parthood); if X is a house, X' is its roof (structured parthood).

The root concepts will then be predicates that are closed under sum, i.e. a predicate whose extension is a complete join semi-lattice. However, depending on the featural make-up of the categorizer, the type of join semi-lattice selected for the root concept will differ. In the spirit of Bale and Barner (2009), I will assume that there are two types of semi-lattices that are relevant: *individuated* semi-lattices and *non-individuated* ones.[12] The crucial component of the *individuated* semi-lattice is that it has atoms as minimal parts, e.g. (45). Atoms are the discrete separable units that will enable counting. The definition of 'atom' is in (46), based on Bale and Barner's (2009, p.238) definition of 'individual'; and the definition of 'minimal part' that I am assuming is in (47).

(45) Individuated semi-lattice

$\mathrm{IND}(P)$ = a predicate P is an individuated semi-lattice iff

a. P is closed under sum, such that if '*' is the sum closure operation, then $P = {}^*P$; and

b. P is generated by the set of atoms in P, such that if atom is the set of atoms in P, then $P = {}^*\mathrm{atom}$.

(46) Definition of atom

An object z is an atom in a set of objects P iff z is a $\mathrm{minimal}$ part for P and for all objects $y \in P$, either (i) $z \leq y$ or (ii) there is no $w \leq z$, such that $w \leq y$.

(47) Definition of $\mathrm{minimal}$ part

$\forall x[P(x) \rightarrow \neg\exists y[P(y) \wedge y < x]]$

'An object x is a $\mathrm{minimal}$ part for a set of objects P iff for all $x \in P$ it is not the case there is an object y, such that $y \in P$ and y is a proper part of x.

[12] For Bale and Barner (2009), there are two types of non-individuated semi-lattices: a *continuous* one and a *limited* one. Both semi-lattices share the fact that they lack what they call 'individuals' in the sense of (46). However, they are different in the while *continuous* semi-lattices do not have minimal parts, every member of the *limited* semi-lattice is composed of minimal parts. For the purposes of this dissertation, it does not matter whether the semi-lattice that mass noun denotations have is *limited* (Chierchia 2010) or *continuous* (Link 1983). The two-way distinction between *individuated* and *non-individuated* is enough.

As Bale and Barner (2009, p.237) point out, the definition of atom in (46) "guarantees that an individuated semi-lattice will not have minimal parts that share an [object]". This seems trivial to see in an individuated semi-lattice like Figure 4.2 because the minimal parts are the single atoms *a, b* and *c*. But, it can be made clear in Figure 4.3: assuming a simple model with only three members {*ab, cd, ef*}, *ab*, *cd* and *ef* are the minimal parts in Figure 4.3. No part of a minimal part can be in another object without all of its parts also being in that object. In other words, since *ab* is a a minimal part in Figure 4.3, because no subpart of *ab* is in any of the objects without the whole *ab* also being part of the object, then *ab* is also an atom.

Figure 4.2: Individuated semi-lattice for thing generated from atoms *a, b, c*

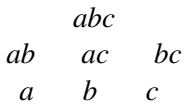
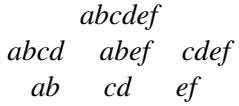


Figure 4.3: Individuated semi-lattice for thing generated from atoms *ab, cd, ef*



In contrast, while *non-individuated* semi-lattices are also closed under sum and thus have a supremum, they are not generated from the set of atoms and lack minimal parts. The definition for the *non-individuated* semi-lattice is in (48) following Bunt (1979); Gillon (1992); Wellwood (2019).[13]

(48) Non-individuating semi-lattice.

Non-IND(P) = a predicate P is a non-individuated semi-lattice iff

a. P is closed under sum, such that if '*' is the sum closure operation, then $P = {}^*P$; and

b. for every object x that is in P there is an object y such that y is also in P and it is a proper part of x

$${}^*P \wedge \forall x[P(x) \rightarrow \exists y[P(y) \wedge y < x]]$$

[13]What I call *non-individuated* in (48) is what Bunt (1979); Gillon (1992); Wellwood (2019) refer to as 'Anti-Atomic'. The definition in (48) is similar what Bale and Barner (2009, p.238) refer to as *continuous* semi-lattice: P is continuous if P is closed under sum and P has no minimal parts.

The two types of semi-lattices differ in whether they have atoms as minimal parts (individuated) or no (non-individuated). Together with the discussion about the concepts that a root is associated with, we can conclude that ROOT-THING is an individuated semi-lattice whereas ROOT-STUFF is non-individuated. This different will be crucial in determining whether the dimension of measurement can be resolved as cardinality.

I propose that the different flavors of n that I identified in Chapter 3 select for one of the two types of semi-lattices on the $\sqrt{\text{ROOT}}$. n underspecified for individuation will select for the non-individuated semi-lattice with no atomic minimal part, i.e. the ROOT-STUFF alloseme. n takes the ROOT-STUFF alloseme and maps it to a type $\langle et \rangle$-predicate with the condition that the predicate has the property of not being individuated. In contrast, n[IND] will select for the individuated semi-lattice, i.e. the ROOT-THING alloseme. n[IND] takes the ROOT-THING alloseme and maps it to a type $\langle et \rangle$-predicate with the condition that the predicate has the property of being individuated. The denotations of these terminal nodes is in (49).

(49) a. $[\![n]\!] = \lambda P.\lambda x.\text{Non-IND}(P)(x)$

b. $[\![n[\text{IND}]]\!] = \lambda P.\lambda x.\text{IND}(P)(x)$

To make things concrete, let's go back to the root $\sqrt{\text{APPLE}}$ in (39). First, the locality of $\sqrt{\text{APPLE}}$ and the underspecified n categorizer triggers the allosemy rule in (40b). This alloseme then saturates n's P-argument. Since the APPLE-STUFF alloseme has no atoms, the non-individuated condition imposed by n is satisfied. This is shown in (50). On the contrary, the locality of $\sqrt{\text{APPLE}}$ and n[IND] triggers the allosemy rule in (40a). This alloseme then saturates n[IND]'s P-argument. Given that APPLE-THING has atomic apples and sums of atomic apples, the individuated condition imposed by the categorizer is satisfied. This is shown in (51).

(50) a. $\sqrt{\text{APPLE}} \leftrightarrow \text{APPLE-STUFF}/\_\_n$

b. $[\![n\ \sqrt{\text{APPLE}}]\!] = \lambda x.\text{Non-IND}(\text{APPLE-STUFF})(x)$ $(e.g.\{a_s, b_s, c_s ... abc_s\})$

(51) a. $\sqrt{\text{APPLE}} \leftrightarrow \text{APPLE-THING}/\_\_n[\text{IND}]$

b. $[\![n[\text{IND}]\ \sqrt{\text{APPLE}}]\!] = \lambda x.\text{IND}(\text{APPLE-THING})(x)$ $(e.g.\{a, b, c ... abc\})$

At the end of the chapter, we will see how this proposal for the meanings of roots and categorizers in tandem with the syntax developed in chapter 3 has important implications for how we understand shifts across classes of nouns within and across languages (i.e. what is sometimes referred to as nominal flexibility or countability shifts, Pelletier 1979; Bunt 1985; Rothstein 2010).[14]

[14]Instead of this approach to root meanings via allosemy, one could adopt a strict model-theoretic approach. I will briefly sketch what that approach would look like here. I thank Deniz Rudin for the discussion to follow. Suppose that a root $\sqrt{\text{ROOT}}$ is a higher order predicate: it is a set of sets or a predicate of predicates. A root $\sqrt{\text{ROOT}}$ denotes a set whose members are themselves sets. We can represent the inventory of meanings of a root as in (xii). Each set within the set in (xii) is a possible meaning associated with the root and can be represented as in (xiii) where α and β are variables of any type (i.e. each set corresponds to its own λ-expression). We can use this notation to refer to a meaning of a root, i.e. one of the possible predicates that the root denotes.

(xii) $[\![\sqrt{\text{ROOT}}]\!] = \{\text{meaning}_1, \text{meaning}_2 \ldots \text{meaning}_n\}$

(xiii) a. $[\![\text{meaning}_1]\!] = \{\alpha\text{: } \alpha \text{ is meaning}_1\}$

b. $[\![\text{meaning}_2]\!] = \{\beta\text{: } \beta \text{ is meaning}_2\}$

Assuming the same ontological difference between object terms and substance terms, let's suppose that a root may denote thing and/or stuff, whose denotations are in (xiv): the extension of thing denotes the set in (xiv.a) where each lower case letter *a, b, c* is an atomic thing or *ab, bc, ac, abc* are the sums of atomic things, for all *n*-things there are in the model; the extension of stuff denotes the set in (xiv.b) where each lower case letter subscripted with *s* (for stuff) is a portion of stuff, for all *n*-portions of stuff in the model. The two denotations for the root differ in whether they have atoms or not. The set in (xiv.a) is generated from the set of atoms and their sums; i.e. the extension of thing is an inherently atomized predicate: it is *individuated*. The set in (xiv.b) is not generated from the set of atoms and has no salient individuation criterion: it is *non-individuated*.

(xiv) $[\![\sqrt{\text{ROOT}}]\!] = \{\text{thing}, \text{stuff}\}$

a. $[\![\text{thing}]\!] = \{x\text{: } x \text{ is an atomic thing or sum of atomic things}\} = \{a, b, c \ldots abc\}$

b. $[\![\text{stuff}]\!] = \{x\text{: } x \text{ is a portion of stuff or sum of portions of stuff}\} = \{a_s, b_s, c_s \ldots abc_s\}$

Each predicate that the $\sqrt{\text{ROOT}}$ denotes is obligatorily licensed in the presence of a categorizer. This is a consequence that the semantics inherits from the syntax: just like a root requires a categorizer to assign a syntactic label to the node that the root adjoins to, a root requires a categorizer to select a meaning from the set of possible associated meanings it denotes.

The denotations of the root do not exist in isolation, but they must be appropriately licensed by a categorizer. Thus, the syntax constrains the lexical semantic interpretation of the root. In a model-thoeretic semantics, we can assume that the licensing is performed via Heim and Kratzer's (1998) Function Application: the categorizer is a function that will take the root as argument and select a possible meaning from the set of root denotata that meets some condition. I propose that an *n*-categorizer takes the denotation of a root and maps it to a type $\langle et \rangle$-predicate making use of the element of that root's denotation that has the property of being individuated or not. Starting with *n*[IND], I propose the denotation in (xv.a).

(xv) a. $[\![n[\text{IND}]]\!] = \lambda\mathcal{P}.\lambda x.\imath P.(\text{IND}(P) \wedge P \in \mathcal{P})(x)$

b. $[\![n[\text{IND}]\ \sqrt{\text{ROOT}}]\!] = \lambda x.\imath P.(\text{IND}(P) \wedge P \in [\![\sqrt{\text{ROOT}}]\!])(x)$

$= \imath P.(\text{IND}(P) \wedge P \in [\![\sqrt{\text{ROOT}}]\!])([\![\text{thing}]\!])$

The *n*-head in (xv.a) takes the root as argument and selects the denotation from the root's denotata that has the property of being individuated: generated from the set of atoms. The individuation function is defined as in (45). The only denotation that matches that condition is $[\![\text{thing}]\!]$. $\imath$'s *P*-argument is thus saturated by the thing-predicate.

As opposed to the categorizer in (xv.a), the *n* categorizer unmarked for individuation features has the denotation in (xvi.a). It takes the root as argument and selects the denotation from the root's denotata that has the property of being non-individuated via the non-individuating function Non-IND, defined as in (48). The only denotation that matches that condition is $[\![\text{stuff}]\!]$. $\imath$'s *P*-argument is thus saturated by the stuff-predicate.

(xvi) a. $[\![n]\!] = \lambda\mathcal{P}.\lambda x.\imath P.(\text{Non-IND}(P) \wedge P \in \mathcal{P})(x)$

b. $[\![n\ \sqrt{\text{ROOT}}]\!] = \lambda x.\imath P.(\text{Non-IND}(P) \wedge P \in [\![\sqrt{\text{ROOT}}]\!])(x)$

$= \imath P.(\text{Non-IND}(P) \wedge P \in [\![\sqrt{\text{ROOT}}]\!])([\![\text{stuff}]\!])$

Singular, plural and collective. In addition to the interpretation of roots and *n*-terminals, we need to assign a meaning to the number features and the collective feature that object mass nouns have. The meaning of [SG] and [PL] are given in (52), after insights from Harbour (2007, 2011, 2014); Wellwood (2018, 2019); Martí (2020b,a).[15]

(52) a. $[\![[\text{SG}]]\!] = \lambda P.\lambda x.P(x) \wedge \text{minimal}(x)$

b. $[\![[\text{PL}]]\!] = \lambda P.\lambda X.\forall x[X(x) \rightarrow (P(x) \wedge \neg\text{minimal}(x))]$

[SG] maps P to a property that only has minimal parts, i.e. the minimal parts that do not share an aggregate. X in (52b) is a plural variable; and, [PL] maps P to a property of pluralities, every non-minmal part of which satisfies P.[16] It is worth noting here that the number features, in particular [PL], do not impose any individuation requirement on their individual argument. This is meant to capture the observation that plural does not entail the NP being countable, i.e. individuated. In other words, [PL] is able to compose with a predicate that has an individuated semi-lattice as well as with one that has a non-individuated semi-lattice. The semantic effects of the number features will differ depending on the type of semi-lattice that their P-argument has. When applied to an individuated semi-lattice such as Figure 4.2, [SG] will remove the non-minimal parts of the lattice, i.e. the sums of atoms: it will return a predicate that is true of atomic minimal parts. When

[15]For Wellwood (2018, 2019) the denotation of [PL] is as in (xvii). What Wellwood calls an atom in (xvii.b) is what I call a minimal part. In addition, the denotation of the plural morpheme encodes a presupposition that its first argument be atomic, i.e composed of single atoms.

(xvii) $[\![[\text{PL}]]\!] = \lambda P$: Atomic(P).$\lambda X.\forall x(X(x) \rightarrow P(x))$

a. Atomic(P) = a predicate P is Atomic if for all x in P, x is an atom

b. atom(x) = for all x, x is an atom if there is no y such that $y < x$

For Harbour (2007, 2011, 2014); Martí (2020b,a), the denotation of the plural morpheme is in (xviii). Again, for them the definition of the function atom is the same as my definition of minimal part from Bale and Barner (2009).

(xviii) $[\![[\text{PL}]]\!] = \lambda P.\lambda x.P(x) \wedge \neg\text{atom}(x)$

$\text{atom(x)} = \neg\exists y[y < x]$

[16]This meaning of the plural gives rise to exclusive pluralities. As mentioned in Chapter 3 Section 4.4.1, the plural in English (and also Spanish, e.g.Martí 2008) can be interpreted inclusively (Krifka 1989; Chierchia 1998b; Sauerland 2003) in some environments. I stay away from this issue here, and assume that whatever is responsible for deriving the inclusive interpretation of the plural is potentially structurally conditioned (Harbour 2016; Ackema and Neeleman 2018; Martí 2020a). In Chapter 5, I provide an explicit account of how to derive inclusive plural readings in Alasha Mongolian via allosemy. This account makes a series of welcome predictions for English too, though it is not free of problems.

applied to individuated semi-lattices such as Figure 4.2, [PL] will have the opposite effect: it will remove the minimal parts, thus returning a predicate that is true of atomic non-minimal parts, i.e. the sums of atoms{*ab, ac, bc, abc*}. Given that non-individuated semi-lattices have no minimal parts, [SG] is not compatible with mass nouns. While predicates with non-individuated semi-lattices have sums, [PL] can apply to them but its application will be vacuous, at most it will remove the smallest subparts in the extension the NP.

Last but not least, I take the meaning of [COLL] to be as in (53). The meaning of this feature is based on Wellwood's (2018; 2019) denotation of the additive plural and Tomioka's (2021, p.492) denotation of the associative plural: as before, X is a plural variable; and R is a free relation variable that refers to some salient association between the members of the plurality and the atomic members of P. We can think of R as Corbett's (2000) 'cohesion of the group' relation.

(53) $[\![\text{[COLL]}]\!] = \lambda P\text{: IND}(P).\lambda X.\forall x[X(x) \rightarrow \exists y[P(y) \wedge \text{minimal}(y) \wedge y \neq x \wedge R(x,y)]]$

'For every x among the Xs, there is an atomic minimal y in P which is different from x and stands in the relation R with x'

Given that the complement of n[COLL] in the syntax is an nP headed by n[IND], I assume that the denotation of the terminal node encodes a presupposition that his first argument be an individuated predicate. This will ensure that COLL's P argument will be an individuated semi-lattice. Having atoms as minimal parts is what will enable counting as well. If we think about what it means for something to qualify as 'jewelry', for instance, we can intuitively say something along these lines: jewelry is a collection of items that are typically made from or contain individual jewels. Similarly, 'footware' is a collection of items that are worn in someone's feet. This is the intuition that the denotation of [COLL] is meant to capture: 'collection of items' = $X(x)$; 'discrete/individual N' = $\text{IND}(P)(y) \wedge \text{minimal}(y)$; 'made from/worn in, i.e. the cohesion of the N group', = $R(x,y)$.

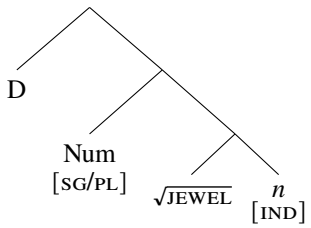
We can summarize the pieces of assumed so far as follows:

- n[IND] selects for a root concept that satisfies the property of being individuated.
- Underspecified n selects for a root concept that satisfies the property of not being individuated.
- Only individuated [n+$\sqrt{\text{ROOT}}$] constituents have atoms as minimal parts which enable counting.
- [SG/PL] restrict the closed-under sum predicate to singletons (minimal parts) or sums (non-minimal parts).
- [COLL] creates collections (i.e. pluralities) out of individuated predicates and is underspecified for a cohesion relation between its members.

4.3.2 Some basic derivations

Before moving on to showing how the Cardinality Generalization Redux is derived, we must look at how the system generates the appropriate interpretations for each class of noun. Starting with count nouns like *jewel(s)*, the structure generated by the syntax and transferred to the semantic derivation is as in (54).

(54) Singular/Plural Count



Given this syntax, and the allosemy rules in conditions in (37) the meaning that will be licensed for the root is the individuated root-concept JEWEL-THING: the set of all jewel-atoms and their sums, e.g. {*a, b, c, ab, bc, ac, abc*}. The unit of individuation is whatever counts as a 'jewel item'. The categorizer then composes with the selected root-concept, and since the concept is individuated, the condition imposed by the n-head is satisfied. If Num is [SG], the extension will be restricted to just the jewel-atoms, i.e. the singletons {*a, b, c*}, as in (55c); if it is plural, the extension will be restricted to just the jewel-pluralities, i.e. the sums {*ab, bc, ac,*

abc}, as in (55d). In other words, a plural-marked count noun is true of pluralities of atomic non-minimal individual parts. The step-by-step derivation is in (55).

(55) *jewel(s) – joya(s)*

a. $\sqrt{\text{JEWEL}} \leftrightarrow$ JEWEL-THING/__n[IND]

b. $[\![n[\text{IND}]\ \sqrt{\text{JEWEL}}]\!] = \lambda x.\text{IND}(\text{JEWEL-THING})(x)$

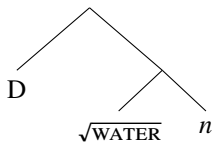
c. $[\![[\text{SG}]\ \ n[\text{IND}]\ \sqrt{\text{JEWEL}}]\!] = [\![[\text{SG}]]\!]([\![(55b)]\!]) = \lambda x.\text{IND}(\text{JEWEL-THING})(x) \wedge \text{minimal}(x)$

d. $[\![[\text{PL}]\ \ n[\text{IND}]\ \sqrt{\text{JEWEL}}]\!] = [\![[\text{PL}]]\!]([\![(55b)]\!]) =$

$= \lambda X.\forall x[X(x) \rightarrow \text{IND}(\text{JEWEL-THING})(x) \wedge \neg\text{minimal}(x)))]$

Moving on to mass nouns, the syntactic structure that the semantic derivation operates on is given in (56). There is no individuated feature on *n*, and subsequently no NumP. As a result, the licensed meaning for the root-concept is WATER-STUFF in (57a), whose extension is a non-individuated semi-lattice. As a result, the condition imposed by *n* will, i.e. that the semi-lattice is a non-individuated one, is satisfied: the set of all portions of water (i.e. all the parts that count as water). The denotation of *water* in (57) is composed of (smaller) water parts (e.g. $w1_s$, $w2_s$) and their sums (e.g. $w1_s w2_s$). None of these parts are atomic.

(56) Mass



(57) *water – agua*

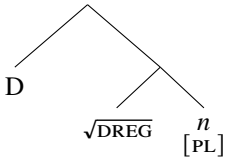
a. $\sqrt{\text{WATER}} \leftrightarrow$ WATER-STUFF/__n

b. $[\![n\ \sqrt{\text{WATER}}]\!] = \lambda x.\text{Non-IND}(\text{WATER-STUFF})(x)$ $\{...w1_s, w2_s, w1_s w2_s...\}$

Next, if the *n* is not specified for individuated, but it is plural, the derivation proceeds as in the case of canonical mass nouns: *n* selects a STUFF denotation for the root. [PL] will then take this predicate as its

argument. However, given that there already are no minimal parts in the extension of the predicate, it is difficult to determine what $[\![[\text{PL}]]\!]$ is restricting the denotation to. We can assume that pluralization of a non-individuated predicate is trivial.[17] The syntactic representation and semantic derivation are in (58) and (59) respectively.

(58) Plural mass



(59) *dregs* or *celos* 'jealousy.PL'

a. $\sqrt{\text{DREG}} \leftrightarrow$ DREG-STUFF/__n

b. $[\![n[\text{PL}]\ \sqrt{\text{DREG}}]\!] = [\![[\text{PL}]]\!]([\![n]\!]([\![\text{DREG}]\!]))$

c. $[\![n\ \text{DREG}]\!] = \lambda x.\text{Non-IND}(\text{DREG-STUFF})(x)\ =$

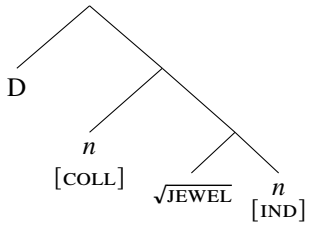
d. $[\![[\text{PL}]]\!]([\![(59c)]\!]) = \lambda X.\forall x[X(x) \rightarrow (\text{Non-IND}(\text{DREG-STUFF})(x) \wedge \neg\text{minimal}(x))]$

Like *water*, *dregs* lacks atoms. Unlike *water*, the denotation of *dregs* is slightly different in that (59c) is true of pluralities of non-atomic subparts.

Last but not least, object mass nouns have the syntax in (60). The root has the same semantics as in (55a) given the locality with n[IND]. After composing with the categorizer as before, the next step in the derivation is the composition with the [COLL] feature. Since its P-argument is an individuated predicate, the presupposition is satisfied. The result is a plurality for every part of which there is an atomic minimal part (y) which is distinct from the member of the plurality (x) and stands in some relation with that member. The derivation is provided in (61).

(60) Object mass

[17] One could imagine that if [PL] has any effect on the nP is the removal of the smallest subparts in the extension of the nP.



(61) *jewelry – joyería*

a. $[\![n[\text{IND}]\ \sqrt{\text{JEWEL}}]\!]$ = (55*b*)

b. $[\![n[\text{COLL}]\ \ n[\text{IND}]\ \sqrt{\text{JEWEL}}]\!] = [\![n[\text{COLL}]]\!]([\![(55b)]\!]) =$

$= \lambda X.\forall x[X(x) \rightarrow \exists y[\text{IND}(\text{JEWEL-THING})(y) \wedge \text{minimal}(y) \wedge y \neq x \wedge R(x,y)]]$

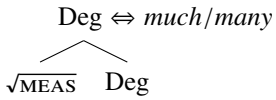
The denotation of *jewelry* is an individuated semi-lattice that contains pluralities of jewelry items. This set is composed of single jewelry items, i.e. the atomic minimal parts, and their sums: {*a, b, c, ab, bc, ac, abc*}. In the case of *jewelry*, the *R* variable can be assigned the value of something like 'made of' or 'contains'. The fact that the denotation of *jewelry/joyería* and *jewels/joyas* both denote an individuated plurality, i.e. plurality built generated from the set of atoms, is what allows them to be measured along the same scale.

4.3.3 Adding QAs into the mix

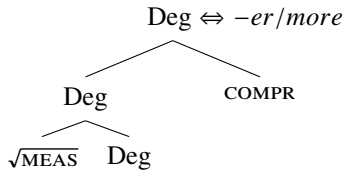
As outlined in Section 3.2.4.2, I am assuming a decompositional approach to QAs. The underlying structures for the positive, comparatives and equative QAs was provided in (47) for English and (48) for Spanish in Chapter 3. For ease of reference, these are repeated in (62) and (63) below, ignoring morpheme linearization. As indicated in that chapter, I take *much, many, mucho, tanto* etc. as different allomorphs of the same underlying measure root $\sqrt{\text{MEAS}}$.

(62) English

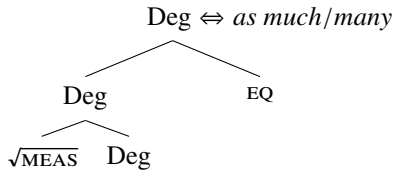
a. Positive



b. Comparative

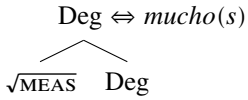


c. Equative

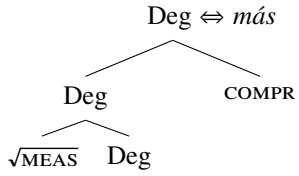


(63) Spanish

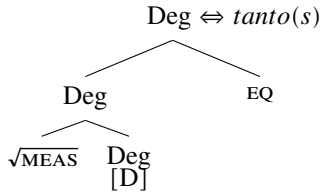
a. Positive



b. Comparative



c. Equative



Following Wellwood (2015, 2018, 2019), I assume that the measure roots have the denotation in (64), licensed against the relevant categorizing head Deg. They introduce a variable ranging over measure functions μ. The value of μ is underspecified and will be determined by the assignment function A. Thus, $A(\mu)$ is the measure function that A assigns to μ. There are some restrictions on the possible dimensions of measurement that A can assign to μ, which I assume are constrained by Monotonicity (Schwarzschild 2006; Nakanishi 2007; Wellwood et al. 2012) defined as in (65).[18]

(64) $[\![\sqrt{\text{MEAS}}]\!]^A = A(\mu)$ $\langle \alpha, d \rangle$

(65) **Monotonicity Constraint**

If two elements (objects, events etc.) x and y in a domain D stand in a proper subpart-superpart relation such that $x < y$, then the measure of the subpart must be strictly smaller than the measure of the superpart

[18] In later work, Wellwood (2015, 2018, 2019) departs from the definition of the Monotonicity constraint in (65). For Wellwood, monotonicity is about structure preservation, not necessarily about part-whole structure preservation.

$\forall x, y \in D$ if $x < y \rightarrow \mu(x) < \mu(y)$

The Monotonicity Constraint allows μ to be resolved with dimensions such as DISTANCE, DURATION, VOLUME, WEIGHT or CARDINALITY: these are all part-whole structure-preserving dimensions. However, it rules out dimensions such as TEMPERATURE or SPEED which are not part-whole structure preserving.[19]

The denotation of the Deg head is as in (66), adapted from Hackl (2000). It is a function from measure functions to a function from degrees to properties of individuals (e), events (v), states (s). The variable α indicates the underspecification of the semantic type. I will assume the theory of comparatives and equatives first proposed by Heim (2001) and later developed by Bhatt and Pancheva (2004, 2007); Toquero-Pérez (2023b). According to these authors, the comparative and equative morphemes are generalized quantifiers over degrees, of type $\langle\langle dt\rangle, \langle dt, t\rangle\rangle$. As generalized quantifiers, they must undergo Quantifier Raising (QR) to a structurally higher position. It is in this position that the *than/as*-phrase will be late-merged, saturating COMPR/EQ's first argument.

(66) $[\![\text{Deg}]\!] = \lambda\mu_{\langle\alpha,d\rangle}.\lambda d.\lambda\alpha.\mu(\alpha) \geq d$

(67) a. $[\![\text{COMPR}]\!] = \lambda P_{\langle dt\rangle}.\lambda Q_{\langle dt\rangle}.MAX(Q) > MAX(P)$

b. $[\![\text{EQ}]\!] = \lambda P_{\langle dt\rangle}.\lambda Q_{\langle dt\rangle}.MAX(Q) \geq MAX(P)$

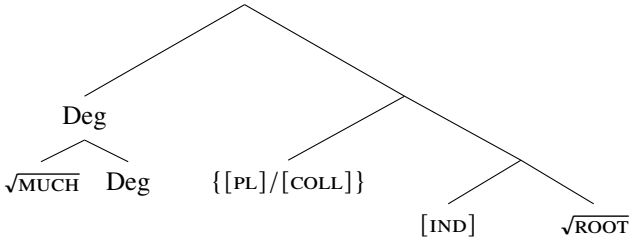
The measure root saturates Deg's first argument. In positive contexts, I will assume that the degree variable of Deg is existentially bound via existential closure, whereas in equatives and comparatives it is saturated by a degree-variable that the comparative/equative terminal has left in its launching site as a result of QR. This variable is then bound via a lambda-abstractor in the terminal's landing site, as per Heim and Kratzer (1998).

Building on insights from Wellwood, I take the value that A assigns to μ to be determined via what is being measured. Crucially, I propose that if the complex Deg head that contains the measure root has an

[19] One notable documented exception to the Monotonicity Constraint is reported in Toquero-Pérez (2022), where verbal comparatives such as *John runs more than Mary* can be interpreted in terms of speed in Iberian Spanish. Alexis Wellwood (p.c.) notes that an expression like *more heat* would also be considered as a counterexample to the Monotonicity Constraint as stated in (65).

individuated plurality in its immediate scope in the syntax, then the value of μ will be affected accordingly: $A(\mu) \rightarrow$CARDINALITY. The structural description that needs to be met for this is schematized in (68), and the definition of a CARDINALITY measure function is in (69).[20]

(68) Structural description for the resolution of μ as CARDINALITY



(69) A CARDINALITY measure function is defined for properties of individuated semi-lattices: when defined, CARDINALITY(α) = 1 iff

a. α is an atom in P; or

b. for every member/part of α there is an atom in P;

c. and $|\alpha| \geq d$.

4.3.4 Deriving the 'Cardinality Generalization Redux'

Given the discussion here, we can go back to the examples with QAs from Section 4.1. We can use the phrases in (70) as an illustration. The bare-letter example is in Spanish, and the prime-letter example is in English.

(70)
a. mucha agua
   much.F water
a'. much water

b. mucho-s celo-s
   much.M-PL jealousy-PL
b'. much/%many dregs

c. mucha-s joya-s
   much.F-PL jewel-PL
c'. many jewels

d. mucha joyería
   much.F jewelry
d'. much jewelry

[20]The approach taken to define the CARDINALITY measure function follows insights from Bale and Barner's (2009) list-approach. For an alternative approach based on automorphism invariance, see Wellwood (2018, 2019).

According to the semantics I have attributed to noun phrases, mass nouns such as (70a-a') have the denotation in (57). Adding the DegP gives rise to the denotation in (71).

(71) a. $[\![agua/\ water]\!] = [\![n\ \sqrt{\text{WATER}}]\!] = \lambda x.\text{Non-IND}(\text{WATER-STUFF})(x)$

b. $[\![mucha/\ much]\!] = [\![\text{Deg}]\!]([\![\sqrt{\text{MUCH}}]\!]^A) = \lambda d.\lambda \alpha.A(\mu)(\alpha) \geq d =$

$\lambda \alpha.\exists d[A(\mu)(\alpha) \geq d]$

c. $[\![mucha\ agua/\ much\ water]\!] = [\![(71b)]\!][\![(71a)]\!] =$

$\lambda x.\exists d[\text{Non-IND}(\text{WATER-STUFF})(x) \wedge A(\mu)(x) \geq d]$

The *n*P water denotes a non-individuated property, which entails that the lattice structure has not been generated from a set of atoms. The DegP composes with the *n*P via Predicate Modification (Heim and Kratzer 1998) after existential closure of its degree-argument. μ ranges over functions of type *e*, because $[\![water]\!]$ belongs to the domain of 'entities'. The structural conditions for *A* to assign μ the value of CARDINALITY are not met; and subsequently the CARDINALITY measure function is not defined: there are no atoms in the extension of predicate *water*. *A* must assign a value to μ that is different from CARDINALITY and still satisfies the Monotonicity requirement in (65). Such a value is VOLUME or WEIGHT.[21]

The same occurs with plural mass nouns like those in (70b-b'). The structural description for *A* to assign μ the value of CARDINALITY is not met. While they have [PL], they denote a non-individuated predicate which means that there are no atoms available. In other words, μ ranges over functions of type *X*, that is properties of pluralities, but there are no atoms in that plurality; and as a result, the CARDINALITY measure function is not defined. The semantic derivation is in (72).[22]

[21] In principle, nothing rules out *A* from assigning μ a value such as DISTANCE/DURATION. However, these values are never assigned to these canonical mass nouns and are generally reserved for processes or events. Here I would like to channel Wellwood (2019, p.49): the domain conditions category mismatches, i.e. type *e* vs. *v* is relevant.

[22] Rothstein (2021, p.67) speculates that pluralization of non-individuated noun phrases, as in the case of lexical plurals, can give rise to "instantiations of N which are either large (= abundance reading) or multiplicities of instantiations (= sums of events or instances)". Neither of these interpretations are, nevertheless, measuring cardinalities. It is unclear how the semantics of [PL] alone can derive any of these interpretations, and Rothstein does not provide a formal account either. A possible answer is that the abundance or multiplicity reading of some plural-marked nouns result from different licensing conditions on the root. In other words, just like *n*[IND] licenses a THING meaning for some roots, we can hypothesize that *n*[PL] licenses a different meaning too. This would require to enlarge our ontology of root meanings to include a meaning like ABUNDANCE. I will discuss this briefly in section 4.4.1 when I discuss nominal flexibility.

(72) a. $[\![dregs]\!] = [\![(59d)]\!] = \lambda X.\forall x[X(x) \rightarrow (\text{Non-IND}(\textsc{dreg-stuff})(x) \wedge \neg\text{minimal}(x))]$

b. $[\![much/^{\%}\ many\ dregs]\!] = [\![(71b)]\!][\![(72a)]\!] =$

$= \lambda X.\exists d[\forall x[X(x) \rightarrow (\text{Non-IND}(\textsc{dreg-stuff})(x) \wedge \neg\text{minimal}(x))] \wedge A(\mu)(X) \geq d]$

In the case of plural count nouns, the structural description in (68) is met: both n[IND] and [PL] are in the c-command domain of Deg. These nouns denote a predicate that is true of pluralities of atomic non-minimal objects. As in the case of plural mass nouns, when Deg composes with the relevant NP-node via Predicate Modification, μ ranges over functions of type X. However, unlike in the case of plural mass nouns, the semi-lattice structure that the property of pluralities takes as input is an individuated one: [PL] has mapped a property of an individuated semi-lattice, i.e. the nP constituent, to a property of pluralities whose members are only the non-minimal parts, i.e the sums. Thus, for every member of the plurality X, there is an atom in the extension of the nP. As a result, A can assign μ the value of CARDINALITY, and the measurement of the noun phrase is in terms of 'number'. The step-by-step derivation is shown in (73).

(73) a. $[\![jewels/\ joyas]\!] = [\![(55d)]\!] = \lambda X.\forall x[X(x) \rightarrow (\text{IND}(\textsc{jewel-thing})(x) \wedge \neg\text{minimal}(x))]$

b. $[\![many\ jewels/\ muchas\ joyas]\!] = [\![(71b)]\!][\![(73a)]\!]=$

$= \lambda X.\exists d[\forall x[X(x) \rightarrow (\text{IND}(\textsc{jewel-thing})(x) \wedge \neg\text{minimal}(x))] \wedge A(\mu)(X) \geq d]$

$A(\mu) \rightarrow$ CARDINALITY

The derivation of object mass nouns proceeds along the same lines as with plural count nouns. The DegP composed of the measure root and the Deg head c-commands [COLL] and [IND] in the extended projection of the noun. This is enough to satisfy the structural description in (68). After [COLL] takes the individuated nP as its argument, satisfying the presuppositional requirement, it returns a property that is true of pluralities for every part of which there is an atomic minimal part which is distinct from the member among the plurality. As a result, what μ ranges over is also a variable of type X formed on the basis of an individuated semi-lattice.

Like in the case of plural count nouns, the value for $A(\mu)$ is calculated with respect to this individuated plurality, resulting in the resolution of μ as CARDINALITY. The derivation is shown in (74).

(74) a. $[\![$*jewelry/ joyería*$]\!] = [\![(61b)]\!] =$

$= \lambda X.\forall x[X(x) \rightarrow \exists y[\text{IND}(\text{JEWEL-THING})(y) \wedge \text{minimal}(y) \wedge y \neq x \wedge R(x,y)]]$

b. $[\![$*much jewelry/ mucha joyería*$]\!] = [\![(71b)]\!][\![(74a)]\!]$

$= \lambda X.\exists d[\forall x[X(x) \rightarrow \exists y[\text{IND}(\text{JEWEL-THING})(y) \wedge \text{minimal}(y) \wedge y \neq x \wedge R(x,y)]] \wedge A(\mu)(X) \geq d]$

$A(\mu) \rightarrow$ CARDINALITY

I have illustrated how assigning the value of CARDINALITY to μ works in the case of positive QAs for simplicity. The situation is exactly the same in the case of comparatives or equatives, with the exception that QR of the comparative/equative morpheme and late-merger of their complement is required. I illustrate the schematic syntactic derivation of sentence like (75) involving a comparative in (76), for the *than*-P, and (77), for the matrix clause. The derivation of the equivalent sentence in Spanish proceeds in the exact same way (Toquero-Pérez 2023b).

(75) Barney bought more jewels than Mary did.

(76) *than*-Phrase LF:

a. than [$_{\text{TP}}$ Mary [$_{\text{vP}}$ buy [$_{\text{NP}_1}$[$_{\text{DegP}_1}$ $\sqrt{\text{MEAS}}$ Deg OP] [$_{\text{N'}_1}$ PL IND $\sqrt{\text{JEWEL}}$]]]].

b. than OP λd.[$_{\text{TP}}$ Mary [$_{\text{vP}}$ buy [$_{\text{NP}_1}$[$_{\text{DegP}_1}$ $\sqrt{\text{MEAS}}$ Deg d_{OP}] [$_{\text{N'}_1}$ PL IND $\sqrt{\text{JEWEL}}$]]]].

c. $[\![\text{NP}_1]\!] = \lambda X.[\forall x[X(x) \rightarrow (\text{IND}(\text{JEWEL-THING})(x) \wedge \neg\text{minimal}(x))] \wedge A(\mu)(X) \geq d^{OP}]$

(77) Matrix clause LF:

a. [$_{\text{CP}}$ [COMPR] λd.[$_{\text{TP}}$ Barney [$_{\text{vP}}$ buy [$_{\text{NP}_2}$[$_{\text{DegP}_2}$ $\sqrt{\text{MEAS}}$ Deg-d_{COMPR}] [$_{\text{N'}_2}$ PL IND $\sqrt{\text{JEWEL}}$]]]]]

b. [$_{\text{CP}}$ [COMPR [*than*-P]] λd.[$_{\text{TP}}$ Barney [$_{\text{vP}}$ buy [$_{\text{NP}_2}$[$_{\text{DegP}_2}$ $\sqrt{\text{MEAS}}$ Deg-d_{COMPR}] [$_{\text{N'}_2}$ PL IND $\sqrt{\text{JEWEL}}$]]]]]

c. $[\![\text{NP}_2]\!] = \lambda X.[\forall x[X(x) \rightarrow (\text{IND}(\textsc{jewel-thing})(x) \wedge \neg\text{minimal}(x))] \wedge A(\mu)(X) \geq d^{\textsc{compr}}]$

Starting with the *than*-P in (76), there is movement of a null degree operator (Bresnan 1973; Chomsky 1977) to the left periphery of the clause. This movement leaves a variable in its launching site which is bound via lambda-abstraction in the operator's landing site (Heim and Kratzer 1998). Assuming that the TP node denotes a proposition of type t, the node resulting from the application of lambda abstraction is a set of degrees of type $\langle dt \rangle$. During the semantic composition at the NP_1-level, the Deg head takes the measure root as its first argument, and then the d-variable saturates Deg's second argument. The internal structure of NP_1 in (76b) is identical to the underlying structure of the constituents we have been looking at: the features [IND] and [PL] are in the scope of the DegP_1. Thus, the denotation of the NP_1, after the N'_1-node composes with the DegP_1, will be as in (76c). At this point A will assign μ the value of CARDINALITY.

Moving to the matrix clause in (77), the COMPR terminal undergoes QR into the clause (Heim 2001; Hackl 2000; Bhatt and Pancheva 2004). Analogous to what happened in the *than*-P, COMPR leaves a variable of type d in its launching site. This variable is then bound by the lambda abstractor created by QR of COMPR, as in (77a). Again, assuming that the TP node denotes a proposition of type t, lambda-abstraction will create a node of type $\langle dt \rangle$, i.e. a set of degrees. The *than*-P is then late-merged in the complement position of COMPR after QR, as in (77b). COMPR takes the *than*-P as its first argument and the lambda-abstracted TP node its second argument, extracting the maximal degree in each set and establishing the ordering between the two. NP_2-internally, the semantic composition proceeds in the exact same way as in the *than*-P: (i) the N'_2-node denotes an individuated plurality by virtue of being [PL] and [IND]; (ii) $\sqrt{\text{MEAS}}$ saturates Deg's first argument, and the d-variable its second argument; (iii) DegP_2 and N'_2 compose via Predicate Modification giving rise to the denotation in (77c). At this point, we can assume that μ is assigned the relevant value, i.e. CARDINALITY.

As a result, the dimension of measurement in both matrix and *than*-P are calculated identically and the interpretation of the sentence can be paraphrased as follows: "the maximal degree in the set of number of

jewels bought by Barney is larger than the maximal degree in the set of number of jewels bought by Mary". In other words, the total number of jewels that Barney bought exceeds the total number of jewels that Mary bought. The denotation of the full sentence is schematized in (78).

(78) $[\![\textit{Barney bought more jewels than Mary did}]\!] =$

$= MAX(\lambda d.[\![\text{Barney bought NP}_2]\!]) > MAX(\lambda d.[\![\text{Mary bought NP}_1]\!])$

We have now an explanation for the Cardinality Generalization Redux. If the denotation of the noun contains atoms, they will allow for number-based measurement, i.e. CARDINALITY. Plural count nouns and object mass nouns are both mapped from individuated semi-lattices, built from the set of atoms, to pluralities; whereas canonical mass nouns and plural mass ones are not: the roots of these nouns are mapped to non-individuated semi-lattices that lack atoms. As a result, the conditions required to ensure measurement in terms of cardinality are not met. This holds regardless of whether the noun itself is plural-marked and denotes a property of pluralities. The assignment of the relevant value to μ, and in particular CARDINALITY is dependent on the structural make-up of the domain that is being measured. That is, the interpretable features that are made available in the syntax together with the position that the DegP occupies in the structure play an important role in determining how the dimension of measurement is to be resolved.

4.4 Ramifications of the theory

4.4.1 Shifts between classes

Before concluding this chapter I want to briefly mention what I think it is an advantage of the proposal developed here. This aspect is related to what is sometimes referred to as 'countability shifts' or 'nominal flexibility'. For example, canonical mass nouns like *beer* can occur in count contexts to mean 'container or units of': *beers*, *a beer*, *2 beers*. Likewise, count nouns may occur in mass contexts, sometimes known as 'grinding' contexts (Pelletier 1979): *there is dog all over the place*.

There is some analysis that unifies the two types of shifts and relates them to the overall grammatical properties of the class of nouns they have shifted into. For some like Pelletier (1979); Bunt (1985); Rothstein (2010), the shifts are triggered by the semantics of covert operators that apply to the relevant nominal predicate. These authors operate largely under lexicalist assumptions and they make an analytic distinction between roots that are lexically mass and roots that are lexically count.

For others like Borer (2005a); Mathieu (2012), the shifts are syntactically derived: for them, all nominal roots start out as mass and what determines countability is the projection of a head that divides matter into countable units, e.g. Division (Div). As described in the introductory chapter of this dissertation, NPs are count because they project DivP; thus, in the absence of DivP the interpretation of an NP like *rock* or *dog* is a mass one. In contrast, when a mass NP like *beer* or *water* is divided by Div, then a packaging or container interpretation arises. That is, additional count structure is added on top of a mass NP. The proponents of this type of approach for languages like English or Spanish parallel the role of Div to that of a singulativizing morpheme in languages like Arabic or Welsh (Mathieu 2012; Mathieu and Dali 2021; Dali and Mathieu 2021). Subsequent pluralization is possible, just like pluralization of singulatitves.

We can test whether container-readings of shifted mass nouns involve singulativization. Mathieu and Dali (2021) note that the plural of the singulative, at least in the languages that they investigate, gives rise to an exclusive plural interpretation: only reference to sums. In English, it has been observed that plurals are generally exclusive except in downward entailing contexts and questions, in which case they are inclusive, i.e. they include both singletons and sums (Krifka 1989; Chierchia 1998a; Sauerland 2003; Sauerland et al. 2005). Thus, if the plural of the singulative is always exclusive regardless of the downward entailingness of the context (Mathieu and Dali 2021), we predict that *beers* or *waters* with a container interpretation will only make reference to the non-singleton sums of beer/water units. That is, there should be no difference between the plural interpretation of *beers* in an upward entailing context and a downward entailing one. As the data in (79) show, the prediction is not borne out for English.

(79) a. Barney drank beers at the fair last night. ($^{\checkmark}$ ≥2, * ≥1)

b. Barney didn't drink (any) beers at the fair last night. (* ≥2, $^{\checkmark}$ ≥1)

A: Did Barney drink (any) beers at the fair last night?

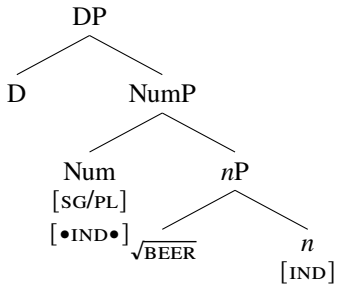
B: {Yes, one/ $^{\#}$No, one}

While in the upward entailing context in (79a), the bare plural *beers* refers to two or more beer-units (i.e. only the sums), the same bare plural noun does not make reference to two or more beers in the other two contexts. In fact, (79b) is only felicitous if Barney didn't drink any beers at all; and the question in (79b) can be answered positively with the numeral *one*, which denotes a singleton.

The theory that I have proposed so far does not rely on the presence of a covert singulativizing morpheme. Shifts can be accounted for by pairing a root with a different categorizer. The root must however be licensed, both semantically and morpho-phonologically. In other words, while the syntax does not preclude a root to adjoin to different nominalizing *n*s, at the interfaces the object put together by the syntax must be mapped to a vocabulary item and an appropriate concept. Under this approach, there is no 'shifting' involved, but the licensing of, or lack thereof, a root in a different syntactic context.

Accounting for shifts. To see how this works, let's first take the situation of shifted mass nouns into a container. The root $\sqrt{\text{BEER}}$ adjoins to the *n*[IND] categorizer which individuates the root. As a result, Number can be merged on top of. If Number is PL, */-s/* will surface on the noun. The semantic effect that plural has will also be uniform. This is represented in (80).

(80) mass-to-count (container interpretation)



When the structure is transferred to the interfaces, the root $\sqrt{\text{BEER}}$ is appropriately licensed in this context. At PF, it is mapped to a vocabulary item *beer*. At LF, the root is also assigned a meaning that is compatible with it. Suppose that the root $\sqrt{\text{BEER}}$ is associated with the root-concepts in (81), where BEER-THING and BEER-STUFF. The choice of one concept over the other is determined by the categorizer that the root adjoins to in the syntax. The LF licensing of the root $\sqrt{\text{BEER}}$ in the nominal domain is summarized by the allosemy rules in (82).

(81) $\sqrt{\text{BEER}}$ = {BEER-STUFF, BEER-THING}

(82) a. $\sqrt{\text{BEER}} \leftrightarrow$ BEER-THING/_n[IND]

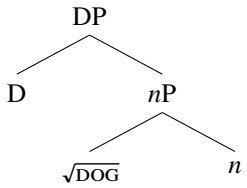
b. $\sqrt{\text{BEER}} \leftrightarrow$ BEER-STUFF

The licensing of (82a) captures the idiomatic interpretation of the root $\sqrt{\text{BEER}}$ when it occurs in a count context, i.e. local to n[IND]. The relevant unit of individuation will be whatever counts as a unit of beer, i.e. container: a glass or a bottle. The individuated root-concept is selected by the individuating categorizer. Elsewhere, i.e. when the categorizer is underspecified for individuation features, the BEER-STUFF concept is licensed.

The same rationale can be applied to the grinding cases of count nouns. But in this case, it is the mirror process: a root like $\sqrt{\text{DOG}}$ will be adjoined to an underspecified n. Since n is not [IND], the nP will not be marked for individuation; Number cannot project and so all the mass-like properties that ground-count nouns share with canonical mass follow. The syntax of 'ground-dog' is given in (83).[23]

[23]In languages that make gender and class inflection distinctions between count and mass nouns, the system predicts that pairing up the same root α with a different categorizer will result in the root bearing a different gender or class exponent. This prediction is

(83) count-to-mass (grinding)



At PF, the root is properly licensed because it is able to be mapped to an exponent: *dog*. At LF, the root is also properly licensed since it is mapped to a meaning. Obtaining this idiomatic meaning for the root can also be modeled in terms of root-allosemy conditioned by the categorizer. I represent the relevant allosemy rules in (85). The most specific allosemy rule in this case is (85a): select the DOG-STUFF concept for the root in the context of underspecified *n*; elsewhere, i.e. in the context of *n*[IND], select the DOG-THING concept (e.g. the animal).

(84) $\sqrt{\text{DOG}}$ = {DOG-STUFF, DOG-THING}

(85) a. $\sqrt{\text{DOG}} \leftrightarrow$ DOG-STUFF/ _ *n*

b. $\sqrt{\text{DOG}} \leftrightarrow$ DOG-THING

The question that one might be willing to raise now is the following: are there ever attested cases in which roots (other than $\sqrt{\text{SUD}}$, $\sqrt{\text{DREG}}$, $\sqrt{\text{HOP}}$) adjoin to *n*[PL]? The answer is yes! These are sometimes referred to as (i) *plurals of extension* such as *mountains, skies, cliffs*, following the nomenclature in Nauta et al. (2022), and (ii) *plurals of abundance* such as *waters, sands, snows* (Alexiadou 2004, 2011; Tsoulas 2006, 2009; Acquaviva 2008; Kouneli 2019; Rothstein 2021). Nauta et al. (2022) observe that there are slight differences

borne out in Asturian. In Asturian, a root like $\sqrt{\text{FERR}}$ 'iron' can have a class marker *-u* or *-o*. The former signals masculine gender and appears on count nouns, and the latter is a portmanteaux for masculine mass (Bonet 2013). Postnominal adjectives agree with the noun in count/mass, while prenominal adjectives agree with the noun in gender. The data and observations are taken from Bonet (2013, p.178).

(xix) a. fierr{ -u/ -o}
iron -M/ -M.MASS
'iron (piece/ material)

b. dur-u fierr-u ferruños-u
hard-M. iron-M rusty-M
'hard rusty iron piece'

c. dur-u fierr-o ferruños-o
hard-M iron-M.MASS rusty-M.MASS
'hard rusty iron'

between the two classes of lexical plural nouns, but for our purposes it suffices to show how these two classes really pattern like the plural-mass nouns discussed in this chapter.

With respect to the former, Nauta et al. (2022) observe that *mountains* in a sentence like (86a) does not refer to a plurality of mountain-individuals, but to a mountainous area. What is more, they observe that these *plurals of extension* are unacceptable with Class 3 determiners like *several* which, as we saw, track individuation and plural number. They also disallow cardinal numeral modification. Both these properties are shown in (86b). With respect to the other group, i.e. plurals of abundance, these too are incompatible with *several* and cardinal numeral modifiers. This is illustrated in (87).

(86) a. We took a hike in the mountains.

b. * We took a hike in {several/ five} mountains.

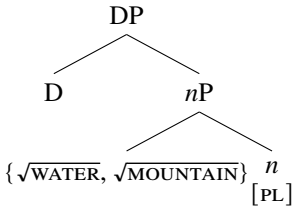
(87) The snows of the Kilimanjaro, international waters, the sands of the Sahara …

a. * The three/several international waters.

b. * The several snows of the Kilimanjaro.

We can straightforwardly account for the syntactic structure that underlies these two types of exceptional plurals: they arise when the root adjoins to n[PL] bleeding count structure. As a result, the mass properties also follow from the syntax in (88).

(88) mass/count-to-plural mass



We can also model the 'exceptional' meanings in terms of the approach to the licensing of root-meanings developed here. In particular, the plural feature on n can trigger an abundance interpretation of the root. That

is, the abundance interpretation is root-allosemy condtioned by n[PL]. The allosemy rules can be summarized as in (90), assuming that a root like $\sqrt{\text{WATER}}$ can be associated with the set of concepts in (89).[24]

(89) $\sqrt{\text{WATER}}$ = {WATER-STUFF, WATER-THING, WATER-ABUNDANCE, WATER-EVENT}

(90) a. $\sqrt{\text{WATER}} \leftrightarrow$ water-thing/_n[IND]

b. $\sqrt{\text{WATER}} \leftrightarrow$ water-abundance/_n[PL]

c. $\sqrt{\text{WATER}} \leftrightarrow$ water-event/_v

d. $\sqrt{\text{WATER}} \leftrightarrow$ water-stuff

We can account for cross-linguistic variation in similar terms. For example, in English roots like $\sqrt{\text{WATER}}$ can be licensed in an individuated and non-individuated context, whereas other roots like $\sqrt{\text{BLOOD}}$ cannot. In contrast, in Nez Perce, both $\sqrt{\text{WATER}}$ and $\sqrt{\text{BLOOD}}$ can be licensed in either context (Deal 2017); while in Alasha Mongolian neither root can be licensed in an individuated context. What this means in this model is that while the syntax can put the relevant terminals together (e.g. the root and n[IND]), the root cannot be assigned a compatible meaning associated with that root. That is, the relevant root-concept is absent from the set of root. As a result, there is no allosemy rule that can map the root to such root-concept. semantic composition fails because the categorizer cannot map the root to the unique root denotation that meets the individuation criteria. A small typology of languages can be summarized in Table 4.2. A first-pass generalization is that the most-marked meaning for some roots, i.e. the most specific allosemy rule, is the one that is not universally available across languages.

The account developed here presents itself as an elegant and parsimonious alternative to covert-shifting approaches or singulativizing approaches. These seemingly exceptional cases are not so exceptional after all, and they do not really involve any 'shifting' in the syntax (at least in the two languages analyzed here):

[24]This is not unreasonable given the following observation from Rothstein (2021, p.67) about the relation between overt pluralization and mass noun syntax: "marking the mass noun as plural would draw attention to sums in the denotation of the noun N, i.e. instantiations of N which are either large (= the abundance reading) or multiplicities of instantiations (= sums of events or instances)."

Table 4.2: Variation across-languages in the licensing of root-meanings

Language	**Form**		**Syntax**		**Root-meaning**	**example**	
Nez Perce	*kuus*	⇔	[$\sqrt{\text{ROOT}}$ *n*]	↔	WATER-STUFF	*kuus*	'water'
	kuus	⇔	[$\sqrt{\text{ROOT}}$ *n*[IND]]	↔	WATER-THING	*3 kuus*	'3 units of water'
	kike't	⇔	[$\sqrt{\text{ROOT}}$ *n*]	↔	BLOOD-STUFF	*kike't*	'blood'
	kike't	⇔	[$\sqrt{\text{ROOT}}$ *n*[IND]]	↔	BLOOD-THING	*2 kike't*	'2 drops of blood'
English	*water*	⇔	[$\sqrt{\text{ROOT}}$ *n*]	↔	WATER-STUFF	*water*	
	water	⇔	[$\sqrt{\text{ROOT}}$ *n*[IND]]	↔	WATER-THING	*2 waters*	
	blood	⇔	[$\sqrt{\text{ROOT}}$ *n*]	↔	BLOOD-STUFF	*blood*	
	blood	⇔	[$\sqrt{\text{ROOT}}$ *n*[IND]]	↔	#	*2 bloods*	
Alasha Mongolian	*os*	⇔	[$\sqrt{\text{ROOT}}$ *n*]	↔	WATER-STUFF	*os*	'water'
	os	⇔	[$\sqrt{\text{ROOT}}$ *n*[IND]]	↔	#	*2 os*	'2 units of water'
	tsos	⇔	[$\sqrt{\text{ROOT}}$ *n*]	↔	BLOOD-STUFF	*os*	'blood'
	tsos	⇔	[$\sqrt{\text{ROOT}}$ *n*[IND]]	↔	#	*2 tsos*	'2 drops of blood'

their syntactic properties follow from the same underlying syntax that makes a noun like *book* count and a noun like *water* or *salt* mass. The syntax is blind as to whether a root can be adjoined to one categorizer or another. But this does not entail that any root-categorizer pair will be appropriately licensed at the interfaces (Harley and Noyer 1998, 1999, 2000; Acquaviva 2009; Harley 2014; Kramer 2015; Pross 2019; Ranero 2021; Wood 2023): the root must be assigned a vocabulary item and a compatible meaning given the relevant syntactic context. While we can also account for cross-linguistic variation in this way, the proposal here does not rule out the fact that some languages might accomplish container and grinding interpretations via different syntactic operations that are independently available, e.g. singulativization as argued for Arabic or Welsh (Borer 2005a; Mathieu 2012). Cross-linguistic variation thus results from the way that the syntax puts terminal nodes together in concert with the satisfaction of the different requirements at the interfaces.

4.4.2 QAs, plural-markedness and the dimension of measurement beyond English and Spanish

The theory that I have advanced, following Wellwood (2015, 2018, 2019), is one where the surface form of the QA does not correlate with the dimension of measurement that is assigned in the semantic composition. The generalization that I have put forth is one where the dimension of cardinality is predictable based on the

interpretable content that certain syntactic terminals are assigned during the semantic computation; namely an individuated plurality. In addition, I have made explicit the following two claims throughout the dissertation: the surface form of QAs can be sensitive to plural-marking, and being countable means being marked for individuation which need not entail being plural-marked. This makes the following predictions:

(i) if a language $\mathbb{L}$ has count and mass nouns both of which are plural-marked they might both trigger allomorphy or plural agreement on the QA;

(ii) the (plural-)marked form of the QA will only be associated with the dimension of cardinality when the plural-marked noun is count, marked for individuation.

Both of these were borne out in English and Spanish. In this section, I show that they are also borne out for Greek and Telugu.

Greek Greek makes a distinction between count and mass nouns. For example, count nouns can be overtly pluralized and be modified by cardinal numerals as in (91), whereas mass nouns in (92) are only acceptable in these contexts under a shifted interpretation, i.e. a container reading. The container interpretation comes out clearly in sentences like (93), from Tsoulas (2009, p.132: ex.7) and from Kouneli (2019, p.239: ex.16b).

(91) Count Nouns in Greek

a. periodik{ -o/ -a}
magazine -SG/ -PL
'magazine/ magazines'

b. dio periodik-a
two magazine-PL
'two magazines'

(92) Mass Nouns in Greek

a. ner{ -o/ -a}
water -SG/ -PL
'water' (substance)/ 'waters' (containers)

b. dio ner-a
two water-PL
'two waters' (#substances/ containers)

(93) a. Tere tria ner-a
bring three water-PL
'Bring three waters'

b. Ipia dio bires prin ligo
drank.1SG two beer.PL before a.bit.ACC
'I drank two beers long ago'

While mass nouns in Greek can appear plural-marked and with numerals under a shifted interpretation, in which case they pattern with count nouns, there is a subclass of mass nouns that when pluralized do not give rise to container interpretations. When this occurs, the interpretation that is obtained is sometimes referred to as an 'abundance' interpretation paraphrased as something like 'a lot of' according to Acquaviva (2008); Tsoulas (2009); Alexiadou (2011) or 'substance scattered/spread over a surface in a disorderly way' according to Kouneli (2019). As Alexiadou (2011) notes, this 'abundance' interpretation is more salient with verbal predicates like *spray, fall, drip, run* or *gather*, as illustrated in (94).

(94) a. (Ta) ner-a trexun apo to tavani
the.PL water-PL run.3PL from the.SG.ACC ceiling.SG.ACC
'A lot of water drips from the ceiling'

b. * Dio ner-a trexun apo to tavani
two water-PL run.3PL from the.SG.ACC ceiling.SG.ACC
'Two waters drip from the ceiling'

The data in (94a) shows that the noun agrees in plural number with the determiner and the verb. Evidence that this type of plural-marked mass noun is in fact mass and not a shifted noun is given in (94b): modification by a numeral is unacceptable. Further evidence for this comes from Kouneli's (2019) observation that plurals of abundance in Greek are also incompatible with Stubbornly Distributive adjectives. The relevant example is in (95).

(95) # Ta ner-a sto patoma in stroglia.
the.PL water-PL at.the.SG.ACC floor.SG.ACC are.3PL round.3PL
'A lot of water on the floor is round'

That said, the generalization is that plurals of abundance in Greek are mass nouns despite being overtly plural-marked and showing overt plural agreement DP-internally and externally.

Moving to QAs, Greek is like Spanish: the QAs (at least in their comparative form) agree in phi-features, including number, with the noun they modify. When the noun is a plural count one, the QA agrees with it in plural number as in (96a); when the noun is mass and unmarked for number, so is the QA as in (96b). Crucially, if the mass noun is plural-marked and occurs in an abundance context, the QA is also plural-marked as in (96c); that is, the surface form of the QA is identical to the one found with plural count nouns in (96a).

(96) Greek plural mass nouns

a. Den exo ksana-di perissoter-a periodik-a sto patoma
not have.1SG again-seen more-PL.ACC magazine-PL.ACC at.the.SG.ACC floor.SG.ACC
'I have never seen more magazines on the floor' CARDINALITY, #ABUNDANCE, #VOLUME

b. Ipia perissoter-o ner-o
drank.1SG more-SG.ACC water-SG.ACC
'I drank more water' #CARDINALITY, VOLUME

c. Den exo ksana-di perissoter{ -a/ *-o} ner-a sto patoma
not have.1SG again-seen more -PL.ACC/ -SG.ACC water-PL.ACC at.the.SG.ACC floor.SG.ACC
'I have never seen more water on the floor' #CARDINALITY, ABUNDANCE

The example in (96a) involves a plural count noun. The QA *perisster-* 'more' agrees with the noun in plural number *-a*. The interpretation of the comparative is in terms of cardinality. The sentence in (96b) involves a canonical mass noun which is unmarked for number. The form of the QA is also unmarked *perisstero*, and the comparison is being established in terms of volume. However, in (96c), the mass noun *nera* 'water' is plural marked and so is the comparative morpheme. Interestingly, as reported by Tsoulas (2009); Kouneli (2019) the interpretation that arises is not one where the number of containers of water is being compared; instead the idiomatic interpretation is something like "I have never seen a larger amount of water spread over the floor".

Alexiadou (2011, 2015); Kouneli (2019) both argue that (i) the plural feature in plurals of abundance is located on the nominalizer *n* that the root combines with, and (ii) these nouns lack NumP. This is exactly the same analysis that I have proposed for plural mass nouns in English and Spanish. Besides, like in Spanish,

the presence of a plural feature in the extended projection of the noun is relevant for concord on nominal modifiers including QAs. This is just one further example that the surface form of a QA need not be directly mapped to a certain dimension of measurement. Rather, the form of the QA seems to be sensitive to the presence or absence of a plural number feature, contrary to what is expected by UD in (5) as proposed by Solt (2009).

Telugu. Telugu is a Dravidian language spoken in India. The data and judgments in this part have all been taken from Smith (2021, ch8). Smith (2021) reports that Telugu makes a singular-plural distinction reflected on the noun and the verb. On the noun, the singular is morphologically unmarked, whereas the plural is marked by the suffix *-lu*. This is shown in (97).

(97) Telugu singular/plural agreement

a. kukka tinn-a-di
dog eat-PAST-3NM.SG
'A dog ate'

b. kukka-lu tinn-aa-ji
dog-PL eat-PAST-3NM.PL
'Dogs ate' (Smith 2021, p.218: ex.346-347)

The class of nouns that make the overt singular-plural distinction are compatible with numeral modifiers. Numerals in the language require the noun to be overtly plural-marked. Besides, these nouns allow modification by Stubbornly Distributive adjectives. This is all shown in (98).

(98) Modification of plural (count) nouns

a. Raaju muuDu aratipanD-lu tinn-aa-Du
Raaju three banana-PL eat-PAST-3M.SG
'Raaju ate three bananas' (Smith 2021, p.218: ex.349)

b. aratipanD-lu pedda-gaa unn-aa-ji
banana-PL big-GA be-PRES-3.NM.PL
'The bananas are large' (Smith 2021, p.220: ex.353a)

These nouns thus show some hallmark properties of count nouns. In fact, they contrast with those that do not have a singular-plural distinction, cannot be modified by numerals and are unacceptable with Stubbornly Distributive adjectives. Smith labels this class as 'mass'. The relevant examples are given in (99).

(99) Telugu mass nouns

a. * aa abbaaji isuka-lu tavvu-tunn-aa-Du
the boy sand-PL dig-PROG-PRES-3.NM.SG
Int.: 'The boy is digging sands' (Smith 2021, p.218: ex.348)

b. * Raaju renDu isuka-lu konn-aa-Du
Raaju two sand-PL dig-PAST-3M.SG
Lit.: 'Raaju dug two sands' (int.: 'Raaju dug two piles of sand') (Smith 2021, p.219: ex.350)

c. # vendi pedda-gaa un-di
silver big-GA be-3.NM.SG
Int.: 'The silver is large' (Smith 2021, p.220: ex.353b)

In addition to these canonical mass nouns, there is a very restricted set of nouns in the language that are obligatorily plural-marked and trigger plural agreement with the verb. Nevertheless, they pattern with the mass nouns in (99); that is, no numeral modification and Stubbornly Distributive adjectives. This is shown in (100).

(100) Telugu plural mass nouns

a. { nii-LLu/ paa-lu} { unn-aa-ji/ *undi}
water-PL/ milk-PL be-PRES-3PL/ be-3.NM.SG
'There is {water/ milk}' (Smith 2021, p.221: ex.356)

b. * Raaju renDu nii-LLu taag-ææ-Du
Raaju two water-PL drink-PAST-3.M.SG
Int.: 'Raaju drank two units of water' (adapted from Smith 2021, p.222: ex.358)

c. # nii-LLu pedda-gaa un-aa-ji
water-PL big-GA be-PRES-3PL
Int.: 'The water is large' (Smith 2021, p.222: ex.359)

With respect to QAs, the *much/many* distinction is neutralized but the *little/few* distinction is not. In other words, while QA *čaala* 'much/many' occurs with both count and mass nouns as shown in (101), *konni* 'few' occurs with plural count nouns and *končam* 'little' with canonical mass nouns. This is shown in (102).

(101) Raaju čaala { aratipanD-lu/ annam} tinn-aa-Du
Raaju much banana-PL/ rice eat-PAST-3M.SG
'Raaju ate {many bananas/ much rice}' (Smith 2021, p.219: ex.351)

(102) *konni* vs. *končam*

a. Raaju konni aratipanD-lu tinn-aa-Du
Raaju few banana-PL eat-PAST-3M.SG
'Raaju ate few bananas' (Smith 2021, p.219: ex.352a)

b. Raaju končam uppu tinn-aa-Du
Raaju little salt eat-PAST-3M.SG
'Raaju ate little salt' (Smith 2021, p.219: ex.352b)

Smith reports that the interpretation of the nouns modified by QAs also differs. While plural count nouns modified by *konii* are measured in terms of cardinality, mass nouns modified by *končam* are measured in terms of volume. Thus, the sentence in (102a) can be paraphrased as "the number of bananas Raaju ate is small" while the one in (102b) can be paraphrased as "the volume of salt that Raaju ate is small".

If the surface form of the QA determined the dimension of measurement in the semantics, as predicted by Solt's (2009) UD, we expect plural mass nouns like *nii-LLu* 'water-PL' or *paa-lu* 'milk-PL' to occur with *končam*. However, this is not what the data in (103) show.

(103) aa abbaaji { konni/ *končam} nii-LLu taag-ees-tun-aa-Du
the boy few/ little water-PL drink-EMPH-PROG-PRES-3.M.PL
Lit.: 'The boy is drinking {few/ *little} waters'

Int.: 'The boy is drinking some (volume of) water' (Smith 2021, p.222: ex.357)

The mass noun in (103) is plural marked and the QA that is acceptable with this plural mass noun is *konni*. This is the same surface form that occurred with plural count nouns in (102a). Besides, the interpretation,

as reported by Smith, is in terms of volume, not cardinality. What do the nouns in (102a) share with those in (103)? The answer is overt plural-marking, which is compatible with the analysis that plural-marking has an effect on the surface form of the QA. As a result, we can model the distribution of these surface forms with the VI rules in (104), in the spirit of Smith (2021, p.231: ex. 369).

(104) a. $\sqrt{\text{KONČAM}} \Leftrightarrow \textit{konni} / \_\text{Deg}[u\text{PL}: \underline{\text{PL}}]$

b. $\sqrt{\text{KONČAM}} \Leftrightarrow \textit{končam}$

Telugu is like English regarding QA suppletion (e.g. *little* vs. *few*) and also like Spanish (i.e. overt-plural marking on the noun triggers plural concord on QAs). Telugu is, thus, one more case in which the surface form of the QA is not conditioned by the semantic interpretation that it is assigned, but by the presence of a plural feature in the extended projection of the noun. The dimension of cardinality is determined by the presence of an individuated feature, which enables subsequent pluralization. The cross-linguistic patterns of plural-marking on the noun/verb, the surface form of the QA and the semantic interpretation that the QA is assigned are summarized in Table 4.3, which is an extended version of Table 4.1.

4.5 Conclusion

This chapter has focused on a semantic asymmetry between some mass nouns and plural count nouns. Namely, object mass and plural count nouns are interpreted in terms of cardinality when modified by QAs, while canonical and plural mass nouns are not. This is not a peculiar property of English, but it seems to be a good candidate for a language universal (see also Lima 2014; Deal 2017; Chierchia 2021; Doetjes 2021, among others). I started by casting doubt on why a generalization like Uniform Dimensionality in (5) misses this robust cross-linguistic fact by correlating surface forms of QAs to their semantic interpretation.

I then proposed that the actual generalization need not, and in fact should not, make any reference to surface forms. The generalization, which I have labeled as the Cardinality Generalization Redux, is more

Table 4.3: Number marking, choice of QA, and semantic interpretation by noun type

	Langs.	Agreement		QA form		Dimension of measurement	
Tyep of N		SG	PL	**Unmarked**	PL-**Marked**	CARDINALITY	OTHER
Canonical Mass	*English*	✓	*	✓	*	*	✓
	Spanish	✓	*	✓	*	*	✓
	Greek	✓	*	✓	*	*	✓
	Telugu	✓	*	✓	*	*	✓
Object Mass	*English*	✓	*	✓	*	✓	*
	Spanish	✓	*	✓	*	✓	*
PL Mass	*English*	*	✓	✓	%	*	✓
	Spanish	*	✓	*	✓	*	✓
	Greek	*	✓	*	✓	*	✓
	Telugu	*	✓	*	✓	*	✓
PL Count	*English*	*	✓	*	✓	✓	*
	Spanish	*	✓	*	✓	✓	*
	Greek	*	✓	*	✓	✓	*
	Telugu	*	✓	*	✓	✓	*

abstract: the dimension of cardinality is predictable if the domain to be measured denotes an individuated plurality. Based on the theory of individuation and number that I have developed, this amounts to saying that the noun must be specified for [IND] in the syntax, and then be either plural or collective-marked. Thus, the dimension of measurement is determined by the syntactic position of the measure word in concert with formal features of the target constituent.

I have then gone on to showing that this approach, allows us to capture shifts between classes without the need to posit covert operations. Roots can be adjoined to different categorizers in the syntax but the root has to be licensed both at PF (mapped to a vocabulary item) and LF (and assigned an interpretation). At LF, a root is licensed if the categorizer, which introduces a selection function, can map the root to an appropriate of denotation from the set denoted by the root: ultimately, this boiled down to whether the root had a thing or a stuff denotation that *n*[IND] and *n* could compose with respectively. If either of those denotations is missing,

the corresponding meaning for the root will remain unlicensed. I have shown how this system enables us to account for cross-linguistic variation.

Last but not least, I have articulated how the proposal, in tandem with a decompositional approach to QAs, allows us to also capture the distribution of the different surface forms of QAs. Surface forms of QAs may be sensitive to plural-marking, but not semantic interpretation. This is not to say that number features are the sole triggers of QA allomorphy; there might be other features that contribute to the insertion of different exponents, such as gender or noun class. The proposal here is compatible with these features being involved in allomorph selection. The view that there is not a perfect match between phonological form and semantic interpretation also supports a view of QAs according to which the dimension of measurement that they are assigned is underspecified (Wellwood 2015, 2018, 2019), rather than lexically determined. This is in turn compatible with a modular view of the grammar according to which there is no interaction between morpho-phonological processes such as Vocabulary Insertion and the semantic interpretation of terminal nodes (and viceversa). In other words, the morpho-phonological system and the semantic system are non-overlapping.

Chapter 5

Accommodating Number Neutrality: Markedness and Semantic Interpretation

5.1 Introduction

Languages oftentimes make a morpho-syntactic distinction between singular and plural marking on nouns or DP internal elements. For example, in Wolof, nouns may occur bare or with a determiner or class marker which spells-out singular. Plural-marking is not expressed on the noun, but on the determiner or class marker. This is shown in (1) adapted from (Fong 2023).

(1) *Wolof*

a. Awa defar-na oto (b-i)
Awa fix-NA.3SG car CM.SG-DEF
'Awa fixed (the) car' SG ⇔ {Ø/ *b-*}

b. Awa defar-na oto y-i
Awa fix-NA.3SG car CM.PL-DEF
'Awa fixed the cars' PL ⇔ *y-*

As argued by Fong (2021, 2023), the unmarked form in (1a) makes reference to singularities (i.e. only atoms), regardles of whether it occurs bare or with the determiner/class marker. In other words, it is exclusively singular. The plural-marked form in (1b) makes reference to exclusive pluralities (i.e. only sums).

The distinction as to whether what counts as a singularity or plurality, however, does not always align with morpho-syntactic exponence. Let's consider the forms in (2) from Western Armenian and those in (3) from English.

(2) *Western Armenian*

a. dəgha — SG ⇔ Ø
boy

b. dəgha-ner — PL ⇔ -ner
boy-PL

(3) *English*

a. boy — SG ⇔ Ø

b. boy-s — PL ⇔ -S

In Western Armenian, the unmarked form in (2a) can make reference to both atoms and their sums, but the plural-marked one in (2b) makes exclusive reference to sums (Bale et al. 2011; Bale and Khanjian 2014). In other words, the unmarked form is number neutral whereas the plural-marked form is exclusively plural.

In English, like in Wolof, the unmarked form *boy* in (3a) denotes a singularity, but the plural-marked one is ambiguous: it may denote an exclusive plurality or an inclusive one, i.e. atoms and sums (Krifka 1989; Sauerland 2003; Sauerland et al. 2005; Spector 2007; Zweig 2009; Farkas and de Swart 2010). As observed by these authors, the latter interpretation is found in downward entailing environments and questions. From now on, I will be using the labels U(pward)E(ntailing)C(ontext) and D(ownward)E(ntailing)C(ontext). For example, this is shown with the contrasts in (4).

(4) a. Ash fostered boys in the cabin.

i. ✓Exclusive: 'Ash fostered two or more boys'

ii. #Inclusive: 'Ash fostered one or more boys'

b. Ash didn't foster boys in the cabin.

i. #Exclusive: ‘Ash didn’t foster two or more boys’

ii. ✓Inclusive: ‘Ash didn’t foster any boys’

c. If Ash fosters boys, he can apply for food stamps

i. #Exclusive: ‘If Ash fosters two or more boys, he can apply for food stamps’

ii. ✓Inclusive: ‘If Ash fosters any boys, he can apply for food stamps’

The conclusion that we can draw from this is that having a morphological singular-plural distinction does not guarantee a uniform semantic interpretation. In fact, it seems that there is variation regarding the denotation of unmarked and plural-marked nouns across languages. This is schematized with the denotation of *n*Ps that are marked or unmarked for number below.

(5) *Unmarked nP that denotes a singleton*

$[\![n\text{P-SG}]\!] = \{a, b, c\}$ English, Wolof

(6) *Unmarked nP that is number neutral*

$[\![n\text{P-}\emptyset]\!] = \{a, b, c, ab, ac, bc, abc\}$ Western Armenian

(7) *Plural-marked nP that denotes an exclusive plurality*

$[\![n\text{P-PL}]\!] = \{ab, ac, bc, abc\}$ English (UEC), Western Armenian, Wolof

(8) *Plural-marked nP that denotes an inclusive plurality*

$[\![n\text{P-PL}]\!] = \{a, b, c, ab, ac, bc, abc\}$ English (DEC)

However, variation in the interpretation of *n*Ps that are marked or unmarked for number can be even more fine-grained. For example, Bylinina and Podobryaev (2020) report that in Barguzin Buriat (Mongolic) the interpretation of unmarked nouns is sensitive to animacy: unmarked inanimates are number neutral, but unmarked animates denote a singleton.[1] Plural-marked nouns behave like their English counterparts: they

[1] An overview of the data is beyond the scope of this chapter, though. See Bylinina and Podobryaev (2020) for details.

can be exclusively or inclusively plural depending on the upward/downward entailingness of the context. In a nutshell, the differences in morpho-semantic markedness in terms of number that seem to emerge across languages are summarized in Table 5.1. The labels SNG/PLR refer to the semantic interpretation and not the phonological form of the noun; thus, SNG refers to a 'singularity' or singleton (e.g. 1) and PLR refers to a 'plurality' (e.g. 2 or more). If a noun can refer to both, then we will say the noun is number neutral if unmarked or inclusively plural if plural-marked.

Table 5.1: The interpretation of number in languages with unmarked and plural-marked forms (to be extended)

	Unmarked *n*P		**PL-marked *n*P**	
	SNG	**PLR**	**SNG**	**PLR**
English	✓	*	✓	✓
Buriat (animate)	✓	*	✓	✓
Western Armenian	✓	✓	*	✓
Buriat (inanimate)	✓	✓	✓	✓

In this paper, I focus on the nominal number system in Alasha Mongolian (Mongolic). I provide novel data from my own fieldwork, a sample of which is illustrated in Table 5.2.[2]

Table 5.2: Unmarked and PL-marked bare nouns in Alasha Mongolian

inanimate	a. **SG**	**PL**	b. **SG**	**PL**
	nom	nom-o:d	almort	almort-o:d
	book	book-PL	apple	apple-PL
	'book(s)'	'books'	'apple(s)'	'apples'
animate	c. **SG**	**PL**	d. **SG**	**PL**
	mör	mör-ö:d	xü	xüch-üd
	horse	horse-PL	boy	boy-PL
	'horse'	'horses'	'boy'	'boys'

As shown in the idiomatic translation, there is a difference between unmarked inanimate nouns like *nom* 'book' and *almort* 'apple' and animate ones like *xü* 'boy' and *mör* 'horse': the former are number

[2]Throughout the paper I will ignore IPA and phonetic transcription. I use the following orthographic conventions that map onto the corresponding IPA symbols. The conventions for vowels are the following: *a* = [ɑ]; *ö* = [ø]; *ü* = [ʏ]; *u* = [o/u]; *o* = [ɔ]; *V* = [ə] or highly reduced unstressed vowels; small caps *v* is a placeholder for any vowel. Long vowels are represented with [ː] after the vowel. The conventions for consonants are as follows: *ch* = [tʃ]; *j* = [dʒ]; *gh* = [ɢ]; *sh* = [ʃ]; *v* = [ʊ]; *x* = [x/χ/h]; *ng* = [ŋ]; *w* = [w].

neutral, whereas the latter denote a singularity. The animacy split is neutralized in the plural-marked form: both animates and inanimates may denote inclusive or exclusive pluralities depending on the polarity of the context (like English). In addition to the basic paradigm in Table 5.2, adjectives like *expensive, heavy, large* force the unmarked inanimate noun to denote a singularity. See (9).

(9) { **tam/ xunde-n/ unte-n**} nom
big heavy-ATTR expensive-ATTR book
SG: '{big/ heavy/ expensive} book'
#PL: '{big/ heavy/ expensive} books'

The empirical generalizations presented so far are as follows: (i) unmarked inanimate *n*Ps are number neutral, unless modified by a subclass of adjectives, in which case they denote a singleton. (ii) Unmarked animate *n*Ps are always strictly singular. (iii) Plural-marked *n*Ps are ambiguous between denoting an exclusive plurality (only sums) or an inclusive one (atoms and sums), depending on whether they are embedded in an upward or downward entailing context. These facts raise the following questions:

Q1. Is there a syntactic difference between unmarked nouns that are number neutral and those that are strictly singular?

Q2. Where is Number encoded?

Q3. How does the inclusive/exclusive ambiguity in the PL-marked forms emerge?

Q4. What is the relation between the class of adjectives in (9) and Number?

Q5. What is the relation between the morpho-syntax and semantics of number?

I will argue that that the generalizations about the morpho-syntactic expression of number and its semantic interpretation follow directly from the syntactic structure of DPs in the language. In particular, I will answer the questions as follows:

A1. I propose that, by adopting the theory of number and individuation developed throughout the dissertation, all (count) nouns are [IND]-marked which makes them underdetermined for number until Number, which hosts [SG/PL], is merged (Borer 2005a; Harbour 2007, 2011, 2014; Cowper and Hall 2009, 2012; Kramer 2017). Thus, the difference between unmarked nouns that are strictly singular and those that are number neutral boils down to the presence or absence of Number (see also Kramer 2017; Martí 2020a): animate nouns always project Number, but inanimates need not always do so. I show that unmarked inanimates may project Number if there is morpho-syntactic evidence to do so: overt plural-marking, modification by a subclass of adjectives and numerals.

A2. Based on word order facts of DP-internal modifiers, I argue that NumP hosting [SG/PL] features is located between *n* and D, and below numerals (Ritter 1991).

A3. The inclusive/exclusive ambiguity is the result of syntactically conditioned allosemy at LF (Arad 2003; Marantz 2001, 2013; Harley 2014; Wood 2016, 2023). In particular, I argue that an indefinite determiner which is either an NPI or inherently negative triggers an interpretation of [PL] which results in an inclusive plurality. Elsewhere, [PL] gives rise to exclusive plurals.

A4. The presence of NumP enables modification by the subclass of adjectives in (9). In other words, this subclass of APs is unacceptable with number neutral nouns, including mass ones.

A5. The results of the analysis paired with cross-linguistic observations about number give rise to a novel generalization that correlates morphological markedness and semantic interpretation: unmarked forms must at least contain individual non-overlapping atoms; and plural-marked ones must contain sums of atoms.

5.2 Alasha Mongolian: Some background

Mongolian languages are spoken in various regions of Central and Northeast Asia. There is a fair amount of comprehensive descriptive studies (Poppe 1955, 1970; Binnick 1979, 2011; Janhunen 2012) and also a growing body of formal morpho-syntactic and semantic literature (Guntsetseg 2016; Fong 2019; Bylinina and Podobryaev 2020; Gong 2021, 2022; Toquero-Pérez 2023a). None of these works reports data from the Alashan variety, however. Alasha Mongolian is a variety of Mongolian spoken in the Alxa League region located in west inner Mongolia.[3] The variety is in close proximity to Oirat, also spoken in west inner Mongolia (Janhunen 2012). The total number of speakers is unknown, and only Wkipedia reports that the number of Alasha Mongolian speakers is roughly 40,000.[4]

Like other languges in the Altaic family (Turkish, Sakha, Buriat a.o.), Alasha Mongolian is head final: the canonical order is SOV (10a), it has postpositions (10b) and adjectives precede the noun they modify (10c). Moreover, it has a rich case system whose exponents are spelled out in the head noun. Among the relevant cases, Alasha Mongolian distinguishes ACC(usative), DAT(itve), GEN(itve), INSTR(umental), ABL(ative) and COMIT(ative). Nominative is typically covert, execept for certain pronouns, nominalized elements or the subject of relative clauses, (see also Janhunen 2012; Gong 2022, for the same observation in other Mongolian varieties).[5]

(10) a. bi BatVr xar-sVn
I Batar see-PST.PERF
'I saw Batar'

b. xol-ni tuxai
food-GEN about
'about food'

c. tam nom (* tam)
big book big
'big book'

[3]The data collection took place during the spring of 2022 as part of a field methods class in Los Angeles, California. In addition to the general class (20 1.5h sessions), there were a total of 8 1h individual sessions. The data were elicited from a single speaker.

[4]https://en.wikipedia.org/wiki/Alasha_dialect.

[5]The aspect and tense system of Mongolian is complex and in some cases subject to massive syncretism (Binnick 2011; Janhunen 2012; Gong 2022). The suffix *-sVn*, in particular, can be used as a perfective aspectual marker, but also as a finite past tense ending. In non-finite contexts, it is acts as a perfect participle marker. From now on, I will be indicating in the glosses the relevant meaning: PST.PERF for finite contexts and PERF.PART for the non-finite ones.

5.3 Core data: unmarked NPs and PL-marked NPs

Nouns in Alasha Mongolian make a morpho-syntactic distinction between a 'singular' form and a 'plural' one. The 'singular' form is morphologically unmarked, i.e. there is no overt singular exponent, whereas the plural form is spelled-out as /-*v:d*/. The vowel in the plural morpheme is subject to vowel harmony conditioned by the noun root.[6] A sample of the data was given in Table 5.2, repeated below for convenience.

Table 5.2: Unmarked and PL-marked bare nouns in Alasha Mongolian

inanimate	a. SG	PL	b. SG	PL
	nom	nom-o:d	almort	almort-o:d
	book	book-PL	apple	apple-PL
	'book(s)'	'books'	'apple(s)'	'apples'
animate	c. SG	PL	d. SG	PL
	mör	mör-ö:d	xü	xüch-üd
	horse	horse-PL	boy	boy-PL
	'horse'	'horses'	'boy'	'boys'

As mentioned in the introduction to the chapter, the first empirical observation is that there is an animacy split in the case of unmarked nouns: inanimates are number neutral whereas animates are strictly singular. In what follows, I first motivate this distinction for unmarked nouns, and then probe the properties of their plural-marked forms. After that, I show how each of these forms (unmarked and plural-marked) interact with DP-internal modifiers such as adjectives and numerals.

Unmarked inanimate nouns. The number neutral interpretation of unmarked inanimate nouns is found in a wide variety of syntactic contexts. For example in (11a), *nom* is the complement of the transitive verb *onsix* 'to read' and the sentence is ambiguous between the speaker having read one or several books. The same is observed when the NP is the complement of a preposition in (11b) or the subject of a copular construction in (11c):

[6]The surface forms of Alasha Mongolian inflectional and derivational suffixes are subject to vowel harmony. Given that the conditions of vowel harmony are not the goal of this paper and the selection of the particular vowel has no semantic effect, I treat all plural allomorphs as variants of the same underlying form /-v:d/.

(11) a. bi nom onsh-Vn
I book read-PST.PERF
SG: 'I read a book'
PL: 'I read books'

b. nom-in tuxai
book-GEN about
SG: 'about a book'
PL: 'about books'

c. nom bol unte
book COP expensive
SG: 'A book is expensive'
PL: 'Books are expensive'

Case marking on the relevant noun does not eliminate number-neutrality. This is observed in (11b) where *nom* is overtly marked genitive. (12a) and (12b) show further support for this observation: *almort* bears instrumental case, and *nom* accusative case.

(12) a. bi xan-ig almort-**or** tijil-sVn
I goat-ACC apple-INSTR feed-PST.PERF
SG: 'I fed the goat with an apple'
PL: 'I fed the goat with apples'

b. bi nom-**ig** xotaltin ap-pa
I nom-ACC bought get-PST
SG: 'I bought a book'
PL: 'I bought books'

In addition to these contexts, number neutrality is maintained with overt possessive determiners and is not sensitive to person restrictions, as illustrated in (13), (in this respect Alasha Mongolian differs from Buriat, Bylinina and Podobryaev 2020).[7]

(13) tir xü { mi-ni/ chi-ni/ tu-ni} tstsig(-ig) BatVr-t og-sVn
that boy 1SG-GEN/ 2SG-GEN/ 3SG-GEN flower(-ACC) Batar-DAT give-PST.PERF
SG: 'That/the boy gave Batar {my/your/his/her} flower'
PL: 'That/the boy gave Batar {my/your/his/her} flowers'

Unmarked inanimate nouns show the typical hallmarks of number neutral nouns cross-linguistically (Farkas and de Swart 2003, 2010; Bale et al. 2011; Dayal 2011; Bylinina and Podobryaev 2020). For example, they serve as the antecedent of either a plural or a singular anaphoric pronoun, as shown in (14).

(14) bi **nom**$_i$ xotaltin ap-pa
I book bought get-PST
'I bought {a book/ books}.

a. **in**$_i$ bol unte
3SG COP expensive
'It was expensive'

b. **tidgir**$_i$ bol unte
3PL COP expensive
'They were expensive'

[7] Alasha Mongolian lacks overt articles, but it has a demonstrative system: *tir* 'that' marks definitiness and can be used with the meaning of 'the'. Thus, the translation.

In addition, the same NP *nom* is compatible with distributive adjuncts such as *nig nigir* 'one by one' in (15a). This is not a particular property of *nig nigir* as the same pattern is observed with other distributive markers such as *tsilgir dülün* 'each other' in (15b), and *adelbas nomin-sangas* 'from different libraries' in (15c).

(15) a. BatVr nom(-ig) nig-nig-ir onsh-wa
Batar book-ACC one-one-INSTR read-PST
'Batar read {*a book/ books} one by one'

b. BatVr nom(-ig) teldur-t tsilgir-dülün tav-o:
Batar book shelf-DAT each other place-PST
'Batar put {*a book/ books} next to each other on the shelf'

c. *[Batar is writing his dissertation and needs many books to consult. He requested all the books he needed via interlibrary loan.]*

nom adelbas nom-in-sang-as ir-be
book different book-GEN-warehouse-ABL came-PST
'{?? a book/ books} arrived from different libraries.'
Int.: Book-1 arrived from library-*x*, book-2 from library-*y* etc.

Apart from showing that unmarked inanimate nouns are number neutral, the data in this section have important consequences for analytic choices to be made. In particular, the data serve as convincing evidence against an analysis based on (pseudo-)incorporation (Massam 2001; Dayal 2004). In those languages where number neutrality is argued to be the result of pseudo-incorporation of the NP (Hungarian, Farkas and de Swart 2003; Hindi, Dayal 2004; 2011; Turkish, Sağ 2022), only non-case marked nouns remain number neutral and the number neutral NP must be (lineraly) adjacent to the verb or selecting predicate. None of these diagnostics hold in Alasha Mongolian. We have seen that case-marked nouns can still be number neutral (e.g. (11b), (12)) and the NP can be separated from the verb (e.g. (13) in which the possessive direct object *tsitsig(-ig)* 'flower(-ACC)' is separated from the verb by the indirect object *BatVrt* 'Batar-DAT'). Last but not least, as reported by Dayal (2011), pseudo-incorporated NPs are incompatible with telic predicates under a number

neutral interpretation. Again, this does not hold for Alasha Mongolian either (and potentially Mongolic languages more generally, see Bylinina and Podobryaev 2020): inanimate NPs unmarked for number are compatible with a number neutral interpretation when the verbal predicate is telic. For example, in (16) the telicity is marked by the temporal adjunct *taun tsakt* 'five hour' and the restructuring verb *dosxix* 'to finish' (Dowty 1979).

(16) *[Batar is an avid reader and has to read LGB, SPE and Barriers for an assignment.]*

BatVr tau-n tsak-t nom-ig ons-ich dosx-wa
Batar five-ATTR hour-DAT book-ACC read-CONV finish-PST
'Batar finished reading the books in 5h'

Unmarked animate nouns. Unmarked animate NPs such as *xü* 'boy' or *mör* 'horse' receive a strict singular interpretation. This is shown in (17).

(17) a. bi xü(d-ig) dilgur-t xar-sVn
I boy-ACC store-DAT see-PST.PERF
SG: 'I saw a boy in the store'
#PL: 'I saw boys in the store'

b. tir xü mi-ni tstsig(-ig) mör-t og-sVn
that boy 1SG-GEN flower(-ACC) horse-DAT give-PST.PERF
SG: 'That/the boy gave a horse my flower(s)'
#PL: 'These/the boys gave horses my flower(s)'

The univocal singular interpretation is maintained regardless of case-marking on the noun or syntactic position: in (17a) *xü* is the direct object and may be marked accusative, and in (17b) *mör* bearing dative case is the recipient argument.

Besides, the unmarked animate NP in (17a) cannot serve as the antecedent for a plural anaphoric pronoun as in (18). Likewise, the unmarked animate NP is incompatible with distributive adjuncts like *nig nigir* or *adelbas nomin-sangas*, as illustrated in (19).

(18) { tir/* tirgir}$_{xü}$ bol tam.
3SG/ 3PL COP big
'(I saw a boy at the store.) {He was/ *They were} big'

(19) a. * bi xü(d-ig) nig-nig-ir xar-sVn
I boy-ACC one-one-INSTR see-PST.PERF
Lit.: 'I saw a boy one by one'
Int.:'I saw boys one by one'

b. * xü adelbas nom-in-sang-as ir-be
boy different book-GEN-warehouse-ABL came-PST
Lit.: 'A boy arrived from different libraries.'
Int.: Batar arrived from library-*x*, Brian from library-*y* etc.

Plural-marked nouns. As shown in Table 5.2, in addition to the unmarked form, all count nouns in Alasha Mongolian can be inflected for plural number by adding the morpheme *-v:d*. In an UEC, a sentence like (20) can only signify that there are two or more apples that the speaker bought. That is, the presence of the *-v:d* morpheme on *almort* induces an exclusive plural interpretation. The same is found with overt plural-marked animate nouns in (21).

(20) Plural-marked inanimate noun (*exclusive plural in UEC*)

bi almort-o:d(-ig) xotaltin ab-sVn
I apple-PL-ACC bought get-PST.PERF
'I bought (2 or more) apples'

(21) Plural-marked animate noun (*exclusive plural in UEC*)

a. bi xüch-ü:d(-ig) dilgur-t xar-sVn
I boy-PL-ACC store-DAT see-PST.PERF
'I saw (2 or more) boys in the store'

b. tir xü mi-ni tstsig(-ig) mör-ö:d-Vt og-sVn
that boy 1SG-GEN flower(-ACC) horse-PL-DAT give-PST.PERF
'That/the boy gave (2 or more) horses my flower(s)'

However, in DEC and questions, plural nouns are interpreted inclusively, i.e. atoms and sums. An example is shown in (22) for inanimates and in (23) for animates.

(22) Plural-marked inanimate noun (*inclusive plural in DEC*)

bi almort-o:d(-ig) xotaltin ab-sVn-ghue
I apple-PL-ACC bought get-PST.PERF-NEG
'I didn't buy (any) apples'

(23) Plural-marked animate noun (*inclusive plural in DEC*)

bi xüch-ü:d(-ig) dilgur-t xar-sVn-ghue
I boy-PL-ACC store-DAT see-PST.PERF-NEG
'I didn't see (any) boys in the store'

In (22) and (23), the negative marker *ghue* 'not' surfaces as a verbal suffix, linearly following tense/aspect morphemes. (22) is judged false if the speaker bought one apple; (23) is judged false if the speaker saw one boy at the store. The same pattern observed with negation is also replicated in polar questions. This is shown in (24) for inanimates and (25) for animates.

(24) A: chi almort-o:d idi-tVg-o?
you apple-PL eat-HAB-Q.POL
'Do you typically eat (any) apples?'

B: time:, nig
yes one
'Yes, I (typically) eat one'

ughue, nig
NEG one
'No, I (typically) eat one.'

(25) A: chi xüch-üd dilgur-t xar-tVg-o?
you boy-PL store-DAT see-HAB-Q.POL
'Do you typically see (any) boys at the store?'

B: time:, nig
yes one
'Yes, I (typically) see one'

ughue, nig
NEG one
'No, I (typically) see one.'

In both (24) and (25), speaker A uses the plural-marked form of the noun in the question, and speaker B can answer felicitously by saying "yes, one". It is infelicitous for B to provide a negative answer.

The effect of (non-)classificatory adjectives. Despite the fact that the number neutral interpretation of unmarked inanimate NPs seems to have no restrictions based on the syntactic position of the NP, it is however unavailable in one very particular syntactic context: when the unmarked noun is modified by non-classificatory adjectives occurring in attributive (i.e. prenominal) position. These non-classificatory adjectives are also gradable and include *old, big, expensive, heavy* etc. Modification by this class of attributive adjectives forces the unmarked inanimate noun to denote a singleton.

This class, when used attributively, contrasts with what Alexiadou et al. (2007) call "classificatory" adjectives, such as *Mongolian, European, scientific* or *religious*. These classificatory adjectives are in turn non-gradable, and do not block number neutrality.[8] (26) and (27) illustrate the contrast between the two classes of adjectives.[9]

(26) a. bi { tam/ xunde-n/ unte-n} nom onsh-Vn
I big heavy-ATTR expensive-ATTR book read-PST.PERF
SG: 'I read a {big/ heavy/ expensive} book'
#PL: 'I read {big/ heavy/ expensive} books'

b. bi { monghol/ shashin-tei/ iuvrop} nom onsh-Vn
I mongolian religion-ADJ european book read-PST.PERF
SG: 'I read a {Mongolian/ religious/ European} book'
PL: 'I read {Mongolian/ religious/ European} books'

[8] While the adjectives in (26a) and (27a) are compatible with degree modifier *mash* 'very', the adjectives in (26b) and (27b) are marked at best. See (xx). This is as might be expected if the latter can be coerced into a gradable property but such coercion is marked.

(xx) a. mash { tam/ xunde/ unte}
very big heavy expensive
'very {big/ heavy/ expensive}

b. ?? mash { monghol/ shashin-tei/ iuvrop}
very Mongolian religion-ADJ European
'very {Mongolian/ religious/ European}

[9] Similar observations between the two classes of AP have been reported for Turkish (Sağ 2022) and Western Armenian (Kalomoiros 2021).

(27) a. bi xan-ig { xunde-n/ unte-n} almort-or tijil-sVn
I goat-ACC heavy-ATTR expensive-ATTR apple-INSTR feed-PST.PERF
SG: 'I fed the goat with a {heavy/ expensive} apple'
#PL: 'I fed the goat with {heavy/ expensive} apples'

b. bi xan-ig { monghol/ iuvrop} almort-or tijil-sVn
I goat-ACC Mongolian European apple-INSTR feed-PST.PERF
SG: 'I fed the goat with a {Mongolian/ European} apple'
PL: 'I fed the goat with {Mongolian/ European} apples'

Attributive non-classificatory APs have a trivial impact on unmarked animate NPs: they are still strictly singular as (28) shows.

(28) bi { tam/ xunde-n} xü(d-ig) dilgur-t xar-sVn
I big heavy boy-ACC store-DAT see-PST
SG: 'I saw a {big/ heavy} boy in the store'
#PL: 'I saw {big/ heavy} boys in the store'

Importantly, overt plural marking on the noun can co-occur with non-classificatory AP modifiers. In that case, the plural morpheme has the expected effect in both upward and downward entailing contexts: in the former it is interpreted exclusively, while in the latter it is interpreted inclusively. This is shown in (29) for inanimates and (30) for animates.

(29) a. bi { tam/ xunde-n/ unte-n} nom-o:d onsh-Vn
I big heavy-ATTR expensive-ATTR book-PL read-PST.PERF
'I read (2 or more) {big/ heavy/ expensive} books' (*exclusive plural*)

b. bi { tam/ xunde-n/ unte-n} nom-o:d onsh-Vn-ghue
I big heavy-ATTR expensive-ATTR book-PL read-PST.PERF-NEG
'I didn't read (any) {big/ heavy/ expensive} books' (*inclusive plural*)

(30) a. bi { tam/ xunde-n} xüch-üd(-ig) dilgur-t xar-sVn
I big heavy-ATTR boy-PL-ACC store-DAT see-PST.PERF
'I saw (2 or more) {big/ heavy} boys in the store' (*exclusive plural*)

b. bi { tam/ xunde-n} xüch-üd(-ig) dilgur-t xar-sVn-ghue
I big heavy-ATTR boy-PL-ACC store-DAT see-PST.PERF-NEG
'I didn't see (any) {big/ heavy} boys in the store' (*inclusive plural*)

Classificatory APs are also compatible with overt plural marking on the noun they modify. An example is in (31). Once again, the plural is exclusive or inclusive depending on the upward or downward entailingness of the sentence.

(31) a. shashin-tei nom-o:d
religion-ADJ book-PL
'Religious books'

b. shashin-tei xüch-üd
religion-ADJ boy-PL
'Religious boys'

In addition to gradability and their interaction with number, the two classes of adjectives differ in three respects: (i) the presence of the attributive morpheme /*-n*/; (ii) NP-internal word order; and (iii) (in)compatibility with mass nouns. I discuss each of these in turn.

Prenominal non-classificatory adjectives bear a morpheme /*-n*/, which is labelled in the descriptive grammars as attributive (ATTR) marking, (Janhunen 2012, ch.6). This attributive marker does not surface on prenominal classificatory APs. Furthermore, it is ungrammatical when it surfaces on both classes of APs when used predicatively. The difference in attributive marking between the two classes of AP is is illustrated in (32) and (33).

(32) Attributive marking with non-classificatory APs

a. bi unte*(**-n**) nom onsh-Vn
I expensive-ATTR book read-PST
SG: 'I read a expensive book'
#PL: 'I read expensive books'

b. nom bol unte(*-**n**)
book COP expensive-ATTR
SG: 'A book is expensive'
PL: 'Books are expensive'

(33) Attributive marking with classificatory APs

a. bi shashin-tei(*-**n**) nom onsh-Vn
I religion-ADJ-ATTR book read-PST
SG: 'I read a religious book'
PL: 'I read religious books'

b. nom bol shashin-tei(*-**n**)
book COP religion-ADJ-ATTR
SG: 'A book is religious'
PL: 'Books are religious'

If the modifier does not end in a vowel, the attributive morpheme is covert. For example, this is shown in (10c) and (26a) for the adjective *tam*: 'big'. In addition, the lack of ATTR-marking on adjectives like *shashintei* 'religious' in (33) is not conditioned by the morpheme *-tei* which seems to be an adjectivizing head. Complex gradable adjectives like *fast* are built from the root *xortots* 'speed' + *-tei* and yet they require ATTR-marking: (34).

(34) xortots-tei-**n** mashin
speed-ADJ-ATTR car
'fast car'

With respect to NP-internal word order, the two classes of adjectives can co-occur in the same NP. When that happens, non-classificatory APs must surface to the left of classificatory APs. This is a common pattern across languages (Cinque 2005, 2010; Alexiadou et al. 2007; Svenonius 2008). The opposite order is ungrammatical, as seen in (35).

(35) 'expensive religious book' $AP_{non\text{-}Class} > AP_{Class} > N$

a. unte-n shashin-tei nom
expensive-ATTR religion-ADJ book

b. * shashin-tei unte-n nom
religion-ADJ expensive-ATTR book

Last but not least, non-classificatory APs are only compatible with count nouns, and are unacceptable with mass nouns. This is shown in (36). Classificatory APs can modify mass nouns, in contrast, as shown in (37).

(36) * { tam/ xunde-n/ unte-n} { tsos/ os}
big heavy-ATTR expensive-ATTR blood water
Int.: '{Large/ heavy/ expensive} {blood/ water}'

(37) { monghol/ iuvrop} { tsos/ os}
Mongolian European blood water

This distribution of non-classificatory APs is reminiscent of Schwarzschild's (2011) observation for Stubbornly Distributive adjectives (e.g. **large/heavy water*).[10,11] Thus, we can conclude that while non-classificatory APs (or at least the ones elicited so far) require the noun to be count and singular/plural, classificatory ones do not.

Numerals. Alasha Mongolian has precise numerals. When used enumeratively, i.e. in a list, they are uninflected as in (38).

(38) nigV(*-n), xoirV(*-n), ghorovV(*-n), duruvV(*-n), tau(*-n)...
one-ATTR two-ATTR three-ATTR four-ATTR five-ATTR
'one, two, three, four, five... (*List*)

When they modify a noun, they are prenominal and must be inflected for attributive morphology, i.e. */-n/*. If used predicatively, no attributive marker is spelled-out on the numeral. The difference between attributive and predicative uses of numerals is illustrated in (39a) and (39b).

(39) a. { nigV-n/ ghorovV-n/ dulu-n} almort
one-ATTR three-ATTR seven-ATTR apple
'{one/ three/ seven} apples' (*Attributive*)

b. almort bol { ghorovV(*-n)/ dulu(*-n) }
apple COP three-ATTR seven-ATTR
'The apples are {three/ seven} (*Predicative*)

[10] Schwarzschild (2011) builds on the observations from Quine (1960); McCawley (1979); Chierchia (1998b); Gillon (1999) and others to establish his generalization.

[11] In English at least, it is possible to modify mass nouns like *water, tea* as in (xxi). It is unclear whether *water/tea* in such examples have a 'canonical mass' interpretation or count one (e.g. *expensive containers/types of water*). It is also possible to say things like (xxii) where *heavy* is modifying a mass noun. However, *heavy* does not seem to introduce a dimension of weight/volume but rather 'strength/abundance'.

(xxi) They drink expensive {water/ tea} at home.

(xxii) Heavy perfume

When numerals and non-classificatory APs co-occur, numerals must precede the AP. In other words, the order is always as in (40a), and never as in (40b). In addition, the ATTR morpheme must surface on both the numeral and the non-classificatory AP. If the ATTR morpheme is absent, the sentence is unacceptable as in (41).

(40) Numeral > $AP_{non\text{-}class}$ > N

a. duruvV-n xunde-n nom
four-ATTR heavy-ATTR book

b. * xunde-n duruvV-n nom
heavy-ATTR four-ATTR book
'Four heavy books'

(41) * duruvV xunde-n nom
four heavy-ATTR book
'Four heavy books'

In addition to the attributive marker, numerals and non-classificatory adjectives have in common the fact that they cannot directly modify mass nouns. The examples in (42) are ungrammatical even in packaging/container or sorting/kind contexts (Bunt 1985; Bach 1986b).[12]

(42) a. * bi duruvV-n os ob-sVn
I 4-ATTR water drink-PST.PERF
'I drank 4 waters' (#container, #kind)

b. * bi duruvV-n adelbas os abchir-gwa
I 4-ATTR different water bring-PST
'I brought 4 different waters' (#container, #kind)

With respect to the interaction of numerals and number marking on the noun, we observe that the numerically modified noun must be unmarked, and cannot be inflected for plural. This is shown in (43) for inanimates and in (44) for animates.

(43) a. { nigV-n/ ghorovV-n/} almort
one-ATTR three-ATTR apple

b. * { nigV-n/ ghorovV-n/} almort-o:d
one-ATTR three-ATTR apple-PL
'{one/ three} apples'

(44) a. { nigV-n/ ghorovV-n/} xü:
one-ATTR three-ATTR boy

b. * { nigV-n/ ghorovV-n/} xü:ch-ü:d
one-ATTR three-ATTR boy-PL
'{one/ three} boys'

[12]The container interpretation can only be obtained with a pseudo-partitive structure. See Toquero-Pérez (2023a).

The compatibility of numerals with unmarked animate nouns, which always refer to a singleton (i.e. they are strictly singular semantically), and their incompatibility with the overt plural morpheme, which makes reference to pluralities, suggests that the noun in combination with numerals must be semantically singular rather than number neutral (Krifka 1989, 1995; Ionin and Matushansky 2006, 2018; Pancheva 2021, 2022; Sağ 2022).

5.4 A novel diagnostic for number neutrality: *much/many* and unmarked NPs

5.4.1 Some background

In addition to precise cardinal numerals, many languages also have QAs (e.g. *much/many/little/few* etc.). These QAs are restricted in their distribution. For example, some only surface with mass NPs while others only surface with plural count NPs. English is an example of such a language, as discussed in the previous chapters (Bresnan 1973; Hackl 2000; Schwarzschild 2006; Bale and Barner 2009; Wellwood et al. 2012). However, singular count NPs are unacceptable with QAs.

The formal explanation for this restriction, i.e. the fact that singular count NPs are unacceptable with either *many* or *much*, is found in the structure of the extension of the relevant NP. Mass and plural count nouns have cumulative extensions that have a part-whole structure; singular count nouns, on the contrary, lack extensions with such part-whole relations among their elements (Cartwright 1975; Link 1983; Krifka 1989, 1997; Chierchia 1998b, 2010, a.o.). Under the assumption that QAs introduce measure functions whose dimension for measurement must preserve the part-whole structure of the domain (Krifka 1989; Schwarzschild 2006; Bale and Barner 2009; Wellwood et al. 2012), QAs can combine with plural count nouns because they

are closed under sum (or some other operation that ensures the existence of plural individuals in the extension). Singular NPs denote singletons and do not have sums of atoms in their extension. Thus, they do not satisfy the cumulativity requirement.

Alasha Mongolian has QAs which are also sensitive to the mass-count distinction. Similar to English, *ix* 'much' is only compatible with (unmarked) mass nouns and *olin* 'many' is acceptable with plural count nouns. This is shown in (45) and (46).[13]

(45) a. ix { os/ tsos}
much water blood
'much {water/ blood}' VOLUME/WEIGHT, #CARDINALITY

b. * ix xü(ch-ü:d)
much boy-PL
'much {boy/ boy}

(46) a. * olin { os/ tsos}
many water blood
'many {water/ blood}'

b. olin xüch-ü:d
many boy-PL
'many boys' #VOLUME/WEIGHT, CARDINALITY

Like in English, when a canonical mass nouns like *water/blood* is modified by a QA, the interpretation is in terms of volume or weight, but not cardinality, as in (45). On the contrary, plural count nouns modified by QAs are interpreted in terms of cardinality only, e.g. (46).

Focusing only on count nouns, we can use the distribution and interpretation of *ix/olin* to determine whether a noun in Alasha Mongolian denotes a plurality or a singleton. In particular, we predict that if

[13] I will not be discussing the count-mass distinction in Alasha Mongolian. For the purposes of this chapter, we can simply establish that the language makes the distinction overtly. For example, we have seen that mass nouns cannot be modified by stubbornly distributive adjectives (36), and be directly modified by numerals as in (42). In addition, they cannot be pluralized either, e.g. (xxiii).

(xxiii) os – * os-o:d ‖ tsos – * tsos-o:d
water water-PL ‖ blood blood-PL

*n*Ps unmarked for number are really number neutral and their denotation is as in (6), repeated in (47) for conveninence, such an *n*P must be compatible with QAs; however, if the *n*P is not number neutral, but strictly singular, the *n*P must be incompatible with them. These predictions are schematically represented in (48):

(47) $[\![n\text{P}]\!] = \{a,\ b,\ c,\ ab,\ ac,\ bc,\ abc\}$ Number neutral *n*P

(48) **Predictions of the *much/many*-test for number neutrality**

a. If an unmarked count *n*P is number neutral, e.g. (47), it must be acceptable with QAs.

b. If an unmarked count *n*P is NOT number neutral, but strictly singular, it cannot be acceptable with QAs.

c. If an unmarked count *n*P can be modified by QAs, its interpretation will be along a cardinality scale.

I now show that the predictions in (48) are borne out in Alasha Mongolian.

5.4.2 Applying the *much/many*-test to Alasha Mongolian

As shown in (49a), inanimate count *n*Ps like *almort*, *jürj* 'orange' or *nom* can be modified by *olin* when they are unmarked for number . The interpretation of said *n*P must be in terms of cardinality: (49a) means "the cardinality of apples/oranges/books exceeds a contextually determined standard". Modification by *ix* is not acceptable, as shown in (49b).

(49) *QA* + unmarked inanimate *n*P

a. olin { almort/ jürj/ nom}
many apple orange book
'many {apples/ oranges/ books}' #VOLUME/WEIGHT, CARDINALITY

b. * ix nom
much book
'much book'

In addition, *olin* is acceptable with (inanimate) *n*Ps that are overtly marked for plural: (50). While plural-marking is optional for inanimate *n*Ps when modified by *olin*, that is not the case for animate ones as illustrated in (51): in fact, if the *n*P is animate, plural-marking on the noun is required. Crucially, unmarked animate *n*Ps are unacceptable with *olin*.

(50) *olin* + plural-marked inanimate *n*P

a. olin nom-o:d
many book-PL
'many books' #VOLUME/WEIGHT, CARDINALITY

b. olin almort-o:d
many apple-PL
'many apples' #VOLUME/WEIGHT, CARDINALITY

(51) *olin* + animate *n*P

a. olin xüch-ü:d
many child-PL
'many children' #VOLUME/WEIGHT, CARDINALITY

b. * olin xü
many child
'many child'

The data confirm the predictions outlined in (48): unmarked inanimates are grammatical with QA *olin* and must be number neutral; unmarked animates are ungrammatical with *olin* and must therefore be strictly singular.

5.5 Taking stock and generalizations

Up until this point, I have described the distribution of animate and inanimate *n*Ps that are both unmarked for number and that are plural-marked in a variety of contexts. The data are summarized in Table 5.3 for unmarked *n*Ps and in Table 5.4 for plural-marked ones. As before, the labels SNG/PLR refer to the semantic

interpretation and not the phonological form of the noun: SNG = 'singularity' or singleton (e.g. 1); and PLR = 'plurality' (e.g. 2 or more). If a noun can refer to both, then we will say the noun is number neutral if unmarked or inclusively plural if plural-marked. The labels 'UEC' and 'DEC' in Table 5.4 stand for 'Upward Entailing Context' and 'Downward Entailing Context' (including questions), respectively. The generalizations that emerge from looking at Table 5.3 and Table 5.4 are summarized in (52).

Table 5.3: Number interpretation of unmarked *n*Ps in Alasha Mongolian

	***n*P-case**		**Poss. *n*P**		**Anaphoric Ref.**		**Non-Class. AP**		**Class AP**	
	SNG	**PLR**	**SNG**	**PLR**	**SNG**	**PLR**	**SNG**	**PLR**	**SNG**	**PLR**
[-animate]	✓	✓	✓	✓	✓	✓	✓	*	✓	✓
[+animate]	✓	*	✓	*	✓	*	✓	*	✓	*

Table 5.4: Number interpretation of plural-marked *n*Ps in Alasha Mongolian

		***n*P-case**		**Non-Class. AP**		**Class AP**	
		SNG	**PLR**	**SNG**	**PLR**	**SNG**	**PLR**
UEC	*[-animate]*	*	✓	*	✓	*	✓
	[+animate]	*	✓	*	✓	*	✓
DEC	*[-animte]*	✓	✓	✓	✓	✓	✓
	[+animate]	✓	✓	✓	✓	✓	✓

(52) **Generalizations about the interpretation of number in Alasha Mongolian**

a. Inanimate unmarked *n*Ps are always number neutral unless they are modified by non-classificatory adjectives in attributive position, in which case they are strictly singular.

b. Animate unmarked *n*Ps are never number neutral, i.e. they are strictly singular.

c. In UEC, plural-marked *n*Ps are always exclusively plural.

d. In DEC, plural-marked *n*Ps are always inclusively plural.

The generalizations in (52) are very similar to the ones reported by Bylinina and Podobryaev (2020) for Buriat in table 5.1, with the exception of some micro-variation which I do not discuss here.[14] The generalizations indicate that Alasha Mongolian is also different from Western Armenian, as described by Bale et al. (2011); Bale and Khanjian (2014), in two important respects: (i) the animacy asymmetry and (ii) the fact that plural-marked NPs are not always exclusive. In fact, Alasha Mongolian is similar to English in this respect, given that the exclusive/inclusive distinction with plural-marked nouns is conditioned by the veridicality of the context (Krifka 1989; Sauerland 2003; Sauerland et al. 2005; Zweig 2009).

In addition to these generalizations, we must address the case of numerals. Precise numerals were ungrammatical with overt plural-marked nouns, regardless of their animacy. What is more, the fact that they are grammatical with unmarked, strictly singular, animate nouns led to the conclusion that they require the noun to refer to a singurality. This is summarized in (53).

(53) Numerically modified *n*Ps must be unmarked for number and refer to a singularity.

The generalization in (53) distinguishes Alasha Mongolian from languages like Western Armenian where numerals are compatible with plural-marked nouns and unmarked nouns that are number neutral (Bale et al. 2011; Bale and Khanjian 2014). But it also makes Alasha Mongolian different from English where nouns modified by numerals higher than one are plural-marked.[15]

In addition to precise numerals, I surveyed the distribution of QAs *ix* and *olin* with different types of count *n*Ps. This distribution is summarized in Table 5.5, where it is compared to the distribution of cardinal numerals.

Given the generalizations in (52) that inanimate unmarked *n*Ps are number neutral, but animate ones are strictly singular we expected only the former to be acceptable with QAs. This is borne out for *olin*, and

[14] In Buriat ACC-marked NPs are strictly singular and so are 1^{st} and 2^{nd} person possessed NPs. Bylinina and Podobryaev (2020) make no distinction with respect to the type of adjectival modification and there is no discussion of the presence of the attributive marker. They do not discuss numerically modified NPs either.

[15] In terms of the semantics, there is a debate as to whether numerals in English require the noun they modify to denote a singleton despite morphological markedness (Krifka 1989, 1995; Ionin and Matushansky 2006, 2018; Alexiadou 2019) or a plurality (Chierchia 1998b, 2010; Bale et al. 2011; Scontras 2013; Martí 2020b, and others). I come back to this question in §5.7.

Table 5.5: Syntactic distribution of *olin* and cardinal numerals with count nouns

	[-animate]		**[+animate]**	
	unmarked (*nom* 'book')	**PL-marked (*nom-o:d* 'books')**	**unmarked (*xü* 'boy')**	**PL-marked (*xüch-üd* 'boys')**
ix 'much'	*	*	*	*
olin 'many'	✓	✓	*	✓
numerals	✓	*	✓	*

is consistent with the predictions outlined in (48). It is in stark contrast with unmarked animate *n*Ps, which cannot combine with *olin*. This is also expected if unmarked animates are strictly singular. *ix* is not acceptable with unmarked animates or inanimates, and neither is it acceptable with their plural-marked counterparts. The distribution of *olin* does not conform to the plural-QA-markedness generalization according to which the surface form of QAs is sensitive to plural-marking on the noun. We observed this was the case for English, Spanish, Greek and Telugu. This could in principle be taken as evidence for Uniform Dimensionality in the spirit of Solt (2009), in particular because *olin*+*n*P gives rise to a cardinality interpretation. However, despite the fact that this could be a potential generalization, we would be losing all the mileage that we gained from separating the forms of QAs from their meaning. Instead, it seems that the distribution of *ix* and *olin* can be predicted on a different basis that is neither meaning nor plural-marking on the noun. I propose that the actual generalization is in (54).[16]

(54) *olin* is found when the noun is individuated, whereas *ix* is found elsewhere.

The generalization is consistent with the observation that count nouns, including number neutral and plural-marked ones, must be marked for individuation in the syntax (Chapter 3). This is also consistent with the observation that the dimension of cardinality is assigned when the measure morpheme has an individuated plurality in its scope. If number neutral nouns denote an individuated semi-lattice, the semantic facts also follow.

[16] Smith (2021) reaches a similar conclusion for Purépecha.

If we compare numerically modified nouns in (43) and (44) to *olin*-modified nouns, as described in section 5.4.2, we observe important differences as summarized in the Table 5.5: nouns that are modified by numerals must be morpho-syntactically unmarked regardless of their animacy, whereas nouns modified by *olin* may not. In fact, animates cannot be morpho-syntactically unmarked, but inanimates can. In other words, we can conclude that while the animacy split for number neutrality is not maintained in cardinal numeral-noun constructions, it remains in *olin*-noun constructions. We can take these facts as evidence that the syntactic and semantic requirements that need to be met for cardinal numeral modification and QA modification differ.

5.6 Analysis

I propose that the generalizations in (52)-(54), as well as the distribution and interpretation of number in Alasha Mongolian, can follow directly from the syntactic representation of the DP, and its mapping to the morphological and semantic interfaces. In particular, under the proposal that (i) an [IND] feature on *n* selects the denotation of the root has atoms and sums of atoms, i.e. the individuated one, and (ii) the features on a Num(ber) head restrict the denotation of the noun to a singleton or a plurality (Cowper 2005; Harbour 2007, 2011, 2014; Cowper and Hall 2009, 2012), the number neutral interpretation of unmarked inanimate nouns is the result of Num not being projected: if Num is not projected, number features cannot restrict the noun's denotation. NumP is projected only when there is morpho-syntactic evidence to do so: plural marking, non-classificatory APs, numerals. On the contrary, Num is always present when the noun is [ANIMATE]. I show that this analysis of nominal number has welcome consequences for the analysis of numerals as well. In addition, I propose that the inclusive/exclusive ambiguity of the plural can be derived via semantic competition or alloseme selection (Arad 2003; Marantz 2001, 2013; Harley 2014; Wood 2016, 2023).

5.6.1 Setting up the system

One of the generalizations to be accounted for is the fact that inanimate unmarked NPs are number neutral, whereas their animate counterparts are strictly singular. Following Ritter (1993); Kramer (2015); Wiltschko and Ritter (2015) I liken animacy to gender and assume that animacy is encoded by the *n* head. Following Cowper and Hall (2009), a feature [ANIMATE] on *n* sorts roots into the class of animate things; in the absence of the feature, the noun root will be inanimate.

In addition, I assume the theory of number and individuation spelled-out in the previous chapters: (i) *n* is the locus of countability or individuation (Bale and Barner 2009; Smith 2021), via the feature [IND]; (ii) *n*[IND] triggers an individuated interpretation for the root; (iii) but underspecified *n* triggers a non-individuated interpretation of the root. This is schematically summarized as in (55), following the notation introduced in Chapter 4.

(55) a. $\sqrt{\text{ROOT}} \leftrightarrow$ ROOT-THING/__*n*[IND]

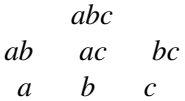
$[\![\text{ROOT-THING}]\!] = \{x\text{: } x \text{ is an atomic thing or sum of atomic things}\} = \{a, b, c...abc\}$

b. $\sqrt{\text{ROOT}} \leftrightarrow$ ROOT-STUFF/__*n*

$[\![\text{ROOT-STUFF}]\!] = \{x\text{: } x \text{ is a portion of stuff or a sum of portions of stuff}\} = \{a_s, b_s, c_s...abc_s\}$

Assuming a simple model in which there are only three members {*a, b, c*} which are atoms, the extension of the individuated nominalized root in (55a) is semi-lattice structure in . The relevant definition of 'atom' and 'minimal part' are the same as in (46) and (47) repeated in (56) and (57) for convenience.

Figure 5.1: Individuated semi-lattice generated from atoms {*a, b, c*}: extension of [*n*[IND] $\sqrt{\text{ROOT}}$]



(56) Definition of atom

An object z is an atom in a set of objects P iff z is a minimal part for P and for all objects $y \in P$, either (i) $z \leq y$ or (ii) there is no $w \leq z$, such that $w \leq y$.

(57) Definition of minimal part

$\forall x[P(x) \rightarrow \neg\exists y[P(y) \wedge y < x]]$

'An object x is a minimal part for a set of objects P iff for all $x \in P$ it is not the case there is an object y, such that $y \in P$ and y is a proper part of x.

Depending on the combination of [ANIMATE] and [IND] on the nominalizer, we can find the flavors of n summarized in Table 5.6. The semantic value of the feature bundles in Table 5.6 is given in (58) and (59). The n-head marked for individuation selects the root concept that has the property of being individuated (i.e. the root-concept that is generated from the set of atoms): ROOT-THING. The definitions of IND and Non-IND are repeated in (60).

Table 5.6: Flavors of n in Alasha Mongolian

	[IND]	**[ANIMATE]**
animate count	✓	✓
inanimate count	✓	–
mass	–	–

(58) Animate count n

a. n[IND, ANIMATE]

b. $[\![n[\text{IND, ANIMATE}]]\!] = \lambda x.\text{IND}(P)(x) \wedge \text{animate}(x)$

(59) Inanimate count n

a. n[IND]

b. $[\![n[\text{IND}]]\!] = \lambda x.\text{IND}(P)(x) \wedge \neg\text{animate}(x)$

(60) Individuating function:

$\text{IND}(P)$ = a predicate P is an individuated semi-lattice iff

a. P is closed under sum, such that if '*' is the sum closure operation, then $P = {}^*P$; and

b. P is generated by the set of atoms in P, such that if atom is the set of atoms in P, then $P = {}^*\text{atom}$.

In addition to this, I assume that number features are located on a functional head called Num, above *n* and below D (Ritter 1991; Cowper 2005; Borer 2005a; Wiltschko 2008; Harbour 2011). This functional head encodes singular or plural number features: [SG/PL]. These features operate on the individuated semi-lattice imposed by [IND] on the *n*P and restrict the denotation of the noun. The meanings of these features are as in (52) in the previous chapter, repeated in (61).

(61) a. $[\![\text{[SG]}]\!] = \lambda P.\lambda x.P(x) \wedge \text{minimal}(x)$

b. $[\![\text{[PL]}]\!] = \lambda P.\lambda X.\forall x[X(x) \rightarrow (P(x) \wedge \neg\text{minimal}(x))]$

In a nutshell, we can say that [SG] = singletons (i.e. the minimal parts; the bottom row of the semi-lattice in Figure 5.1), and [PL] = non-singletons or pluralities (i.e. the non-minimal parts; everything but the bottom row of the semi-lattice in Figure 5.1). This is summarized in (62).

(62) a. $[\![n\text{P}_{\text{[IND]}}]\!] = [\![n\text{[IND]}]\!]([\![\sqrt{\text{ROOT}}]\!]) = \text{IND}(\text{ROOT-THING})(x) \wedge (\neg)\text{animate}(x)$ {*a, b, c, ab, ac, bc, abc*}

b. $[\![\text{[SG]}\ n\text{P}_{\text{[IND]}}]\!] = [\![\text{[SG]}]\!]([\![(62a)]\!]) = \text{IND}(\text{ROOT-THING})(x) \wedge (\neg)\text{animate}(x) \wedge \text{minimal}(x)$ {*a, b, c*}

c. $[\![\text{[PL]}\ n\text{P}_{\text{[IND]}}]\!] = [\![\text{[PL]}]\!]([\![(62a)]\!]) =$

$= \forall x[X(x) \rightarrow (\text{IND}(\text{ROOT-THING}) \wedge (\neg)\text{animate}(x) \wedge \neg\text{minimal}(x))]$ {*ab, ac, bc, abc*}

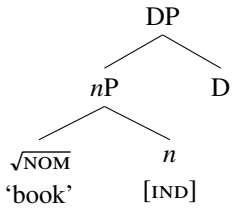
5.6.2 The basic syntactic structure of (count) nouns

Given the theory adopted, projecting NumP entails that the noun will be strictly singular if unmarked or (exlcusively) plural if plural-marked. This leaves no room for unmarked nouns which are number neutral.

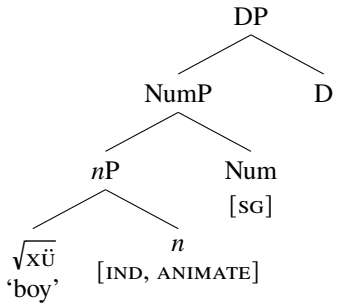
However, there is a solution within this system, which I adopt here: unmarked nouns which are number neutral are syntactically impoverished and do not project NumP. If [SG/PL] is absent from the numeration and thus not represented in the syntax, NumP will not be projected;[17] as a result, no number features will restrict the interpretation of the *n*P. The hypothesis that unmarked number neutral nouns do not project NumP receives cross-linguistic support from Amharic (Kramer 2017), Bayso and Fouta Jalon Fula (Corbett 2000; Harbour 2014; Martí 2020a), and Haitian Creole (Déprez 2005) to name a few. That said, I propose that the structure of unmarked number neutral nouns in Alasha Mongolian is as given in (63a).[18] This structure differs from the one that unmarked animate nouns have, given in (63b).

(63) The syntax of (unmodified) unmarked count nouns

a. Inanimates = number neutral



b. Animates = singular



The two structures for unmarked nouns share the fact that *n* is specified for individuation. But they differ in two main respects: (i) animacy class features on *n*, and (ii) the absence or presence of Num. Inanimate nouns are underspecified for animacy and lack Num; animate nouns are [ANIMATE] and project NumP by virtue of being specified as [SG].

This does not mean, however, that inanimate nouns will never project NumP. In fact, these nouns can be overtly pluralized by *-v:d*, just like their animate counterparts. We can take this as evidence that whenever

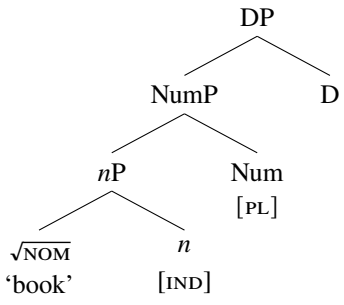
[17] This follows from the theory of Bare Phrase Structure (Chomsky 1994, 1995) and the framework of Distributed Morphology (Halle and Marantz 1993): syntactic categories are taken to represent the features that compose them.

[18] I follow von Heusinger and Kornflit's (2017) analysis of Altaic nominals and assume that, despite lacking an overt articles, Alasha Mongolian has DPs.

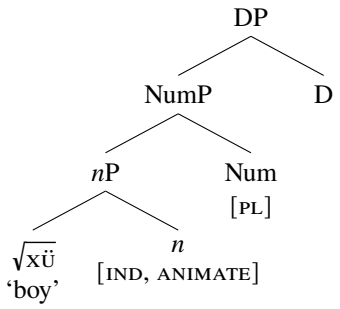
the noun is overtly plural, [PL] must be part of the syntactic derivation and NumP must be projected. Plural-marked nouns, therefore, have the structures in (64a) if inanimate, and in (64b) if animate.

(64) The syntax of Plural-marked nouns

a. Inanimates



b. Animates



This has consequences for both PF and LF. When transferred to the PF interface, the terminals or features are assigned a vocabulary item via a series of Vocabulary Insertion (VI) rules. For Alasha Mongolian, the relevant VI rules are formulated in (65) for *n* and in (66) for Num.

(65) VI rules for *n*

a. *n*[IND, ANIMATE] ⇔ Ø

b. *n*[IND] ⇔ Ø

(66) VI rules for Num

a. Num[SG] ⇔ Ø

b. Num[PL] ⇔ *-v:d*

As the rules predict, there is no overt exponent for the features on *n* in the language. Likewise, [SG] is not mapped to an overt exponent either. Only [PL] has an overt exponent.

In terms of the semantic composition, the syntactic structures also give rise to the desired interpretations.The roots $\sqrt{\text{NOM}}$ and $\sqrt{\text{XÜ}}$ are associated with the concepts in (67). Each one is appropriately selected by the categorizer. As a result, the denotation of the *n*P, before Number, is as in (68): (unmodified) unmarked inanimate nouns denote book-atoms and their sums (i.e. they are number neutral). When *n*P composes with

Number, as in the case of animates, the result is a strictly singular predicate: one that only has book-atoms in its extension. This is shown for singular *xü* 'boy' in (69).

(67) a. $\sqrt{\text{NOM}} = \{\text{BOOK-THING}\}$

b. $\sqrt{\text{XÜ}} = \{\text{BOY-THING}\}$

(68) $[\![(63a)]\!] = [\![\text{nom}]\!] = [\![n[\text{IND}]\sqrt{\text{NOM}}]\!] =$

$= \lambda x \text{IND}(\text{BOOK-THING})(x) \wedge \neg\text{animate}(x)$ (e.g. {*a, b, c, ab, ac, bc, abc*})

'The property of being an atomic book or sum of atomic books'

(69) $[\![(63b)]\!] = [\![[\text{SG}]\ n[\text{IND}]\sqrt{\text{XÜ}}]\!]$

a. $[\![n[\text{IND}]\sqrt{\text{XÜ}}]\!] = \lambda x.\text{IND}(\text{BOY-THING})(x) \wedge \text{animate}(x)$ (e.g. {*a, b, c, ab, ac, bc, abc*})

b. $[\![[\text{SG}]]\!]([\![n[\text{IND}]\sqrt{\text{XÜ}}]\!]) = \lambda x.\text{IND}(\text{BOY-THING})(x) \wedge \text{animate}(x) \wedge \text{minimal}(x)$ (e.g. {*a, b, c*})

'The property of being an atomic boy'

In addition, restricting ourselves to the interpretation of the plural in upward entailing contexts, the interpretation for both types of nouns regardless of their animacy features is an exclusive plurality. This is illustrated with the derivations in (70).

(70) a. $[\![(64a)]\!] = [\![[\text{PL}]\ n[\text{IND}]\sqrt{\text{NOM}}]\!] =$

$= \lambda X.\forall x[X(x) \rightarrow (\text{IND}(\text{BOOK-THING})(x) \wedge \neg\text{animate}(x) \wedge \neg\text{minimal}(x))]$

'The property of being a individuated plurality of (only) sums of books' (e.g. {*ab, ac, bc, abc*})

b. $[\![(64b)]\!] = [\![[\text{PL}]\ n[\text{IND}]\sqrt{\text{XÜ}}]\!] = [\![[\text{PL}]]\!]([\![n[\text{IND}]\sqrt{\text{XÜ}}]\!]) =$

$= \lambda X.\forall x[X(x) \rightarrow (\text{IND}(\text{BOY-THING})(x) \wedge \text{animate}(x) \wedge \neg\text{minimal}(x))]$

'The property of being an individuated plurality of (only) sums of boys' (e.g. {*ab, ac, bc, abc*})

5.6.3 Deriving the exclusive/inclusive ambiguity with plural-marked nouns

An immediate consequence of the theory of number adopted is that plural-marked nouns, being [PL], will be forced to be interpreted always exclusively: [PL] will restrict the denotation of the count noun to the atomic non-minimal parts. While this is certainly a welcome result in the case of plural-marked nouns in upward entailing contexts, it makes the wrong prediction when it comes to plural-marked nouns in downward entailing contexts: they are interpreted inclusively.

One possibility, briefly entertained by Harbour (2014) and described in more detail by Martí (2020a, p.59), would be to hypothesize that plural-marked nouns are structurally ambiguous between projecting NumP or not. The difference between exclusive and inclusive plural-marked nouns would be along the same lines as the difference between unmodified unmarked inanimates and their animate counterparts that I have proposed here. If [PL] is not present in the derivation, the number neutral denotation of the *n*P imposed by the categorizer will be passed along the DP.

However, this solution makes inaccurate morpho-syntactic predictions. In those languages, Alasha Mongolian being one of them, where we observe the exclusive-inclusive ambiguity in the plural, there is no difference in the exponence of the plural morpheme. That is, the same vocabulary item that spells out the [PL] feature is used, regardless of the interpretation. This is unexpected under this type of structural ambiguity account: if [PL] is not part of the syntax, it will not be subsequently mapped to a vocabulary item at PF; and the rule in (66b) will not apply. What we can conclude from this is that whatever is responsible for the ambiguity need only have a semantic effect leaving the VI rules in (65) intact.

A very popular solution in the literature derives the ambiguity based on Gricean competition in the pragmatic computation (Krifka 1989; Sauerland 2003; Sauerland et al. 2005; Spector 2007; Zweig 2009). However, Martí (2020a) has recently argued that these approaches would fail to capture Harbour's robust typology of number systems. Martí advocates instead for an account that derives the ambiguity based on the syntactic structure of the DP and its consequences for LF. In this paper, I will adhere to the spirit of the claims

made by Martí (2020a) and propose an alternative solution to the ambiguity that is rooted in the architecture of the DP that is fed to LF, and does not rely on implicature calculation.[19] In particular, I propose that the feature [PL] has two allosemes at LF: an elsewhere alloseme, which is the denotation in (61b), and a marked alloseme that arises whenever [PL] occurs in the local context of a negative or NPI indefinite determiner. In what follows, I provide some motivation for the presence of an NPI element in the DP; then, I outline the standard assumptions for allosemy and finally show how we can use it to derive the ambiguity at hand.

Inclusive plurals and covert *any*. It has been observed, first by Harbour (2016, ch.6: p.149-150) and shortly after by Ackema and Neeleman (2018, ch.3: p.81-83), that bare plural NPs interpreted inclusively in downward entailing contexts are in parallel distribution to plural-marked NPs with NPI *any*. For example, the negative English sentences in (71) are truth-conditionally equivalent. Compare these to (72): overt *any* in (72b) makes the sentence odd.

(71) a. I didn't see children.

b. I didn't see **any** children.

'There is not even a child that I saw'

(72) a. I saw children.

b. ?? I saw **any** children.

'There is more than one child that I saw'

The same occurs with questions as in (73) and antecedents of conditionals such as (74), which are the other contexts where the inclusive interpretation is found.

(73) A: { Did you see children in the park? / Did you see **any** children in the park? }

B: { Yes, I saw one / # No, I saw one }

[19] An approach that relies of competition in terms of structurally determined scalar alternatives may be in principle compatible with the data and the syntactic structures proposed here. That is the approach that Bylinina and Podobryaev (2020) pursue for Buriat. However, for Bylinina and Podobryaev, [PL] = * whereas for me [PL] ≠ *. Thus, one needs to factor this difference when determining the set of possible alternatives.

(74) a. If you have children, you are welcome to board now.

b. If you have **any** children, you are welcome to board now.

'Even if you have one child, you can board now'

We must note, in addition, that in English the negative indefinite *no* triggers an inclusive plural interpretation on the noun. See (75).

(75) a. No children were invited to the party.

b. John has no children with Mary.

These patterns observed for *any* and plural-marked nouns in English are also found in Alasha Mongolian. An indefinite determiner *yamarch* 'any' is only found in downward entailing contexts, as the contrast in (76) shows. (77), which parallels (25), illustrates that *yamarch* can also be found in questions.

(76) a. * bi yamarch { nom-o:d/ xüch-üd} xar-sVn
I any book-PL/ boy-PL see-PST.PERF
Lit. 'I saw any {books/ boys}'

b. bi yamarch { nom-o:d/ xüch-üd} xar-sVn-ghue
I any book-PL/ boy-PL see-PST.PERF-NEG
'I didn't see any {books/ boys}'

(77) A: chi yamarch { nom-o:d/ xüch-üd} dilgur-t xar-tVg-o?
you any book-PL/ boy-PL store-DAT see-HAB-Q.POL
'Do you typically see any {books/ boys} at the store?'

B: time:, nig
yes one
'Yes, I (typically) see one'

ughue, nig
NEG one
No, I (typically) see one.

Like Harbour (2016) and Ackema and Neeleman (2018), we can conclude from this that there is a covert counterpart of *any* that occurs with bare plurals in downward entailing contexts. Furthermore, whenever

this (overt or covert) *any/yamarch* is appropriately licensed, it will be responsible for triggering the inclusive interpretation of the plural. Schematically, we can summarize the rule that triggers the inclusive interpretation of plural-marked nouns as in (78).

(78) General rule for the interpretation of plural-marked nouns in downward entailing contexts

A plural-marked noun …

a. …is interpreted inclusively if it is c-commanded by a negative indefinite or a properly licensed NPI at LF.

b. Otherwise, it will be interpreted exclusively.

c. Structural description: $\{\textsc{neg}/\text{ NPI}\} > \textsc{pl} > n\ \sqrt{\textsc{root}}$

I will take the structural description of the rule in (78c) to indicate an interaction between the negative element and the plural feature. In particular, when the structural description is met, the canonical or unmarked meaning of the plural will be blocked and a different meaning for the plural will be selected instead. I model this interaction in terms of allosemy (Marantz 2001, 2013; Arad 2003; Harley 2014; Wood 2016, 2023): competition for selection of meanings into terminals at LF.

Allosemy: some necessary background. We can think of allosemy as the counterpart of allomorphy but at LF (Arad 2003; Marantz 2001, 2013; Wood 2016, 2023): mapping from terminals to interpretation is mediated by Sense Insertion rules. In particular, we can adopt the view that the denotation of functional heads, which have different flavours or are polysemous, is determined post-syntactically via the syntactico-semantic context. Crucially, the rules that determine the insertion of these meanings will only affect the semantic output, and have no impact whatsoever in the morphology. This already is a promising result for the case of the inclusive-exclusive interpretation of the plural because, as we have seen, the plural morpheme is always mapped to the same exponent.

The analogue to VI rules are the mapping rules in (79), which are also subject to the Subset Principle (Kiparsky 1973; Halle and Marantz 1993). I schematically formalize these rules in (79) as established by Harley (2014); Wood (2016, 2023) and others.

(79) a. $X \leftrightarrow \lambda\sigma \ldots / \_\_Y$ 'Interpret X as the λ-expression in the context of Y'

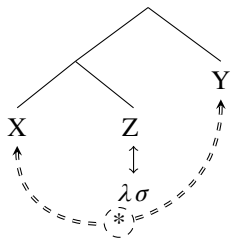
b. $X \leftrightarrow \lambda\sigma.\lambda\tau \ldots$ 'Interpret X as the λ-expression elsewhere'

Whenever the contextual specification for X is met, the rule in (79a) will apply. Otherwise, X will be interpreted as the default or elsewhere case in (79b).

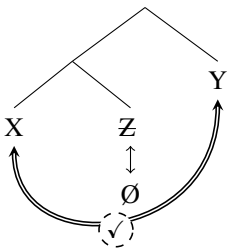
In thinking about the domain of allosemy, we can apply the same logic as for allomorphy (Embick and Noyer 2001; Embick 2010; Bobaljik 2012). For instance, for a feature/terminal Y to condition an alloseme on X, there must be no semantically contentful Z that intervenes between them. By semantically contentful, I am referring to any meaning other than an identity function. A schematic illustration is given in (80).

(80) Locality conditions for allosemy

a.



b.



Given the LF structures in (80), Y cannot condition an alloseme on X in (80a) because Z is contentful. As a result, the elsewhere rule in (79b) is applied. However, if Z is an identity function represented as 'Ø' in (80b), Y and X are local and thus Y can trigger alloseme insertion on X. In other words, the contextual specification for the rule in (79a) is met, and the rule applies.

When applied to the interpretation of the plural at hand, the structural description in (78c) entails that the NEG or NPI feature and the Number head hosting the feature [PL] must be local for the former to condition

an idisyncratic alloseme on [PL]. In other words, NEG or NPI and [PL] must be part of the same extended projection, and the former must immediately c-command the latter. I turn to the formal details next.

[NEG/NPI] as allosemy triggers on [PL]. I propose that negative-words including NPIs and negative determiners are decomposed into two parts (Collins and Postal 2014): a negative or NPI element and an indefinite element.[20] It should be explicitly remarked that it is crucial for the proposal here that NPIs are distinguished from non-NPI determiners by a syntactically visible feature. I propose the following decomposition in (81) and (82).

(81) The features of NPI indefinite determiners

D[NPI]⇔ *any*/*yamarch*

(82) The features of negative indefinite determiners

D[NEG]⇔ *no*

While the exact semantic content of the NPI feature in (81), though, is to be yet determined, we can take its contribution to be in the spirit of Guerzoni (2006): the feature must be licensed at LF against the relevant negative or downward entailing head. D is the category feature and, as in Section 3.2.4 of Chapter 3, I am assuming that indefiniteness is lack of a feature [DEF]. The denotations for the two feature bundles are as given in (83).[21]

(83) a. $[\![\text{D[NPI]}]\!] = \lambda P.\lambda Q.[\exists x(P(x) \wedge Q(x))]$

b. $[\![\text{D[NEG]}]\!] = \lambda P.\lambda Q.\neg[\exists x(P(x) \wedge Q(x))]$ (Collins and Postal 2014, ch3.: p.25)

In addition to this, I propose that [PL] has two allosemes. These are captured in the allosemy rules formulated in (84).

[20] For Collins and Postal (2014), *any* = [NEG SOME].

[21] One might wonder whether it is necessary to have two different feature bundles, and two separate denotations for *any/yamarch* and *no* or whether a negative denotation like the one proposed by Collins and Postal (2014) suffices. In terms of parsimony, having the same denotation for *no* and *any*, as Collins and Postal (2014) do, is an advantage. However, as Y. Sudo (p.c.) points out such denotation of *any/yamarch* should not involve negation, as it would predict the wrong truth-conditions in various cases, e.g. under (semantically interpreted) negation, conditional antecedents, sentences with multiple NPIs, etc. Rather, the denotation of *any/yamarch* must be standardly built on a simple existential quantifier (some analyses involve some additional mechanisms on top of that, e.g. Chierchia 2013). Perhaps a solution to reconcile this issue is to fully endorse Collins and Postal's proposal according to which the NEG element that NPIs are decomposed into must raise out of D into the clause. For the purpose of this dissertation, I remain neutral as to whether such an analysis is needed to account for the plural facts.

(84) Allosemy rules for [PL]

a. [PL] ↔ $\lambda P.P/\_\_$ D{[NPI]/[NEG]}

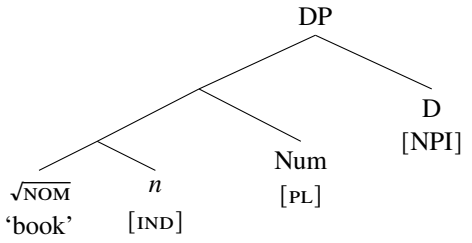
b. [PL] ↔ $\lambda P.\lambda X.\forall x[X(x) \rightarrow P(x) \wedge \neg \text{minimal}(x)]$

Given the rules, [PL] has two allosemes which compete for insertion at LF. The elsewhere case in (84b) is the default denotation. This denotation will be inserted at LF unless there is a D terminal with the feature [NPI] or [NEG] in its specified local context. In that case, the elsewhere rule will be blocked in favor of the more specific rule in (84a). According to this rule, the denotation of [PL] will be that of an identity function.

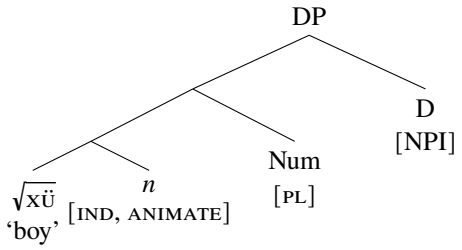
The syntactic structure that I have proposed for DPs in Alasha Mongolian allows us to locate the feature bundle for the NPI as realizing D. Thus, in downward entailing contexts, the DP structure that is transferred to LF is illustrated in (85a) and (85b) for inanimates and animates respectively.

(85) LFs of plural marked nouns in downward entailing contexts

a. *nom-o:d* 'book-PL'



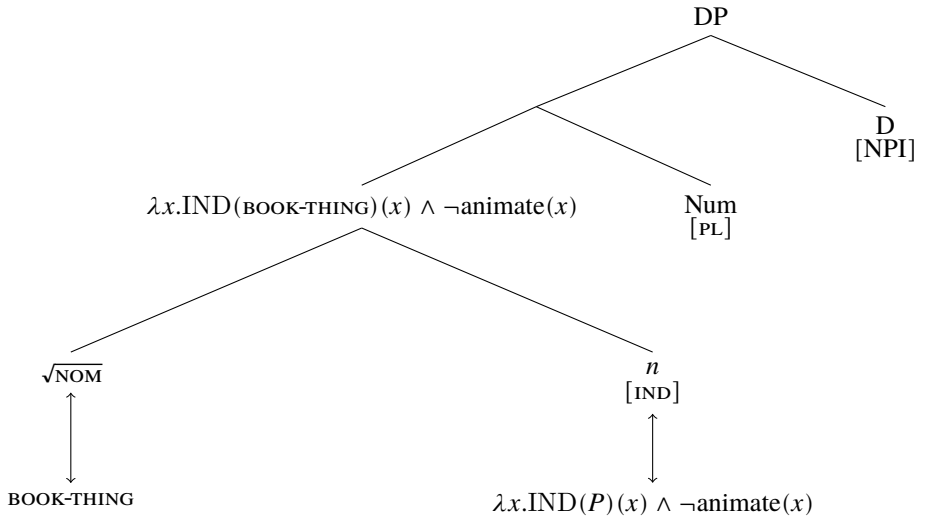
b. *xüch-ü:d* 'boy-PL'



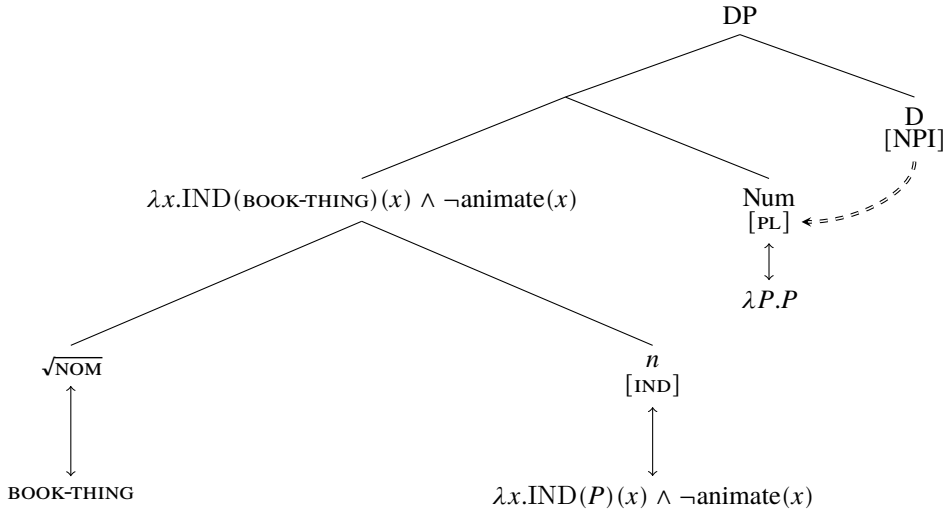
Importantly, as both LF structures show, the structural description in (78c) for the interpretation of the plural as inclusive is met: [PL] is the immediate scope of a negative indefinite. This allows for D to trigger allosemy on [PL], i.e. (84a). In particular, the derivation proceeds as in (86), illustrated with an inanimate noun. The derivation would be identical for animate nouns, with the exception of the [ANIMATE] feature.

(86) Semantic derivation of *nom-o:d* in a downward entailing context

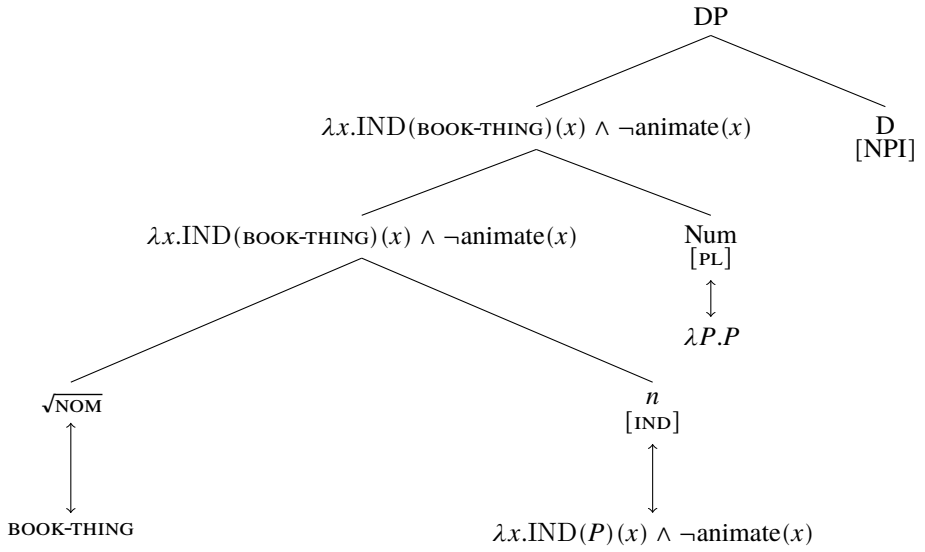
a. $[\![n[\text{IND}]]\!]([\![\sqrt{\text{NOM}}]\!])$



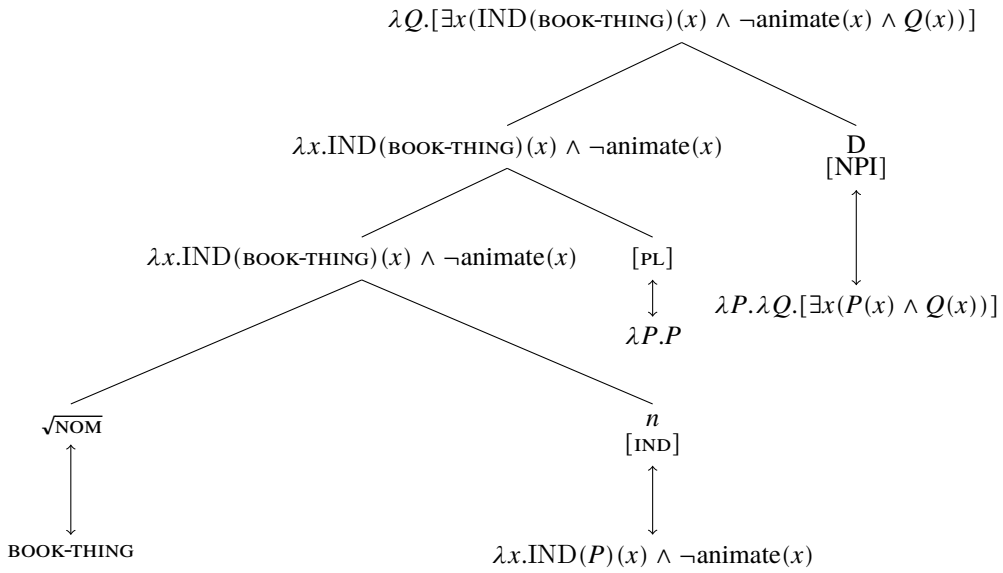
b. D triggers allosemy of (84a) on Num



c. $[\![\text{Num}[\text{PL}]]\!]([\![[n[\text{IND}]\ \sqrt{\text{NOM}}]]\!])$



d. ⟦D⟧(⟦[Num[PL] *n*[IND] $\sqrt{\text{NOM}}$]⟧)



The semantic composition proceeds bottom-up, as is standard, by composing the root with the nominalizing *n* head taking the root as its argument The result in (86a) is an individuated semi-lattice which is number neutral: the predicate has atoms and and their sums in its extension (e.g. {*a, b, c, ab, ac, bc, abc*}). The next step in the derivation is the trigger of allosemy as in (86b): [PL] occurs in the context of D[NPI] which meets the contextual specification for the allosemy rule in (84a). As a result, and given the Subset Principle, the insertion of the elsewhere sense for [PL] is blocked. Instead, the more specific rule is applied. According to this rule, [PL] is an identity function. When composing with the number neutral constituent in (86c), [PL]

has no effect on it, passing along its denotation to the next higher node. By virtue of [PL] being an identity function, the extension of the noun still has both atoms and their sums. The last step is the composition of this just-created node and the determiner head, given in (86d).

The derivation has the desired result which is a plurality that also contains atomic minimal parts. Crucially, the derivation of plural-marked nouns in downward entailing contexts differs from their derivation in upward entailing contexts regarding the choice of denotation inserted for [PL]. In upward entailing contexts, as illustrated in (64), there is no NPI or NEG on D; as a result, the application of the context sensitive allosemy rule in (84a) is blocked. Instead, the elsewhere rule for [PL] is applied, which restricts the extension of the noun to only sums.

There are some important benefits of deriving the ambiguity in this way. First, the analysis relies on the syntactic structure that is fed to LF and includes a mechanism responsible for neutralizing non-atomic plural interpretations. In particular, it captures the insight from the pragmatic competition approaches that the morpho-syntactic expression of plural-marked nouns remains the same across the board, i.e. [PL] always projects, and only the meaning is affected. In this respect, it is compatible with the claims made by Martí (2020a) and presents itself as an alternative to other structural ambiguity accounts. Last but not least, there is a methodological advantage. Given the strict locality conditions for allosemy and the allosemy rules for [PL], it only takes a single interpretable feature that intervenes between D and Num to block alloseme selection.

In other words, the account is "fragile" in that it is easily falsifiable. Like Deal (2019); Erlewine (2020), I take this aspect to be a virtue of the theory.[22]

5.6.4 Adding (non-classificatory) APs and numerals into the mix

Up until this point, I have argued that a major difference between animate and inanimate nouns is that the former always project NumP, but the latter need not. I have argued, though, that it is possible for inanimate nouns to project NumP if they are overtly plural-marked, for instance. The question that arises now is whether these nouns can also project NumP when they are unmarked. The way that the system is set up does not preclude Num to be specified as [SG] when the [IND] noun is not specified for animacy. That is, it must be in principle possible to find cases where unmarked inanimate nouns like *nom* are actually not number neutral but singular. This is the exact situation that we found with non-classificatory APs and numerals. I discuss APs first.

The case of APs. Non-classificatory APs must precede classificatory ones according to the word order facts in (35). What is more, the former but not the latter, interact with number information in a non-trivial manner. In particular, the former belong to the subclass of strongly distributive adjectives. I take this set of facts to propose the following: classificatory APs are adjoined to the domain of class which is lower in the structure (Alexiadou et al. 2007; Svenonius 2008; Wiltschko 2014; Dékány 2021), i.e. *n*P; non-classificatory

[22] While the allosemy account seems to be empirically well-motivated for Alasha Mongolian and can be extended to English, there are at least two places where the interpretation of (covert/overt) *any* and inclusive plurals seems to diverge. I thank Y. Sudo (p.c.) for this observation. (a) One such case is in the scope of *only*: since the scope of *only* is an NPI licensing context, we would expect a plural-marked NP to receive an inclusive interpretation, but that is arguably incorrect, e.g. (xxiv) is wrongly predicted to not imply that 'John has multiple iPhones'.

(xxiv) Only John has iPhones.

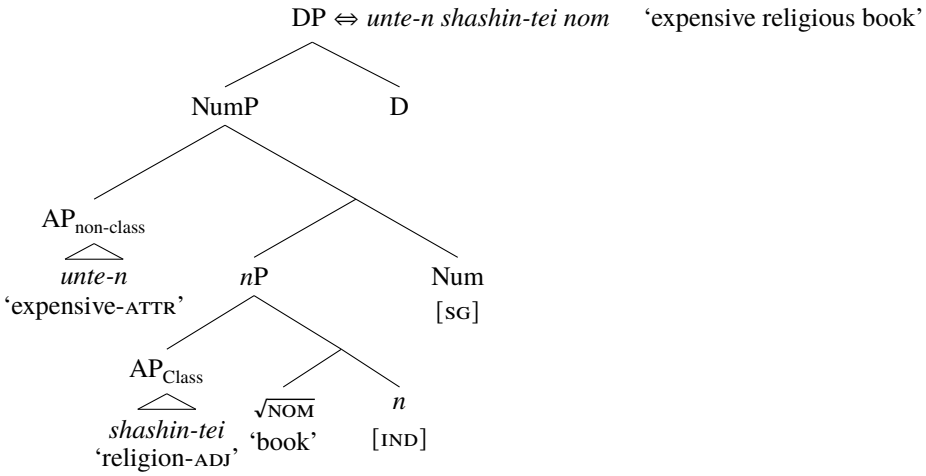
(b) In a similar vein, plurals in the scope of *every* are potentially problematic for the analysis (Farkas and de Swart 2010). A sentence like (xxv) has a reading that does not entail that every applicant submitted multiple journal articles, but at least some applicants did. Since the scope of *every* is not an NPI licensing environment, we would expect an exclusive plural interpretation that should entail that every applicant submitted multiple journal articles.

(xxv) Every applicant submitted journal articles as part of their job application.

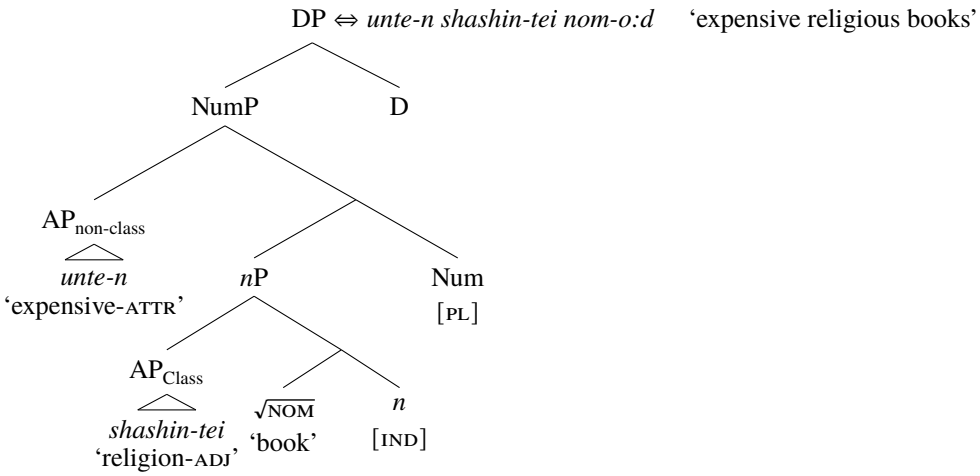
These are problematic if we aim to have a generalized allosemy account for the inclusive/exclusive ambiguity of the plural. At this point, however, there is little that I can say about them and I will thus leave them for future research.

APs are adjoined higher in the DP (Cinque 2005, 2010, 2023; Svenonius 2008; Dékány 2021). In particular, they are adjoined to NumP. The structure of the DP when both types of APs are present is given in (87a) for unmarked [SG] nouns, and in (87b) for plural-marked [PL] nouns.

(87) a. unmarked [SG] inanimate noun modified by APs



b. Plural-marked [PL] inanimate noun modified by APs in upward entailing contexts



What we can conclude from the structures is that, once again, the difference between unmarked inanimate nouns which are number neutral and unmarked inanimate nouns that are strictly singular is the absence or presence of Num. This difference is, however, obscured by the lack of overt exponents at PF. In fact, given our VI rules in (66), if Num is [SG], there will be no overt vocabulary item associated with it, which has the

same phonological effect as there being no Num: the noun will remain unmarked for number in both cases. If, on the contrary, the noun is overtly plural-marked, that can only be because Num is [PL].

In terms of the semantics, projecting Num[SG] leads to an interpretive difference between the two types of unmarked inanimate nouns, though: the noun will be interpreted as a singularity. If Num is [PL], the inanimate noun will denote an inclusive or exclusive plurality depending on the veridicality of the context.

For example, the semantics of the [SG]-marked DP in (87a) is provided in (89), and the semantics of the [PL]-marked DP in (87b) is provided in (90). Following a degree-semantics framework (Cresswell 1976; von Stechow 1984; Heim 2001), I will assume that while classificatory APs do not introduce a degree variable in the semantics because they are non-gradable, non-classificatory ones do. Their semantics are given in (88).[23]

(88) a. $[\![\text{unten}]\!] = \lambda x.\exists d[\text{expensive}(x) \geq d]$

b. $[\![\text{shashintei}]\!] = \lambda x.\text{religious}(x)$

(89) *unten shashintei nom* 'expensive religious book'

a. $[\![\text{shashintei } n[\text{IND}]\ \sqrt{\text{NOM}}]\!] = \lambda x.[\![n[\text{IND}]\sqrt{\text{NOM}}]\!](x) \wedge \text{religious}(x)$

b. $[\![[\text{SG}]\ \text{shashintei } n[\text{IND}]\ \sqrt{\text{NOM}}]\!] = \lambda x.[\![n[\text{IND}]\sqrt{\text{NOM}}]\!](x) \wedge \text{minimal}(x) \wedge \text{religious}(x)$

c. $[\![\text{unten } [\text{SG}]\ \text{shashintei } n[\text{IND}]\ \sqrt{\text{NOM}}]\!] =$

$\lambda x.\exists d[[\![n[\text{IND}]\sqrt{\text{NOM}}]\!](x) \wedge \text{minimal}(x) \wedge \text{religious}(x) \wedge \text{expensive}(x) \geq d]$

'The property of being a religious book-atom which is d-expensive'

(90) *unten shashintei nom-o:d* 'expensive religious books' (exclusive plural)

a. $[\![\text{shashintei } n\ \sqrt{\text{NOM}}]\!] = \lambda x.[\![n[\text{IND}]\sqrt{\text{NOM}}]\!](x) \wedge \text{religious}(x)$

b. $[\![[\text{PL}]\ \text{shashintei } n\ \sqrt{\text{NOM}}]\!] = \lambda X.\forall x[X(x) \rightarrow ([\![n[\text{IND}]\sqrt{\text{NOM}}]\!](x) \wedge \neg\text{minimal}(x) \wedge \text{religious}(x))]$

c. $[\![\text{unten } [\text{PL}]\ \text{shashintei } n\ \sqrt{\text{NOM}}]\!] =$

[23] Svenonius (2008) observes that classificatory APs, or APs adjoined lower in the extended projection of the noun, are generally non-gradable across languages. However, see Dékány (2021, ch.2: p.46-47) for some possible counterexamples of gradable APs that are lower in the structure.

$= \lambda X.\exists d[\forall x[X(x) \rightarrow ([\![n[\text{IND}]\sqrt{\text{NOM}}]\!](x) \wedge \neg\text{minimal}(x) \wedge \text{religious}(x))] \wedge \text{expensive}(X) \geq d]$

'The property of being a non-atomic individuated plurality of religious books which are d-expensive'

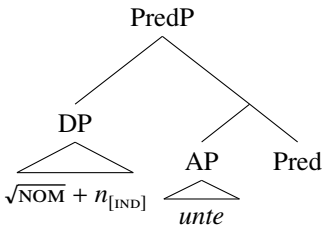
In both (89) and (90), the nP first composes with the classificatory AP via Predicate Modification (Heim and Kratzer 1998), and then the output of this operation saturates the first argument of [SG/PL]. Afterwards, non-classificatory APs compose with the [SG/PL] nP again via Predicate Modification.

This manner and order of semantic composition does not interfere with the allosemy rules for [PL]. It is important to remember that one of the necessary conditions for allosemy, which was the same as for allomorphy, was that the two terminals involved were local within the same extended projection. Modifiers, or elements in specifier position, do not disrupt the locality between two heads. In the structure in (87b), D and Num satisfy the locality condition as there is no intervening head between them. Thus, in downward entailing contexts when D is [NPI] and Num is [PL], the Sense Insertion rule in (84a) is predicted to apply.[24]

The situation in predicative contexts differs due to the fact that the syntactic structure is not as in (87). For ease of exposition, I assume that predicative adjectives have a Small Clause-like structure (Chomsky 1981; Stowell 1981; Bowers 2001, for an overview). Under this approach, the AP is not part of the extended projection of the NP and is not adjoined to Num; instead, the unmarked NP has the structure in (63a) (i.e. it lacks NumP), it is merged in a specifier position and acts as the subject of the predication. As a result, no number restriction is imposed on the interpretation of the noun. The structure is illustrated in (91), where the PredP label is used purely pretheoretically.

(91) Predicative AP construction

[24] Another argument for the application of allosemy comes from the timing of the composition. [PL] must compose with the nP before the non-classificatory AP does. This entails that a denotation for [PL] must be inserted before the nP saturates its argument. The timing of operations is therefore as illustrated for unmodified plural nouns in (86): (i) the nP is composed; (ii) D triggers allosemy on Num and the context specific rule is applied; (iii) Num composes with nP; and (iv) the non-classificatory AP enters the semantic composition.



The case of cardinal numerals. Numerals modifying nouns must not only precede the noun they modify, but also any AP-modifiers. In fact, if a (non-classificatory) AP precedes the numeral, the sequence is unacceptable, as shown in (40). Numerals must follow other DP-internal constituents such as possessors, which are located high in the DP (Gong 2021; Toquero-Pérez 2023a). This is shown in (92).

(92) a. xüch-üd-in dulu-n xunde-n nom
child-PL-GEN seven-ATTR heavy-ATTR book
'The children's seven heavy books' Poss > # > AP > N

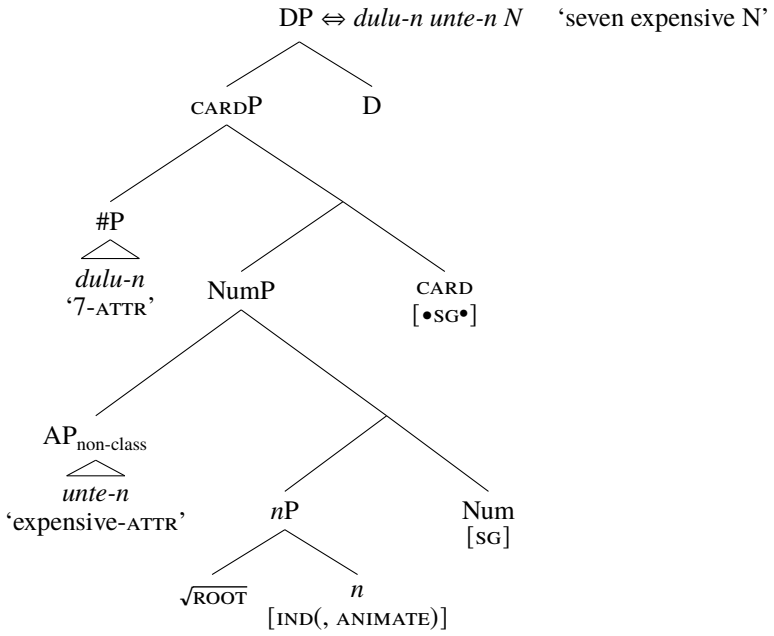
b. * dulu-n xüch-üd-in xunde-n nom
seven-ATTR child-PL-GEN heavy-ATTR book
Int.: 'The children's seven heavy books' # > Poss > AP > N

Given the interaction of APs with Number and the fact that they must always follow numerals, I propose that numerals must be higher than NumP. In other words, NumP is merged in the syntax before numeral modifiers. In addition, assuming that possessors generally occupy Spec,DP (Abney 1987; Corver 1990), numerals must be located below D.[25] I take this position of numerals to be the specifier of a functional projection called CARD(inality)P (Scontras 2013, 2014; Martí 2020b; Pancheva 2021, 2022).[26] This CARD head selects only for [•SG•]. The structure for numerically modified NPs is in (93).

(93) #P in Spec,CARDP

[25] If numerals and APs were adjuncts adjoined to the same projection, e.g. NumP, nothing would in principle prevent a flexible ordering. There are generally no syntactic selectional requirements for adjuncts (Svenonius 1994; Chomsky 1994, 1995; Adger 2003). The strict ordering in (40) would need to be stipulated.

[26] Scontras (2013, 2014) and Martí (2020b) assume without independent motivation that Num is merged immediately higher than CARD. Pancheva (2021, 2022) shows that the position of CARD, which she labels as MEAS, can be above and/or below Num. The word order facts indicate that CARD must be higher than Num in Alasha Mongolian.



The hierarchical structure in (93) derives the word order facts: numerals must precede APs because they are adjoined to a higher functional projection. In addition, CARD selects for a [SG] complement which rules out overtly-plural marked nouns.

Semantically, I take the view that numerals themselves denote numbers of type n, as in (94). Thus, a measure expression is required to compose them with the predicate nominal (Krifka 1989, 1995; Hackl 2000; Scontras 2013, 2014; Martí 2020b; Pancheva 2021, 2022). That is the role of CARD whose meaning is as in (95a), based on Pancheva's (2021; 2022) denotation for singular-selecting CARD heads.[27]

(94) $[\![dulun]\!] = 7$

(95) a. $[\![\text{CARD}]\!] = \lambda P_{\langle e,t\rangle}.\lambda n.\lambda x.{}^{*}P(x) \wedge |x| = n$

b. $[\![dulun\ \text{CARD}\ [\text{SG}]\ n\text{P}]\!] = \lambda x.{}^{*}[\![[\text{SG}]\ n\text{P}]\!](x) \wedge |x| = 7$

[27] Alternatively, one could assign CARD a denotation based on Ionin and Matushansky's (2006; 2018), ch.2: p.13 semantics for numerals.

(xxvi) $[\![\text{CARD}]\!] = \lambda P_{\langle e,t\rangle}.\lambda n.\lambda x.\exists S[\Pi(S)(x) \wedge |S| = n \wedge \forall s \in S \rightarrow P(s)]$
'A set of individuals S is a partition Π of a plural individual x if x is the sum of all members of S and the members of S do not overlap.'

The semantics of CARD introduces a partition, Π, in the body of the function. One of the conditions of the partition is that its members must not overlap. Plurals are cumulative which entails that the members composing the plurality overlap. As a result, the condition imposed by the partition rules out the possibility that the nominal argument of the numeral denotes a plurality. The feature [SG] on Num creates a singularity ensuring the non-overlapping of the members in the extension of the constituent that saturates CARD's first argument.

CARD takes an individuated predicate of atomic individuals, P, a numeral, n, and returns a predicate of atoms and their sums with cardinality n via Link's (1983) '*' operator. In other words, CARD reintroduces the sums into the extension of the individuated nP consisting only of atomic minimal parts: $\{a, b, c\} \rightarrow \{a, b, c, ab, ac, bc, abc\}$.

ATTR-marking on prenominal modifiers. There is one final aspect about non-classificatory APs and numerals that needs to be addressed. This involves ATTR-marking. The attributive marker /-*n*/ surfaces on these high modifiers when they occur prenominally, but it does not surface on them in predicative position. While more work needs to be done to fully understand the distribution of the attributive morpheme in the language, I speculate that this marker is a reflex of agreement.

As Alexeyenko and Zeijlstra (2020, 2021) and Corver (2021) observe, attributive morphemes across languages seem to serve the purpose of marking 'nominality'. By 'nominality', I mean that they stand in a local relation with a noun they directly modify. In some cases, like for example German or Dutch, this nominality is encoded via the overt exponence of the noun's φ-features (or at least a subset) such as gender or number. Against this background, Corver (2021) proposes that the ATTR morpheme on Dutch prenominal adjectives is the result of spelling out the feature bundle of the noun. The affix is then realized on the AP via Spec-Head agreement.

We could adopt a similar analysis for ATTR-marking in Alasha Mongolian: *-n* on modifiers is the result of nominal concord. As in Chapter 3, I assume that concord features on the relevant non-head constituents attach in the form of unvalued features which will receive a matching value. This all occurs post-syntactically (Bonet 2013; Norris 2014, 2017a,b; Deal 2016b). This entails that the heads of non-classificatory APs and numerals receive an unvalued uninterpretable [*u*AGR:__] feature post-Spell-Out, where 'AGR' represents any potential φ-feature(s): [IND, SG/PL]. This [*u*AGR:__] feature will copy a value available in the extended projection of the NP. In the case of count nouns, which are the class of NPs where these modifiers occur

prenominally, the unvalued feature on the AP will copy the value [SG/PL] on Num and [IND] on the *n*. This is represented in (96).

(96) a. $[_{\text{NumP}}\ \text{AP}_{[u\text{AGR:\_}]}\ [_{\text{Num'}}\ \text{SG/PL}\ [_{n\text{P}}\ n_{[\text{IND}]}\ \sqrt{\text{ROOT}}]]]$

b. $[_{\text{NumP}}\ \text{AP}_{[u\text{AGR:}\underline{\text{SG/PL, IND}}]}\ [_{\text{Num'}}\ \text{SG/PL}\ [_{n\text{P}}\ n_{[\text{IND}]}\ \sqrt{\text{ROOT}}]]]$

The valued AGR feature in (96b) will then be spelled out as /-*n*/ at the point of vocabulary insertion if the stem of the adjective that it affixes to ends in a vowel. When the numeral, projecting a #P, is part of the derivation, it will also receive an unvalued [*u*AGR] feature post syntactically. This is shown in (98).

(97) $[u\text{AGR:}\underline{val}] \Leftrightarrow$ -*n*/$\sqrt{\text{A/\#}}$-V ‘Map the terminal to -*n* if the A/# ends in a vowel’

(98) $[_{\text{CARDP}}\ \#\text{P}_{[u\text{AGR:}\underline{\text{SG, IND}}]}\ [_{\text{CARD'}}\ \text{CARD}\ [_{\text{NumP}}\ \text{AP}_{[u\text{AGR:}\underline{\text{SG, IND}}]}\ [_{\text{Num'}}\ \text{SG}\ [_{n\text{P}}\ n_{[\text{IND}]}\ \sqrt{\text{ROOT}}]]]]]$

In predicative contexts, the probe features on APs and #P do not occur DP-internally, e.g. (91). This entails that no [*u*AGR] feature is inserted post-syntactically on the adjectival and numeral terminals, thus precluding concord. The relevant VI rule in (97) does not apply, and no attributive marker is exponed in predicative contexts.

5.6.5 A note on QA allomorphy and the dimension of measurement

It was observed in Section 5.4.2, that QA *olin* occurred with inanimate unmarked number neutral nouns such as *nom* as well as plural marked nouns *nomo:od* or *xüchü:d*. The other QA, e.g. *ix*, was unacceptable with either. The descriptive generalization was formulated in(54), repeated below.

(54) *olin* is found when the noun is individuated, whereas *ix* is found elsewhere.

In addition, it was also observed that both unmarked number neutral nouns and overtly plural-marked nouns were measured along a cardinality scale when modified by *olin*. I want to propose that these facts can be accounted for in terms of the proposal here and are consistent with the Cardinality Generalization Redux.

In terms of the distribution, *olin* cannot be sensitive to plural. That is so because number neutral nouns do not project Number or have a [PL] in their extended projection. What the two classes of nouns share, to the exclusion of mass nous, is the [IND]-feature on *n*. *ix*, on the contrary, occurs in environments where the [IND] feature is not available. Thus, we can capture these facts with the VI rules in (99).

(99) VI rules for QAs in Mongolin

a. $\sqrt{\text{IX}} \Leftrightarrow olin/\_\_\text{Deg}[u\text{IND}: \underline{\text{IND}}]$

b. $\sqrt{\text{IX}} \Leftrightarrow ix$

Under the assumption that concord features on modifiers are inserted post-sytactically, the Deg head will receive a [*u*IND: __] feature. The feature will receive a value from the individuating nomilalizer. At the point of Vocabulary Insertion, the rule in (99a) will apply. The other rule, e.g. (99b), will apply elsewhere: when the noun is unmarked for individuation.

In terms of the semantics and the dimension of measurement, [IND] ensures an individuated semi-lattice generated from the set of atoms. The denotation of this *n*P will contain the atomic minimal and non-minimal parts. This is enough for μ to be assigned the value of CARDINALITY. The semantic composition is in (100).

(100) $[\![olin\ nom]\!]$

a. $[\![nP]\!] = [\![n[\text{IND}]]\!]([\![\sqrt{\text{NOM}}]\!]) = [\![(68)]\!]$ $\{a, b, c, ab, ac, bc, abc\}$

b. $[\![\sqrt{\text{IX}}\ \text{Deg}]\!]^A = \lambda\alpha.\exists d[A(\mu)(\alpha) \geq d]$

c. $[\![[\sqrt{\text{IX}}\ \text{Deg}]\ nP]\!]^A = \lambda x.\exists d[[\![nP]\!](x) \wedge A(\mu)(x) \geq d]$

$A(\mu) \rightarrow$ CARDINALITY

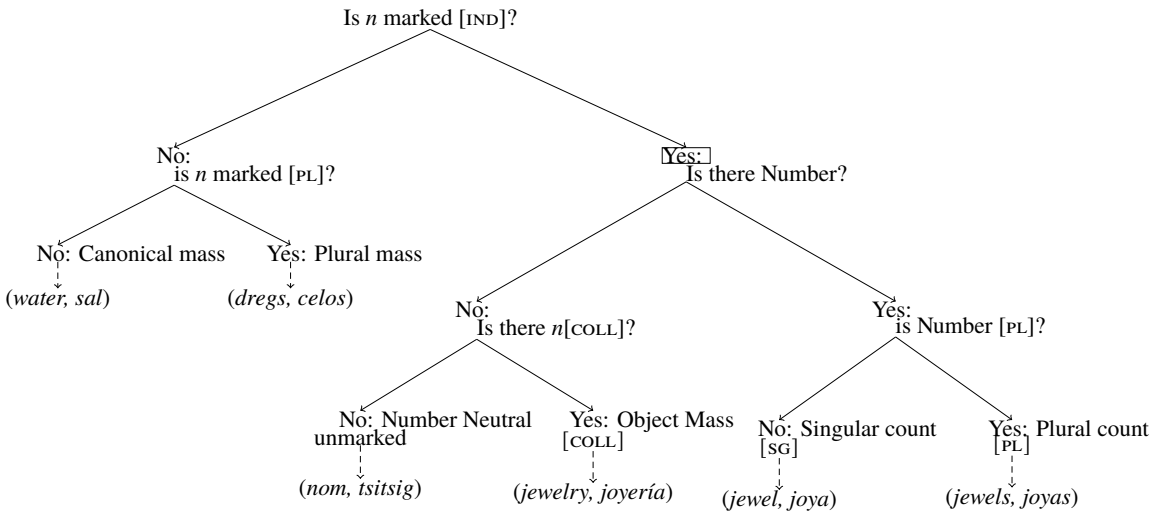
The denotation of the *n*P in (100a) is true of book atoms and book-sums. When the DegP composes with the *n*P via predicate modification, μ has a variable x ranging over an inclusive individuated plurality. The CARDINALITY function is defined because x is an atom in P (i.e book).

This is predicted by the Countability Hypothesis from Chapter 4, repeated below. We can go back to our dependency tree in Figure 4.1, in Chapter 4 and update it with the relevant findings. The new version is given in Figure 5.2.

(32) **The Countability Hypothesis**

Being countable means being marked for individuation.

Figure 5.2: Predicting countability asymmetries



As correctly predicted by the hypothesis, the nouns plural-count nouns, object mass ones and number neutral ones are all marked for individuation and are thus countable. The nouns, however, differ in their morpho-syntactic make-up: unmarked for collective or plural; collective, but not plural-marked; and, plural-marked, but not collective-marked. This in turn has an effect on the semantic interpretation of each class of noun. The theory of individuation and number that I have proposed is able to capture the similarities among classes, but also the aspects with respect to which they differ. Besides, it makes predictions about what we might find across languages. While singular count nouns are unacceptable with QAs because they do not

satisfy the cumulativity requirement, they are also marked for individuation and are thus countable: they can be counted via numeral modification (e.g. *one book* in English or *xoirV-n nom* 'two book' in Mongolian).

5.7 Conclusion: Broader implications

I started the chapter by positing 5 questions that the data from Alasha Mongolian would help shed light on. We can now go back to answering each of these questions.

The first question was concerned with the morpho-syntactic structure of unmarked nouns. I have argued that unmarked nouns are syntactically ambiguous. In particular, unmarked number neutral nouns are syntactically impoverished. The NumP hosting number features is absent and so the noun is underdetermined for number: they are bare count nouns underspecified for number, but IND-marked. Singular-denoting unmarked nouns must project NumP. This was the case of bare unmarked inanimates and AP/numerically modified inanimates. The animacy split is neutralized in the plural form because [PL] is part of the derivation projecting NumP. Variation in the interpretation of NPs is thus located in the morpho-syntactic pieces available within and across languages (see also Deal 2016a, 2017).

An innovation of this chapter is the diagnosing of number neutrality via QAs like *many/olin*. This is a significant test since it relies on the mereological structure of the noun. In Alasha Mongolian, *olin* ('many') is compatible with (inanimate) unmarked NPs, which further supports the analysis that (inanimate) unmarked NPs in Alasha Mongolia are number neutral and have sums of atoms in their extension (in addition to single atoms). This is a promisingly reliable diagnostic and it opens up the possibility to probe the question of number neutrality of unmarked NPs in languages like Turkish where arguments have been made in both directions: Bale et al. (2011) argue for unmarked NPs as number neutral, whereas Sağ (2022) has recently challenged their arguments. Besides, the analysis of QAs is consistent with the theory developed: the semantic interpretation of QAs conforms the Cardinality Generalization Redux, and it is independent of their surface form.

The second question addressed the location of Number in the structure. Based on the data from APs and numerals, the account supports the traditional view that NumP is located between *n* and D (Ritter 1991; Cowper 2005; Cowper and Hall 2009, 2012). Furthermore, it provides empirical evidence for the hypothesis that Number can be lower than numerals (Pancheva 2021, 2022). This goes against the view that numerals enter the syntactic derivation and semantic composition before Number does, e.g. Scontras (2013); Martí (2020b). It also goes against approaches that exclusively locate number higher than D, e.g. Sauerland (2003).

Building on the discussion of numerals, Alasha Mongolian sheds light on the debate as to whether numerals universally combine with (semantically) singular (Ionin and Matushansky 2006, 2018) or plural predicates (Bale et al. 2011; Bale and Khanjian 2014). For example, Bale et al. (2011) propose a semantic universal which they call the 'Strong Thesis': numeral modification is restrictive, because modification in language is restrictive. If correct, the Strong Thesis predicts that a semantics for numerals à la Ionin and Matushansky (2006, 2018) is not appropriate; and in fact when numerals combine with bare (unmarked) NPs that is because these NPs must be number neutral. Given the data from Alasha Mongolian, we can conclude that while numerals combine with bare unmarked NPs, these NPs are not number neutral. Alasha Mongolian, thus, casts doubt on the universality of the Strong Thesis: it is too strong, and numerals can in fact compose with strictly atomic predicates. These facts have also been corroborated by Pancheva (2021, 2022) for Bulgarian. That does not mean, though, that Ionin and Matushansky's competing alternative – that numerals universally require singular predicates and that plural morphology is uninterpretable agreement – is not too strong: plural morphology can be interpretable and need not be the result of agreement.

Languages differ as to whether numerals require the nominal they modify to be a predicate of atomic non-minimal part (i.e pluralities) or a predicate of atomic minimal parts (i.e singularities), and the challenge that remains is to explicate and model that variation. A promising way to account for such variation is proposed by Pancheva (2021, 2022). Under the assumption that numerals are introduced by a CARD head in the extended projection of the noun that c-selects for Number, the variation will stem from the specification of this head

rather than the numeral itself. For instance, for numerals higher than 1, CARD$_1$ will only be compatible with [SG] nouns, in which case it will have to introduce a pluralizing function; CARD$_2$ will be compatible with [PL] predicates and will not have pluralizing semantics. Thus, languages will differ depending on whether they have CARD$_1$ (Alasha Mongolian, Finnish, Turkish), CARD$_2$ (English) or both (Bulgarian).

With respect to the third question, i.e. the exclusive/inclusive interpretation of the plural morpheme, I developed an account which locates the ambiguity at the syntax-semantics interface. Namely, just like vocabulary items can compete for insertion at PF given the Subset Principle, so can 'meanings' at LF. The exclusive meaning of the plural is taken to be the default one, which is blocked in the presence of an indefinite NPI or a negative indefinite, which may be overt or covert. While the analysis seems to make many empirically appropriate predictions for languages that also display the same ambiguity, e.g. English, it also faces some shortcomings (see footnote 21). However, if the analysis is on the right track, the following parallel emerges across the interfaces: just like languages differ in the inventory of VI rules at PF, so will they in the inventory of allosemy rules at LF.

The fourth question targeted the relation between APs and Number. The non-classificatory APs discussed here, which overlap with the class of stubbornly distributive adjectives, do not only require the noun to be individuated. *n* is responsible for individuating the nominal root; however, if this was the sole condition that enabled AP-modification, we would expect number neutral nouns to occur with non-classificatory APs. However, the fact that they do not signals that this class of modifiers is also sensitive to number and the noun being minimally atomic or non-minimally so. Since that is the function of Num, then it follows that these adjectives be adjoined at least as high as Num. In the absence of Num, there will be no structural position for them to adjoin. The hypothesis that individuated atomic (non-)minimal NPs enable adjunction of this class of APs receives support from classifier languages like Hungarian (Csirmaz and Dékány 2014; Dékány 2021) or Teochew, Southern Min (Biggs and Zhuosi 2022). In Hungarian, for instance, non-classificatory APs

including, but not limited to, size, length, height, weight are adjoined higher than classifiers whose function issimilar to that of Number. Thus, the pattern that emerges is schematized in (101).

(101) $\text{AP}_{\{\text{non-classificatory/dimensional}\}}$ > {Num/ CL} > IND N.

The same logic can be applied for numerals. Only nouns that have atoms can be counted (Chierchia 1998b, 2010, 2021; Borer 2005a; Rothstein 2004, 2010, 2021). Moreover, in Alasha Mongolian, the CARD head that introduces the numeral in its specifier selects for [SG], in the sense of Adger (2003); Müller (2010). Therefore, their grammaticality is dependent on their being a NumP in the syntax: merger of CARD fails if [Num: SG] is absent.

Last but not least, the Alasha Mongolian data have broader implications for theories of number, both in terms of morpho-syntactic markedness and semantics. First, regarding the morpho-syntax of number and its relation to the semantics, the data present a complication to analyses in which the singular vs. plural distinction relies on the presence of uninterpretable number agreement (Ionin and Matushansky 2006, 2018; Alexiadou 2019). One could perhaps build the argument that */-v:d/* is pure $\text{Agree}(\text{Num}, \text{n})$ in the case of inanimates but this would face the challenge of PL-marked animate nouns and PL-marked NPs modified by non-classificatory adjectives in attributive position. Besides, if the plural morpheme is uninterpretable agreement, we would need to find an independent explanation for the inclusive/exclusive ambiguity. Instead, the data supports an approach in which there is a one-to-one mapping from syntax to semantics and to morphology: the morpho-syntactic expression of number on Num, spelled-out on the head noun, is always semantically interpretable (see Pancheva 2021, 2022, for Bulgarian).

Furthermore, typologically, Alasha Mongolian patterns with Buriat (Bylinina and Podobryaev 2020) in that both a subset of unmarked and plural-marked NPs are number neutral, with some restrictions. Given the cross-linguistic data available, we can divide languages that distinguish between unmarked and plural marked nouns into four types depending on the interpretation of the unmarked and plural-marked forms. Type $\mathbb{A}$ includes languages in which the unmarked form of the NP is strictly singular (i.e. it denotes a

singleton) and the plural-marked form is exclusively plural, e.g. Wolof (Fong 2021, 2023); Type 𝔹 consists of those languages where the unmarked form is strictly singular, but the plural-marked form may be inclusively plural, e.g. English (Sauerland 2003; Sauerland et al. 2005; Zweig 2009), Spanish (Martí 2008, 2020a), and animate nouns in Buriat (Bylinina and Podobryaev 2020) and Alasha Mongolian; Type ℂ concerns languages like Western Armenian (Bale et al. 2011; Bale and Khanjian 2014) or Brazilian Portuguese (Müller 2002; Martí 2020a): the unmarked form is number neutral but the plural-marked one is exclusively plural; Type 𝔻 groups languages where nouns unmarked for number may be number neutral and so may plural-marked nouns, e.g. inanimates in Buriat and Alasha Mongolian. These patterns are summarized on table 5.7, which is an extended version of table 5.1.[28]

Table 5.7: The interpretation of number in languages with unmarked and plural-marked forms (final version)

		Unmarked NP		**PL-marked NP**	
		SNG	**PLR**	**SNG**	**PLR**
Type 𝔸	*Wolof*	✓	*	*	✓
Type 𝔹	*English*	✓	*	✓	✓
	Spanish	✓	*	✓	✓
	Buriat$_{[+anim.]}$	✓	*	✓	✓
	A. Mongolian$_{[+anim.]}$	✓	*	✓	✓
Type ℂ	*W. Armenian*	✓	✓	*	✓
	B. Portuguese	✓	✓	*	✓
Type 𝔻	*Buriat*$_{[-anim.]}$	✓	✓	✓	✓
	A. Mongolian$_{[-anim.]}$	✓	✓	✓	✓
Type 𝔼	*unattested (yet)*	*	✓	✓	*

I do not intend to provide an answer as to what is driving the variation between the different language types. I leave this for future research. I want to indicate, though, that all these language types share two general features: (i) unmarked forms must include at least single atoms in their extension, (ii) and PL-marked ones must at least include their sums. In other words, the unmarked form must refer to at least a singleton,

[28]The '*' means that the relevant morpho-syntactic expression (e.g. unmarked vs. PL-marked) cannot be associated with the intended interpretation (e.g. SNG = singleton vs. PLR = plurality). If the relevant morpho-syntactic expression can be associated with one interpertation, a '✓' is assigned. This is so even if this interpretation is determined by certain factors (polarity, modification, etc.).

while the PL-marked one must refer to at least an exclusive plurality. We can, thus, formulate the (potentially universal) generalization in (102):

(102) ***The morpho-semantic number markedness generalization***

If a language makes a morphological distinction between unmarked and plural-marked forms in the nominal domain,

a. the unmarked form must at least contain individual non-overlapping atoms; and

b. the plural-marked one must at least contain sums of atoms.

If this generalization is correct, it predicts that there should be no language of Type $\mathbb{E}$ on Table 5.7: this would be a language in which unmarked forms of nouns denote exclusive pluralities (e.g. $\{ab, bc, abc\}$) whereas their plural-marked counterparts denote a singleton (e.g. $\{a, b, c\}$). As far as I know, there is no record of such a language, which is promising evidence for the universality of the generalization. Under the proposed analysis here, such a language should be ruled out given that [SG] will restrict the denotation of the noun to the minimal parts, i.e. non-overlapping atoms, while [PL] will restrict the extension of the noun to the non-minimal atoms, i.e. the sums. In case Number was not projected, the theory predicts that the result should be an unmarked number neutral noun. In the event that such a language is indeed attested, the explanation for that pattern would have to be potentially found in the meaning of covert material shifting the atomic structure of the predicate, obscuring the mapping from the morpho-syntax.[29]

[29]One may wonder whether languages with inverse number systems like Dangaare (Grimm 2010, 2012, 2018) or Kipsigis and Didinga (Kouneli 2017, 2020) are a counterexample to the generalization. These languages have what is referred to as "inherently plural" nouns: morphologically these nouns are unmarked in the plural, but an overt singulative affix surfaces when the noun is interpreted as a singleton. Descriptively, the languages do not fit the generalization (because the singular is marked morphologically), but they could be accommodated within the general insights of the generalization. According to Kouneli (2020), number in these languages is split between a low position in *n*, where number is uninterpretable, and a high position in Number, where it is interpreted. Kouneli argues that the structure of inherently plural nouns is as in (xxvii):

(xxvii) $[_{\text{NumP}}\ \text{Num}[\text{PL}]\ [_{n\text{P}}\ n[\text{PL}]\ \sqrt{\text{ROOT}}]]$

The two loci of number for inherently plural nouns in (xxvii) are both [PL], and when this happens a morphological operation called *Obliteration* (Arregi and Nevins 2007), taking place before Vocabulary Insertion, deletes the higher number feature in Number if it is identical to the low number feature in *n*. In the singular, they are marked because [SG] on Number is mapped to an overt exponent. I would like to thank Maria Kouneli for discussion of this issue.

All in all, we can summarize the significance of the study of Alasha Mongolian in 3 classes: (i) the presence vs. absence of syntactic information may drive not only differences in exponence, but also yield distinctions in interpretation; what this entails is that number neutrality can be syntactically encoded, rather than lexically presupposed. Further evidence for this comes from looking at QAs. (ii) Number marking cannot be reduced to uninterpretable agreement on the NP; instead, variation lies on the location, availability and interpretation of number features in the nominal extended projection. (iii) Taken together these facts have consequences for the type of predicates that numerals can combine with: singular predicates or plural ones.

Chapter 6

Conclusions

The primary aim of this dissertation has been to understand the grammatical encoding of being count and the grammatical encoding of countability, by probing the count-mass distinction. At a general level, the count-mass distinction raises the following questions that I outlined in the introductory chapter of this dissertation:

- What makes an NP count as opposed to mass?
- What do countable NPs, both count and mass, share in common? (i.e. do they form a natural class in any way?)
- What determines variation?

We are now in a position to answer those questions and discuss the implications that the answers have for linguistic theories. Building on insights from the previous literature, I have argued at length that we need to separate individuation from number-marking. While these are closely related and interact in many non-trivial ways, each of these pieces has their own morphological, syntactic and semantic import. An important analytic conclusion that we arrive to by separating the two is that being count and being countable are decomposable into different sets of elements. In particular, being count means both markedness for individuation and SG/PL

in the syntax. Constituents that are marked for individuation, regardless of whether they are also number-marked, display the property of countabilitiy, i.e. being countable. In this chapter I address the questions on the list above by summarizing and discussing what I think are the key contributions of the dissertation.

6.1 Contributions of the dissertation

At an empirical level, the dissertation provides a comprehensive and theoretically informed description of the count-mass distinction in English and Spanish. In order to probe what it means for a noun to be count as opposed to mass, we need to look at the morpho-syntactic properties in (1). Descriptively speaking, being count means having all the properties in (1). Having none or a restricted subset of these properties means being mass.

(1) Being count (having count syntax)

a. the noun makes a singular/plural distinction;

b. the noun can be modified by cardinal numerals;

c. the noun can be modified by size/shape adjectives (Stubbornly Distributed adjectives);

d. the noun allows number mismatches under ellipsis;

e. the noun can be a target for *one*-substitution;

f. the noun is allowed to combine with certain determiners such as *every, each* or *several*.

Regarding countability, the key property is listed in (2). Nouns that can be measured along a cardinality scale are countable, whereas those that cannot are non-countable. While singular count nouns are independently ruled out with measure words such as QAs, they can still be measured in terms of cardinality via cardinal numerals (and in fact in many languages, the numeral requires the NP it modifies to be unmarked, i.e. singular, e.g. Alasha Mongolian in Chapter 5 but see also Ionin and Matushansky 2018 for more cases).

(2) Being countable

The noun allows measurement in terms of 'cardinality' when modified by measure expressions (e.g. *more, many* or numerals...).

One of the takeaways of the dissertation is that being count is not a grammatical primitive or lexical property of a certain syntactic category, but it is decomposable into two more abstract grammatical units: markedness for Individuation and Number. Individuation is a feature that appears on nominal categorizers; Number is a functional head that hosts number features such as [SG/PL]. These grammatical primitives are distinct from each other and serve different syntactic, morphological and semantic purposes. A summary of their functions is in Table 6.1.

Table 6.1: The roles of IND and Number

	Syntax	**Morphology**	**Semantics**
IND	- Enables Number - Enables [COLL] - Class 1,2,3 determiners - [E]-marked for ellipsis	- Triggers QA-allomorphy (in Mongolian) - Undergoes *one*-substitution under Number	- Selects for semi-lattices with atoms and sums of atoms - Enables measurement in terms of CARDINALITY
Number	- Singular/Plural agreement - Enables adjectival modification - Enables CARD hosting numerals - Class 1,2,3,(4) determiners - [E]-marked for ellipsis - Marks [IND] for ellipsis	- Triggers QA-allomorphy - Triggers Root allomorphy - Spells out plural-marking	- Restrict the denotation to (non-)minimal parts

At an abstract level, we can now say that what makes a noun count is being marked for both [IND] and [SG/PL] on Number. Mass nouns, however, are those that lack Number hosting [SG/PL]. But, they may be [IND]-marked as is the case of object mass nouns. Features such as [PL] may but need not be restricted to the Number terminal. In fact, they may be located lower in the structure. In that case, they will not be contingent upon there being an [IND] feature.

In addition, depending on whether only [IND] is part of the derivation, the countability properties of the noun will also differ. Count nouns (both singular and plural), object mass nouns and number neutral (count) nouns are all [IND]-marked and enable measurement in terms of cardinality. This is what is expected under

the Countability hypothesis I formulated in Chapter 4, repeated below. Thus, as summarized in Table 6.1, the crucial property that distinguishes countable from non-countable nouns is markedness for individuation.

(32) **The Countability Hypothesis**

Being countable means being marked for individuation.

That said, we can establish a formal typology of noun classes based on their underlying features. This is shown in Table 6.2.

Table 6.2: NP classes based on their underlying features

			n_1	n_2	Number	Ex.
Non-Countable	*Mass*	*canonical*	Ø	*	*	'water'
		plural	[PL]	*	*	'dregs'
Countable		*object*	[IND]	[COLL]	*	'jewelry'
	Num. neutral	*unmarked*	[IND]	*	*	'nom' (book)
	Count	*singular*	[IND]	*	[SG]	'jewel'
		plural	[IND]	*	[PL]	'jewels'

As shown in Table 6.2, all the nouns that are marked for [IND] are countable, regardless of whether they are count or mass. Thus, it is possible that a noun is syntactically mass or does not project Number and yet it is countable (e.g. object mass nouns and number-unmarked number neutral nouns). Nouns that are unmarked for individuation features are non-countable. Looking at Table 6.2 there seems to be a correlation between being count and being countable that I describe in the generalization in (3).

(3) **The Count-Countability Generalization**

Being count entails being countable, but being mass does not entail being non-countable.

Focusing on count NPs, they are among the most marked class when it comes to their grammatical properties. This includes the choice of determiners. There is a restricted set of determiners that are only acceptable with singular and plural-marked individuated nouns, but there is no single determiner that is restricted to the domain of nouns unmarked for individuation. That is, a D with an unvalued 'mass' feature.

The proposal in this dissertation is able to explain this fact and it is consistent with the hypothesis that 'mass' really means lack of count syntax (Doetjes 1997, 2021; Borer 2005a; Deal 2016a, 2017): *water, dregs* are unmarked. For the languages analyzed, it was observed that if a D probes for [IND], it will also probe for Number, which accounts for the fact that there is no object mass specific determiner. Whether this is a universal or an area of cross-linguistic variation is an issues for future research. If there is a determiner that is sensitive to [IND] and this is a feature that object mass nouns share with count nouns, we should expect that determiner to be compatible with the two types of nouns. The closest that we got to this prediction being borne out was QA allomorphy in Alasha Mongolian post-concord: *olin* seems to be conditioned by the *n*P being marked for [IND]. Smith (2021) reports similar observations from Purépecha.[1]

One of the longstanding problems in the literature of the count-mass distinction is the status of object mass nouns, which largely have mass syntax but some of their properties are co-extensive with the class of count nouns: adjectival modification and measurement in terms of cardinality. A common solution is to assume that this class of nouns is lexically different from 'canonical' mass, and in fact are identical to plural count nouns, but they enter the syntax in a mass frame (Chierchia 1998a; Borer 2005a; Bale and Barner 2009; Smith 2021). By looking at their morphological composition, I concluded that this could not be accurate; namely, across languages the roots on which object mass nouns are formed are coextensive with count noun roots. What is more, object mass nouns are morphologically more complex.

My solution to the object mass paradox has been to propose that object mass nouns syntactically contain an individuated *n*P layer. Where they differ is in the feature that projects on top of *n*[IND]: [SG/PL] project Number in the case of count nouns, whereas [COLL] projects in the case of object mass nouns. In English and Spanish, I argued that the label of this projection was a nominalizer *n* which competes with Number for merger. This provides a natural explanation for the lack of pluralized object mass as well as the lack of

[1] In the event that these are rare or unattested, we should not think about this as a weakness of the theory. A similar empirical situation, I believe, is observed with gender: while determiners may be sensitive to both gender and number, as far as I know determiners that require the NP goal to have a particular gender (i.e masculine, feminine, neuter) regardless of number marking are not generally reported. We could think about the potential lack or scarcity of [IND]-only determiners in the same way, in particular if both gender and individuation features are located on *n*.

numeral modification. However, languages might differ as to the location of the [COLL] feature. If it is on *n*, no numeral modification is possible (English/Spanish), but if it is on Number we would expect numeral modification to be allowed. I showed that this prediction is borne out in Czech (Grimm and Docekal 2021), where the [COLL] feature is spelled out on the noun and numeral modifiers.

This fully decompositional approach to the object mass paradox does not negatively impact the semantics. In fact it enables to formulate a uniform generalization regarding when 'QA+N' can be interpreted in terms of cardinality. What matters is that the constituent to be measured denotes an individuated plurality. The generalization entails that as long as the constituent is generated from the set of atoms and has sums of atoms (though it may contain the single atoms as well), the value of the dimension of measurement is cardinality. Both object mass nouns and plural count nouns conform to this description. The assignment of the value as 'cardinality' is thus predictable given the syntax in tandem with the semantic properties of the target constituent. This approach makes more language internal and cross-linguistic predictions than lexicalist-based approaches that correlate a certain surface form to a particular semantic interpretation, e.g. $\text{Form}_1 \rightarrow \text{DIMENSION}_A$; $\text{Form}_2 \rightarrow \text{DIMENSION}_B$. The formulation of the generalization in the more abstract terms (i) makes it a good candidate for a language universal and (ii) enables us to maintain a modular view of the grammar (Chomsky 1986, 1995, 2000, 2001, 2008; Halle and Marantz 1993; Marantz 1997, 2001; Arad 2003, among others).

We have been able to accommodate the category of number neutral nouns which are unmarked for number. These nouns like (unmarked) mass nouns, which are generally referred to as being number neutral (Krifka 1989; Chierchia 1998b), cannot be modified by numerals and stubbornly distributive adjectives, and are cumulative. However, despite them both being closed under sum, they correspond to different semi-lattices: countable number neutral nouns are generated from the set of atoms while mass nouns are not. This is evidenced from the fact that QA+number neutral *n*P results in a cardinality interpretation. As a result, only countable number neutral nouns but not mass nouns allow Number to project, if there is morpho-syntactic

evidence to do so; as a result, when Number is projected, they are turned into regular count nouns and as such they display all the properties of this class including modification by stubbornly distributive adjectives and cardinal numerals. What is more the investigation of number neutral NPs sheds light on the restriction for adjectival modification across languages: modification by the class of adjectives that are referred as stubbornly distributive, at least in the domain of attributive adjectives, is syntactically conditioned. In this respect, the class resembles cardinal numeral modifiers.

Before concluding, I want to address the status of variation. Languages might differ as to whether Number is projected and the location of the relevant features. For example, the fact that expression X is count *mueble* in one language but mass in another is accounted for by saying that the former expression has Number whereas the latter does not. Similarly, we can say that the reason the Czech counterparts of English object mass nouns can be modified by numerals is because [COLL] is a Number feature in the former language but not in the latter. As a result of there being Number, the functional head that hosts numerals can be merged. In this regard, we can conclude that variation is syntactic.

However, there is also variation in the domain of nominal flexibility and shifts across classes, e.g. containers, grinding etc. The variation here is much less systematic with some roots being more prone to participate in the shifts and others being less so. This fact is observed within the same language but also across languages. For instance, in English it is more acceptable to obtain a container interpretation with *water* than it is with *blood*: *we ordered two waters for the table* vs. ??*the doctor ordered two bloods for his patient in the OR*. In Nez Perce, there do not seem to be such restrictions as reported by Deal (2016a, 2017), whereas in Mongolian the changes are even more restricted than in English. The proposal that I have developed here provides an answer: it is syntactically conditioned lexical variation. In other words, variation in this domain results from the way that the syntax puts terminal nodes together in concert with the satisfaction of the different requirements at the interfaces (both PF and LF). A very important part of this variation is the ability to license roots: the assignment of a vocabulary item for the root in the given syntactic configuration and

the assignment of a meaning for the root in the given syntactic context. When it comes to root licensing at LF, we observed that the mass interpretation of a root (i.e. the STUFF concept) was the application of the elsewhere allosemy rule, i.e. the default, whereas shifting entailed a context sensitive and more marked rule. The inability to map the root to the more marked concept in that particular syntactic configuration results in an unlicensed root, which cannot be interpreted during the semantic computation.

6.2 Moving forward

Classifiers. There are many ways in which the count-mass distinction is instantiated cross-linguistically. Here I have focused on overt number-marking languages, that do not have classifiers. A natural empirical domain to be probed next is languages that have classifiers. Some examples are Mandarin or Cantonese (Krifka 1995; Chierchia 1998b; Cheng and Sybesma 1999), Bangla (Dayal 2014; Biswas 2016), or Vietnamese (Simpson and Ngo 2018) to name a few. As observed by Cheng and Sybesma (1999), classifiers in Mandarin for instance, are sensitive to whether the noun the modify is 'count' or 'mass'. Does this go against the hypothesis that mass nouns are unmarked? Difficult to say, especially if the 'mass' classifier in question is itself an individuated lexical item that refers to a unit or container (Cowper and Hall 2014). In addition, these languages have a series of measure expressions and quantificational determiners that seem to be sensitive to the noun being individuated or not (Bale and Gillon 2020): *mēi* 'each' and *liáo-liáo-wú-jǐ* 'very few' are compatible with individuated nouns only. These restrictions seem similar, at least at face value, to what we observed here, which re indeed syntactic. But only an in-depth investigation of the full nominal system can shed light on the actual generalizations and how the theory can handle them.

Shifts and nominal flexibility. In Czech, grinding and packaging shifts are unacceptable as reported by Grimm and Docekal (2021). On the one hand, the situation resembles Alasha Mongolian where packaging of mass is not acceptable. On the other, Czech differs from both Alasha Mongolian and English because

interpreting an otherwise count noun as mass (i.e. grinding) is also precluded. Czech is in fact the mirror image of Nez Perce (Deal 2016a, 2017) and Yudja (Lima 2014), where roots have a larger degree of flexibility. Can we maintain the same explanation we gave for English and Spanish? Namely, roots are not properly licensed at the interfaces and this is what precludes the 'shifts'. Or is there something structurally different between the types of languages described?

Individuation, number and measurement in the VP. It has been observed that there exists a parallelism between mass/count and atelic/telic predicates (Mourelatos 1978; Bach 1986a; Krifka 1989; Borer 2005a,b; van Geenhoven 2005; Wellwood et al. 2012). On the one hand, telic parallels count and atelic mass; on the other, number on NPs parallels grammatical aspect on VPs: perfective and progressive involve singular events whereas imperfective-habitual involves plural events. An immediate question that arises is whether we can have a uniform theory of individuation and number across domains. In other words, how are the features {IND, SG, PL, COLL} distributed in the VP and how do they interact with argument structure?

In addition, the grammatical properties of the NP/VP domain being measured affect the choice of dimension of measurement. These properties are summarized in Table 6.3, but see Wellwood et al. (2012) for more details.

Table 6.3: Dimensions of measurement by NP and VP type

Schwarzschild (2006): NP domain		Wellwood et al. (2012): VP domain	
Type of NP	**Dimension of measurement**	**Type of VP**	**Dimension of measurement**
canonical mass	VOLUME, WEIGHT	atelic (homogenous)	DURATION, DISTANCE
object mass	CARDINALITY	atelic (non-homogenous)	CARDINALITY
PL-count	CARDINALITY	IMPF-telic	CARDINALITY
SG-count	*	PERF-telic	*

These facts are also important for the Cardinality Generalization Redux. Can we extend the syntactic approach to measure expressions to the VP domain? In particular, if object mass parallel atelic non-homogeneus activities we would expect their underlying syntax to be the same: {[*v*/*n*[COLL]], [*v*/*n*[IND]]}. Likewise, plural

count and imperfective telic should be composed of the same feature bundles: {[*Number*[PL]], [*v/n*[IND]]}. The goal of answering these questions and verifying the predictions is developing a parsimonious theory is applicable cross-categorially.

References

Abney, S. (1987). *The English Noun Phrase in its Sentential Aspect*. PhD thesis, MIT.

Ackema, P. and Neeleman, A. (2018). *Features of Person: From the Inventory of Persons to their Morphological Realization*. MIT Press.

Acquaviva, P. (2008). *Lexical Plurals: A Morphosemantic Approach*. Oxford studies in theoretical linguistics. Oxford University Press, Oxford, UK.

Acquaviva, P. (2009). Roots and lexicality in distributed morphology. *York Essex Morphology Meeting*, 2:1–21.

Acquaviva, P. (2016). Linguistic plurality and the conceptualization of part structure. In Carrara, M., Arapinis, A., and Moltmann, F., editors, *Unity and Plurality: Logic, Philosophy, and Linguistics*, pages 194–218. Oxford University Press.

Adamson, L. and Šereikaitė, M. (2019). Gender representation and defaults in Lithuanian. *Glossa: A Journal of General Linguistics*, 4:1–35.

Adger, D. (2003). *Core Syntax*. Oxford University Press, Oxford.

Aelbrecht, L. (2010). *The Syntactic Licensing of Ellipsis*. John Benjamins Publishing Company, Amsterdam.

Alexeyenko, S. and Zeijlstra, H. (2020). (Dis)obeying the Head-Final Filter. In *Proceedings of WCCFL 38*, pages 1–8. Cascadilla Proceedings Project.

Alexeyenko, S. and Zeijlstra, H. (2021). Linearization of complex modifiers: Ways of (Dis)obeying the Head-Final Filter. Unpublished Ms. University of Göttingen.

Alexiadou, A. (1997). *Adverb Placement: A Case Study in Antisymmetric Syntax*. John Benjamins, Amsterdam.

Alexiadou, A. (2004). Inflection class, gender and dp-internal structure. In Müller, G., Gunkel, L., and Zifoun, G., editors, *Explorations in Nominal Inflection*, pages 21–50. Mouton, Berlin.

Alexiadou, A. (2011). Plural mass nouns and the morpho-syntax of number. In Washburn, M. B., McKinney-Bock, K., Varis, E., Sawyer, A., and Tomaszewicz, B., editors, *West Coast Conference in Formal Linguistics (WCCFL) 28*, pages 33–41, Somerville, MA. Cascadilla Proceedings Project.

Alexiadou, A. (2015). Deriving fake mass nouns. In Bui, T. and Özyildiz, D., editors, *North East Linguistic Society (NELS) 45*, pages 11–24, Amherst, MA. GLSA.

Alexiadou, A. (2019). Morphological and semantic markedness revisited: the realization of plurality across languages. *Zeitschrift für Sprachwissenschaft*, 38:123–154.

Alexiadou, A., Haegeman, L., and Stavrou, M. (2007). *Noun Phrase in the Generative Perspective*. Mouton de Gruyter, Berlin.

Arad, M. (2003). Locality constraints on the interpretation of roots: The case of Hebrew denominal verbs. *Natural Language and Linguistic Theory*, 21:737–778.

Arregi, K. (2013). The syntax of comparative numerals. In Kan, S., Moore-Cantwell, C., and Staubs, R., editors, *North East Linguistic Society (NELS) 40*, pages 45–58. GLSA Amherst.

Arregi, K. and Nevins, A. (2007). Obliteration vs. impoverishment in the Basque g-/z- constraint. *University of Pennsilvania Working Papers in Linguistics*, 13:1–14.

Arregi, K. and Nevins, A. (2012). *Morphotactics: Basque Auxiliaries and the Structure of Spellout*. Springer, Dordrecht.

Arregi, K. and Nevins, A. (2013). Contextual neutralization and the Elsewhere Principle. In Matushansky, O. and Marantz, A., editors, *Distributed Morphology Today: Morphemes for Morris Halle*, pages 199–221. MIT Press.

Bach, E. (1986a). The algebra of events. *Linguistics and Philosophy*, 9:5–16.

Bach, E. (1986b). Natural language metaphysics. In Barcan Marcus, R., Dorn, G. J., and Weingartner, P., editors, *Logic, Methodology and Philosophy of Science VII*, pages 573–595. Elsevier Science, Amsterdam.

Bale, A. (2016). Sentential oddities and the mass-count distinction: Do colourful ideas sleep calmly? Unpublished Ms. Concordia University. https://ling.auf.net/lingbuzz/003102.

Bale, A. and Barner, D. (2009). The interpretation of functional heads: Using comparatives to explore the mass/count distinction. *Journal of Semantics*, 26:217–252.

Bale, A., Gagnon, M., and Khanjian, H. (2011). Cross-linguistic representations of numerals and number marking. In Li, N. and Lutz, D., editors, *Proceedings of Semantics and Linguistic Theory (SALT) 20*, pages 582–598, Cornell University. CLC Publications.

Bale, A. and Gillon, B. (2020). Re-examining the mass-count distinction. In Moltmann, F., editor, *Mass and Count in Linguistics, Philosophy and Cognitive Science*, pages 13–36. John Benjamins, Amsterdam.

Bale, A. and Khanjian, H. (2014). Syntactic complexity and competition: the singular-plural distinction in Western Armenian. *Linguistic Inquiry*, 45:1–26.

Bale, A. and Reiss, C. (2018). *Phonology: A Formal Introduction*. MIT Press, Cambridge, MA.

Bale, A. and Schwarz, B. (2019). Proportional readings of many and few: the case for an underspecified measure function. *Linguistics and Philosophy*.

Bale, A., Schwarz, B., and Shanks, D. (2020). Monotonicity restored: *more* never means *purer*. In *Proceedings of the 22nd Amsterdam Colloquium*, pages 445–455, Amsterdam.

Barker, C. (1992). Group terms in English: Representing groups as atoms. *Journal of Semantics*, 9:69–93.

Beghelli, F. and Stowell, T. (1997). Distributivity and negation: The syntax of *each* and *every*. In Szabolcsi, A., editor, *Ways of Taking Scope*, pages 71–107. Kluwer.

Benmamoun, E., Bhatia, A., and Polinsky, M. (2009). Closest conjunct agreement in head final languages. *Linguistic Variation Yearbook*, 9:67–88.

Bhatt, R. and Pancheva, R. (2004). Late merger of degree clauses. *Linguistic Inquiry*, 35:1–46.

Bhatt, R. and Pancheva, R. (2007). Degree quantifiers, position of merger effects with their restrictors, and conservativity. In Barker, C. and Jacobson, P., editors, *Direct Compositionality*, pages 306–335. Oxford University Press, Oxford.

Bhatt, R. and Walkow, M. (2013). Locating agreement in grammar: An argument from conjunctions. *Natural Language and Linguistic Theory*, 31:951–1013.

Biggs, A. and Zhuosi, L. (2022). Adjective classifiers in Shantou Teochew. In Kim, S., Kurtz, N., Hewett, M., and Kasper, C., editors, *Chicago Linguistic Society (CLS) 56*, pages 25–36, Chicago. Chicago Linguistic Society.

Binnick, R. (1979). On the classification of the Mongolian languages. *Central Asiatic Journal*, 31:178–195.

Binnick, R. (2011). *The Past Tenses of the Mongolian Verb: Meaning and Use*. Brill.

Biswas, P. (2016). *Number Marking and Definiteness in Bangla*. PhD thesis, University of Southern California.

Bloomfield, L. (1933). *Language*. Henry Holt, New York.

Bobaljik, J. (2012). *Universals in Comparative Morphology*. MIT Press, Cambridge, MA.

Bobaljik, J. and Harley, H. (2017). Suppletion is local: Evidence from Hiaki. In Newell, H., Noonan, M., Piggott, G., and Travis, L., editors, *The Structure of Words at the Interfaces*, pages 141–159. Oxford University Press, UK.

Bobaljik, J. and Zoca, C. L. (2011). Gender markedness: The anatomy of a counterexample. *Morphology*, 21:141–166.

Bonet, E. (1991). *Morphology after Syntax: Pronominal Clitics in Romance*. PhD thesis, Massachusetts Institute of Technology, PhD.

Bonet, E. (2008). The Person-Case Constraint and repair strategies. In D'Alessandro, R., Fischer, S., and Hrafnbjargarson, G. H., editors, *Agreement Restrictions*, pages 103–2008. Mouton de Gruyter, Berlin.

Bonet, E. (2013). Agreement in two steps (at least). In Matushansky, O. and Marantz, A., editors, *Distributed Morphology Today: Morphemes for Morris Halle*, pages 167–184. MIT press, Cambridge, MA.

Borer, H. (2005a). *Structuring Sense*, volume 1: *In Name Only*. Oxford University Press, Oxford.

Borer, H. (2005b). *Structuring Sense*, volume 2: *The Normal Course of Events*. Ohio State University.

Borer, H. (2014). Wherefore roots? *Theoretical Linguistics*, 40:343–359.

Bošković, Ž. (2014). Now I'm a phase, now I'm not a phase: on the variability of phases with extraction and ellipsis. *Linguistic Inquiry*, 45:27–89.

Bosque, I. (1980). *Sobre la Negación*. Cátedra, Madrid.

Bosque, I. (1999). El nombre común. In *Gramática Descriptiva de la Lengua Española*, volume 1: sintaxis básica de las clases de palabras, pages 3–71. Espasa.

Bowers, J. (2001). Predication. In Baltin, M. and Collins, C., editors, *The Handbook of Contemporary Syntactic Theory*, pages 299–333. Blackwell.

Bresnan, J. (1973). Syntax of the comparative clause construction in English. *Linguistic Inquiry*, 4:275–343.

Bunt, H. (1979). Ensembles and the formal semantic properties of mass terms. In Pelletier, J., editor, *Mass Terms: Some Philosophical Problems*, pages 249–277. Reidel, Dordrecht.

Bunt, H. (1985). *Mass Terms and Model-Theoretic Semantics*. Cambridge University Press, New York.

Bylinina, L. and Podobryaev, A. (2020). Plurality in Buriat and structurally constrained alternatives. *Journal of Semantics*, 37:117–128.

Cartwright, H. (1975). Amounts and measures of amount. *Noûs*, 9:143–163.

Champollion, L. (2010). *Parts of a Whole: Distributivity as a Bridge between Aspect and Measurement*. PhD thesis, University of Pennsylvania.

Champollion, L. and Krifka, M. (2016). Mereology. In Aloni, M. and Dekker, P., editors, *The Cambridge Handbook of Formal Semantics*, Cambridge Handbooks in Language and Linguistics, pages 369–388. Cambridge University Press.

Cheng, C.-Y. (1973). Response to Moravscik. In Hintikka, J., Moravcsik, J., and Suppes, P., editors, *Approaches to Natural Language*, volume 49, pages 286–288. Synthese Library, Springer, Dordrecht.

Cheng, L.-L. and Sybesma, R. (1999). Bare and not-so-bare nouns and the structure of NP. *Linguistic Inquiry*, 30:509–542.

Chierchia, G. (1994). Syntactic bootstrapping and the acquisition of noun meanings: The mass-count issue. In Lust, B., Suñer, M., and Whitman, J., editors, *Syntactic Theory and First Language Acquisition: Crosslinguistic Perspectives*, pages 301–318. Lawrence Erlbaym Associates, Mahwah, NJ.

Chierchia, G. (1998a). Plurality of Mass Nouns and the Notion of "Semantic Parameter". In Rothstein, S., editor, *Events and Grammar*, pages 53–104. Kluwer Academic Publishers.

Chierchia, G. (1998b). Reference to kinds across languages. *Natural Language Semantics*, 6(4):339–405.

Chierchia, G. (2010). Mass nouns, vagueness and semantic variation. *Synthese*, 174:99–149.

Chierchia, G. (2013). *Logic in Grammar: Polarity, Free Choice, and Intervention*. Oxford University Press, Oxford.

Chierchia, G. (2021). Mass vs. count: Where do we stand? outline of a theory of semantic variation. In Kiss, T., Pelletier, J., and Husić, H., editors, *Things and Stuff: The Semantics of the Mass-Count Distinction*, pages 21–54. Cambridge University Press, Cambridge.

Chomsky, N. (1977). Conditions on transformations. In *Essays on form and interpretation*, pages 81–162. Elsevier North-Holland, Inc., New York, New York.

Chomsky, N. (1981). *Lectures on Government and Binding*. Foris, Dordrecht.

Chomsky, N. (1986). *Barriers*. MIT Press, Cambridge, MA.

Chomsky, N. (1994). *Bare Phrase Structure*. MIT press, Cambridge, MA.

Chomsky, N. (1995). *The Minimalist Program*. MIT Press, Cambridge, MA.

Chomsky, N. (2000). Minimalist inquiries: the framework. In Martin, R., Michaels, D., and Uriagereka, J., editors, *Step by Step: Essays on Minimalist Syntax in Honor of Howard Lasnik*, pages 89–156. MIT Press, Cambridge, MA.

Chomsky, N. (2001). Derivation by phase. In Kenstowicz, M., editor, *Ken Hale: A Life in Linguistics*, pages 1–52. MIT Press, Cambridge, Massachusetts.

Chomsky, N. (2008). On Phases. In Freidin, R., Otero, C., and Zubizarreta, M. L., editors, *Foundational Issues in Linguistic Theory: Essays in Honor of Jean-Roger Vergnaud*, pages 133–166. MIT Press, Cambridge, MA.

Cinque, G. (1999). *Adverbs and Functional Heads: A Cross-linguistic Perspective*. Oxford University Press, New York.

Cinque, G. (2005). Deriving Greenberg's Universal 20 and its exceptions. *Linguistic Inquiry*, 36:315–332.

Cinque, G. (2010). *The Syntax of Adjectives*. MIT press, Cambridge, MA.

Cinque, G. (2023). *On Linearization*. MIT Press, Cambridge, MA.

Cleani, A. M. and Toquero-Pérez, L. M. (2022). Debunking multiform dimensionality: *many*, Romance *tant*-PL, & morpho-syntactic opacity. In Starr, J., Kim, J., and Öney, B., editors, *Semantics and Linguistic Theory (SALT) 32*, pages 705–726. CLC Publications.

Cohen, D. (2020). Activewear and other vaguery: A morphological perspective on aggregate-mass. In Moltmann, F., editor, *Mass and Count in Linguistics, Philosophy and Cognitive Science*, pages 37–60. John Benjamins Publishing Company.

Collins, C. and Postal, P. (2014). *Classical NEG Raising: An Essay on the Syntax of Negation*. MIT Press, Cambridge, MA.

Corbett, G. (2000). *Number*. Cambridge University Press.

Corbett, G. (2006). *Agreement*. Cambridge University Press, Cambridge, UK.

Corver, N. (1990). *The Syntax of Left Branch Extractions*. PhD thesis, Katholieke Universiteit Brabant.

Corver, N. (2021). Inflected intensifiers: The structure-dependence of parasitic agreement. In Bárány, A., Biberauer, T., Douglas, J., and Vikner, S., editors, *Syntactic architecture and its consequences III: Inside syntax*, pages 185–217. Language Science Press, Berlin.

Cowper, E. (1992). *A Concise Introduction to Syntactic Theory*. University of Chicago Press.

Cowper, E. (2005). A note on Number. *Linguistic Inquiry*, 36:441–445.

Cowper, E. and Hall, D. C. (2009). Argumenthood, pronouns, and nominal feature geometry. In Ghomeshi, J., Paul, I., and Wiltschko, M., editors, *Determiners: Universals and Variation*, pages 97–120. John Benjamins, Amsterdam.

Cowper, E. and Hall, D. C. (2012). Aspects of individuation. In Massam, D., editor, *Count and Mass across Languages*, pages 27–53. Oxford University Press, Oxford, UK.

Cowper, E. and Hall, D. C. (2014). The features and exponence of nominal number. *Lingue e Linguaggio*, 13:63–82.

Cresswell, M. (1976). The semantics of degree. In Partee, B., editor, *Montague Grammar*, pages 261–292. Academic Press.

Csirmaz, A. and Dékány, É. (2014). Hunagrian is a classifier language. In Simone, R. and Masini, F., editors, *Word Classes: Nature, Typology and Representation*, pages 141–160. John Benjamins.

Dali, M. and Mathieu, E. (2021). The semantics of distributed number. In Kiss, T., Pelletier, J., and Husić, H., editors, *Things and Stuff: The Semantics of the Mass-Count Distinction*, pages 261–278. Cambridge University Press, Cambridge.

Dayal, V. (2004). Number marking and indefiniteness in kind terms. *Linguistics and Philosophy*, 27:393–450.

Dayal, V. (2011). Hindi pseudo-incorporation. *Natural Language and Linguistic Theory*, 29:123–167.

Dayal, V. (2014). Bangla plural classifiers. *Language and Linguistics*, 15:47–87.

De Belder, M. (2011). *Roots and Affixes: Eliminating Lexical Categories from the Syntax*. PhD thesis, Universiteit Utrecht.

De Belder, M. (2013). Collective mass affixes: when derivation restricts functional structure. *Lingua*, 126:32–50.

de Vries, H. (2021). Collective nouns. In Cabredo Hofherr, P. and Doetjes, J., editors, *The Oxford Handbook of Grammatical Number*, Oxford Handbooks in Theoretical Linguistics, pages 288–306. Oxford University Press, Oxford, UK.

Deal, A. R. (2009). The origin and content of expletives: Evidence from "selection". *Syntax*, 12:285–323.

Deal, A. R. (2016a). Do all languages make countability distinctions? evidence from Nez Perce. In Bade, N., Berezovskaya, P., and Schöller, A., editors, *Sinn und Bedeutung 20*, pages 180–197, University of Konstanz.

Deal, A. R. (2016b). Plural exponence in the Nez Perce DP: a DM analysis. *Morphology*, 26:313–339.

Deal, A. R. (2017). Countability distinctions and semantic variation. *Natural Language Semantics*, 25:125–171.

Deal, A. R. (2019). Raising to ergative: Remarks on applicatives of unaccusatives. *Linguistic Inquiry*, 50:388–415.

Dékány, É. (2021). *The Hungarian Nominal Functional Sequence*. Studies in Natural Language and Linguistic Theory. Springer.

Déprez, V. (2005). Morphological number, semantic number and bare nouns. *Lingua*, 115:857–833.

Doetjes, J. (1997). *Quantifiers and Selection: On the Distribution of Quantifying Expressions in French, Dutch and English*. Holland Academic Graphics, The Hague.

Doetjes, J. (2021). Count–mass asymmetries: The importance of being count. In Kiss, T., Pelletier, J., and Husić, H., editors, *Things and Stuff: The Semantics of the Mass-Count Distinction*, pages 81–114. Cambridge University Press.

Dowty, D. (1979). *Word Meaning and Montague Grammar: The Semantics of Verbs and Times in Generative Semantics and in Montague PTQ*. Studies in Linguistics and Philosophy. Reidel Publishing Company, Dordrecht.

Dunbar, E. and Wellwood, A. (2016). Addressing the two interface problem. *Glossa: a journal of general linguistics*, 1:1–29.

Eguren, L. (2010). Contrastive focus and nominal ellipsis in Spanish. *Lingua*, 120:435–457.

Embick, D. (2007). Blocking Effects and analytic/synthetic alternations. *Natural Language and Linguistic Theory*, 25(1):1–37.

Embick, D. (2010). *Localism versus Globalism in Morphology and Phonology*. MIT Press, Cambridge, MA.

Embick, D. (2015). *The Morpheme: A Theoretical Introduction*. Interface Explorations. Mouton de Gruyter.

Embick, D. and Marantz, A. (2008). Architecture and blocking. *Linguistic Inquiry*, 39:1–53.

Embick, D. and Noyer, R. (2001). Movement operations after syntax. *Linguistic Inquiry*, 32:555–595.

Erlewine, M. Y. (2020). Anti-locality and subject extraction. *Glossa: A Journal of General Linguistics*, 5:1–38.

Fábregas, A. (2013). Diminutives as heads or specifiers: The mapping between syntax and phonology. *Iberia: An International Journal of Liguistics*, 5:1–44.

Farkas, D. and de Swart, H. (2003). *The Semantics of Incorporation*. CSLI Publications.

Farkas, D. and de Swart, H. (2010). The semantics and pragmatics of plurals. *Semantics and Pragmatics*, 3:1–54.

Fernández-Sánchez, J. (2015). An (only apparent) case of hyper raising in Spanish. *Iberia: An International Journal of Liguistics*, 7:1–32.

Folli, R. and Harley, H. (2020). A Head Movement Approach to Talmy's Typology. *Linguistic Inquiry*, 51:425–470.

Fong, S. (2019). Proper movement through Spec-CP: An argument from hyperraising in Mongolian. *Glossa: a journal of general linguistics*, 4:1–42.

Fong, S. (2021). The syntax of plural marking: The view from bare nouns in Wolof. In Docekal, M. and Wągiel, M., editors, *Formal Approaches to Number in Slavic and Beyond*, pages 129–148. Language Science Press, Berlin.

Fong, S. (2023). Feature licensing and the number interpretation of bare nominals in Wolof. *Glossa: A Journal of General Linguistics*, 8:1–46.

Ghomeshi, J. (2003). Plural marking, indefiniteness, and the noun phrase. *Studia Linguistica*, 57:47–74.

Gillon, B. (1992). Towards a common semantics for English count and mass nouns. *Linguistics and Philosophy*, 15:597–639.

Gillon, B. (1999). The lexical semantics of English count and mass nouns. In Viegas, E., editor, *The Breadth and Depth of Semantic Lexicons*, volume 10 of *Text, Speech and Language Technology*, pages 19–37. Kluwer.

Gillon, B. (2012). Mass terms. *Philosophy Compass*, 7:712–730.

Gong, M. (2021). Postsyntactic lowering and linear relations in Dagur noun phrases. *Glossa: A Journal of General Linguistics*, 6:1–29.

Gong, M. (2022). *Issues in the Syntax of Movement: Cross-Clausal Dependencies, Reconstruction, and Movement Typology*. PhD thesis, Cornell University.

Grimm, S. (2010). Number and markedness: A view from Dagaare. In Prinzhorn, M., Schmitt, V., and Zobel, S., editors, *Sinn und Bedeutung 14*, pages 168–184.

Grimm, S. (2012). *Number and Individuation*. PhD thesis, Stanford University.

Grimm, S. (2018). Grammatical number and the scale of individuation. *Language*, 94:527–574.

Grimm, S. and Docekal, M. (2021). Counting aggregates, groups and kinds: Countability from the perspective of a morphologically complex language. In FIlip, H., editor, *Countability in Natural Language*, pages 85–120. Cambridge University Press, Cambridge.

Guerzoni, E. (2006). Intervention effects on NPIs and feature movement: Towards a unified account of intervention. *Natural Language Semantics*, 14:359–398.

Guntsetseg, D. (2016). *Differentian Case Marking in Mongolian*. Harrassowitz Verlaf Wiesbaden.

Hackl, M. (2000). *Comparative Quantifiers*. PhD thesis, MIT.

Halle, M. and Marantz, A. (1993). Distributed Morphology and the pieces of inflection. In Hale, K. and Keyser, S. J., editors, *The View from Building 20*, pages 111–176. MIT Press, Cambridge, MA.

Harbour, D. (2007). *Morphosemantic Number: From Kiowa Noun Classes to UG Number Features*. Studies in Natural Language and Linguistic Theory. Springer.

Harbour, D. (2011). Valence and atomic number. *Linguistic Inquiry*, 42:561–594.

Harbour, D. (2014). Paucity, abundance and the theory of number. *Language*, 90:185–229.

Harbour, D. (2016). *Impossible Persons*. MIT Press.

Harley, H. (2005). One-replacement, unaccusativity, acategorial roots, and Bare Phrase Structure. In Gorbachov, S. and Nevins, A., editors, *Harvard Working Papers on Linguistics 11*, pages 59–78.

Harley, H. (2009). Compounding in Distributed Morphology. In Lieber, R. and Stekauer, P., editors, *Oxford Handbook of Compounding*, pages 129–144. Oxford University Press.

Harley, H. (2014). On the identity of roots. *Theoretical Linguistics*, 40:225–276.

Harley, H. and Noyer, R. (1998). Licensing in thenon-lexicalist lexicon: Nominalizations, vocabulary items and the encyclopaedia. *MIT Working Papers in Linguistics*, 32:119–137.

Harley, H. and Noyer, R. (1999). Distributed morphology (state-of-the-article). *Glot International*, 4:3–9.

Harley, H. and Noyer, R. (2000). Formal versus encyclopedic properties of vocabulary: evidence from nominalisations. In Peeters, B., editor, *The Lexicon-Encyclopedia /interface*, pages 349–374. Elsevier, New York.

Harris, J. (1991). The exponence of gender in Spanish. *Linguistic Inquiry*, 22:27–62.

Heck, F. and Müller, G. (2007). Extremely local optimization. In Brainbridge, E. and Agbayani, B., editors, *West Coast Conference in Formal Linguistics (WCCFL) 34*, pages 170–182. Cascadilla Proceedings Project.

Heim, I. (2001). Degree operators and scope. In Fery, C. and Sternefeld, W., editors, *Audiatur Vox Sapientiae. A Festschrift for Arnim von Stechow*, pages 214–239. Akademie Verlag, Berlin.

Heim, I. and Kratzer, A. (1998). *Semantics in Generative Grammar*. Blackwell, Malden, MA.

Henderson, R. (2017). Swarms: Spatiotemporal grouping across domains. *Natural Language and Linguistic Theory*, 35:161–203.

Ionin, T. and Matushansky, O. (2006). The composition of complex cardinals. *Journal of Semantics*, 23:315–360.

Ionin, T. and Matushansky, O. (2018). *Cardinals: The Syntax and Semantics of Cardinal-Containing Expressions*. MIT Press, Cambridge, MA.

Israel, M. (1996). Polarity sensitivity as lexical semantics. *Linguistics and Philosophy*, 19:619–666.

Jackendoff, R. (1977). *X' Syntax*. MIT press, Cambridge, MA.

Janhunen, J. (2012). *Mongolian*. John Benjamins, Amsterdam.

Jespersen, O. (1924). *The Philosophy of Grammar*. Allen and Unwin, London.

Joosten, F. (2010). Collective nouns, aggregate nouns and superordinate: Where 'part of' and 'kind of' meet. *Linguisticæ Investigationes*, 33:25–49.

Kalomoiros, A. (2021). Bare singulars and pseudo-incorporation in Western Armenian. In Dreier, N., Kwon, C., Darnell, T., and Starr, J., editors, *Semantics and Linguistic Theory (SALT) 31*, pages 365–384. CLC Publications.

Kayne, R. (2005). *Movement and Silence*. Oxford University Press, Oxford, UK.

Kiparsky, P. (1973). "Elsewhere" in Phonology. In Anderson, S. and Kiparsky, P., editors, *A Festschrift for Morris Halle*, pages 93–106. Holt, Rinehart and Winston, New York.

Kiss, T., Pelletier, J., and Husić, H. (2021). Polysemy and the count–mass distinction: What can we derive from a lexicon of count and mass senses? In Kiss, T., Pelletier, J., and Husić, H., editors, *Things and Stuff: The Semantics of the Mass-Count Distinction*, pages 377–397. Cambridge University Press, Cambridge.

Klima, E. (1964). Negation in English. In Fodor, J. and Katz, J., editors, *The Structure of Language: Readings in the Philosophy of Language*, pages 246–323. Prentice-Hall, New Jersey.

Kouneli, M. (2017). The morphological expression of nominal number in Kalenjin. In Lamont, A. and Tetzloff, editors, *North East Linguistic Society (NELS) 47*, volume 2, pages 167–176. GLSA.

Kouneli, M. (2019). Plural marking on mass nouns: Evidence from Greek. In Mathieu, E., Dali, M., and Zareikar, G., editors, *Gender and Noun Classification*, pages 233–249. Oxford University Press, Oxford, UK.

Kouneli, M. (2020). Number-based noun classification: The view from Kipsigis. *Natural Language and Linguistic Theory*, 39:1195–1251.

Kramer, R. (2015). *The Morphosyntax of Gender*. Oxford University Press.

Kramer, R. (2016). A split analysis of plurality: Number in Amharic. *Linguistic Inquiry*, 47:527–599.

Kramer, R. (2017). General number nouns in Amharic lack NumP. In Ostrove, J., Kramer, R., and Sabbagh, J., editors, *Asking the Right Questions: Essays in Honor of Sandra Chung*, pages 39–54. Linguistics Research Center, UC Santa Cruz.

Kratzer, A. (1996). Severing the external argument from the verb. In Rooryck, J. and Zaring, L., editors, *Phrase Structure and the Lexicon*, Studies in Natural Language and Linguistic Theory, pages 109–137. Springer.

Kratzer, A. (2008). On the plurality of verbs. In Dölling, J., Heyde-Zybatow, T., and Shäfer, M., editors, *Event Structures in Linguistic Form and Interpretation*, pages 269–300. De Gruyter.

Krifka, M. (1989). Nominal reference, temporal constitution and quantification in event semantics. In Bartsch, R., van Benthem, J., and van EmbdeBoas, P., editors, *Semantics and Contextual Expression*, pages 75–115. CSLI Publications, Standord, CA.

Krifka, M. (1995). Common nouns: A contrastive analysis of English and Chinese. In Carlson, G. and Pelletier, J., editors, *The Generic Book*, pages 398–411. University of Chicago Press, Chicago.

Krifka, M. (1997). The expression of quantization (boundedness). Paper presented on workshop on *Cross-linguistic Variation in Semantics*. LSA Summer Institute.

Kučerová, I. (2018). ϕ-features at the syntax-semantics interface: Evidence from nominal inflection. *Linguistic Inquiry*, 49:813–845.

Landman, F. (1989a). Groups i. *Linguistics and Philosophy*, 12:559–605.

Landman, F. (1989b). Groups ii. *Linguistics and Philosophy*, 12:723–744.

Landman, F. (2004). *Indefinites and the Types of Sets*. Oxford University Press.

Lehrer, A. (1986). English classifier constructions. *Lingua*, 68:109–148.

Levinson, L. (2007). *The Roots of Verbs*. PhD thesis, New York University.

Levinson, L. (2014). The ontology of roots and verbs. In Alexiadou, A., Borer, H., and Schäfer, F., editors, *The Syntax of Roots and the Roots of Syntax*, pages 208–229. Oxford University Press, Oxford.

Lieber, R. (2004). *Morphology and Lexical Semantics*. Cambridge University Press.

Lieber, R. (2016). *English Nouns: The Ecology of Nominalization*. Cambridge University Press.

Lima, S. (2014). *The Grammar of Individuation and Counting*. PhD thesis, University of Massachusetts, Amherst.

Link, G. (1983). The logical analysis of plurals and mass terms: A lattice-theoretical approach. In Bäuerle, R., Schwarze, C., and von Stechow, A., editors, *Meaning, Use and Interpretation of Language*, pages 302–323. De Gruyter, Berlin.

Link, G. (1984). Hydras. on the logic of relative constructions with multiple heads. In Landman, F. and Veltman, F., editors, *Varieties in Formal Semantics*, pages 245–257. Foris, Dordrecht.

Lipták, A. and Saab, A. (2014). No N-raising out of NPs in Spanish: Ellipsis as a diagnostic of head movement. *Natural Language and Linguistic Theory*, 32:1247–1271.

Lobeck, A. (1995). *Ellipsis: Functional Heads, Licensing and Identification*. Oxford University Press, New York.

Marantz, A. (1997). No escape from syntax: Don't try morphological analysis in the privacy of your own lexicon. In Dimitriadis, A., Siegel, L., Surek-Clark, C., and Williams, A., editors, *University of Pennsylvania Working Papers in Linguistics*, pages 201–225. University of Pennsylvania.

Marantz, A. (2001). Words and things. Handout of talk given at MIT.

Marantz, A. (2013). Locality domains for contextual allomorphy across the interfaces. In Matushansky, O. and Marantz, A., editors, *Distributed Morphology Today: Morphemes for Morris Halle*, pages 95–115. MIT Press.

Martí, L. (2008). The semantics of plural indefinites in Spanish and Portuguese. *Natural Language Semantics*, 16:1–37.

Martí, L. (2020a). Inclusive plurals and the theory of number. *Linguistic Inquiry*, 51:37–74.

Martí, L. (2020b). Numerals and the theory of number. *Semantics and Pragmatics*, 13:1–57.

Massam, D. (2001). Pseudo noun incorporation in Niuean. *Natural Language and Linguistic Theory*, 19:153–197.

Mathieu, E. (2012). Flavors of division. *Linguistic Inquiry*, 43:650–679.

Mathieu, E. and Dali, M. (2021). *A Theory of Distributed Number*. John Benjamins, Amsterdam.

McCawley, J. (1979). Lexicography and the count-mass distinction. In McCawley, J., editor, *Adverbs, Vowels and Other Objects of Wonder*, pages 165–173. University of Chicago Press.

Merchant, J. (1999). *The Syntax of Silence: Sluicing, Islands, and Identity in Ellipsis*. PhD thesis, University of California, Santa Cruz.

Merchant, J. (2004). Fragments and Ellipsis. *Linguistics and philosophy*, 27(6):661–738.

Merchant, J. (2014). Gender mismatches under nominal ellipsis. *Lingua*, 151:9–32.

Moskal, B. (2015). Limits on allomorphy: A casde-study in nominal suppletion. *Linguistic Inquiry*, 46:363–375.

Moskal, B. and Smith, P. (2016). Towards a theory without adjacency: Hyper-contextual VI-rules. *Morphology*, 26:295–312.

Mourelatos, A. (1978). Events, processes, and states. *Linguistics and Philosophy*, 2:415–34.

Müller, A. (2002). Genericity and the denotation of common nouns in Brazilian Portuguese. *Probus*, 2:279–298.

Müller, G. (2010). On Deriving *CED* Effects from the *PIC*. *Linguistic Inquiry*, 41(1):35–82.

Nakanishi, K. (2007). Measurement in the nominal and verbal domains. *Linguistics and Philosophy*, 30(2):235–276.

Nauta, S., de Vries, H., and Doetjes, J. (2022). The mountains are impure: the semantics of lexical plurality. In Starr, J., Kim, J., and Öney, B., editors, *Semantics and Linguistic Theory (SALT) 32*, pages 12–29. CLC Publications.

Nevins, A. and Anand, P. (2003). Some AGREEment matters. In Gardin, G. and Tsujimura, M., editors, *West Coast Conference in Formal Linguistics (WCCFL) 22*, pages 370–383, Somerville, MA. Cascadilla Proceedings Project.

Norris, M. (2014). *A Theory of Nominal Concord*. PhD thesis, UC Santa Cruz.

Norris, M. (2017a). Description and analyses of nominal concord (pt i). *Language and Linguistic Compass*, 11:1–15.

Norris, M. (2017b). Description and analyses of nominal concord (pt ii). *Language and Linguistic Compass*, 11:1–20.

Ojeda, A. (2005). The paradox of mass plurals. In Mufwene, S., Francis, E., and Wheeler, R., editors, *Polymorphous Linguistics. Jim McCawley's Legacy*, pages 389–410. MIT press.

Oltra-Massuet, I. and Arregi, K. (2005). Stress-by-structure in Spanish. *Linguistic Inquiry*, 36:43–84.

Ott, D. (2011). Diminutive-formation in German: Spelling out the classifier analysis. *Journal of Comparative Germanic Linguistics*, 14:1–46.

Pancheva, R. (2021). Morphosyntactic variation in numerically-quantified noun phrases in Bulgarian. Unpublished Ms. University of Southern California.

Pancheva, R. (2022). Determiner vs. adjectival numerals and nominal number. In Stockall, L., Martí, L., Adger, D., Roy, I., and Ouwayda, S., editors, *For Hagit: A Celebration*, volume 47, pages 1–10. Queen Mary Occasional Papers in Linguistics.

Payne, J., Pullum, G., Scholz, B., and Berlage, E. (2013). Anaphoric *one* and its implications. *Language*, 89:794–829.

Pearson, H. (2011). A new semantics for group nouns. In Washburn, M. B., McKinney-Bock, K., Varis, E., Sawyer, A., and Tomaszewicz, B., editors, *West Coast Conference in Formal Linguistics (WCCFL) 28*, pages 160–168, Somerville, MA. Cascadilla Proceedings Project.

Pelletier, J. (1975). Non-singular reference: Some preliminaries. *Philosophia*, 5:451–465.

Pelletier, J. (1979). *Mass Terms: Some Philosophical Problems*. Reidel, Dordrecht.

Pesetsky, D. and Torrego, E. (2006). Probes, goals and syntactic categories. In Otsu, Y., editor, *7th Annual Tokyo Conference on Psycholinguistics*, lingbuzz/000321.

Pesetsky, D. and Torrego, E. (2007). The syntax of valuation and the interpretation of features. In Karimi, S., Samllam, V., and Wilkins, W., editors, *Phrasal and Clausal Architecture*, pages 262–294. John Benjamins.

Picallo, C. (2008). Gender and number in Romance. *Lingue e Linguaggio*, 8:47–66.

Piera, C. (1995). On compounding in English and Spanish. In Campos, H. and Kempchinsky, P., editors, *Evolution and Revolution in Linguistic Theory. Studies in Honor of Carlos P. Otero*, pages 1–13. Georgetown University Press.

Pietroski, P. (2010). Concepts, meanings, and truth: first nature, second nature, and hard work. *Mind and Language*, 25:247–278.

Pietroski, P. (2017). Semantic internalism. In McGilvray, J., editor, *The Cambridge Companion to Chomsky*, pages 196 – 216. Cambridge University Press, Cambridge, UK.

Poppe, N. (1955). *Introduction to Mongolian Comparative Studies*. Suomalais-ugrilainen Seura, Helsinki.

Poppe, N. (1970). *Mongolian Language Handbook*. Center for Applied Linguistic University of Vienna, Vienna.

Pross, T. (2019). What about lexical semantics if syntax is the only generative component of the grammar? a case study on word meaning in German. *Natural Language and Linguistic Theory*, 37:215–261.

Quine, W. V. O. (1960). *Word and Object*. MIT press, Cambridge, MA.

Ranero, R. (2021). *Identity Conditions on Ellipsis*. PhD thesis, University of Maryland, College Park.

Rips, L. and Hespos, S. (2019). Concepts of objects and substances in language. *Psychonomic Bulletin & Review*, 26:1238–1256.

Ritter, E. (1991). Two functional categories in noun phrases: Evidence from Modern Hebrew. In Rothstein, S., editor, *Syntax and Semantics 25: Perspectives on Phrase Structure: Heads and Licensing*. Academic Press.

Ritter, E. (1993). Where's Gender? *Linguistic Inquiry*, 24:795–803.

Roca, I. (1989). The organisation of grammatical gender. *Transactions of the Philological Society*, 87:1–32.

Rothstein, S. (2004). *Structuring Events*. Blackwell Publishing, Oxford, UK.

Rothstein, S. (2010). Counting and the mass/count distinction. *Journal of Semantics*, 27:343–397.

Rothstein, S. (2017). *Semantics for Counting and Measuring*. Cambridge University Press, Cambridge, UK.

Rothstein, S. (2021). Counting, plurality and portions. In Kiss, T., Pelletier, J., and Husić, H., editors, *Things and Stuff: The Semantics of the Mass-Count Distinction*, pages 55–80. Cambridge University Press, Cambridge, UK.

Rudin, D. (2019). Head-based syntactic sluicing. *Linguistic Inquiry*, 50:253–283.

Saab, A. (2010). Impossible deletions in the Spanish DP. *Iberia*, 2:45–83.

Saab, A. (2019). Nominal ellipsis. In van Craenenbroeck, J. and Temmerman, T., editors, *The Oxford Handbook of Ellipsis*, pages 526–561. Oxford University Press.

Sauerland, U. (2003). A new semantics for number. In Young, R. and Zhou, Y., editors, *Proceedings of Semantics and Linguistic Theory (SALT) 13*, pages 258–275. CSLI Publications.

Sauerland, U., Anderssen, J., and Yatsuhiro, K. (2005). The plural is semantically unmarked. In Kepser, S. and Reis, M., editors, *Linguistic Evidence: Empirical, Theoretical and Computational perspectives*, Studies in Generative Grammar, pages 413–434. De Gruyter.

Sauerland, U. and Elbourne, P. (2002). Total reconstruction, PF movement and derivational order. *Linguistic Inquiry*, 33(283-319).

Sağ, Y. (2022). Bare singulars and singularity in Turkish. *Linguistics and Philosophy*, 45:741–793.

Schwarzschild, R. (1996). *Pluralities*. Kluwer Academic, Dordrecht ; Boston.

Schwarzschild, R. (2006). The role of dimensions in the syntax of noun phrases. *Syntax*, 9:67–110.

Schwarzschild, R. (2011). Stubborn distributivity, multiparticipant nouns and the count/mass distinction. In Lima, S., Mullin, K., and Smith, B., editors, *North East Linguistic Society (NELS) 39*, pages 661–678, Amherst, MA. GSLA.

Scontras, G. (2013). Accounting for counting: A unified semantics for measure terms and classifiers. In Snider, T., editor, *Semantics and Linguistic Theory (SALT) 23*, pages 549–569. CLC Publications.

Scontras, G. (2014). *The Semantics of Measurement*. PhD thesis, Harvard University.

Simpson, A. and Ngo, B. (2018). Classifier syntax in Vietnamese. *Journal of East Asian Linguistics*, 27:211–246.

Smith, P. (2021). *Morphology–Semantics Mismatches and the Nature of Grammatical Features*. John Benjamins.

Snyder, E. (2021). Counting, measuring, and the fractional cardinalities puzzle. *Linguistics and Philosophy*, 44:513–550.

Snyder, W. (1995). *Language Acquisition and Language Variation: The Role of Morphology*. PhD thesis, Massachusetts Institute of Technology, Cambridge.

Snyder, W. (2012). Parameter theory and motion predicates. In Demonte, V. and McNally, L., editors, *Telicity, Change and State: a Cross-Categorial View of Event Structure*. Oxford University Press.

Snyder, W. (2016). How to set the Compounding Parameter. In *6th Conference on Generative Approaches to Language Acquisition North America (GALANA 6)*, pages 122–130.

Soja, N., Carey, S., and Spelke, E. (1991). Ontological categories guide young children's inductions of word meaning: Object terms and substance terms. *Cognition*, 38:179–211.

Solt, S. (2009). *The Semantics of Adjectives of Quantity*. PhD thesis, The City University of New York.

Solt, S. (2015). Q-Adjectives and the semantics of quantity. *Journal of Semantics*, 32:221–273.

Spector, B. (2007). Aspects of the pragmatics of plural morphology: On higher-order implicatures. In Sauerland, U. and Stateva, P., editors, *Presupposition and Implicature in Compositional Semantics*, pages 243–281. Palgrave Macmillan UK, London.

Sportiche, D. (1988). A theory of floating quantifiers and its corollaries for constituent structure. *Linguistic Inquiry*, 19:425–449.

Stigliano, L. (2022). *The Silence of Syntax: A Theory of Ellipsis Licensing and Identity*. PhD thesis, University of Chicago.

Stowell, T. (1981). *Origins of Phrase Structure*. PhD thesis, MIT.

Suñer, M. (2002). The lexical preverbal subject in a Romance null subject language: Where art thou? In Núñez-Ceñedo, R., López, L., and Cameron, R., editors, *A Romance Perspective on Language Knowledge and Use*, pages 341–360. John Benjamins, Amsterdam.

Svenonius, P. (1994). *Dependent Nexus: Subordinate Predication Structures in English and the Scandinavian Languages*. PhD thesis, University of California, Santa Cruz.

Svenonius, P. (2008). The position of adjectives and other phrasal modifiers in the decomposition of DP. In McNally, L. and Kennedy, C., editors, *Adjectives and Adverbs: Syntax, Semantics and Discourse*, Oxford Studies in Theoretical Linguistics, pages 16–42. Oxford University Press.

Thoms, G. (2019). Antireconstruction as layering. In Baird, M. and Pesetsky, J., editors, *North East Linguistic Society (NELS) 49*, volume 3, pages 221–230, Amherst, MA. GLSA.

Tomioka, S. (2021). Japanese *-tati* and generalized associative plurals. In Cabredo Hofherr, P. and Doetjes, J., editors, *The Oxford Handbook of Grammatical Number*, pages 463–484. Oxford University Press, Oxford.

Toquero-Pérez, L. M. (2020). The semantics of Spanish compounding: An analysis of NN compounds in the parallel architecture. *Glossa: A Journal of General Linguistics*, 5:1–41.

Toquero-Pérez, L. M. (2022). A seeming violation of the Monotonicity Constraint in Spanish verbal comparatives. In Gutzmann, D. and Repp, S., editors, *Sinn und Bedeutung 26*, pages 845–864.

Toquero-Pérez, L. M. (2023a). The syntax of individuating and measuring pseudo-partitives in Alasha Mongolian. *Journal of East Asian Linguistics*, 32:551–593.

Toquero-Pérez, L. M. (2023b). There is only one *más*: Spanish *que/de* comparative alternation. *Natural Language and Linguistic Theory*.

Tsoulas, G. (2006). Plurality of mass nouns and the grammar of number. Paper presented at *Generative Linguistics in the Old World 29*, Barcelona.

Tsoulas, G. (2009). On the grammar of number and mass terms in greek. In Halpert, C., Hartman, J., and Hill, D., editors, *Workshop in Greek Syntax and Semantics at MIT (2007)*, volume 57, pages 333–348. MIT Working Papers in Linguistics.

Vallduví, E. (1994). Polarity items, *n*-words and minimizers in catalan and spanish. *Probus*, 6:263–294.

van Geenhoven, V. (2005). Atelicity, pluractionality, and adverbial quantification. In Verkuyl, H., de Swart, H., and van Hout, A., editors, *Perspectives on Aspect, vol. 1. Studies in Theoretical Psycholinguistics*, pages 107–124. Springer.

von Heusinger, K. and Kornflit, J. (2017). Partitivity and case marking in Turkish and related languages. *Glossa: A Journal of General Linguistics*, 2:1–40.

von Stechow, A. (1984). Comparing semantic theories of comparison. *Journal of Semantics*, 3:1–77.

Wechsler, S. and Zlatić, L. (2003). *The Many Faces of Agreement*. CSLI Publications, Stanford, CA.

Wellwood, A. (2015). On the semantics of comparison across categories. *Linguistics and Philosophy*, 38:67–101.

Wellwood, A. (2018). Structure preservation in comparatives. In Maspong, S., Bryndhildur, S., Blake, K., and Davis, F., editors, *Semantics and Linguistic Theory (SALT), 28*, pages 78–99. CSLI Publications.

Wellwood, A. (2019). *The Meaning of More*. Oxford University Press.

Wellwood, A. (2020). Interpreting degree semantics. *Frontiers in Psychology*, 10:1–14.

Wellwood, A., Hacquard, V., and Pancheva, R. (2012). Measuring and Comparing Individuals and Events. *Journal of Semantics*, 29:207–228.

Williams, E. and di Sciullo, M. (1987). *On the Definition of Word*. MIT Press, Cambridge, MA.

Wiltschko, M. (2008). The syntax of non-inflectional plural marking. *Natural Language and Linguistic Theory*, 26:639–694.

Wiltschko, M. (2012). Decomposing the mass/count distinction: Evidence from languages that lack it. In Massam, D., editor, *Count and Mass across Languages*, Oxford Studies in Theoretical Linguistics, pages 146–171. Oxford University Press, Oxford, UK.

Wiltschko, M. (2014). *The Universal Structure of Categories: Towards a Formal Typology*. Cambridge University Press, Cambridge.

Wiltschko, M. (2021). The syntax of number markers. In Cabredo Hofherr, P. and Doetjes, J., editors, *The Oxford Handbook of Grammatical Number*. Oxford University Press.

Wiltschko, M. and Ritter, E. (2015). Animating the narrow syntax. *The Linguistic Review*, 32:869–908.

Wood, J. (2016). How roots do and don't constrain the interpretation of Voice. *Working Papers in Scandinavian Syntax*, 96:1–25.

Wood, J. (2023). *Icelandic Nominalizations and Allosemy*. Oxford University Press (to appear).

Zabbal, Y. (2005). The syntax of numeral expressions. Upublished Ms., University of Massachusetts, Amherst. https://ling.auf.net/lingbuzz/005104.

Zwarts, J. (2020). Contiguity and membership and the typology of collective nouns. In Franke, M., Kompa, N., Liu, M., Müller, J., and Schwab, J., editors, *Sinn und Bedeutung 24*, pages 539–554.

Zweig, E. (2009). Number-neutral bare plurals and the multiplicity implicature. *Linguistics and Philosophy*, 32:353–407.