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QUANTIFICATION AND THE NATURE OF CROSSLINGUISTIC VARIATION*

The standard analysis of quantification says that determiner quantifiers (such as *every*) take an NP predicate and create a generalized quantifier. The goal of this paper is to subject these beliefs to crosslinguistic scrutiny. I begin by showing that in St'át'imcets (Lillooet Salish), quantifiers always require sisters of argumental type, and the creation of a generalized quantifier from an NP predicate always proceeds in two steps rather than one. I then explicitly adopt the strong null hypothesis that the denotations of quantifiers should be crosslinguistically uniform. Since the Salish data cannot be captured by the usual analysis of English, I pursue the idea that English is reducible to the Salish pattern. Reanalysis of many English constructions is required. I argue that the reanalysis has advantages over the standard analysis for partitives, as well as for non-partitive *all-* and *most*-phrases, which I analyze as containing bare plurals of argumental type. Even where the new analysis faces some challenges (for example, with *every*), the attempt still leads to fruitful results. It forces us to view familiar constructions in a new light, and to redefine, I believe correctly, which quantificational constructions are 'basic' and which stand in need of further explanation.

1. INTRODUCTION

Determiner quantifiers, such as *every* or *most*, are standardly assumed to take common noun phrases (NPs) as their first argument. The NP corresponds to a one-place predicate, of type ⟨e, t⟩, and the resulting constituent denotes a generalized quantifier, of type ⟨⟨e, t⟩, t⟩. An example is given in (1).

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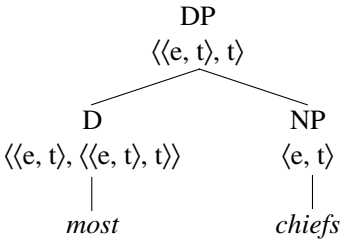
(1)



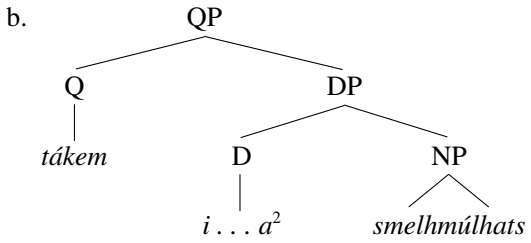
This analysis corresponds to what may be found in any introductory semantics textbook or standard reference on quantification. Some of the many authors who adopt these assumptions are Barwise and Cooper (1981: 162), van Benthem (1986: 5), Keenan and Stavi (1986: 259), Cooper (1987: 73), Chierchia and McConnell-Ginet (1990: 410), Partee, ter Meulen and Wall (1990: 374), Cann (1993: 164), von Fintel (1994: 2–3), Partee (1995: 544), Larson and Segal (1995: 276 (in a slightly different framework)), Keenan (1996: 42), Heim and Kratzer (1998: 146), and de Swart (1998: 172).[1]

However, there are many languages which lack the standard construction in (1). Examples include Straits (Salish; Jelinek 1995), Mohawk (Iroquoian; Baker 1995), Newari (Tibeto-Burman; Kölver 1978), Asurini de Trocará (Tupi-Guarani; Vieira 1995), and Tohono O'odham (Uto-Aztecan; Zepeda 1983). The language I will focus on in this paper is St'át'imcets (Salish; Matthewson 1998).

In St'át'imcets, constructions paralleling the typical English case are systematically ungrammatical. The structure of a generalized quantifier is always as illustrated in (2): a quantificational element appears as sister to a full DP containing an overt plural determiner. (See the Appendix for a list of abbreviations used in examples.)

(2) a. tákem [i smelhmúlhats-a]
all [DET.PL woman(PL)-DET]
'all the women'

[1] Barbara Partee points out (p.c.) that the analysis of quantification presented in textbooks represents only a basic approximation. This is true; however, the goal of this paper is to argue that the basic approximation presented in textbooks might need to be altered.



The goal of this paper is to investigate the consequences of these observations, both for the individual analyses of English and St'át'imcets and for a general theory of crosslinguistic variation. I will claim that the St'át'imcets facts invite us to submit our standard assumptions about English to closer scrutiny than they usually receive. I will propose a radical solution to the crosslinguistic variation between English and St'át'imcets. I will argue that the standard analysis is wrong, and that English is more like St'át'imcets than it at first appears.

1.1. *Overview of the Paper*

Section 2 presents the St'át'imcets data and my analysis of them. We will see that the St'át'imcets quantificational constructions are not amenable to the standard analysis as designed for English. In St'át'imcets, there is no single item (a 'determiner quantifier') which creates a generalized quantifier from an NP predicate. Rather, there are always two steps. The first is the creation of a DP of type e; the second involves quantification over parts of the plural individual denoted by the DP.

The remainder of the paper addresses the crosslinguistic issues which are raised by the St'át'imcets–English difference. I begin (in section 3) with a discussion of what the null hypothesis should be with respect to crosslinguistic variation in quantificational structures. I argue that the strongest hypothesis is one which maintains that there is no significant variation in the ways in which generalized quantifiers are constructed. The ideal situation would therefore be to find a unified analysis for English and St'át'imcets quantifiers, in spite of surface evidence to the contrary. The aim will be to see how far this null hypothesis can be pushed.

Since the St'át'imcets constructions are not capturable within the standard analysis of English, I propose that we reconsider the standard analysis.

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[2] This determiner consists of two discontinuous parts, a proclitic which encodes deictic and number information, and an enclitic . . . *a* which attaches to the first lexical item in the phrase. See Matthewson (1998) for details.

The idea I will pursue is that English is a disguised version of St'át'imcets, and that in both languages, quantifiers expect a sister of type e, not of type ⟨e, t⟩.

In section 4 I discuss the English partitive construction and argue that *of* is semantically vacuous. We then have a structure directly paralleling the canonical St'át'imcets structure. Section 5 discusses non-partitive phrases containing *all* and *most*; I argue that these contain bare plurals of argumental type. For each of these cases, I show that my revised analysis has some English-internal empirical advantages. I also discuss learnability issues. The different surface properties of English and St'át'imcets can be accounted for in terms of an easily learnable difference between the languages. Conversely, I argue that if English is analyzed according to the standard analysis, learnability problems arise.

In section 6 I discuss a potentially problematic case for the null hypothesis, namely English *every*. I argue that even if *every* cannot be analyzed in a way paralleling St'át'imcets quantifiers, this is not a disappointment, because it leads to interesting consequences. Looking at quantification from the new perspective advocated in this paper means that things we thought were problems or exceptions (St'át'imcets in general, the English partitive) become unproblematic, while things we thought were simple (English *every*) become tricky. Indeed, it turns out that many authors have already suspected that there is more to the analysis of *every* than the standard view would predict. I conclude by outlining some further predictions for learnability and acquisition which result from the current proposal, and by making brief comments about the quantifiers which are not discussed in this paper.

2. Quantification in St'át'imcets

St'át'imcets (šx̌áx̌imxəč; a.k.a. Lillooet) is a Northern Interior Salish language spoken in the southwest interior of British Columbia, Canada. The language is endangered; almost all fluent speakers are over the age of 60. Example sentences come from fieldwork unless otherwise noted, and are presented in the practical orthography of the language created by Jan van Eijk (see the Appendix for a key).

2.1. *DPs in St'át'imcets: Relevant Basic Facts*

This subsection contains some basic facts about how argumental phrases are constructed in St'át'imcets, which will be relevant for the discussion to follow.

All argumental phrases in St'át'imcets require the presence of an overt determiner. This is illustrated in (3–5); omission of the D from any of the arguments results in ungrammaticality. (The category label 'D' is not crucial. What will be important is that the overt elements in the set I am calling 'D' are in an exceptionless one-to-one correspondence with argumenthood.)

(3) a. q'wez-ílc [**ti** smúlhats-**a**]
dance-INTR [**DET** woman-**DET**]
'The/a woman danced.'

b.* q'wez-ílc [smúlhats]
dance-INTR [woman]

(4) a. léxlex [**i** smelhmúlhats-**a**]
intelligent [**DET** woman(PL)-**DET**]
'The/some women are intelligent.'

b.* léxlex [smelhmúlhats]
intelligent [woman(PL)]

(5) a. wa7 ts'aqw-an'-ítas [**i** t'éc-**a**] [**i** míxalh-**a**]
PROG eat-TR-3PL.ERG [**DET.PL** sweet-**DET**] [**DET** bear-**DET**]
'The/some bears eat honey.'

b.* wa7 ts'aqw-an'-ítas [t'ec] [i míxalh-a]
PROG eat-TR-3PL.ERG [sweet] [DET.PL bear-DET]

Determiners are obligatorily absent on all main predicates, as shown in (6). Examples (6a, b) show that a nominal predicate such as *kúkwpi7* 'chief' obligatorily lacks a D. (6c) illustrates how equational sentences are expressed; the predicate in (6c) is the focus marker *nilh.*

(6) a. kúkwpi7 [kw-s Rose]
chief [DET-NOM Rose]
'Rose is a chief.'

b.* [**ti** kúkwpi7-**a**] [kw-s Rose]
[**DET** chief-**DET**] [DET-NOM Rose]
'Rose is a/the chief.'

c. nilh s-Rose [ti kúkwpi7-a]
FOC NOM-Rose [DET chief-DET]
'It is Rose who is the chief.'

The evidence so far indicates that in St'át'imcets, arguments are categorially DPs, while nominal predicates are categorially NPs.[3]

2.2. *The Syntax of Quantification in St'át'imcets*

In the discussion to follow I concentrate for reasons of space on strong quantifiers, which in St'át'imcets comprise the universal quantifier *tákem* 'all' and the distributive universal quantifier *zí7zeg'* 'each'. Examples will sometimes be given containing weak quantifiers.

Quantifiers which appear inside arguments always co-occur with determiners. Examples are given in (7).[4]

(7) a. léxlex [**tákem** **i** smelhmúlhats-**a**]
intelligent [**all** **DET.PL** woman(PL)-**DET**]
'All (of the) women are intelligent.'

b. úm'-en-lhkan [**zí7zeg'** **i** sk'wemk'úk'wm'it-**a**]
give-TR-1SG.SUBJ [**each** **DET.PL** child(PL)-**DET**]
[ku kándi]
[DET candy]
'I gave each of the children candy.'

c. [**cw7it** **i** smelhmúlhats-**a**] léxlex
[**many** **DET.PL** woman(PL)-**DET**] intelligent
'Many of the women are intelligent.'

Arguments crucially cannot be of the form [Q NP], as shown in (8). Example (8b) shows that the quantifier *zí7zeg'*, which allows either a singular or a plural range, is ungrammatical with either a singular or a plural noun, if no D is present. (See also Jelinek (1995), who was the first to discuss the absence of the [Q NP] construction in Salish.)

(8) a.* léxlex [**tákem** smelhmúlhats]
intelligent [**all** woman(PL)]
'All women are intelligent.'

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[3] This corresponds directly to the predictions of Higginbotham (1985), Stowell (1989), Longobardi (1994), among others, and fits in very well with what I called the standard analysis above. In terms of Chierchia's (1998) system, this makes St'át'imcets an NP-Predicate language similar to French.

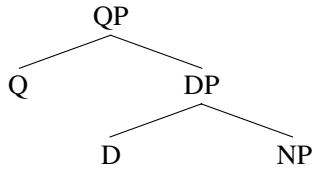
[4] Word order can be ignored throughout; there is some freedom of positioning for quantified phrases, but it does not affect the interpretation. See Matthewson (1998), Davis (1999).

b.* úm'-en-lhkan [**zí7zeg'** sk'úk'wm'it/sk'wemk'úk'wm'it]
give-TR-1SG.SUBS [**each** child/child(PL)]
[ku kándi]
[DET candy]
'I gave each child/each (of the) children candy.'

c.* [**cw7it** smelhmúlhats] léxlex
[**many** woman(PL)] intelligent
'Many women are intelligent.'

The syntactic structure I adopt for the quantificational phrases is as in (9). The quantifier takes a DP sister to form a larger constituent; see Demirdache et al. (1994), Matthewson and Davis (1995), and Matthewson (1998) for supporting argumentation.[5]

(9)



2.3. *The Semantics of Determiners and Quantifiers in St'át'imcets*

Now we have a structure which our semantics needs to interpret, namely (9). Beginning with the NP, there is no reason to doubt the standard assumption that NPs denote predicates of type ⟨e, t⟩. NPs function as one-place predicates in sentences such as (10) (see also (6a) above).

(10) nk'yap [ti t'ák-a]
coyote [DET go-DET]
'The one going along is a coyote.'

The entire quantificational phrase in St'át'imcets corresponds to a gener-

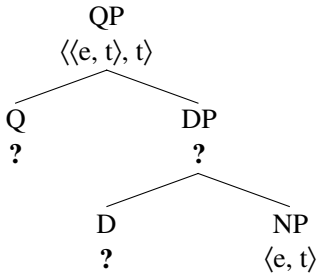
[5] There is one construction not discussed here in which strong quantifiers may appear; this is shown in (i). The quantifier still co-occurs with a determiner, but the order of Q and D is reversed.

(i) qwatsáts [i tákem-a smúlhats]
leave [DET.PL all-DET woman]
'All the women left.'

Analysis of this construction goes beyond the bounds of this paper. See Matthewson (1998) for details of the syntactic behaviors of both strong and weak quantifiers in St'át'imcets.

alized quantifier, as argued in detail in Matthewson (1998). This gives us the situation in (11), with question marks indicating what we still need to find out about the semantic types.

(11)



Recall that in the standard theory which accounts for English, determiner quantifiers take an argument of type ⟨e, t⟩, and create a generalized quantifier. This is clearly not the case in St'át'imcets. There are two steps involved in the transformation from an NP predicate to a generalized quantifier. Moreover, the Q takes a DP, not an NP, as its sister. Recall that DPs never function as predicates in St'át'imcets. This is shown in (12), repeated from (6c) above.

(12) * [ti kúkwpi7-a] [kw-s Rose]
[DET chief-DET] [DET-NOM Rose]
'Rose is a/the chief.'

The conclusion is that quantifiers in St'át'imcets combine with sisters of argumental type. The next question is, what is the analysis of these DP sisters?

I have argued previously (Matthewson 1999) that a subset of St'át'imcets determiners, including all determiners which combine with quantifiers, necessarily introduce variables over choice functions (see Reinhart 1995, 1997; Winter 1997; Kratzer 1998; among many others). Thus, these determiners apply to NPs of type ⟨e, t⟩ and choose one (singular or plural) individual from the set denoted by the NP predicate. DPs containing these determiners are therefore of type e. A simple example is given in (13).

(13) a. q'wez-ílc [ti smúlhats-a]
dance-INTR [DET woman-DET]
'A woman danced.'

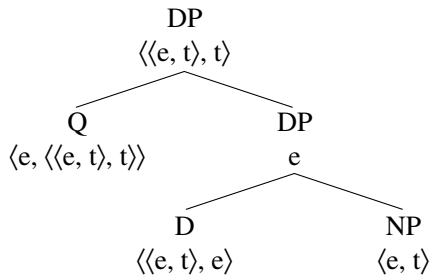
b. danced (f(woman))

c. Paraphrase: The woman who is chosen from the set of women by the contextually salient function f danced.

In (13b), f is a variable over choice functions. It remains free and receives a value from the context, as in Kratzer (1998).[6]

According to this analysis, DPs in St'át'imcets denote singular or plural individuals (on plural individuals, see Link 1983, among many others), and quantifiers must be taking individual-denoting phrases as their first argument. The quantifiers quantify over parts of the individual denoted by their sister DP. We can thus fill in the question marks as follows:

(14)



The lexical entries which go along with this analysis are given and discussed in (15–19).

(15) Nouns:
smúlhats 'woman':
[[*smúlhats*]] = $\lambda x \in D_e$. x is a woman

(16) Plural (pluralization operator; Link 1983):
smelhmúlhats 'women':
[[*smelhmúlhats*]] = [[*]] ([[*smúlhats*]])

(17) [[*]] is that function from $D_{\langle et \rangle}$ into $D_{\langle et \rangle}$ such that, for any $f \in D_{\langle et \rangle}$, $x \in D_e$: [*(f)](x) = 1 iff [f(x) ≠ 1 & $\exists y \exists z$ [x = y$\oplus$z & [*(f)](y) = 1 & [*(f)](z) = 1]]

The pluralization operator * takes any one-place predicate over individuals f, and returns all the plural individuals composed of members of the extension of f. $\oplus$ is a mereological sum operator. (I assume that the domain forms a complete join semi-lattice; see Link 1983.)[7]

Plural morphology is not obligatory on the surface, and some nouns do

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[6] In Matthewson (1999), I argued for a widest-scope existential closure analysis. It turns out that a free-variable analysis is required, at least as an option, once quantificational constructions are taken into consideration. See Matthewson (2000) for some discussion.

[7] The issue of whether singular individuals should be included in the extension of plural predicates (as in Schwarzschild 1991, 1996), or excluded (as in Hoeksema 1983; Chierchia 1995, 1998), is not crucial here.

not have a plural form which differs from their singular form. I assume that the * operator is the denotation of an abstract plural feature (which may, for example, sit in the head of a Number Phrase). The singular Number feature is vacuous.

(18) Determiners:
$[[X\ .\ .\ .\ a_k]]^g = \lambda f \in D_{\langle et \rangle}\ .\ (g(k))(f)$

Determiners combine with a predicate and return one of the individuals which satisfy the predicate. The index on the determiner specifies which choice function will be used; g is an assignment function, from indices to choice functions. Thus, g(k) is a choice function of type $\langle\langle e, t\rangle, e\rangle$.

A determiner which attaches to a singular predicate is pronounced *ti . . . a*, while a determiner which attaches to a pluralized predicate is pronounced *i . . . a*.

(19) Distributive universal quantifier:
$[[zí7zeg']] = \lambda x \in D_e\ .\ \lambda f \in D_{\langle et \rangle}\ .\ \forall y \leq x\ [atom(y) \rightarrow f(y) = 1]$

The quantifier *zí7zeg'* takes an individual and a predicate, and specifies that every atomic subpart of that plural individual satisfies the predicate.

Putting everything together, the sentence in (20a) ends up with the meaning paraphrased in (20b).

(20) a. [zí7zeg' i smelhmúlhats-a] qwatsáts
[all DET.PL woman(PL)-DET] leave

'Each woman left.'

b. $[[zí7zeg'\ i_k\ smelhmúlhatsa\ qwatsáts]]^g = 1$ iff for all y which are atomic parts of the plural individual composed of women chosen by the choice function g(k), y left.

For the purposes of the crosslinguistic discussion to follow, the crucial point to be drawn from this section is that the creation of a generalized quantifier in St'át'imcets proceeds in two steps, so that the quantifier's first argument is of type e rather than $\langle e, t\rangle$. The fact that St'át'imcets determiners seem to require a choice function analysis is orthogonal to the main claims of this paper (for example, I could have used an iota analysis instead without materially affecting the discussion). When we turn in Section 4 to a reanalysis of English along St'át'imcets lines, I will therefore not be claiming that a choice function analysis of English definite determiners is required.

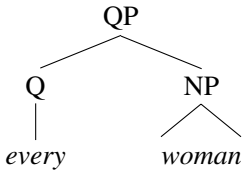
Summarizing the results so far, we have seen that in St'át'imcets, the creation of a generalized quantifier cannot be analyzed in a way paral-

leling the standard analysis of English. In St'át'imcets, the creation of a generalized quantifier always proceeds in two steps rather than one. First, a determiner creates a phrase of argumental type (type e); second, a quantifier quantifies over parts of the individual denoted by the DP.

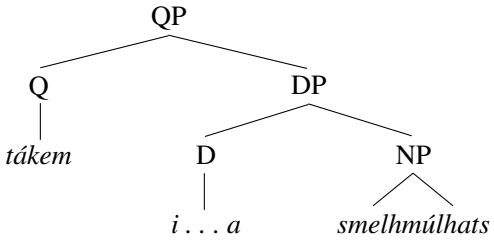
3. How to Deal with Variation

The crosslinguistic difference we are dealing with is summarized in (21). The typical English construction in (21a) is unavailable in St'át'imcets.

(21) a. English:



b. St'át'imcets:



Variation of this sort means that there is no uniformity of semantic type for quantifiers across languages. Moreover, we have no explanation for why the canonical English construction in (21a) should be unavailable in St'át'imcets. The problem to be addressed in the remainder of the paper is how to reconcile the behavior of quantifiers in these two languages. In order to do that, I need to first address the conceptual issue of what our null hypothesis with respect to variation should be.

I would like to contrast two possible approaches to crosslinguistic variation, which I will call the 'transparent mapping' hypothesis and the 'no variation' hypothesis. According to the first view, the null hypothesis is that in each language, the semantics transparently reflects the surface syntax (Barbara Partee, p.c.; see also Partee 1995 for some discussion). Since there is no requirement that all languages share the same semantics, this view allows for a wide range of semantic variation. For example, this view happily accommodates the possibility that there are languages which lack

DP-generalized quantifiers and possess only A-type quantification (see also Jelinek 1995).

One advantage of the transparent mapping approach is that it frees us from an anglo-centric view of the world. The transparent mapping approach does not necessarily lead us to expect that the structure in (21a) will appear in languages other than English. We can approach each new language with the intent of discovering what ways it has of expressing quantificational notions, and we will not be tempted to force languages whose syntax differs from that of English to look like English in the semantic component.

According to a pure version of the transparent mapping hypothesis, the limits on variation are set by the syntax, and semantic differences result from syntactic differences. Examples of semantic differences deriving from syntactic differences can be found in the work of Jelinek (1995) and Baker (1995). Jelinek and Baker both propose (morpho-)syntactic parameters which as one of their consequences derive the absence of English-like quantificational structures, in Straits Salish and Mohawk respectively.

The second way of thinking about semantic variation adopts the null hypothesis that there is no crosslinguistic variation in the semantics. According to this view, there are certain fundamental semantic structures or properties which all languages should share; which exactly these are is of course the interesting question. An example of work in this spirit is Barwise and Cooper (1981). Barwise and Cooper propose a set of language universals, including for example the Determiner Universal:

(22) *Determiner Universal:*
Every natural language contains basic expressions (called *determiners*) whose semantic function is to assign to common noun denotations (i.e., *sets*) A a quantifier that lives on A (Barwise and Cooper 1981: 179).

We have already seen evidence from St'át'imcets that Barwise and Cooper's Determiner Universal is false. However, this does not mean that we should abandon the search for underlying similarities between languages in how quantification is expressed. On the contrary, I believe that the no-variation null hypothesis is the one we should adopt.

The primary advantage of the no-variation null hypothesis is its strength. It is more restrictive than the transparent mapping hypothesis because it subsumes the latter's requirements. We too will require, for each language, a plausible analysis which posits abstractness only when this is well motivated. However, we will not be satisfied with having good individual analyses for each language. We will not even be satisfied with a taxonomy of different, well-analyzed constructions in the world's languages. Rather,

if the individual analyses differ from each other in major ways, we will be forced to ask why.

Since the no-variation hypothesis is so strong, it is easy to find apparent or real counterexamples to it. What do we do when faced with cross-linguistic variation? In my own earlier work on the Salish quantification problem (Matthewson 1998), I searched for independent reasons why the canonical English construction in (21a) is unavailable in Salish languages. I claimed that English and Salish exemplify opposite settings of a parameter dealing with possible determiner denotations. One of the consequences of the Salish setting of the parameter is that quantificational elements are barred from occupying the D position. Hence, quantifiers have no option but to appear as sisters to an entire DP.

Parametric solutions weaken the null hypothesis. For example, the parameter proposed in Matthewson (1998) weakens the null hypothesis that languages do not vary in matters as fundamental as the presence or absence of determiner quantification. This does not mean that parametric solutions are wrong, but rather that they must be argued for on the basis of considerable empirical advantages. (This illustrates the strength of the no-variation hypothesis; it forces us to justify claims about variation.) An example of this situation is Chierchia's (1998) work on the semantics of nouns. Chierchia (1998) adheres to a fairly strict version of the no-variation null hypothesis (see pp. 399–402), yet he still proposes that the denotation of nouns is subject to parametric variation. He argues for his parameter by claiming that it derives a range of facts and typological correlations which are unexplained otherwise.

In this paper I would like to pursue the null hypothesis even further when analyzing English and St'át'imcets quantificational structures: I want to see what happens if we try to find a common analysis for both languages. Since we have seen that the St'át'imcets system is not reducible to the standard analysis of English, I propose taking the opposite tack. Let us use the St'át'imcets facts as an invitation to re-examine English. Let us explore the possibility that the standard analysis is wrong, and that English is more like St'át'imcets than it at first appears.

This line of inquiry will illustrate another advantage of the no-variation methodology. When we combine it with data from languages which look very different from English, we will often be forced to subject basic assumptions to closer scrutiny. We may then discover that the standard analysis of English was not correct even for English.

To conclude this subsection, I would like to point out that some form of the no-variation hypothesis is implicitly assumed by many researchers. For example, Barwise and Cooper's Determiner Universal is very often

implicitly assumed; the existence of the analysis of English quantification summarized in (21a) is regarded as sufficient motivation for the expectation that other languages will also possess this type of quantificational configuration.

In this connection, a reviewer claims that the prevailing view in crosslinguistic research in the past ten years has been that languages may differ in the way meaning is encoded lexically and structurally. It is true that crosslinguistic researchers recognize that languages vary in their semantics. However, I believe that the prevailing view adheres to the no-variation *null hypothesis*, even if this is rarely explicitly stated. My experience in presenting Salish data to semanticists has been that I am asked to explain why Salish differs from what we *expect* (what we expect being, almost always, what we already know English is like). Therefore, the main difference between the prevailing view and the view I am advocating here is not in the null hypothesis, but only in perspective (which language is taken as the 'starting point').

3.1. *A Proposal to Reanalyze English*

The idea to be explored in the rest of this paper is as follows. Assume that in both St'át'imcets and English, quantifiers expect their first argument to be of type e, rather than of type ⟨e, t⟩. In the usual case (with count nouns), this will have the consequence that getting from an NP predicate to a generalized quantifier involves two steps. We will call the two steps D and Q. The function of D is to 'narrow down' the domain of the quantifier from the original set provided by the NP to an individual corresponding to a subset thereof. The function of Q is to quantify over elements in that narrowed down domain. (See section 5 below for discussion of mass nouns.)

For English, which superficially looks quite unlike St'át'imcets, reanalysis of various familiar phenomena will be required. We have seen that it is not possible to analyze St'át'imcets according to the standard analysis of English. If we are following the null hypothesis, then reexamining what we thought we knew about English is our only option.

In later sections I will examine in turn the English partitive construction (section 4), phrases of the form '*all* NP' and '*most* NP' (section 5), and *every*-phrases (section 6). But first, I will briefly discuss some conceptual overlap between my proposal and other work which involves a two-step process in the creation of generalized quantifiers. This work relates to domain restrictions.

3.1.1. *Domain Restrictions*

In my summary above of the standard analysis of English, I made the simplifying assumption that the first argument of a quantifier is provided by its NP, and that the quantifier quantifies over the entire set denoted by that NP. However, it has been noted by many people that the domain of a quantifier is actually contextually restricted. This general idea is hundreds of years old; see discussion and references provided in Kratzer (1978: 229–230). See also Westerstahl (1984), Neale (1990), Lewis (1973, 1986), Barwise and Perry (1983), among many others. Here, I will concentrate on one recent analysis of domain restrictions, that of von Fintel (1994).

Consider the following example. The scenario is that the speaker is relating the experiences of last night when a group of people went out for pizza.

(23) Everyone had a good time. (von Fintel 1994: 28)

Von Fintel argues (1994: 29) that "what is said by [23] is literally the narrower claim that every member of the group last night had a great time. . . . The contextually calculated restriction to members of our group is part of the truth-conditions." He argues that each quantified phrase must have its own domain restriction (i.e., a global domain restriction will not work), and proposes that "the context-dependency is located in each determiner itself. . . . The locality of the contextual restriction is captured by interpreting the determiner relative to a contextually supplied set which is intersected with the common noun argument" (1994: 30).

Von Fintel's theory involves a two-step process in the creation of a generalized quantifier. The semantics of a quantifier like *every* is redefined, so that it first intersects the set denoted by its NP sister with another contextually-determined set, provided by a Resource Domain Variable. The quantifier then takes the resulting 'narrowed down' domain as its first argument, rather than the entire set denoted by its NP sister.

There is a clear conceptual similarity between von Fintel's proposal and mine; both involve a two-step process in the creation of a generalized quantifier. However, the two approaches involve different implementations (a resource domain variable which is a phonologically null predicate vs. a determiner which narrows the domain and also converts the NP predicate into an argumental type). My claim is that St'át'imcets provides us with overt evidence about the nature and the position of the domain restriction of quantifiers. According to my analysis, domain restriction is done by a non-quantificational determiner, which attaches before the quantificational element. My proposal will also unify the domain restric-

tion present in ordinary quantification with the function of the overt definite determiner inside partitives.[8, 9]

In the next section I begin my attempt to assign a common analysis to English and St'át'imcets quantificational structures.

4. The Partitive Construction

The partitive construction, illustrated in (24), poses an English-internal challenge for the standard analysis of quantifiers. In the partitive construction, quantifiers which otherwise combine directly with NPs instead combine with '*of the* NP'. '*Of the* NP' is a constituent which is not obviously of type ⟨e, t⟩.

(24) Most/many/some/three/few/all/both **of the** chiefs spoke.

We would ideally like quantifiers to have the same denotation in all syntactic environments, yet in the partitive it is not clear that the quantifier is combining with a one-place-predicate-denoting sister. The problem is described by Ladusaw (1982: 232–233):

> Quantifier determiners like *some* and *every* denote functions which take sets as their arguments. . . . Assuming that quantifier determiners have the same denotations in Partitive NPs as they do in simple NPs, we are faced with a technical question: how can the family of sets that the Partitive Phrase NP denotes be reduced to an appropriate argument for the determiner, a set?[10]

Ladusaw's solution, which builds on that of Barwise and Cooper (1981), is to say that partitive *of* ensures that the Q receives the right type of input. It works as follows.[11]

First, the DP inside the partitive must denote an individual, where 'individuals' are defined as the principal filters generated by atoms:

(25) For atoms x of the set of possible CN denotations, I_x (the individual generated by x) is $\{p \in D_{CN}: x \subseteq p\}$.

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[8] Recently, von Fintel has also proposed unifying resource domain variables with choice function determiners; see for example handouts from lectures given in Prague, 1998.

[9] Barwise and Perry (1983) present a situation-based analysis of domain restrictions, whereby the determiner itself is not involved in the contextual restriction of the domain. See Percus (1998) for a possible way of unifying a situation-based approach with the proposal that the determiner is responsible.

[10] Within a single language, as well as crosslinguistically, we can contrast a 'transparent mapping' approach with a 'no variation' approach. This extract from Ladusaw indicates that he adheres to the 'no variation' methodology.

[11] See also Hoeksema (1984), which is similar in some respects, and Barker (1998). Barker's analysis of partitives involves a minimal alteration to Ladusaw's analysis, proposed to account for anti-uniqueness effects.

For example, the name *John* denotes the individual I_j, which is the set of all sets which contain the atom {j}. Singular definites such as *the woman* similarly denote individuals in models where their presuppositions are met. For plurals, Ladusaw utilizes the notion of a 'group' – a non-empty, non-singleton set of entities. Groups, just like ordinary atoms, can be the generators of (group-level) individuals. For example, the phrase *John and Mary* denotes the individual which is the set of all sets containing the group consisting of John and Mary. *The women* denotes the set of all sets containing the unique contextually relevant group of women.

Partitive *of* then converts the group-level individual denoted by the DP into a set. In (26), g is a 'consists of' function which takes any group-level individual and returns the set of atoms corresponding to the generator of the principal filter. *Of the women* is thus the same type of object as the NP *women*, but instead of denoting the set of all women, it denotes the set of all contextually relevant women.

(26) [[*of* NP]] = g(a) if [[NP]] = I_a, undefined otherwise.

Ladusaw's analysis of *of*, like Barwise and Cooper's forerunner of it, is designed to ensure that the quantifier receives an input of type ⟨e, t⟩. This allows the denotation of quantifiers to remain uniform, a desirable result. Ladusaw himself notes, however (p. 239), that there is no independent explanation for *why* the 'consists of' function g should be necessary.

Here is an alternative view. Suppose we reject the assumption that the [Q NP] structure is "basic" in the sense that it reveals the true nature of quantifiers. We thus reject the assumption that partitives should be assimilated to the non-partitive construction. Based on observations about St'át'imcets, let us assume that quantifiers actually *prefer* to receive an input which has already been operated on by a determiner. Then, all that needs to be said about English partitives is that *of* is semantically vacuous.

Once *of* is semantically vacuous, we have a structure which directly parallels the St'át'imcets structure. We can assume that the definite DP denotes a plural individual (of type e) and the quantifier will quantify over parts of that individual. Once we allow quantifiers to take sisters of type e, we don't need to include Ladusaw's 'consists of' function.[12]

The semantic vacuity proposal raises the question of why the *of* is there at all. An obvious possibility is that it is there for Case reasons. This is

[12] The fact that in my approach, the definite DP denotes an individual of type e, while in Ladusaw's, it denotes an 'individual' (a kind of generalized quantifier), is not an important difference. Ladusaw's approach stems from a Montague Grammar tradition in which all noun phrases **must** denote generalized quantifiers.

supported by the fact that *of* performs a Case-assigning function in other constructions (e.g., *destruction **of** the city*; see Chomsky 1986, among many others). Partitive-internal support for the claim that a Case requirement is involved comes from German (Angelika Kratzer, p.c.). In German, there are partitives containing the dative-inducing preposition *von* 'from', which require dative case on the definite determiner, but there are also partitives which lack *von*, and in these, genitive case is required. The claim that case is what requires *of* to appear correlates well with the fact that St'át'imcets, which lacks an *of*-like element in partitives, lacks overt case marking.[13]

An interesting issue is raised by some cases in which *of* is optional in English:

(27) a. all (of) the women
b. both (of) the women
c. half (of) the women

Neither the semantic vacuity analysis nor Ladusaw's analysis have obvious answers to why *of* should be optional here. The vacuity analysis is supported by the observation that there does not seem to be any meaning difference between the *of* versions and the *of*-less versions;[14] however, the question of why *of* is allowed to be optional only for these quantifiers is unexplained. Under Ladusaw's analysis, the *of*-less versions would have to contain a null element which performs the same function as overt *of*; it is unclear why other quantifiers do not allow the null version of *of*.

The fact that *all* and *both* allow *of* to drop could actually be encouraging for the 'contentful *of*' theory, in light of recent work by Brisson (1998). Brisson argues that *all* and *both* are not true quantifiers, but rather modifiers which make an adjustment to the meaning of a definite DP. Since *all* and *both* are merely modifiers, they do not require inputs of type ⟨e, t⟩, unlike the true quantifiers. Brisson in fact claims that the *of* in *all-* and *both*-phrases is there, optionally, merely by analogy with other partitive constructions (1998: 21).

Very briefly, Brisson's account works as follows. Sentences containing definite plural DPs are analyzed as in (28). Cov_k is a contextually-speci-

[13] There is also diachronic evidence that a case requirement was involved in English partitive constructions, and that the *of* came in when morphological case agreement was lost (Barbara Partee, p.c.).

[14] Reed (1996: 165) notes that "there is general agreement in the literature that such expressions are interpreted identically, e.g. *both the boys* is equivalent to *both of the boys* (Hogg 1977; Westerstahl 1984)."

fied cover of the universe of discourse. All elements of Cov_k which are also subsets of the denotation of *the boys* have to satisfy the predicate *hungry*.[15]

(28) a. The boys are hungry.
b. $\forall x\ [x \in [[Cov_k]] \ \& \ x \subseteq [[\text{the.boys'}]] \rightarrow x \in [[\text{hungry'}]]$

If a value for Cov_k is chosen in which one of the boys appears in the same subset as a non-boy, the prediction is that that boy will not have to be hungry. This accounts for the fact that definite plurals allow exceptions; (28a) can be judged true even if not all of the boys are hungry.

When *all* attaches to a definite subject DP, its effect is to ensure that such 'ill-fitting' covers are ruled out. When *all* is present, the only covers under consideration are those in which every boy appears in a subset consisting only of boys. Thus, the formula in (28b) also provides the truth conditions for *All the boys are hungry*, but in this case, no exceptions are allowed.

Brisson's claim that *all* and *both* are not true quantifiers accounts for the fact that they can float, while true quantifiers such as *every* or *most* cannot float. As mentioned above, it also correctly predicts that *all* and *both* allow *of* to be dropped. Work by Zamparelli (1998) is also relevant here. Zamparelli argues, partly on the basis of Italian facts, that phrases like *all of the boys* are not 'true' partitives, but instead are instances of a related construction, where *all* functions as a VP modifier.

I do not have the space here to enter into detailed discussion of Brisson's or Zamparelli's proposals. I shall merely note that *of* is optional also with *half*, which does not float and presumably would not fall into the modifier category with *all* and *both*.[16] My intuition is that the presence or absence of *of* in (27a–c) (as well as elsewhere) is a fairly superficial fact, and that

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[15] For any set A, C is a cover of A iff:

i. C is a set of subsets of A.
ii. Every member of A belongs to some set in C.
iii. Ø is not in C. (Schwarzschild 1996: 69)

See work by Schwarzschild (1991, 1996) on plurals, on whose ideas Brisson draws.

[16] There is a possible contrast between *half the NP* and *half of the NP*. Compare the dialogues in (i) and (ii):

(i)	A: Half the suits were sold.	B: Which half?	* A: The jackets.
(ii)	A: Half of the suits were sold.	B: Which half?	? A: The jackets.

I find (ii) to be fairly marginal (or joking). However, there is a slight contrast which deserves further investigation. Thanks to Henry Davis and Marcin Morzycki (p.c.) for discussion of *half* (*of*).

the fact that *of* is droppable is consistent with the vacuity hypothesis.[17] In the remainder of this subsection I shall point out some empirical and conceptual problems for the 'contentful *of*' theory.

The 'contentful *of*' theory as it stands mistakenly generates ungrammatical partitive constructions. If *of* turns a definite DP into a set-denoting predicate, we predict that any set-taking D or Q could appear "upstairs" in a partitive, which is incorrect (this is pointed out by Hoeksema 1996: 8). For example, why are the constructions in (29) bad?

(29) a.* the of the women
b.* these of the women
c.* every of the women

As Hoeksema correctly points out, this is mainly a syntactic problem for Ladusaw's theory. We could account for (29) by saying that while semantically, '*of the* NP' and a plain NP are of the same type, syntactically they differ. Then we could add a requirement that quantifiers and determiners be sensitive to the syntactic, as well as the semantic, category of their sister. Items such as *most* or *many* are allowed to take arguments which are PPs, while *the* or *every* cannot.

This syntactic solution cannot be extended to account for St'át'imcets, however. In this language, quantifiers appear to take individual-denoting sisters directly as arguments. In order to keep the general semantic properties of quantifiers constant across languages, the contentful-*of* theory would have to say that in St'át'imcets, there is a null version of 'of' in every quantified phrase. Apart from the fact that this raises the question of why *of* must be overt in English but may be null in St'át'imcets, it leaves the core fact unexplained that quantifiers cannot directly combine with one-place predicates in St'át'imcets. If (30a) is good, showing that *tákem* 'all' can take an input of type ⟨e, t⟩, then why is (30b) bad? Similarly, if (30c) is good, why is (30d) bad?

(30) a. tákem **Ø** i smelhmúlhats-a
all **of** DET.PL woman(PL)-DET
'all of the women'

b.* tákem smelhmúlhats
all woman(PL)
'all women'

[17] There are other quirks in the *of* data. For example, a reviewer asks why **most of women* is bad, while another reviewer asks why **many of women* is bad but *lots of women* requires the *of*. I have nothing insightful to say about these wrinkles at this stage.

c. cw7it **Ø** i smelhmúlhats-a
many **of** DET.PL woman(PL)-DET
'many of the women'

d.* cw7it smelhmúlhats
many woman(PL)
'many women'

This problem cannot be solved by the syntactic solution discussed immediately above. The only thing one could say is that quantifiers such as *tákem* and *cw7it* necessarily take arguments which are categorially PPs. But this is just a re-statement of the fact that (30b) and (30d) are bad.[18]

The basic point here is that Ladusaw's theory makes '*of the* NP' semantically parallel to a plain NP. At the level where the upstairs Q attaches, the only way to distinguish the two types of phrase is syntactically. For the cases where *of-the*-phrases differ from plain NPs, the only solution is syntactic stipulation.

According to my proposal, on the other hand, quantifiers and determiners differ from each other semantically. Determiners such as *the* or *these* take one-place predicates as their arguments; this accounts for (29a, b). Quantifiers, on the other hand, take individual-denoting DPs as their arguments. (30b) and (30d) are bad because *tákem* and *cw7it* are quantifiers. For discussion of why quantifiers can appear to attach to plain NPs in English (as in *all women*), see section 5 below. For discussion of *every* and its restricted use, shown in (29c), see section 6.

To summarize, in this section we have seen that if quantifiers are to have a uniform denotation, both language-internally and crosslinguistically, there are two possible approaches to take. The first is to claim that partitive *of* converts a generalized quantifier into a set-denoting predicate. Under this proposal, St'át'imcets quantified phrases contain a null version of *of*. The second is to claim that partitive *of* is vacuous, and that quantifiers uniformly function as in the analysis of St'át'imcets given in section 2.3 above. The contentful-*of* theory overgenerates some non-existent constructions in both English and St'át'imcets, while the vacuous-*of* theory accounts for all of the facts, with the only open issue being the option-

[18] Zamparelli's (2000) theory, which builds on that of Barker (1998), is a contentful-*of* theory which avoids some of the problems of Ladusaw's theory. This theory basically says that *of* denotes the operation of set complement. Since it adds to a definite, it subtracts the supremum from the denotation of the original noun. This correctly rules out at least (29a, b). However, it is unclear to me how Zamparelli's theory would account for the data in (30).

ality of *of* with *all*, *both*, and *half*. Our null hypothesis, that English is like St'át'imcets, can be upheld so far.

4.1. *The Partitive Constraint*

Any discussion of partitives should probably at least mention the Partitive Constraint. This constraint is a requirement that the inner DP in a partitive be definite; examples are given in (34). See Jackendoff (1977), Selkirk (1977), Abbott (1996), Reed (1991, 1996), Wilkinson (1996), de Hoop (1997), among others.

(31) a.* many of some women
b. many of the women
c. many of his friends
d.* all of many men
e. all of the many men
f.* one of both books
g. one of the two books

Ladusaw's analysis derives the Partitive Constraint from the semantics assigned to *of*: the 'consists of' function g which *of* denotes is defined only for inputs which denote individuals. This rules in definite DPs, including genitive DPs and '*the two* NP', while ruling out strongly or weakly quantified phrases.[19] It also correctly rules in some famous Partitive Constraint 'violations', involving specific indefinite DPs:

(32) a. That book could belong to one of three people.
b. This is one of a number of counterexamples to the PC.
c. John was one of several students who arrived late.
(Ladusaw 1982: 240)

Ladusaw can account for the seeming Partitive Constraint 'violations' by claiming that the relevant DPs are specific in the sense of Fodor and Sag (1982). Fodor and Sag-style specific indefinites denote individuals (the individual that the speaker has in mind), and as such will be the right kind of sister for *of*.

Within my theory of partitives, there is no semantically contentful *of* into whose lexical entry we could write a requirement that the DP denote an individual. Instead, it is the lexical entry of the *quantifier* which is responsible for requiring that the DP denote an individual. However, my

[19] Barker (1998: 700) also derives the Partitive Constraint directly from the meaning of *of*.

theory will make the same basic predictions as Ladusaw's about Partitive Constraint cases.

There is, however, one difference between Ladusaw's approach (whereby *of* is responsible for Partitive Constraint effects) and mine (whereby the quantifier is responsible). The latter theory predicts that the phenomenon is more general, rather than being tied to the partitive construction as such. This prediction is correct; see Matthewson (2000), where I demonstrate that St'át'imcets quantificational constructions, which do not contain an *of*, display Partitive Constraint effects directly paralleling the English ones.[20]

Summarizing the results up to now: I have argued that in the interest of a crosslinguistically valid and appealing theory, we should investigate the idea that English quantification parallels St'át'imcets quantification. This means rejecting the assumption that the [Q NP] structure is "basic" and that partitives need to be "explained away". I have shown that the simple assumption that *of* is semantically vacuous allows us to analyze the English partitive as directly paralleling the St'át'imcets quantification structure.

5. Non-Partitive *All* and *Most*

In this section I examine non-partitive *all* and *most*, in constructions such as *all linguists*, *most lions*. Unlike in partitives, there is no obvious overt evidence here for the two-tier structure I have been advocating. Nevertheless, we will see that my claim that quantifiers expect sisters of an argumental type is well supported.

My proposal about non-partitive *all*- and *most*-phrases is that they contain bare plurals. This means that the quantifier does not combine directly with a predicate-denoting NP, as the standard analysis would predict, but rather with a phrase of argumental type. The idea that *all*-phrases, at least, contain bare plurals, has some precedent in the literature; Partee (1995: 583) claims that "*all* is not so much acting as a determiner as it is adding an 'exhaustiveness' meaning to what is otherwise still the meaning of a bare plural."

There is good evidence for the claim that bare *all*- and *most*-phrases contain more, in some sense, than the standard analysis would lead us to

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[20] There is another interesting issue which arises concerning the Partitive Constraint. What happens once we allow non-specific indefinites to be of type e (for example, certain types of choice function analysis; see Reinhart 1997; Winter 1997)? If this is allowed, non-specific indefinites will not be ruled out of partitives by the type-driven accounts described here, and an alternative explanation must be found. This issue is discussed at some length in Matthewson (2000), where I propose a novel approach to the Partitive Constraint. I will not go into it here, however, since it is not crucial to the main proposals put forward in this paper.

expect. First, *all-* and *most*-phrases combine only with plurals, not with singular count nouns, as shown in (33a, b). They also combine with mass nouns, as illustrated in (33c).

(33) a. All/most linguists are millionaires.
b.* All/most linguist is a millionaire.
c. All/most snow is white.

These data are consistent with the idea that *all* and *most* combine with phrases of argumental type. Plurals and mass nouns are exactly the things which can stand alone as arguments in English:

(34) a. Linguists are millionaires.
b.* Linguist is a millionaire.
c. Snow is white.

Therefore, the assumption that *all-* and *most*-phrases contain phrases of argumental type means that whatever rules out (34b) can also directly rule out (33b).

What do we predict about the semantics of *all-* and *most*-phrases, if they contain bare plurals? Roughly speaking, bare plurals allow either existential or generic readings. As for the exact way in which these readings arise, there is a vast literature on the topic and this is not the place to decide on the best analysis (see Carlson 1977; Krifka 1988; Wilkinson 1991; Diesing 1992; Gerstner and Krifka 1995; Kratzer 1995; Chierchia 1998; and many others too numerous to mention). For concreteness, I will assume the neo-Carlsonian version put forward by Chierchia (1998), according to which bare plurals denote kinds, usually by virtue of having undergone the $\cap$ operation defined in (35). (K is the set of kinds. See Chierchia 1998: 348 for discussion of what is included in it.)

(35) For any property P and world/situation s,
$^{\cap}P = \lambda s\ \iota\ P_s$, if $\lambda s\ \iota\ P_s$ is in K
undefined, otherwise
where P_s is the extension of P in s.

(Chierchia 1998: 350)

The $\cap$ operator makes a kind out of a property P by returning the largest member of the extension of P at any given world. Kind-denoting bare plurals receive an existential interpretation in certain contexts due to the operation of Derived Kind Predication. See Chierchia's paper for details.

Now, if a bare plural is inserted inside an *all-* and *most*-phrase, we expect the quantifier to be able to quantify over the kind denoted by the bare plural. We do not, however, expect the existential reading of the bare plural to

be possible. That is, we do not expect *All linguists are millionaires* to have a reading where it means 'All of some linguists are millionaires'. This reading cannot arise within Chierchia's system, because Derived Kind Predication takes place only when forced by sort mismatches. Since a quantifier such as *all* is the type of thing which *can* range over a kind, nothing will force DKP to take place.[21]

Finally, note that we also do not expect *all* and *most* to be able to quantify over a contextually restricted set, except in cases where bare plurals can also do this (cf. Condoravdi 1994, and see discussion below).

All these predictions are correct. I will present the *all* facts first, which are very clear, and then discuss *most*, where the data are slightly more complex.

All does not usually quantify over a contextually restricted set, but instead seems to be felicitous only in generic-type contexts. This is noticed by Partee (1995), as well as by Brisson (1998: 7) and by Gil (1995: 352, fn. 2), who notes that "NPs of the form *all* N generally entail a preference for generic contexts. . . . In [episodic] contexts, a more appropriate construction is provided by NPs of the form *all the* N."

Examples showing the preference for genericity are given in (36–38). In each case, the clash between an *all*-phrase and an overtly non-generic context gives rise to infelicity. (Infelicity is marked differently by each author, by #, * or !.)

(36) a. All desks are brown.
b.# All pages in this book were torn. (Partee 1995: 583)

(37) a. All the girls went to the gym.
b.* All girls went to the gym. (Brisson 1998: 7)

(38) a. I admire all linguists.
b.! I talked to all linguists.
c. I talked to all the linguists. (Matthewson 1998: 327–328)

Plain bare plurals in each of the (b)-cases here would allow an existential reading. This reading is correctly predicted to disappear when *all* is added, for the reasons outlined above.

Even if we explicitly set up a discourse context which would normally be sufficient to restrict the domain of quantification, *all* resists quantifying over a restricted set. This is shown in (39) and (40). In each case,

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[21] Thanks to Irene Heim (p.c.) for discussion of this point. In Matthewson (2000), the disappearance of the existential reading of the bare plural when a quantifier is added falls out from the revised version of the Partitive Constraint.

the *all*-phrase sounds like it should involve quantification over all linguists in the world, and hence gives rise to infelicity.

(39) Last night I threw a party and a bunch of linguists and philosophers came.
All linguists got drunk.

(40) There were 100 linguists and 100 philosophers at the party. We asked everyone, and we found out that . . .

a. Every linguist went to New Zealand for Christmas last year.
b. All of the linguists went to New Zealand for Christmas last year.
c.#All linguists went to New Zealand for Christmas last year.

An interesting prediction of the bare plural analysis arises with cases where it is independently known that bare plurals allow a reading other than the usual generic or existential ones.[22] Condoravdi (1994) discusses cases such as (41).

(41) In 1985 there was a ghost haunting the campus . . .

a. Students were aware of the danger.
b. The students were aware of the danger.
c. There were students who were aware of the danger.

Sentence (41a) seems to mean the same as (41b), not (41c). Condoravdi provides arguments that (41a) is not an instance of a generic reading, but is a separate reading, which she calls 'functional'.

Condoravdi argues that the functional reading always involves contextual restrictions, but that not just any contextual restriction is appropriate. Strikingly, the cases where bare plurals do allow functional readings are those which also allow *all*-phrases to receive non-generic readings. The cases where bare plurals do *not* allow functional readings are those in which *all*-phrases sound infelicitous. Some examples are provided in (42–43).

(42) In 1985 there was a ghost haunting the campus . . .

a. Students were aware of the danger. (functional reading OK)
b. All students were aware of the danger. (same reading)

[22] Thanks to Kai von Fintel (p.c.) for pointing this out to me.

(43) Last night I threw a party and a bunch of linguists and philosophers came over . . .

a. Linguists got drunk.
(no functional reading; existential only)

b.#All linguists got drunk. (infelicitous)

A further example is given in (44). Condoravdi notes (1994: 87) that (44a) does not allow a functional reading restricted to the visible students, but does allow a functional reading which encompasses all students on campus. The same results hold in (44b). Quantification must be over all the students on campus; no restriction is possible to the visible students.

(44) Context: We know that there is a ghost haunting the campus. We are standing in front of the library and we can both see several students.

a. Students are afraid to enter the library.
b. All students are afraid to enter the library.

The data presented here provide good evidence for the claim that *all*-phrases contain bare plurals. The range of readings seems to correlate absolutely with the range of readings available for bare plurals. The one reading which disappears, the existential reading, is predicted to disappear by the fact that Derived Kind Predication will not be licensed (and/or by some version of the Partitive Constraint; see footnote 21).[23]

All can also attach to mass nouns, as shown in (45), and the same restriction against episodic readings obtains as with bare plurals, as shown in (46).

(45) a. All insulation is fire-resistant.
b. All metal conducts heat.
c. I like all furniture.

(46) a.* I removed all insulation from the attic.
b.* When I cleaned the fridge, I found that all milk was sour.
c.* All furniture in this house needs to be cleaned.

These data are as expected; as noted above, mass nouns can also stand alone as arguments in English (without requiring a determiner). Whatever one's favorite analysis of mass nouns is, it is clear that the quantifier in (45) is

[23] Some further crosslinguistic support for the idea that bare *all*-phrases contain bare plurals comes from Italian (Zamparelli 2000, p.c.). Zamparelli shows that phrases of the form 'all'+noun in Italian obey the same distributional restrictions as bare plurals.

attaching to items which can be of argumental type, and which disallow contextually definite readings in the contexts in (46).

Now let us turn to *most. Most*-phrases display most of the same effects outlined above for *all*-phrases. According to my judgments, *most*-phrases also prefer to occur in generic environments. Some examples are given in (47).[24]

(47) a. I admire most linguists.
b.# I talked to most linguists.
c. Most linguists are millionaires.
d.# Most linguists went to New Zealand for Christmas last year.

Examples with discourse contexts which try to encourage domain restriction still sound odd with non-partitive *most*-phrases:

(48) Last night I threw a party and a bunch of linguists and philosophers came.
Most linguists got drunk.

(49) There were 100 linguists and 100 philosophers at the party. We asked everyone, and we found out that . . .
a. Every linguist went to New Zealand for Christmas last year.
b. Most of the linguists went to New Zealand for Christmas last year.
c.# Most linguists went to New Zealand for Christmas last year.

The data from functional readings also support the claim that *most* patterns like *all* in taking a bare plural sister:

(50) In 1985 there was a ghost haunting the campus . . .
a. Students were aware of the danger. (functional reading OK)
b. Most students were aware of the danger. (same reading)

(51) Last night I threw a party and a bunch of linguists and philosophers came over . . .
a. Linguists got drunk. (no functional reading; existential only)
b.# Most linguists got drunk. (infelicitous)

[24] Some of the judgments are delicate for some speakers.

(52) Context: We know that there is a ghost haunting the campus. We are standing in front of the library and we can both see several students.

a. Students are afraid to enter the library.
b. Most students are afraid to enter the library.
(not restricted to visible students)

Finally, *most* can also attach to mass nouns, with the same results as the *all* cases seen above:

(53) a. Most insulation is fire-resistant.
b. Most metal conducts heat.
c. I like most furniture.

(54) a. *When I cleaned the fridge, I found that most milk was sour.
b. *I removed most insulation from the attic.
c.??Most furniture in this house needs to be cleaned.

My claim that *most*-phrases are similar to *all*-phrases in these respects is supported by observations in Cooper (1996: 80) (thanks to a reviewer for drawing my attention to this). Cooper claims that *most* (as well as *few*) prefers generic contexts and usually disallows contextual restrictions. In contexts involving contextual restrictions, *most of the* is to be used. Cooper also reports an observation of Sheila Glasbey's that speakers resist episodic restricted uses of *most* even more when it does not occur in subject position.

While the analysis is successful for the cases looked at so far, the facts become less clear when *most*-phrases contain more complicated restrictions. In the presence of certain modifiers, especially relative clauses, *most* seems to be able to quantify over a contextually specified set (just as if a definite determiner were present). Some examples are given in (55) (provided by Veneeta Dayal, p.c.):

(55) a. Most men who came to the party left early.
b. Most people at yesterday's rally were Democrats.
c. Most voters surveyed indicated that . . .
d. Most competent cooks applied for the job.
e. Last night I threw a party and a bunch of linguists and philosophers got drunk.

Most linguists who got drunk merely passed out, but most philosophers who got plastered revealed interesting things about their colleagues.

I personally find that many of the examples require contrastive situations.

(55e) is already explicitly contrastive; (55d) is good for me only in a discourse context such as the following:

(56) I own a restaurant in a small town. I advertised for the position of head cook. I pay the best wages in town, but I am also very fussy. Everyone knows that I only allow good cooks to work for me. There are 30 trained cooks in the town. 15 of them are competent, and 15 are incompetent.

Most COMPetent cooks applied for the job in my restaurant. (The INcompetent ones didn't bother to apply.)

The data in (55) are puzzling because some of the examples which are good with *most* seem to still be bad with *all* (for example, (55e)). Moreover, the bare plural versions of some of the examples in (55) are degraded, yet my analysis predicts that *most*-phrases should correspond in their interpretations to the corresponding bare plural versions.

I have no answer at present to why *most*-phrases are more able to receive contextually definite readings than *all*-phrases. Nor do I have a theory at this stage of why the presence of a relative clause or other modifier facilitates the relevant reading. Note, however, that with mass nouns, the addition of a modifier does *not* license episodic, definite readings for *most*-phrases:

(57) a.* I shoveled most snow that was in this yard.
b.* Most milk in this fridge is sour.
c.* Most mud that you traipsed in the house ended up on my rug.

There is clearly a complex array of data here. While I do not yet have an account for the modifier effects in (55), it should be noted that the standard analysis of English quantification fares worse overall. The standard analysis has no way to deal with the behavior of *all*, which is quite consistent, nor with the facts about *most*-phrases with simple restrictions and with mass nouns. Moreover, the facts regarding *most* and modifiers are new data which only came to light because of expectations raised by the current proposals. Thus, it can be regarded as a virtue of the current approach that it forces us to think about the facts in (55), and others like them.

Summarizing this section, I have argued that non-partitive *all* and *most* do not take predicate-denoting NPs as their arguments, as the standard analysis would lead us to expect. Rather, *all*- and *most*-phrases are best analyzed as containing phrases of argumental type, either bare plurals or mass nouns. This claim correctly predicts that *all* and *most* quantify either over the entire kind denoted by the NP, or over a contextually restricted set correlating with Condoravdi's 'functional' reading of bare plurals.

5.1. *Learnability*

My claim that English *all-* and *most*-phrases contain bare plurals has an interesting consequence when we consider the difference between English and St'át'imcets. St'át'imcets differs from English in one very relevant respect: it lacks bare nominal arguments. As was shown in section 2.1, all argumental phrases in St'át'imcets must contain an overt determiner. This independent difference between the languages immediately accounts for the fact that St'át'imcets lacks quantificational phrases of the surface form [Q NP]. Thus, we account for the core way in which St'át'imcets quantification appears so different from English quantification. Nothing further needs to be said about the crosslinguistic difference.

The difference between the two languages as characterized under the current analysis is an easily learnable one. The child only has to learn whether or not her language allows bare nominal arguments, or instead requires overt determiners on all argumental phrases. Applying the Subset Principle (Berwick 1985; see also Manzini and Wexler 1987), things will work as follows. The child must start out assuming that bare plurals do not exist (since that creates the smaller grammar). An English-learning child hears many examples of bare plurals in the primary linguistic data, and realizes that bare plurals are possible.

According to this analysis, an English-learning child who hears bare *all-* or *most*-phrases knows that they contain bare plurals because s/he knows that quantifiers take argumental phrases as their sisters. This is the default assumption about quantifiers under my proposal. (Input data may serve to alter this default assumption; see section 6 below.)

On the other hand, the standard analysis of English has a learnability problem with bare *all-* or *most*-phrases. According to the standard analysis, quantifiers prefer to take NPs as their sisters, and also allow the context to further limit the domain of quantification (however this latter part is implemented; see section 3.1.1). The fact that *all-* or *most*-phrases do not usually allow non-generic readings is something which the child would have to learn. Unlike the task of learning whether bare plurals exist, this task involves the acquisition of extremely subtle semantic facts, on which there would be very little, if any, overt evidence in the primary linguistic data. In fact, negative evidence would be required; the child would have to retreat from a less restricted semantics to a more restricted semantics.

Before concluding this section, I would like to mention one further interesting consequence of the absence of bare plurals in St'át'imcets, which has to do with the expression of genericity in that language. Not only are Ds always present and overt in St'át'imcets, they all encode semantic

number and deictic features (van Eijk 1997; Matthewson 1998). This means that they all narrow the domain of the quantifier in a meaningful (i.e. non-trivial) way. We therefore predict that it should be difficult to make generic statements in St'át'imcets by using the quantifier 'all'.

This prediction is upheld. When an English generic sentence is given to a St'át'imcets speaker, sentences such as (58) are sometimes volunteered as translations. However, the consultant's comment about (58) is highly revealing.[25]

(58) [tákem i twéw'w'et-a] ama-mín-itas k-wa
[all DET.PL boy(PL)-DET] good-APPL-3PL.SUBJ DET-PROG
píx-em'
hunt-INTR
'All boys love hunting.'
Consultant's comment: "There's a bunch of men there; it doesn't pertain to all the men in the world."

6. *EVERY*

So far, the English constructions we have examined have all been compatible with the null hypothesis that quantifiers have a constant denotation across all languages, and that this denotation corresponds to the analysis of St'át'imcets quantifiers provided above. Now we come to a very challenging case for the hypothesis: English *every*. *Every* is problematic since it is a quantifier which is *not* analyzable as taking a DP complement.

In contrast to what we saw with *all* and *most*, *every* seems to occupy a relatively low position in the syntax of the DP. For a start, *every*-phrases clearly do not contain bare plurals, since the complement of *every* is a singular count noun:

(59) Every linguist is a millionaire.

Unlike almost all other English quantifiers, *every* cannot precede an entire DP. Thus, it is illegitimate in the very type of construction which I am trying to reduce all quantification to!

(60) * Every (of) the linguists got drunk.

---

[25] The one *non*-choice-function determiner does not encode number and deictic features. Correspondingly, it is often employed in generic contexts, and may be what is used when kind-reference is desired. See Demirdache (1997) for some discussion. Note also that one may not use deictic determiners on the subjects of kind-level predicates such as 'be rare'.

Other evidence that *every* occupies a low position comes from the constructions in (64), where *every* appears inside a possessive.

(61) She watched his/Oscar's every move.

In terms of its semantics, *every* can easily be interpreted as quantifying over a contextually limited subset of the set of individuals denoted by the common noun.

(62) There were many linguists and philosophers at the party last night . . .

Every linguist had a good time.

Here, then, is the problem. The standard analysis puts quantifiers in D position and says that they create a generalized quantifier from an NP. For St'át'imcets quantification in general, and for English partitives and bare *all-* and *most*-phrases, this claim has successfully been challenged. There is syntactic evidence that the quantifiers are in a higher position than D, and semantic evidence that the creation of a generalized quantifier proceeds in two steps. However, with *every* there is no such evidence. It is low in the structure, plausibly occupying the D position, yet it is quantificational.

Under a strict version of the hypothesis I am pursuing, the roles of Q and D are always separate. If *every* is in D position, as the syntactic evidence suggests, then the strong version of the hypothesis would force me to claim that *every* is not a quantifier, and that its apparent quantificational nature comes from some other (possibly null) element.

This claim is obviously quite controversial. However, there are some suggestive pieces of evidence which indicate that it is at least worth investigating.

Suppose that *every* is a determiner which selects the individual corresponding to the maximal contextually salient subset of the set denoted by the NP. In this respect it is similar to plural definite *the*. In addition, however, *every* has a requirement for distributivity. This extra distributivity requirement could be implemented in a number of ways; see Beghelli and Stowell (1997) for a sketch of one possible implementation.

This assumption about *every* immediately accounts for the fact that it can quantify over contextually specified subsets, as in (62). *Every* can also quantify over the entire set denoted by the noun, as in (63):

(63) a. Every dog has four legs.
b. I admire every linguist.

However, it is already known that domain narrowing can be trivial, so the data in (63) are not a problem.

The analysis being sketched here receives some indirect, because cross-linguistic, support from a construction in Chinese which parallels what I want to say about English *every*-phrases. It concerns the element *mei*, illustrated in (64).

(64) **mei** ge ren dou mai-le shu
every CL man all buy-ASP book
'Everyone bought a book.' (Lin 1998: 219)

Mei, although translated as 'every', is analyzed by Lin (1998) as a non-distributive determiner. It denotes "a function which takes a predicate of type ⟨e, t⟩ as its argument and returns the maximal collection of the individuals denoted by the predicate" (Lin 1998: 238). Lin's lexical entry is given in (65) (Lin does not deal with context dependency).

(65) [[*mei*]] = that function f such that for all P an element of $D_{\langle et \rangle}$, f(P) = ∪[[P]]

Mei obligatorily co-occurs, at least in subject position, with an overt element *dou*. Lin analyzes *dou* as a generalized distributivity operator. Thus, the distributivity found in *mei*-sentences comes from *dou* rather than from *mei* itself.

Some support for the claim that *mei* is not a quantifier comes from facts pointed out to me by Lisa Cheng (p.c.; see also Lin 1998). In Chinese, demonstratives co-occur with classifiers, as shown in (66), but quantifiers are more like modifiers and are marked with the modificational marker *de*, as in (67):

(66) na yi ben shu
that one CL book
'that book'

(67) a. suoyou de ren
all DE person
'all people/everyone'

b. henduo de shu
many DE book
'many books'

Mei parallels the demonstratives and differs from the quantifiers; it co-occurs with classifiers (at least in Mandarin and Cantonese):

(68) a. mei (yi) ge ren
every (one) CL person
'everyone'

b. mei (yi) zhang zhi
every (one) CL paper
'every piece of paper'

Cheng believes (p.c.) that *mei* simply gives a reading of a 'collection' of the individuals from a particular domain; that is why the distributive *dou* is needed.[26]

This analysis of *mei* could be adopted to deal with English *every. Mei* would correspond to English *every*, while the distributivity operator, *dou* in Chinese, simply happens to be null in English.

Something similar to this idea is argued for by Beghelli and Stowell (1997) and Szabolcsi (1997) for English (although it is implemented differently). Beghelli and Stowell claim that *every*-phrases are not true distributive QPs. In their system, *every*-phrases introduce variables, just as indefinites do (1997: 101). *Every*-phrases are underspecified for the feature [Distributive]; therefore (unlike *each*) they are not forced to check this feature by moving to Spec of DistP (1997: 103).

Beghelli and Stowell's idea, as well as my idea that *every* is the same as *mei*, predicts that there might be cases where *every*-phrases receive non-distributive construals, in contrast to *each*-phrases. In support of this, Landman (2000) claims that *every*-phrases can have collective definite interpretations as well as generalized quantifier interpretations. Various authors have given examples where *every*-phrases are non-distributive (symbols for grammaticality and felicity judgments are as provided by the respective authors):

(69) a.# In this class I try to combine each theory of plurality.
b. In this class I try to combine every theory of plurality.
(Landman 2000: 10)

(70) a.* It took each boy to lift the piano.
b. It took every boy to lift the piano.
(Beghelli and Stowell 1997: 98)

(71) a.? She counted each of the proposals.
b. She counted every proposal. (Dowty 1987: 106)

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[26] Some quantifiers other than *mei*, such as *henduo* 'many' and *dabufen* 'most', also need to have *dou*. See Lin (1998) for some discussion and explanation.

(72) a.# Ricky weighed each apple from the basket, but not individually.
b. Ricky weighed every apple from the basket, but not individually.
(Tunstall 1998: 99)[27]

(73) a.?#Jake photographed each student in the class, but not separately.
b. Jake photographed every student in the class, but not separately.
(Tunstall 1998: 99)

(74) a. each student's desk (unambiguous)
b. every student's desk (ambiguous; collective ok)
(Barbara Partee, p.c.)

Zimmermann (1992: 177) makes a similar point; he says that

> although noun phrases of the form '*every* N' are traditionally analyzed as denoting quantifiers, it is clear that this cannot be the whole story: despite their being in the singular, they may express some kind of *summation* (or maybe *collectivity*) as indicated by the following kinds of examples:
>
> [75] There is every prospect for success.
>
> [76] ?Everybody met in the hall.
>
> Although I cannot offer an analysis of these examples either, they show that there are independent problems with *every* which may also be the source of the trouble with [77].
>
> [77] I have looked for every typo in the manuscript.

There are many unresolved issues for the idea being sketched here. For instance, it is not clear under which circumstances *every*-phrases can be non-distributive, and why those circumstances allow non-distributivity. The discussion in this section is merely intended to show that the idea that *every* is not a true universal quantifier (which is forced upon us by the strict version of my 'no crosslinguistic variation in quantification' hypothesis) has some precedent in the literature and some potential for further investigation.

If the claim that *every* is not a quantifier does *not* go through, then our null hypothesis will have to be weakened. It need only be weakened slightly, however. We can still claim that in principle, the creation of a generalized quantifier proceeds in two steps. First, domain narrowing (or kind-creation) takes place. Then, quantification happens. The extra thing to be said about English *every* is that occasionally, in certain languages, the two jobs may be combined and performed by a single element. That is, *every* is an exceptional quantifier in that it performs two jobs rather

[27] Tunstall's (1998) theory is that *each* is subject to a stronger distributivity condition than *every*.

than one. It restricts its own domain, and then quantifies over that restricted domain. (See Matthewson 1998 for this proposal about *every*.)

Support for my prediction that *every* is an unusual, portmanteau element is provided by Gil (1995). Gil explicitly analyses *every* and its counterparts in a number of other languages as portmanteau items which perform two jobs. He further notes (1995: 321) that "as for *every* and its equivalents, far from being prototypical, these are in fact among the most exceptional of quantifiers in their syntactic and semantic behaviour."

This is relevant precisely because *every* is the most problematic element for my 'no crosslinguistic variation' hypothesis. The virtue of looking at things from a new angle is that things that we thought were problems (St'át'imcets in general, the English partitive) become unproblematic, while things that we thought we understood (English *every*) become tricky. This new standpoint leads us to reinvestigate the supposedly most ordinary quantifiers, and perhaps to discover that they were not quite as "ordinary" as we thought they were.

Let's consider more precisely what the consequences are of the "worst case scenario" for my null hypothesis (namely that *every* is a quantifier which behaves exactly as the standard analysis predicts). As outlined above, I would still like to say that the default is that quantifiers expect a sister of argumental type. I would still say that in the default case, any domain restriction is provided by a (non-quantificational) determiner which attaches before the quantifier comes along. This makes a prediction about "unusual" quantifiers such as *every*: they should be more difficult to learn than either partitives, or bare *all-* or *most*-phrases. Children should require overt evidence before they learn that *every*-phrases can have contextually restricted domains.

Intuitively speaking, it seems possible for a child to learn that *every*-phrases allow contextual restrictions. It may be sufficient for the child to hear *every*-phrases used in contexts where a universal statement without a domain restriction would clearly be false. Note that this accords with the Subset Principle. The child begins by assuming that no quantifiers can restrict their own domains, and then learns that some quantifiers can. Thus, this is a very different situation from the problematic one discussed in section 5.1. There, we saw that if the standard analysis is assumed, it would be impossible for children to retreat, and learn that bare *all-* and *most*-phrases do *not* involve contextual restrictions. Under the current proposal, the child starts out assuming that quantifiers like *every* do not exist, and learns by overt evidence that they do.

While I am not aware of any studies which have explicitly tested these predictions, Tom Roeper informs me (p.c.) that the acquisition of *all*

precedes that of *every* by quite a bit. This conforms to the predictions made here.

7. How Far Do We Extend the Analysis?

In this paper I have pursued the idea that quantification in two superficially quite different languages, English and St'át'imcets, can receive a common analysis. I have demonstrated the success of the proposal for English partitives and for *all-* and *most*-phrases, and have also discussed a recalcitrant case, English *every*. The question now arises of how much further, both within English and crosslinguistically, I intend my claims to be taken.

It is fairly obvious what the ideal situation would be, according to the no-variation null hypothesis: that every language would be subject to the same analysis. It should also be obvious from my discussion of English that I only want to push the idea as far as the facts of the individual languages will allow. At some point, we reach problematic cases; the discussion of English *every* was intended as an example of how one proceeds with those cases.

There are many quantifiers even within English which I have not discussed, partly due to space reasons. I anticipate that my analysis can be extended to weak quantifiers, which will be ambiguous between true quantifiers and adjectives. Interestingly, weak quantifiers in Salish overtly show this distinction; they occur either before D or after D (in adjective position), but never replace D (see Matthewson 1998 for discussion).[28] Further interesting cases are *each* and *both*. These quantifiers share the property of being *necessarily* contextually restricted, and one possibility is that they contain some null partitive structure. One potentially problematic item is free-choice *any* (pointed out by a reviewer), which can take a bare singular noun as its argument.

One prediction of my analysis, and of the learnability arguments in

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[28] There are interesting issues to be explored in future research relating to weak quantifiers. A reviewer points out that the following discourses are felicitous:

(i) Last night I threw a party and a bunch of linguists and philosophers came over . . .
Exactly four / several / a lot of linguists got drunk.

Interestingly, these are quantifiers which seem to favor or require a cardinal interpretation, rather than a proportional one (cf. Partee 1988). Judgments are less clear with *many* and *few*; I suspect that these also force a cardinal interpretation in this context, but further work is clearly required; care will be needed just to tease apart the readings.

section 5.1, is that other languages which lack bare plurals should be similar to St'át'imcets in their quantificational structures. For example, French is a language where arguments require overt determiners. Consequently, my analysis predicts that French will not allow quantifiers such as *all* or *most* to attach to bare plural nouns. Rather, a determiner should have to intervene.

This appears to be correct. (78) contains a range of French quantificational constructions. While French does possess a singular universal determiner which attaches to a bare singular noun (like English *every*), it crucially does not allow strong quantifiers to directly attach to bare plurals or mass nouns.[29]

(78) a. tous les femmes
all DET.PL women

b.* tous femmes
all women

c. chaque femme
each woman

d. tout le lait
all DET milk

e.* tout lait
all milk

f. la plupart des femmes
DET most of.DET women

g.* plupart femmes
most women

Investigation of a wider range of languages is clearly necessary, and should reveal whether there are a greater number of problematic cases for my proposal or for the standard analysis. What is certain is that the two

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[29] A reviewer points out that the French sentence in (i) has a generic interpretation.

(i) Tous les hommes sont mortels
all DET.PL men are mortal
'All men are mortal.'

This contrasts with what I suggested above for St'át'imcets 'all'-phrases (see 58). The difference will, I think, be reducible to differences between the French definite plural determiner *les* and the St'át'imcets plural determiner *i...a*. As pointed out above, the latter crucially contains deictic features (present, visible). Intuitively, it is this which makes the St'át'imcets 'all'-sentences incompatible with a generic interpretation.

approaches differ in which things are predicted to be problematic (and/or difficult to learn). I have tried to demonstrate how we can reason on the basis of learnability about which quantifiers should be regarded as 'exceptions'. However, I cannot make any specific claims about particular constructions in any language, beyond those I have discussed here. The predictions for other languages are clear, and may be falsified by further research.

A final point is in order regarding the status of my analysis with regard to type-shifting. One of the main claims of this paper is that the default type for quantifiers is not ⟨⟨e, t⟩, ⟨⟨e, t⟩, t⟩⟩, but rather ⟨e, ⟨⟨e, t⟩, t⟩⟩. However, as Chierchia (1998: 353) notes, "given an ordinary determiner meaning DET, it is completely trivial to define a variant of it, call it DET′, that applies to kinds." Does the availability of type-shifting options for quantifiers mean that my claim reduces to a trivial detail, which is subsumed by already-existing type-shifting possibilities?

Not at all! The situation is quite to the contrary: My analyses of English and St'át'imcets provide support for a high level of restrictiveness in type-shifting possibilities for quantifiers. If quantifiers could freely type-shift to take arguments of either type ⟨e, t⟩ or type e, then none of the data discussed in this paper would have an explanation. We would not be able to explain why in St'át'imcets, quantifiers are unable to take arguments of predicative type, and why English *all* and *most* display semantic restrictions indicating that they contain bare plurals of argumental type, rather than simple predicates.

I am not claiming that type-shifting is completely disallowed. For example, in the bare plural cases with *all* and *most*, the first step (before the quantifier is added) may well be a type-shift. When contextual domain restrictions are required, more than a simple type-shift needs to take place, so an overt determiner appears *(all of the women)*. What the facts indicate is that type-shifting on the part of the quantifier is not freely available.

This last claim raises the theoretical question of *why* this type-shifting should fail to exist – what rules it out? (Thanks to two reviewers for raising this point.) I do not know the answer to this question. Aside from what I have already said about the empirical advantages of assuming that type-shifting is not freely available, I can only make the following comment. There is also no reason why quantifiers should always be of type ⟨⟨e, t⟩, ⟨⟨e, t⟩, t⟩⟩. So, either type-shifting of quantifiers *is* freely available (in which case we must abandon the widespread implicit assumption that the standard analysis has some predictive power for languages other than English), or it is not, in which case both sides of the debate have exactly the same conceptual challenge to face.

8. Conclusion

The goal of this paper was to subject the standard analysis of determiner quantifiers to crosslinguistic scrutiny. Given that there are languages where the canonically expected quantificational structure is unavailable, there are two options for how to proceed. We could either simply admit that variation exists and that the standard analysis is English-specific, or we could pursue the stronger hypothesis that variation does not exist, and attempt to find a common analysis for languages which differ on the surface. In this paper I have taken the latter approach.

Once we adopted the strong null hypothesis that quantifiers are invariant crosslinguistically, the next question was what the common analysis of English and St'át'imcets should look like. Since the St'át'imcets data cannot be analyzed according to the standard analysis of English, we need to re-examine that standard analysis. I have argued that the new standard analysis of quantifiers should be that they require arguments of type e. In the usual case, this means that the creation of a generalized quantifier from an NP predicate proceeds in two steps, rather than one.

I have argued that the English partitive construction can be fruitfully analyzed in this way, under the simple assumption that partitive *of* is semantically vacuous. I have further argued that non-partitive *all* and *most* take sisters of argumental type, either bare plurals or mass nouns. This was shown to correctly predict some quite striking facts about the possible interpretations of *all*- and *most*-phrases.

This analysis provides a simple account of the variation between these two languages. There is no variation at all in the denotations of quantifiers. The surface variation is reducible to the easily learnable fact that St'át'imcets possesses obligatory overt determiners and therefore lacks bare plurals. Consequently, in St'át'imcets we are never even fooled into thinking that there is a [Q NP] construction.

The analyses proposed for each language are well supported empirically and involve transparent mappings between the syntax and the semantics. The one case where an abstract layer is assumed, namely with non-partitive *all*- and *most*-phrases, relies only on mechanisms which are independently needed for bare plurals and mass nouns when these function as arguments of main predicates.

Finally, I discussed English *every*, a case where the evidence for reanalysis is not as strong, and where the standard analysis may be right after all. But even if *every* is a true 'determiner quantifier' as in the standard analysis, interesting results obtain. First, we correctly predict that *every* is crosslinguistically unusual and displays portmanteau characteristics. Second,

we make testable predictions about learnability, namely that aspects of the semantics of *every* will be difficult to acquire, compared to what have now become the 'ordinary' quantificational constructions, such as partitives.

APPENDIX

Abbreviations

APPL = applicative, CL = classifier, DET = determiner, ERG = ergative, FOC = focus, INTR = intransitive, NOM = nominalizer, PL = plural, PROG = progressive, SG = singular, STA = stative, SUBJ = subject, TR = transitive.

Key to St'át'imcets Orthography

Orthography	Phonemic script	Orthography	Phonemic script	Orthography	Phonemic script
p	p	k'	k̓	gw	ʕʷ
p'	p̓	kw	kʷ	g'w	ʕ′ʷ
m	m	k'w	k̓ʷ	h	h
m'	m̓	c	x	w	w
t	t	cw	xʷ	w'	ẇ
ts	č	q	q	y	y
ts'	č̓	q'	q̓	y'	ẏ
s	š	qw	qʷ	z	z
n	n	q'w	q̓ʷ	z'	z′
n'	ṅ	x	x̲	7	ʔ
t'	ẗ	xw	x̲ʷ	a	a
lh	ɬ	r	ɣ	e	ə
l	l	r'	ɣ′	i	i
l'	l̓	g	ʕ	u	u
k	k	g'	ʕ′	v	ʌ

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