Countability in Dagaare

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December 6, 2011

Topics in Countability

Major themes in understanding how languages manifest grammatical number

- Mass-Count Opposition
- Singular-Plural Opposition
- Non-Canonical Number Marking (e.g. singulatives)

This talk will examine these themes from the perspective of Dagaare and develop a typological view on countability

Background: The Mass-Count Distinction

What does it mean for a noun to be morphosyntactically mass or count?

Count nouns (*dog*, *chair*):

- plural marking (*dogs*, *chairs*)
- modification by cardinal quantifiers (*two dogs/chairs*)
- modification by determiners implicating plurality (*several dogs*, *several chairs*)

Mass nouns (*water, sand*)

- do not permit plural marking (**waters, *sands*)
- nor cardinal quantifiers or those implicating plurality (**two waters*, **several sands*)
- may allow modification by *much* or *a lot of*

The Mass-Count Distinction

The mass-count distinction is perhaps the fundamental distinction in the nominal domain

Connects to my all-time favorite question:

- How are grammar and meaning related?

The Mass-Count Distinction

The mass-count distinction has often served as a touchstone for those who would deny that meaning and grammar are related

> *It is easy enough to show that grammatical distinctions are not semantic ones by indicating the many cases where there is not a one-to-one correspondence. . . . examples are to be found in* foliage [mass] *vs.* leaves [count], *in English* hair, *which is singular, vs. French* cheveux, *plural. These distinctions are grammatical and do not directly correspond to any categories of meaning (Palmer 1971, p. 34–35).*

Topics in Countability

Central question:

- Are countability distinctions tied to lexical meaning of a noun?

Points of controversy:

- Within-language variation:
  - *foliage* vs. *leaves*
- Across-language variation:
  - *hair* vs. *cheveux*
- Within-language variation across contexts (aka "Grinding" and "Packaging"):
  - *apples on the tree* vs. *apple in the salad*

Central Hypothesis

Central hypothesis: *morphological realization* of number is sensitive to the *meaning* conveyed by the noun.

- There is a relation between the number realization of nouns and their meaning, it just may take some work to make the connection clear

individuation: the propensity for an entity to appear as an individual unit

- the realization of number is sensitive to conceptual and perceptual factors tied to individuation

Number and Individuation

This hypothesis connects to the themes at the center of theoretical research on grammatical number:

- (i) the characterization of mass as opposed to count terms
  - the more individuated an entity, the more likely it has count morphosyntax, and conversely
- (ii) the meaning (and semantic representation) of grammatical number markers—plural, dual, collective, and singulative markers
  - the use of these number markers are related to different degrees of individuation

Number and Individuation

A major goal is to work towards a systematic understanding of:

- different ontological types of entities (world)
- their attendant properties, which classify different entity types (conceptual)
- the relation to different possibilities for morphosyntactic realization across languages (morphosyntactic realization)
  - what types of moprhosyntactic marking are available for a given class of entities

Exploring Grammatical Number in Dagaare: Outline

- Background on Dagaare
- Mass Nouns: Two classes
- Non-Canonical Number Markers
- Flexibility of Noun Interpretation, or Lack Thereof
- Count Nouns: The Singular-Plural Contrast and Dagaare's Inverse Number Marking System

Background: Language Facts about Dagaare

Classifictation: Oti-Volta; Gur; Niger-Congo

Region: Spoken in northwest corner of Ghana, western part of Upper West Region

Population: 700,000 (1,000,000 including Northern Dagara in Burkina Faso) (2003 figures)

Background on Fieldwork

Documentation on Dagaare is developing, with solid sketch grammars and wordlists now available

- Conducted fieldwork in 2008 and 2011.

Background

Joint work with Mark Ali (College of Education, Winneba, Ghana)

Background on Fieldwork

Actively developing a Dagaare-English dictionary

- Two forms:
  - A 1700-word dictionary compiled for linguistics and comparison with other African languages (following the format of Snider and Roberts 2006)
  - A larger, more general dictionary aimed for use in Ghana by Dagaare speakers
- The data in this talk comes from a subset of over 1000 nouns coded for (relatively transparent) semantic domains

Count-Mass Contrast in Dagaare

There is a clear opposition between objects and substances in Dagaare:

- substance terms do not fall into the standard singular/plural marking patterns
- they have special number markers: a distinct distributive plural marker *-ree*

Mass	**2nd Pl.**	**Gloss**
kùó	kònnéé	'water/ (types of) waters'
múó	múónéé	'grass/grasses'

Count-Mass Contrast in Dagaare

Substances terms can be further divided as to whether they permit the singulative marker *-ruu*:

Singulative	**Mass**	**2nd Pl.**	**Gloss**
—	kùó	kònnéé	'water/ (types of) waters'
múórúú	múó	múónéé	'blade of grass/grass/grasses'

Implicates two types of mass nouns in Dagaare

The Distributive ("Second") Plural

Grammars of Dagaare normally only discuss the second plural -ree in relation to mass terms and liquids

The second plural is however very productive, and combines with nouns that are not mass terms:

- *waa* 'yam' has both a regular plural form *waari* 'yams' and a form *waaree* which designates 'different piles of yams'

The plural -ree has further uses:

- Taxonomic Use: can designate a "many types of" reading
- Pejorative Use: use of -ree with non-mass terms is usually accompanied by an implication that the referent is of little value

The Singulative

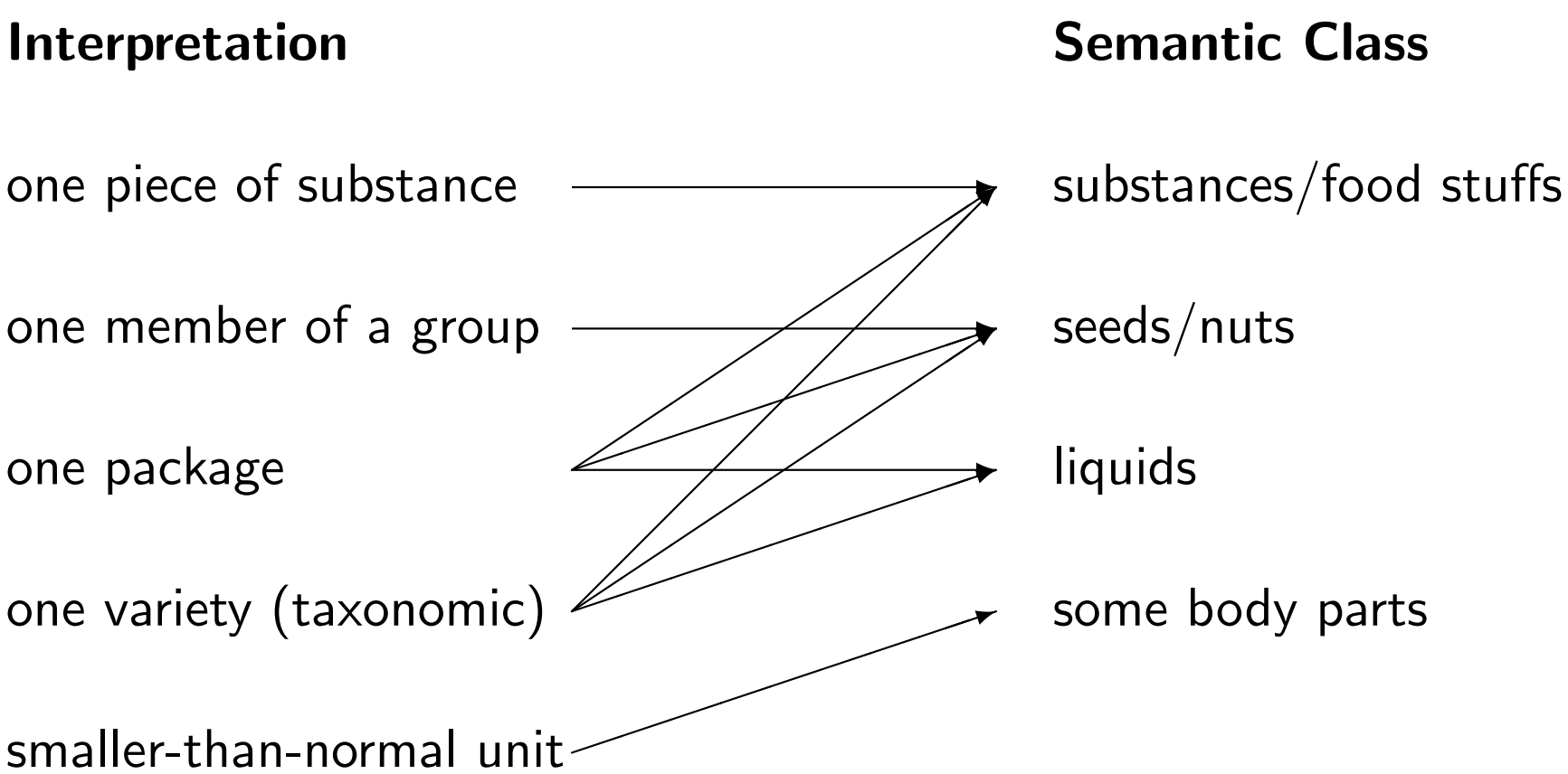
The singulative in its core use appears mainly with clearly mass terms as well as aggregates with are particularly close-knit:

múórúú	'blade of grass'	múó	'grass'
kpéérúú	'piece of malt'	kpéé	'malt'

Further (less frequent) types of designations:

- one member of a group
- one package
- one variety (taxonomic)
- smaller-than-normal unit

Uses of the Singulative in Dagaare



Comparison: The Turkana Singulative

"Nouns denoting entities that normally occur in unspecified numbers, like e.g. 'hair', 'grass', 'word' and entities that normally occur in pairs, like 'ear', 'breast', most often have a plural which occurs as the basic form." (Dimmendaal 1983: 227)

Singulative	**Gloss**	**Collective**	**Gloss**
ɛ-ɲa-ít	'blade of grass'	ŋɪ-ɲa`	'grass'

Comparison: The Turkana Singulative

Semantic domain appears to be quite large, including

- granular aggregates
- insects
- vegetation
- small fruits and vegetables
- other likely suspects such as 'seeds' or 'roots'
- types of people

(see Ohta (1989) "A Classified Vocabulary of the Turkana in Northwestern Kenya")

Comparison: The Welsh Singulative

The same lexical semantic classes appear to be at issue in Welsh's number marking system, which possesses both a singular/plural distinction and and singulative/collective distinction ('leaf': *deil-en* singulative/*deil* pl.)

Semantic domains for singulative/collective (Stolz 2001):

- Small animals/insects
- Mid-sized animals coming in herds, swarms, etc.
- Vegetation/cereals/fruit
- Granular aggregates

Summary: Singulatives

The singulative in Dagaare differs from those found in other languages both in

- its comparatively restricted range—in its primary use only occurs with granular aggregates
- its variety of uses (although such uses may simply be under-reported in other languages)

Interpretive Flexibility

A large number of researchers, since e.g. Gleason (1965) or Pelletier (1975), have discussed the fact that nouns can often appear as either "mass" or "count" interpretations, when the context is set correctly

- This observation seems to hold for English (with limitations)
- Not clear how valid this is cross-linguistically

Universal grinder

- **Universal grinder** ⇒ Every count noun, given the right context, can have a mass interpretation

(1) There is dog all over the highway.

Universal packager

- **Universal packager** ⇒ The 'inverse' operation, which results in count interpretations for typically mass nouns

(2) Three beers please. [= three servings of beer]

Universal grinder and packager

Universal grinder and packager data are often taken as evidence that a noun's status is not tied to the lexical item itself but is necessarily computed at the NP level (Allan 1980, Bunt 1985).

Non-universality of universal grinder/packager

If the effects of the grinder and packager were truly universal, they should apply uniformly across all nouns, but these operations are *restricted*.

Non-universality of universal grinder

- Grinding is restricted. In particular, it is difficult to grind highly individual objects, especially artifacts (Chierchia 2010).

(3) There is dog all over the highway.

(4) #There is mug/toaster on the table.

(5) #Would you care for some more pea? (Fillmore 1989: 49)

Experimental results support this (Djalali, Grimm, Clausen and Levin 2011)

Non-universality of universal packager

- Packaging is largely restricted to those nouns whose referents are already associated with conventionalized units of packaging

(6) Three beers please. [= three servings of beer]

(7) #Rices adorn the altar.

Dagaare as an "inflexible" language

Grinding and packaging through normal singular or plural morphology appears to be disallowed in Dagaare

- preferred for grinding: "There is dog-meat/yam-pieces all over the road"

Dagaare permits bare nouns in general anyway, which blocks using a bare noun for a substance reading of an individual

Typical packaging readings are probably blocked by the more singulative and distributive plural markers.

- One exception—the local brew is quantifiable:
  Dãã ayi : "two pitos"

Dagaare as an "inflexible" language

Jerry Sadock has reported similar difficulties for grinding in Greenlandic Eskimo

Possible explanation:

- for packaging, flexibility of noun interpretation is inversely related to richness of number marking
- for grinding, flexibility of noun interpretation is related to how the language treats bare nouns in general

More cross-linguistic data needed!

Singular/Plural Opposition

Marking system for singular and plural distinctions where same marker can mark either singular or plural.

- synchronically resembles an inverse number marking system

The number marking pattern of Dagaare is demonstrated by the near minimal pair below.

Both nouns share the same stem, yet *-ri* marks the plural interpretation for 'child' and the singular interpretation for 'seed'.

Singular	**Plural**	**Stem**	**Gloss**
bíé	bíírí	bi-	'child'
bìrí	bíè	bi-	'seed'

Inverse Number Marking

This is a rare system but attested in at least North American (Kiowa) and the Pacific (New Ireland) (see Corbett 2000)

Mock English Inverse Marking

Singular	**Plural**	**Gloss**
cat	cat-s	'cat'
dog-s	dog	'dog'

Such a system seems as if it would be both intrinsically unstable and difficult to learn.

Point of controversy: many theoreticians would prefer not to acknowledge such systems (see Baerman 2007 for discussion)

Inverse Number Marking: Basic Pattern

-A/-E/-O Singular	-rI/-nI Plural	Gloss
bíé	bíírí	'child'
tìɛ́	tìírí	'tree'
gbìé	gbèrí	'forehead'
pìɛ́	pɛ̀rí	'basket'
dùó	dòŕi	'pig'
nàŋá	nànní	'scorpion'

Inverse Number Marking: Basic Pattern

rI/-nI Singular	-E/-O/-A Plural	Gloss
bìrí	bìé	'seed'
kùùrí	kùé	'hoe, metal instrument'
lúgrí	lúgó	'prop, pillar'
nyágrí	nyágá	'root'
fìlí	fìlɛ́	'sores'
dólì	dólò	'dry spot'
íílí	íílɛ̀	'horn'

Prior Approaches

Two main approaches for Dagaare:

Morphological classes:

- V/-ri form one class, while -ri/V form another (Bodomo 1997, Dakubu 2006)

Phonological explanation :

(Anttila and Bodomo 2007) give a set of phonological generalizations, but does not address central issue of why certain nouns have -ri in plural vs. singular

Nominal Classes

The nominal class system in Dagaare is in great decay

Over 70% of the countable nouns in my database belong to the paradigm of V/ri or ri/V, modulo assimilation or other phonological processes

The rest belong to

- human class (Gender 1)
- mass/liquids
- handfull of nouns from residuals of the noun class system (támmʊ́, támá 'bow')

Phonological Generalizations

Insight from (Anttila and Bodomo 2007):

Monosyllabic stems which are unmarked by -ri in singular undergo epenthesization:

- stem do- → dùó 'pig' (sg.)

Monosyllabic stems which are unmarked by -ri in plural appear to have a legitimate suffix:

- stem lo- → lóè 'meteorite' (pl.)

CVC stems add a copy of the root vowel (for forms not marked by -ri):

- stem naŋ- → nàŋá 'scorpion' (sg.)

Phonological Generalizations

While the evidence from CV segments shows remnants of another suffix, the pattern has clearly generalized.

The distribution of -ri is not predictable on phonological grounds, and there are several near minimal pairs:

Gloss	Stem	Singular	Plural
'wild rat'	ku-	kúó	kúúrí
'hoe'	ku-	kùùrí	kùé
'granary'	bug-	bùgó	bùgrí
'pillar'	lug-	lúgrí	lúgó

Human Noun Paradigm (from Dakubu 2005)

Singular	-ba Plural	Gloss
dɔ́ɔ́	dɔ́bá	'man'
pɔ́gá	pɔ́gbá	'woman'
bààlá	bààlbá	'sick person'
sáánà	sáámá	'stranger'

Minor Paridigms (adapted from Dakubu (2005)

Zero Singular	-ri Plural	Gloss
túú	túúrí	'forest'
zû	zúrí	'head'
-bU Singular	-a Plural	Gloss
támmʊ́	támá	'bow'
zàmmʊ́	zàmá	'onion'
-bU Singular	-ri Plural	Gloss
pírʊ́ʊ́	píírì	'sheep'
wááʊ́	wíírì	' snake'
-aa Singular	-ri Plural	Gloss
ŋmáràà	ŋmárì	'moon'
píráá	pírí	'button'

Nominal Classes in Dagaare

SG		PL
∅,V	———	-ba
(-bu	———	-a)
V,∅	———	-ri
-ri	———	E, V

$\tilde{V}$

Number Marking in Dagaare

While synchronically the noun class system does not appear to be productive, as we have already seen, marking number distinctions by suffixation does appear so.

Three distinct morphological markers:

- -ri, sometimes marking singular, sometime plural
- -ree, compatible with most nouns
- -ruu, compatible with few nouns

Number Marking in Dagaare

I elicited a few words which allow all endings:

- fanfani "one soap"
- fanfama "soaps, soap (general term)"
- fanfanee "different types of soap"
- fanfanuu "a piece of soap"

This is rare, since it plays on two understandings of soap—both as a usable unit and as a type of material, but in principle, if the interpretations support it, the number markers freely combine with noun stems.

Interim summary

Dagaare appears to have a greatly reduced noun class system, where, aside from the human class, almost all the singular/plural number marking is performed by -ri

The synchronic distribution of -ri resembles polarity or inverse number marking systems

Does the distribution adhere to any principles?

What's at stake

The inverse marking pattern is to all appearances a big problem for theories of markedness:

- Usually, singular is unmarked and plural is marked (Jakobson, Greenberg's Universal 35)
- This is clearly contradicted by the inverse number marking pattern

Towards a Semantic Approach: Individuation

Individuation Hypothesis:

- Cognitive or perceptual qualities influence the grammatical realization of count and mass nouns
  - count nouns (dog) correlate with individual entities
  - mass nouns (water) correlate with non-individuated substances
- Open Question: Do speakers attend to individuation distinctions beyond the well-known count/mass dichotomy?

Towards a Semantic Approach: Individuation

Individuation suffers in the same manner as other commonly cited conceptual factors in linguistics, such as animacy and agentivity—far from rigorously defined

- Strategy is to use individuation as a heuristic to gain insight into the nominal structure of Dagaare and consequently into the functioning of inverse number marking
- Consider the potential influence of four individuating factors on the realization nominals in Dagaare: animacy, ease of distinguishability, manner of interaction, and "inherently plurality"

Individuation: Animacy

Animacy (relative to some sort of animacy scale ranging from humans to larger then smaller animals), which correlates to a scale of individuation, is known to influence number marking cross-linguistically (Smith-Stark 1974; Corbett 1996, 2000).

- The higher the entity corresponding to a noun rates on an animacy hierarchy, i.e. the closer to human a noun is, the greater likelihood that the noun is capable of expressing a singular/plural contrast.

The higher the animacy level of the entity, the more likely it will be treated as individuated and unmarked in the singular

Individuation: Distinguishability

"Distinguishability" as a factor originates in Wierzbicka (1988)

- entities for which the constituents are more easily distinguishable are more likely to be used as a count nouns while those entities for which the constituents are not easily distinguishable will be used as mass nouns.
- *beans* is more likely to be a count term than *rice* since individual beans are in principle easier to distinguish than individual grains of rice.

Middleton et al. (2004) examined this hypothesis experimentally, where subjects had to match a nonce count or mass term with one of two graphical displays of novel aggregates which varied in terms of distinguishability.

Individuation: Distinguishability

Middleton et al. presented subjects with pairs of aggregate displays which varied along two dimensions:

(i) spatial proximity to other elements (Close versus Apart)

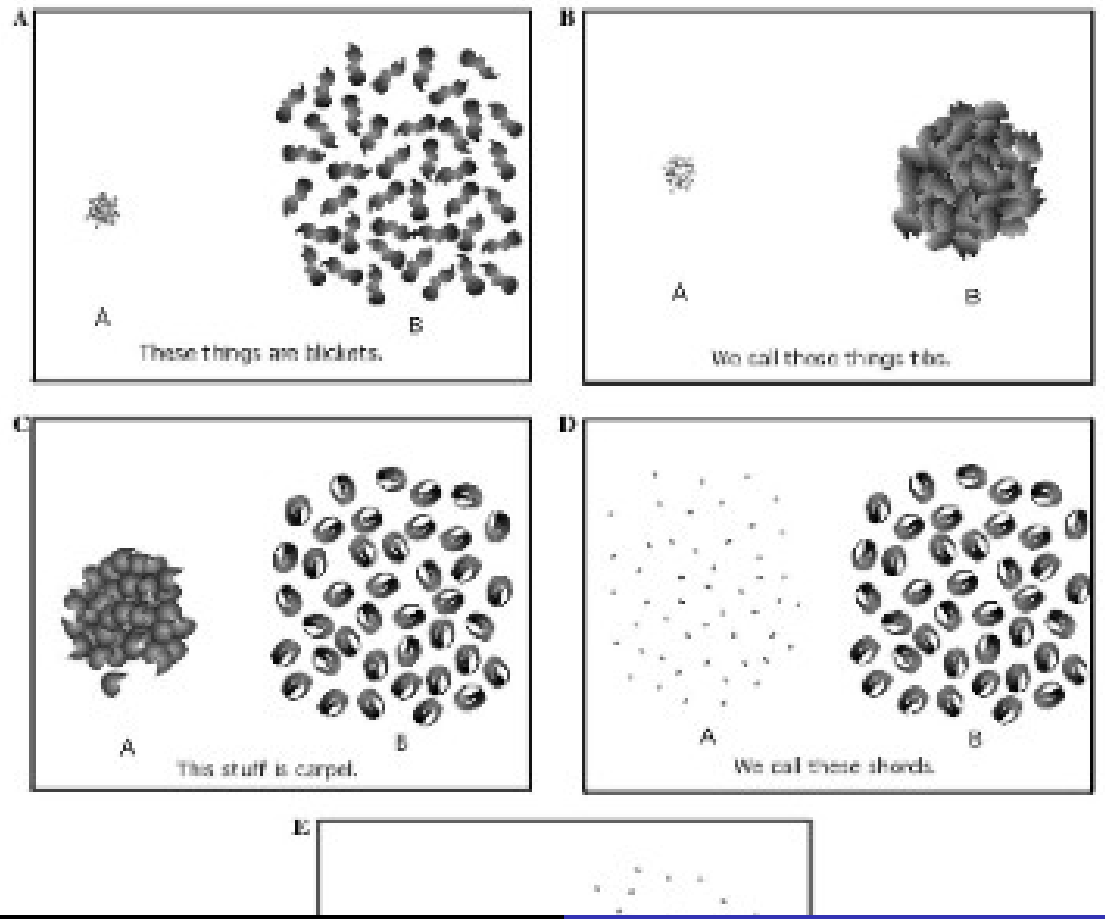
(ii) size of elements (Large versus Small)

A subject would see a two sets of an element where for one set, for instance, each element was spatially separated from the other and for the other set each element was spatially contiguous with other elements.

The subject would then decide which picture aligned with a phrase such as "This is worgel."

Individuation: Distinguishability

Novel Aggregates Used in Middleton et al. (2004) (reproduced from p. 383)



Individuation: Distinguishability

Results:

subjects' choice of count or mass terms was very significantly influenced ($p < .001$) by the factor of spatial proximity, but not of the size, of the elements.

Individuation: Manner of Interaction

Wierzbicka exemplifies "canonical manner of interaction" with examples such as the naming of berries in Polish.

- Berries are generally count terms because, she claims, people interact with them one by one, viz. picking/eating them
- Farmers selling berries typically use mass syntax to describe berries since they interact with them in quantities rather than individually

Individuation: Manner of Interaction

This also receives experimental support from Middleton et al. (2004) with a similar forced choice design (mass vs. count syntax)

When subjects were presented with a novel aggregate—"yellow decorative coarse-grained sugar" in a cardboard box—they majoritarily assigned it a mass phrase ("This is worgle").

When subjects interacted with the sugar by scooping up individual grains, they majoritarily assigned it a count phrase ("These are worgles").

Inherent Plurality

Acquaviva (2008) has emphasized the distinctive mophosemantic behavior of entities which canonically appear in collectives, duals and other "marked" number categories.

Individuation is normally considered only in light of mass/count syntax, but entities that canonically appear as a member of a pair or group, as in the case of duals and collectives, are qualitatively different form those which canonically appear as individuals

Appears independent of the previous three factors:

- dual/collective paradigms is orthogonal to the animacy scale (Corbett 1996)
- distinguishability and interaction are relevant for aggregates when all else is held constant

The Hypothesis

Nouns possess lexical information, i.e. nouns come with a 'basic' number determined by the noun's semantic properties.

The application of *-ri* gives the inverse value.

[Highly Individuated N] + *-ri*
$\Rightarrow$ plural

[Less Individuated/Inherently Plural N] + *-ri* $\Rightarrow$ singular

The Hypothesis

Prediction :

- the more likely the entity is to be viewed as individuated, the more likely the singular will be unmarked and *-ri* will mark the plural
- the more likely the entity is to be viewed as coming in groups or non-individuated, the more likely the plural will be unmarked and *-ri* will mark the singular

Validation Across Semantic Domains

If individuation has an effect on the distribution of *-ri*, one should observe distributional asymmetries in the appropriate semantic domains. Four relevant predictions would be the following:

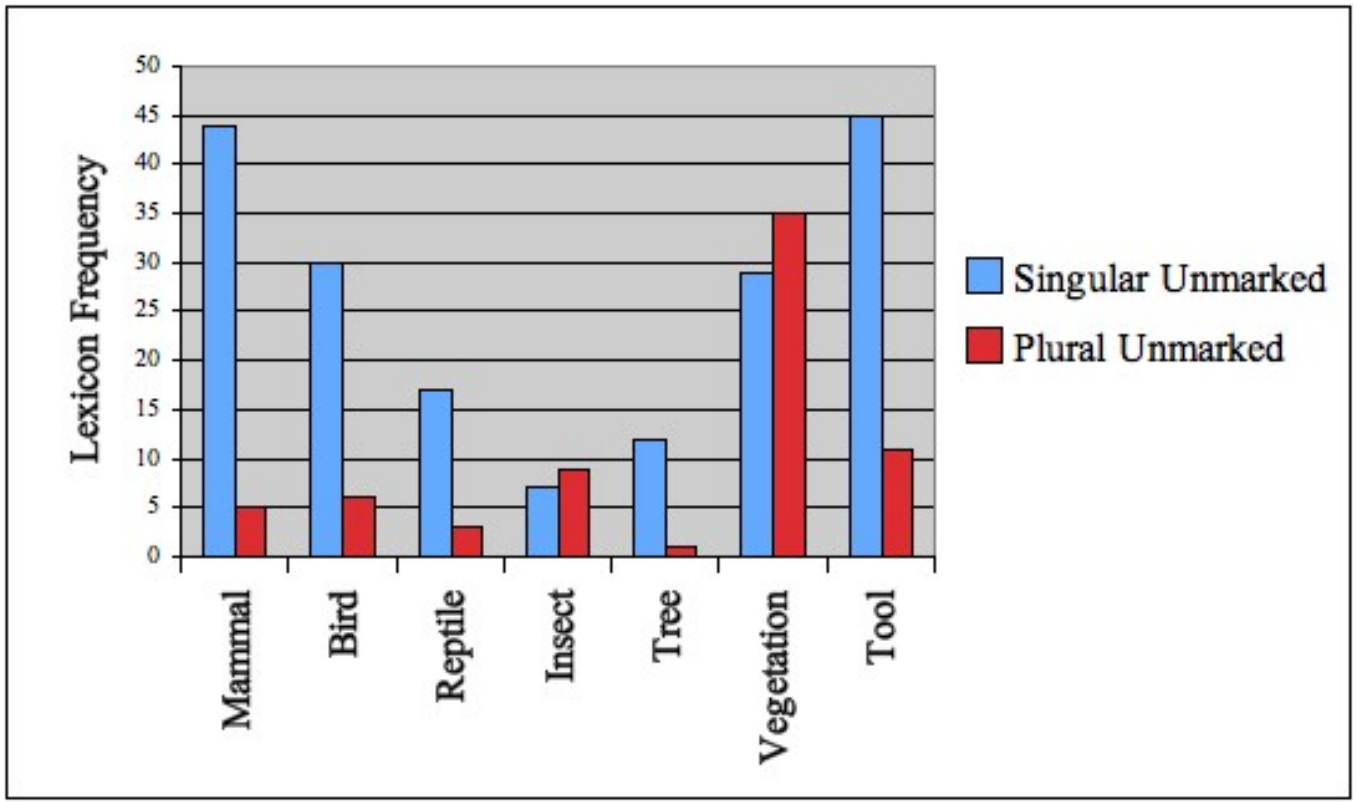
(i) Larger (more salient) animals should be more likely to be unmarked in the singular than insects

(ii) Trees should be in unmarked in the singular in comparison to vegetation

(iii) Tools should be more likely to be unmarked in singular (canonically interact with them individually)

(iv) Body parts in pairs/groups are more likely to be unmarked in the plural while non-paired/grouped body parts are more likely to be unmarked in the singular

Marking of -ri across semantic domains



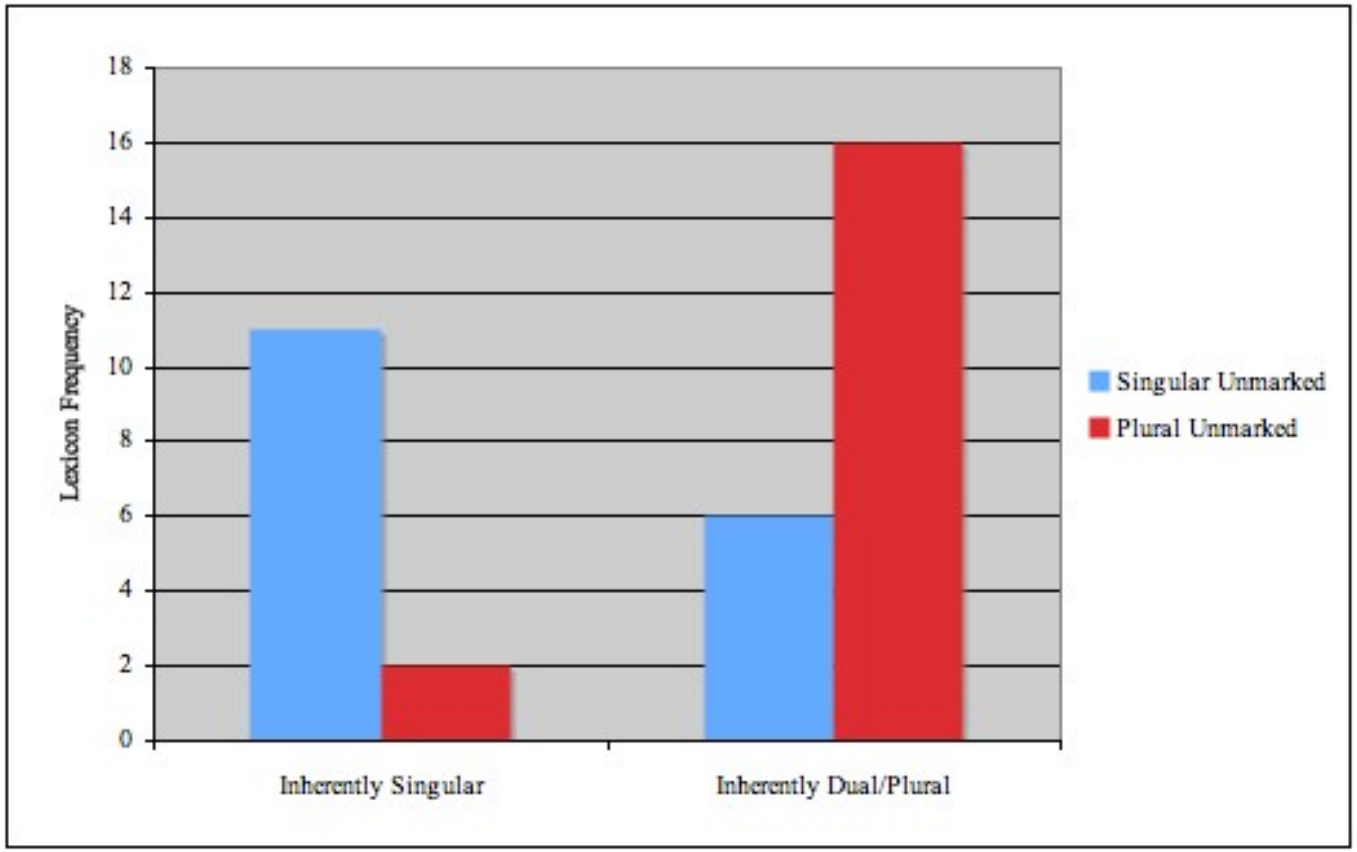
Validation Across Semantic Domains

Reliable asymmetries are visible across the semantic domains:

- higher level animates, trees and tools are typically unmarked in the singular
- insects and vegetation have a majority of nouns for which the plural is unmarked

I controlled for derived forms, since they follow their own patterns which tends to obscure the generalizations

Validation for Body Parts



Validation Across Semantic Domains

Nouns which do not conform to the general trend of the domain display semantic sub-regularities:

- most of the insects unmarked in the singular are those capable of causing harm (e.g. scorpion, wasp, spider)

Varia

There are two words which are glossed almost identically in Dagaare:

Singular	Plural	Gloss
wɛ́gɛ̀	wɛ́grì	'log'
lúgrí	lúgó	'log, pillar'

Varia

Summary

Bottom line:

- Dagaare singular/plural morphology is sensitive to noun's degree of individuation/inherent plurality
- -ri marks singular when a noun is considered to be less individuated/inherently plural, otherwise marks the plural

More broadly, Dagaare, along with the other languages we have looked at, implicates that different ontological types of objects may be susceptible to special morphosyntactic treatment

Countability and Morphosyntax

Three elements relevant for understanding countability:

- things in the world (extensions)
- ontological types (e.g. granular aggregate)
- morphosyntactic classes (count, mass)

(This section is based on joint work with the Stanford "Mass-Count Collective" of 2010: David Clausen, Alex Djalali, Sven Lauer, Tania Rojas-Esponda and Beth Levin)

Countability and Morphosyntax

Is there is organization or arbitrariness among these three elements at the typological level

- I.e., can we determine determine which ontological types are associated with which morphosyntactic classes?

This is not trivial as languages dispose of different numbers of morphosyntactic classes related to countability

- additionally characterized by differences in markedness with respect to countability

Cross-Linguistic Differences

I argue associations with different morphosyntactic classes are

- systematic rather than arbitrary
- cohere to a scale of individuation

Examine three languages and mapping the relation between ontological type and morphological class:

- English [2 classes]
- Welsh [3 classes]
- Dagaare [4 classes]

English: Morphosyntactic Classes

English makes a two-way split in terms of morphosyntactic type:

- Class 1: Nouns allow plural marking
  - individuated things (*apple*, *pencil*)
  - collective aggregates (*bees*, *grapes*)
- Class 2: Nouns have one form
  - liquids (*water*, *oil*)
  - substances (*granite*, *wood*)
  - granular aggregates (*flour*, *rice*, *sand*, *sugar*)

English: Morphosyntactic Markedness

Class 1 has a markedness distinction:

- the singular interpretation has the unmarked form
- the plural interpretation has a marked form

English: Morphosyntactic Markedness

Language	liquids/ substances	granular aggregates	collective aggregates	individual entities
English	0		0/Plural (*–s*)	

Welsh: Morphosyntactic Classes

Welsh has a three-way split:

- Class 1: Nouns allowing plural marking
  - includes primarily animates and other individuals
- Class 2: Nouns allowing singulative marking
  - includes granular aggregates (*turf*, *sand*) as well as collective aggregates such as small animals and insects, vegetables/grains/fruits, inherently plural body parts (*ribs*) (cf. Acquaviva's 2008 'inherent plurals')
- Class 3: Nouns having one form
  - includes liquids and substances

Welsh: Morphosyntactic Markedness

Class 1 and Class 2 differ in the direction of markedness:

- for Class 1 (singular/plural), the singular is morphologically unmarked
- for Class 2 (collective/singulative), the aggregate is unmarked and the singulative is marked

Welsh: Morphosyntactic Markedness

Language	liquids/ substances	granular aggregates	collective aggregates	individual entities
Welsh	0	0/Singulative (*–yn*)		0/Plural (*–od*)
English	0		0/Plural (*–s*)	

Dagaare: Morphosyntactic Classes

Dagaare has a four-way split :

- Class 1: Nouns with plural marked
  - individuals (*child, dog*)
- Class 2: Nouns with singular marked
  - collective aggregates such as vegetation, insects, or inherently plural body parts
- Class 3: Nouns with optional singulative
  - granular aggregates such as *pepper*, *straw*, *grass*
- Class 4: Nouns with one form
  - liquids, materials

Dagaare: Morphosyntactic Markedness

The classes differ in the direction of markedness:

- Class 1: the singular is morphologically unmarked
- Class 2 and 3: the aggregate is unmarked and the singular/singulative is marked

Mapping the Terrain

Ordering classes from those most unmarked in the plural to those most unmarked in the singular imposes an order on the ontological types

Language	**liquids/ substances**	**granular aggregates**	**collective aggregates**	**individual entities**
Dagaare	0	0/Singulative (*–ruu*)	0/Singular (*–ri*)	0/Plural (*–ri*)
Welsh	0	0/Singulative (*–yn*)		0/Plural (*–od*)
English	0		0/Plural (*–s*)	

The Scale of Individuation

The picture that emerges from the table suggests that the ontological types form a scale

liquids/substances $<$ granular aggregates $<$ collective aggregates $<$ individual entities

This scale can be viewed as organized under the principle of individuation

Understanding the ordering of the scale

The poles of the scale are liquids/substances vs. individual entities

This opposition in turn corresponds to minimally and maximally individuated entities:

- **Liquids/substances**: minimal elements are continuous and not distinguishable: one does not interact with individual elements at all
- **Individual entities**: the inverse holds

This fundamental opposition appears early in child development (Soja et al. 1991).

Understanding the ordering of the scale

Granular aggregates have individuation properties similar to liquids and tend to pattern with them morphosyntactically:

- often have minimal elements (*a grain of sand*), which are small and not easily distinguishable; one does not canonically interact with them

Collective aggregates represent an intermediate category:

- the minimal elements are more accessible and are larger than for granular aggregates; interaction with their minimal elements is also more frequent.

Relating the scale to the morphosyntax

For a given language, entities are realized in the manner that their location on the individuation scale is realized in that language.

A particular ontological type can be assigned

- a unique morphosyntactic class (Dagaare liquids)
- or the same class as the type to its left, right, or both

Language	**liquids/ substances**	**granular aggregates**	**collective aggregates**	**individual entities**
Dagaare	0	0/Singulative (*–ruu*)	0/Singular (*–ri*)	0/Plural (*–ri*)
Welsh	0	0/Singulative (*–yn*)		0/Plural (*–od*)
English	0		0/Plural (*–s*)	

Relating the scale to the morphosyntax

The morphosyntactic classes respect the structure of the scale:

- no morphosyntactic class spans two individuation types that are not contiguous on the scale

Entities of a given ontological type may receive distinct treatments in different languages

Language	**liquids/ substances**	**granular aggregates**	**collective aggregates**	**individual entities**
Dagaare	0	0/Singulative (*–ruu*)	0/Singular (*–ri*)	0/Plural (*–ri*)
Welsh	0	0/Singulative (*–yn*)		0/Plural (*–od*)
English	0		0/Plural (*–s*)	

Things-in-the-world, ontological types and morphosyntactic classes

Recall the controversial question about the mass/count distinction:

- Are countability distinctions tied to lexical meaning of a noun?

And the challenges for a semantic account:

- Within-language variation:
  - *foliage* vs. *leaves*
- Across-language variation:
  - *hair* vs. *cheveux*
- Within-language variation across contexts (aka "Grinding" and "Packaging"):
  - *apples on the tree* vs. *apple in the salad*

Mapping between things-in-the-world, ontological types and morphosyntactic classes

The mapping between things-in-the-world, ontological types and morphosyntactic classes in a given language conforms to a picture as below:

$$\underbrace{\text{ont. type 1} < \overset{\llbracket\text{entity1}\rrbracket}{\text{ont. type 2}}}_{\text{Morphosyntactic Class 1}} < \underbrace{\text{ont. type 3} < \text{ont. type 4} < \overset{\llbracket\text{entity 2}\rrbracket}{\text{ont. type 5}}}_{\text{Morphosyntactic Class 2}}$$

Application: Within Language Variation

Key insight: a single slice of reality can be described in different ways in a given moment, but that doesn't mean that the descriptions are in all manners equivalent

Some nouns provide a holistic perspective on a co-occurring, contiguous and normally connected aggregate of things.

- *foliage* (compare *leaves*): the collectivity and the interconnectedness of leaves with one another rather than individual leaves

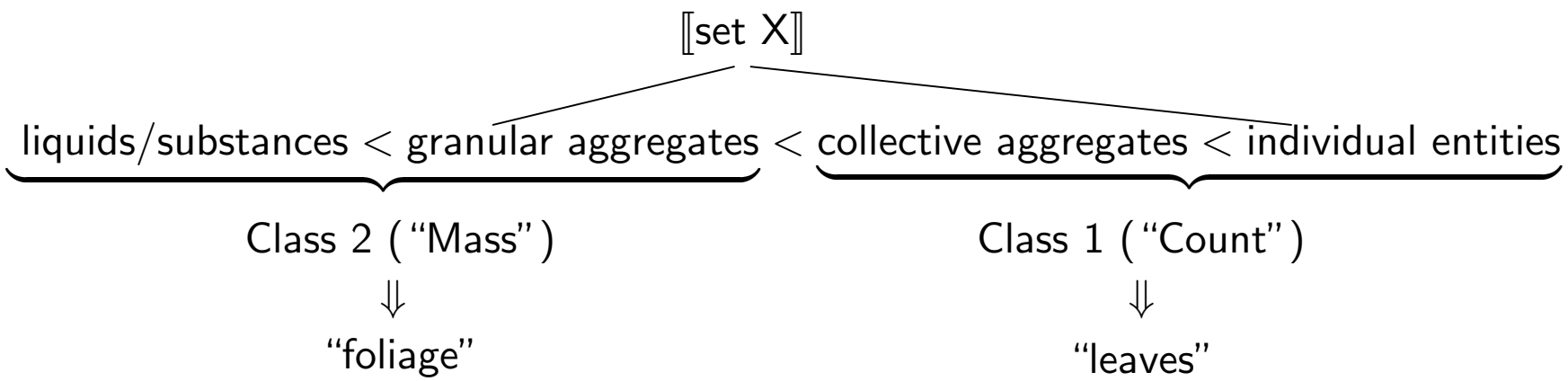
Further reflected in allowable adjective combinations:

- *dense foliage* / *?dense leaves*

Application: Within Language Variation

A set of entities which are referentially interchangeable in certain situations may be construed differently

- corresponding to distinct individuation types
- in turn, having distinct morphological classes



Application: Across Language Variation

An entity mapped to a given individuation type may have a different morphosyntactic realization

Language 1:

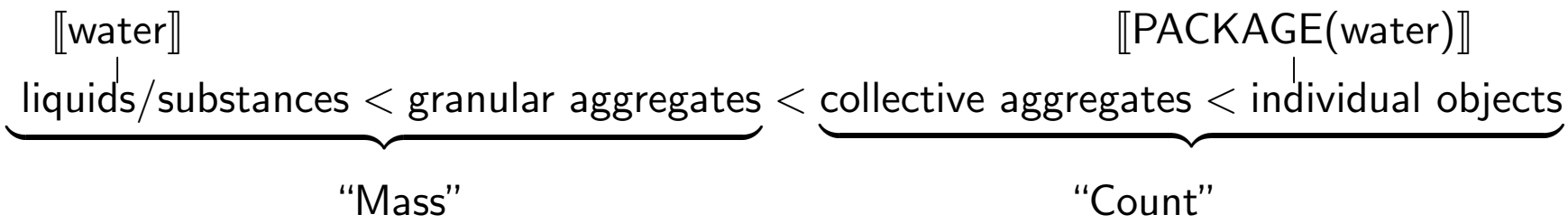
$$\underbrace{[\![\text{entity X}]\!] \mid \text{ont. type 1} < \text{ont. type 2}}_{\text{Morphosyntactic Class 1}} < \underbrace{\text{ont. type 3}}_{\text{Morphosyntactic Class 2}}$$

Language 2:

$$\underbrace{\text{ont. type 1}}_{\text{Morphosyntactic Class 1}} < \underbrace{[\![\text{entity X}]\!] \mid \text{ont. type 2} < \text{ont. type 3}}_{\text{Morphosyntactic Class 2}}$$

Application: Flexibility of Interpretation

Packaging can be seen as a function resulting in a shift in individuation type



Conclusion

Examining rich grammatical number systems such as that of Dagaare is not only intrinsically interesting, but helps to make generalizations about which ontological types are relevant for countability across languages

The larger typological picture sketched here recognizes three levels:

- things-in-the-world
- ontological
- morphosyntactic

Conclusion

Understanding the relation between the different levels:

- empirical challenges to the mass/count distinction
- the cross-linguistic diversity of mass/count-related morphosyntactic distinctions

Much further investigation of the empirical phenomena is needed!

Thank you

Thanks to Mark Ali, Adams Bodomo, J.A. Saanchi for discussion of Dagaare data and Arto Anttila, Jeff Good, Paul Kiparsky, Beth Levin, Uli Sauerland and The Stanford "Mass-Count Collective" of 2010 (David Clausen, Alex Djalali, Sven Lauer, Tania Rojas-Esponda and Beth Levin) for more discussion

I gratefully acknowledge the National Science Foundation (Grant No. 1023289) and the Stanford Center of African Studies for their generous support

Thanks to previous audiences at University of Toronto (Count-Mass Workshop), Universität Wien (Sinn und Bedeutung 14), Zentrum fur Allgemeine Sprachwissenschaft, the Department of African Studies at Humboldt University, Berlin, and the Universität Bochum (Workshop on Empirical, Theoretical and Computational Approaches to Countability in Natural Language)