WHY *A FEW*? AND WHY NOT **A MANY*? [*]

Stephanie D. Solt,
The CUNY Graduate Center

ssolt@gc.cuny.edu

Abstract

The expressions *few* and *a few* are typically considered to be separate quantifiers. I challenge this assumption, showing that with the appropriate definition of *few*, *a few* can be derived compositionally as *a* + *few*. The core of the analysis is a proposal that *few* has a denotation as a one-place predicate which incorporates a negation operator. From this, argument interpretations can be derived for expressions such as *few students* and *a few students*, differing only in the scope of negation. I show that this approach adequately captures the interpretive differences between *few* and *a few*. I further show that other such pairs are blocked by a constraint against the vacuous application of *a*.

1 Introduction

The starting point for the present paper is the often-overlooked contrast exemplified below:

(1) a. Few students came to the party.
    b. A few students came to the party.

(2) a. Many students came to the party.
    b. *A many students came to the party.

The expressions *few* and *many* have long been recognized as problematic for treatments of quantification, on account of their vagueness and context dependence (or even ambiguity), and their resistance to classification on the standard dimension of strong versus weak (Milsark 1974; Barwise & Cooper 1981; Westerståhl 1985; Keenan & Stavi 1986; Lappin 1988, 2000; Partee 1989; Herburger 1997).

But one idiosyncrasy of *few* that has received little serious attention (though see Kayne 2005) is that it forms a pair with the superficially similar expression *a few*, the only such pair in the English count noun quantifier system. In particular, while *few* and *many* otherwise exhibit very similar properties, there is no **a many* in parallel to *a few*.

My goal in this paper is to present some interesting facts and contrasts relating to the semantics of *few* and *a few*, to show that, despite their differences, *a few* can be derived from *few*, and finally to address why *a few* does not have a counterpart in **a many*. I also discuss some broader implications for the semantics of *few* and *many*, and of the indefinite article.

1.1 Does *a few* = *a* + *few*?

It is not immediately clear that *a few* should receive a compositional treatment at all. And in particular, it is not obvious that *a few* is composed of the *a* in *a student* plus the *few* in *few students*. Within basic accounts of generalized quantifiers (e.g., Keenan & Stavi 1986) as

[*] My thanks to Bill McClure for his encouragement and guidance in pursuing this research, to Bob Fiengo, Rachel Szekely and Erika Troseth for valuable comments, and to the audience at Sinn und Bedeutung 10 for helpful questions and discussion. All errors are of course my own.

well as introductory semantics texts (e.g., Gamut 1990), the standard if unspoken assumption would seem to be that *a few* is an idiom, that is, a fixed, unanalyzable unit.

But on closer examination, it is clear that *a few* does not always function as a unit: *a* and *few* may be separated by an adverb (as in (3)) or, more interestingly, by an adjective modifying the head noun (as in (4)):

(3) a. A very few students got perfect scores on the test.
b. An incredibly few collectors have the good fortune to own one.

(4) a. A lucky few students will get fellowships.
b. We spent a happy few days at John's house in the country.

The conclusion must be that *a few* is composed of an independent *a* and *few* which combine in the syntax; in light of this, a compositional semantic treatment is desirable as well.

1.2 Outline of the paper

The organization of the paper is the following. I begin in Section 2 by presenting some facts in the semantics of *few* and *a few* that must be captured by a compositional account. In Section 3, I introduce two further properties of *few* that will prove crucial to the present analysis. Section 4 is the core of the paper, where I present a proposal regarding the semantics of *few* and the derivation of *a few*. In Section 5, I address the obvious question that arises: why *a few* does not have a counterpart in **a many*. I summarize in Section 6 with some conclusions and questions for further study.

2 The Interpretation of *Few* and *A Few*

2.1 Basic facts

Considering again examples (1a) and (1b), it can be observed that these sentences have overlapping truth conditions: Both are true if some small but unspecified number of students attended the party. But from there, the interpretations of *few* and *a few* diverge.

Specifically, diagnostics such as those proposed by Horn (1989, 2003) show that *few* is defined by its upper bound. That is, *few* means <u>at most</u> some maximum value. Thus for example "few students came to the party" can be followed felicitously by "in fact, hardly any did" and so forth, but not by "in fact, many did" or the like, evidence that the former but not the latter are encompassed within the possible interpretations of *few*:

(5) a. Few students came to the party; in fact, hardly any/almost none/only one did.
b. Few students came to the party; in fact, *many/*lots/*dozens did.

Likewise, (6) can only mean that I'm surprised that <u>more</u> students did not come to the party:

(6) I'm surprised that few students came to the party.

Furthermore, although speakers' intuitions differ with regards to this point, similar diagnostics show that *few* can even be *none*. Thus suppose I make you the bet in (7). If it later turns out that <u>no</u> students come to the party in question, it would seem that I have won the bet.

(7) I'll bet you that few students will come to the party.

Few is therefore monotone decreasing in its right argument, as seen by the validity of the entailment in (8a), and thus licenses negative polarity items, as in (8b):

(8) a. Few students in the class own cars. $\Rightarrow$ Few students in the class own red cars.
b. Few students in the class have <u>ever</u> owned a car.

A few, by comparison, has essentially mirror image semantics relative to *few*. *A few* is defined by its lower bound. It is existential (in that it must be non-zero), and marginally allows an "at least" reading, similar to the cardinal numbers. Thus for example "a few students came to the party" can be continued with "in fact, many did," but not with "in fact, none did" or "in fact, one did":

(9) a. A few students came to the party; in fact, many/lots/dozens/over twenty did.
b. A few students came to the party; in fact, *none/*one/(?) two did.

Similarly, (10) seems to mean that I am surprised that <u>any</u> students at all came to the party (or perhaps that I am surprised that some particular students attended, a point that I will not address here).

(10) I'm surprised that a few students came to the party.

On its "at least" reading, *a few* is therefore monotone increasing (as seen in (11a)), and thus does not license negative polarity items (as in (11b)):

(11) a. A few students in the class own red cars. ⇒ A few students in the class own cars.
b. *A few students in the class have <u>ever</u> owned a car.

Finally, for completeness, I consider also *many*, which will be relevant below. As seen through the contrasts in (12), *many* is lower bounded like *a few*, but of course specifies a larger number of individuals:

(12) a. Many students came to the party; in fact, dozens/hundreds did.
b. Many students came to the party; in fact, *none/*one/*a few did.

Within a generalized quantifier framework (Barwise & Cooper 1981), the above facts might as a first approximation be summed up by the expressions in (13) as the denotations of *few*, *a few* and *many*.

(13) a. $[\![\text{few}]\!] = \lambda P\lambda Q(|P\cap Q| \leq n$, where n is some small number)
b. $[\![\text{a few}]\!] = \lambda P\lambda Q(|P\cap Q| \geq m$, where m is some small number ≥ 2)
c. $[\![\text{many}]\!] = \lambda P\lambda Q(|P\cap Q| \geq p$, where p is some large number)

But this approach does not provide an account of the relationship of *a few* to *few*. Nor is it apparent why *a few* does not have a counterpart in **a many*.

2.2 Some additional complexities

Beyond these issues, there are some further subtleties that the expressions in (13) do not adequately capture. As is now well known, the semantics of *few* is notoriously difficult to specify precisely (Partee 1989). In some contexts, *few* would appear to have a proportional interpretation. For example, the intuition seems to be that *few Americans* in (14a) could refer to a larger number of individuals than *few senators* in (14b), which in turn could be a larger number than *few students in my class* in (14c) (assuming a class of ten students or so).

(14) a. Few Americans voted for Ralph Nader in 2004.
b. Few senators supported the bill.
c. Few students in my class solved the problem.

In fact, (14a) is clearly true – and perfectly felicitous – in a situation where one hundred thousand Americans (out of millions) voted for Nader in 2004. These facts could be readily be captured by giving *few* proportional semantics, so that *few N* is interpreted as "a small proportion of the Ns."

But the situation is not as simple as this: In other contexts, *few* has a purely cardinal interpretation, where *few N* could be paraphrased as "a small number of Ns." On this reading, *few N* could even be all of the Ns. Thus for example (15) could best be paraphrased as "a small number of truly qualified candidates applied," rather than "a small proportion of all qualified candidates applied."

(15) Few truly qualified candidates applied for the position.

In fact, (15) could be judged true if there were only a small number of really qualified candidates (perhaps because the job requirements were particularly onerous), and all of them applied.

Likewise, (16), an example from Partee (1989), could be true if there were only a small number of faculty children in 1980, and all of them were at the picnic.

(16) There were few faculty children at the 1980 picnic.

The possibility of a cardinal reading for *few* is particularly clear when it appears in object position. Thus (17) means that my reasons are small in number, not that of all such reasons I subscribe to only a small proportion.

(17) I have few reasons to trust John.

Along with its difficult-to-specify interpretation, *few* also exhibits inconsistent formal properties. On the most simple test, namely allowability in *there*-insertion contexts (Milsark 1974), *few* can be classified as weak, patterning with other weak determiners such as *some* or *no*:

(18) There are few cars in the parking lot.

But as is well known, *few* does not possess the properties characteristic of prototypical weak determiners (Barwise & Cooper 1981; Lappin 1988, 2000; Partee 1989). One such property is symmetry. As an example of symmetry, the two sentences in (19a) are logically equivalent. But it is not as clear that the equivalence in (19b) holds, and it is obvious that the one in (19c) does not:

(19) a. Some students are anarchists. ⇔ Some anarchists are students.
b. ?Few students are anarchists. ⇔ Few anarchists are students.
c. Few women are great-grandmothers. ⇎ Few great-grandmothers are women.

Similar issues arise with other characteristic properties of weak determiners, such as intersection and persistence/antipersistence (upward/downward monotonicity in a determiner's left argument).

Finally, *few* does not even appear to possess the property of conservativity, long argued to be a universal characteristic of natural language determiners (Barwise & Cooper 1981). Thus consider (20), based on a well-known example from Westerståhl (1985).

(20) Few Americans have won the Nobel Prize in Physics.

The number of Americans who have won the Nobel Physics prize – and certainly the proportion – is without doubt small. Nevertheless, on one reading, (20) could be judged false if Americans make up a large proportion of the winners. But if the cardinality of the predicate is factored into the truth conditions of a sentence such as this, conservativity does not obtain.

Importantly, the interpretation of *a few* is largely free of these complexities. To start with, *a few* is purely cardinal. Regardless of the context or the nominal expression with which it combines, *a few* specifies a small number of individuals in an absolute sense. Thus (21a-c) could all be judged true if a handful of individuals within the domain (*Americans*, *senators* or *students in my class*) satisfied the predicate:

(21) a. A few Americans voted for Ralph Nader in 2004.
b. A few senators supported the bill.
c. A few students in my class solved the problem.

Furthermore, in a situation in which one hundred thousand Americans voted for Nader in 2004, (21a) is pragmatically odd if not actually untrue, evidence that *a few* does not exhibit the proportionality that I have shown is characteristic of *few*.

A few, like *few*, can be classified as weak, as seen by the acceptability of (22a). But unlike *few*, it displays the characteristic properties of this class, such as symmetry, as seen by the equivalence in (22b):

(22) a. There are a few cars in the parking lot.
b. A few senators are anarchists. ⇔ A few anarchists are senators.

Finally, *a few* is clearly conservative; for example, the truth or falsity of (23) cannot depend on the total number of prize winners.

(23) A few Americans have won the Nobel Prize in Physics.

In short, *a few* is altogether a better-behaved expression than *few*. Any attempt to establish a compositional relationship between the two must capture this fact.

3 Two Crucial Properties

In this section, I introduce two further properties of *few* (and in parallel, *many*) that will serve as the starting point for the analysis to follow.

3.1 *Few* and *many* are adjectives

Within a standard generalized quantifier framework (Barwise & Cooper 1981), all noun phrases are uniformly represented as objects of semantic type $\langle\langle e,t\rangle,t\rangle$, such that "quantificational determiners" – including *few* and *many* – must have the semantic type $\langle\langle e,t\rangle, \langle\langle e,t\rangle,t\rangle\rangle$. But this uniform approach has been challenged in other frameworks which distinguish indefinites from truly quantificational expressions, holding that the former are not inherently quantificational (Kamp 1981; Heim 1982; Landman 2004).

While the status of *few* and *many* with regards to this dichotomy is not completely clear (an issue which itself merits further investigation), in one respect there is clear evidence that these terms do not always have the semantics of determiners which produce generalized quantifiers: In many respects, *few* and *many* exhibit the morphological properties and syntactic distribution of adjectives rather than determiners (Hoeksema 1983; Partee 1989; Kayne 2005).

To begin with the most basic facts, both *few* and *many* pattern with adjectives in having comparative and superlative forms:

(24) fewer, fewest; more, most (cf. taller, tallest)

Both may combine with degree modifiers:

(25) so few/many; too few/many; very few/many (cf. so/too/very tall)

Both may appear in predicative position:

(26) His good qualities are few/many (cf. numerous/evident/remarkable)

Both may be sequenced after determiners other than *a*:

(27) a. The few/many advantages of his theory (cf. the important advantages)
b. His few/many friends (cf. his close friends)
c. Those few/many students who understood the problem (cf. those smart students…)

Finally, perhaps the most convincing evidence, both may be conjoined with other adjectives:

(28) a. Study shows few – and small – inheritances for baby boomers.
b. Precious and few are the moments we two can share.
c. … the many and complex processes involved in the development of an organism…

Since *few* and *many* exhibit the morphosyntactic behavior of adjectives, it is also desirable to represent them semantically as adjectives (i.e., noun modifiers), rather than as determiners. (For a related proposal, see Partee 1989, where *few* and *many* in their cardinal interpretations are associated with adjectival semantics.) Such an approach aligns these expressions within the broader treatment of indefinites as not inherently quantificational. In particular, this view of *few* and *many* finds a parallel in recent semantic analyses of cardinal numbers as noun modifiers lacking in quantificational force (Link 1983; Krifka 1999; Ionin & Matushansky 2004; Landman 2004).

3.2 *Few* is negative

A second crucial fact about *few* is that it is negative. This is in one sense an obvious point, and certainly not a new one. As early as Barwise & Cooper (1981) we find the proposal that *few* can be defined as "not many":

(29) Semantic Postulate: $[\![\text{few}]\!] = \neg [\![\text{many}]\!]$

More recently, McNally (1998) proposes that *few* is equivalent to a variant of *many* which has the morphosyntactic licensing condition that it appear within the scope of clausal negation.

But not all accounts have treated *few* as explicitly negative. An alternate approach is to represent *few* and *many* as opposites, related as ≤ is related to >. Thus for example Partee (1989) proposes the following as a first approximation of the semantics of *few* and *many* in their cardinal interpretations:

(30) $[\![\text{few N}]\!] = \{X: |X \cap N| \leq n\}$, where n is some small number
$[\![\text{many N}]\!] = \{X: |X \cap N| > n\}$, where n is some large number

Lappin (1988, 2000) similarly remarks that the denotation of *few* can be obtained from that of *many* by replacing > with ≤ in the relevant formula.

Now, it is not immediately apparent that the distinction between Partee's and Lappin's approach (*few* and *many* as opposites) and that of Barwise & Cooper and McNally (*few* as the negation of *many*) is an important one. After all, there is an obvious equivalence between the two, stemming from the equivalence of a formula of the form $|X \cap N| \leq n$ to one of the form $\neg|X \cap N| > n$. Thus we can of course move transparently from one type of definition to the other. But on another level, the difference between these two approaches is a more fundamental one. In the expressions in (30), *few* and *many* are of equal status; either one can be viewed as the opposite of the other. But with semantics such as Barwise & Cooper's (29), *many* is the primary term, while *few* is derived from it. Or to put this differently, the denotation of *few* includes an additional element that is not present in that of *many*, namely a negation operator. This is a basic asymmetry between the two expressions, which we might predict would have syntactic or semantic consequences. Thus it seems to matter which of these two approaches to *few* we choose.

I would like to argue that there is ample evidence that *few* is in fact negative, and should be represented as such. As a first point of support, the syntactic distribution of *few* parallels that of explicitly negative expressions. On standard tests for negativity (e.g., Klima 1964), *few* patterns with overtly negative quantifiers such as *no*, rather than positive quantifiers such as *some* or *many*. For example, *few*, like *no*, takes *either* rather than *too* tags:

(31) a. Some men like Brussels sprouts, and some women do, ✓too/*either. (POS)
b. Many men like Brussels sprouts, and many women do, ✓too/*either. (POS)
c. No men like Brussels sprouts, and no women do, *too/✓either. (NEG)
d. Few men like Brussels sprouts, and few women do, *too/✓either. (NEG)

Few is also similar to *no* and other negative expressions in being somewhat awkward in object position, at least in colloquial speech. In either case, the most natural way to express the same proposition would be by means of an explicit negator higher in the clause:

(32) a. ?He has no books. ➔ He doesn't have any books.
b. ?He has few books. ➔ He doesn't have many books.

Perhaps the most compelling evidence that the representation of *few* contains a negative component is provided by the existence of so-called "split scope" readings (Jacobs 1980) when it appears in the scope of an intensional verb or modal operator. For example, the most natural reading of (33a) is roughly that given by the paraphrase in (33b), where negation is interpreted outside the scope of the verb *need*, while *many reasons* is interpreted as within its scope. This is distinct from the narrow scope or *de dicto* reading in (33c), where both negation and *many reasons* are within the scope of *need*, and which could be paraphrased as "to fire you, they need it to be the case that they have not many (i.e. a small number of) reasons." It is also distinct from the true wide scope or *de re* interpretation in (33d), where both negation and *many reasons* scope outside of *need*, and which could be paraphrased as "to fire you, there are not many (specific) reasons such that they need them."

(33) a. They need few reasons to fire you.
b. "to fire you, it is not the case that they need many reasons"
$\neg$ > need > many reasons
c. "to fire you, they need there to be not many reasons"
need > $\neg$ > many reasons
d. "to fire you, there are not many (specific) reasons such that they need them"
$\neg$ > many reasons > need

Similarly, (34a) could be best paraphrased by (34b), where negation outscopes the modal operator, which in turn outscopes *many reasons*:

(34) a. You can have few reasons to doubt my story.
b. "it is not possible that you have many reasons…."
$\neg > \Diamond >$ many reasons

In light of these facts, as well as the previously discussed distributional patterns, I propose that at the level of logical form, *few* must be decomposed into a negation operator and a positive term.

4 The Semantics of *Few* and the Derivation of *A Few* (Or: Why *A Few*?)

In this section, I build on the conclusions of the previous discussion with a proposal for the formal semantics of *few,* which I show addresses many of the difficulties discussed above, and also allows *a few* to be derived in a compositional manner.

4.1 *Few*

I begin with the lattice theoretic framework of Link (1983), in which the domain of individuals is extended to include plural individuals formed as the sums over sets of atomic individuals. Within this framework, the cardinal numbers may be represented as follows (e.g. Landman 2004):

(35) $[\![\text{three}]\!] = \lambda x\,[|x|=3]$

Here, *three* is defined as a one-place cardinality predicate, that is, an expression of type ⟨e,t⟩.

I propose that a similar approach can be applied to *few* and *many*, the primary difference being that these terms require a contextual component to their interpretations. My proposal for the semantics of *many* and *few* is given in formal terms in (36):

(36) a. $[\![\text{many}]\!] = \lambda x[\text{large}^C(|x|)]$
b. $[\![\text{few}]\!] = \lambda x[\neg\text{large}^C(|x|)]$

Here large^C is a contextually defined value that may reflect the size of the domain of quantification, contextual information, prior expectations, and perhaps other factors. To paraphrase (36) in less formal language, *few* and *many* thus denote sets of (plural) individuals of (contextually specified) small or large cardinality, respectively.

I further follow Link (1983) in introducing the pluralization operator *, defined as follows for any one-place predicate P:

(37) $*P = \{x \in D : \exists Z \subseteq P: x = \sqcup Z\}$, where $\sqcup Z$ is the sum of the elements in Z

With this in place, *few* and *many* may combine with a plural noun such as *students* by intersective modification, giving the following for *few*:

(38) $[\![\text{few students}_{\langle e,t\rangle}]\!] = [\![\text{few}]\!] \cap [\![\text{students}]\!]$
$= \lambda x[\neg\text{large}^C(|x|)\ \&\ {*}\text{student}(x)]$

The resulting expression is again of semantic type ⟨e,t⟩, a one-place predicate or set of plural individuals (cf. previous non-quantificational treatments of indefinites, e.g. McNally 1998; de Swart 2001; Landman 2004; among other). Beyond this, I assume that the plural morphology on the noun restricts the denotation of *few students* to proper plural (i.e., non-atomic) individuals; that morphological pluralization can have this effect is seen through the contrast in (39), where (39a) must refer to a single student, while (39b) must be two or more:

(39) a. some student
b. some students

The advantages of this approach to the semantics of *few* and *many* are several. First and most obviously, the vagueness and context-sensitivity of their interpretations can be accounted for. In particular, both cardinal and proportional readings of *few* can be obtained with the appropriate choice of large^C, as can the "reverse" reading available for examples such as (20). Secondly, the non-determiner-like properties of *few* – notably lack of conservativity – receive an explanation: *Few* is not a determiner, and so it is not surprising that it does not behave like one.

It should be mentioned that there are two important questions that I am not addressing here, the first being precisely how large^C receives its value within a particular context, and the second being whether the denotations of *few* and *many* should reference the same or different values. There is much of interest to pursue here, but the definitions in (36) are sufficient for the present purposes.

An issue that must be addressed in this sort of treatment is that, within a classical generalized quantifier framework, an expression of type ⟨e,t⟩ such as (38) is not the appropriate type to appear in argument position. Within "adjectival" theories of indefinites, the standard approach to resolving this issue is to invoke a shift to type ⟨⟨e,t⟩,t⟩, an operation that has come to be known as existential closure (Partee 1986; de Swart 2001; Landman 2004). I follow this approach here, using the following definition of existential closure:

(40) Existential closure (EC)
For any one-place predicate P:
$EC(P) = \lambda Q \exists x[P(x) \& Q(x)]$

I further propose that under existential closure, the negation operator in the underlying semantic representation of *few* is able to detach and take higher scope, above the existential operator. The necessity of such an operation is separately motivated by the existence of split scope readings, discussed in Section 3.2 above, which provide evidence that the negative component of *few* is able to take separate scope from the remainder of the expression (though I should note that the precise mechanism by which this occurs requires further investigation).

(41) $[\![\text{few students}_{\langle\langle e,t\rangle,t\rangle}]\!] = \lambda Q\ \neg\exists x[\ \text{large}^C(|x|)\ \&\ {*}\text{student}(x)\ \&\ Q(x)]$

To paraphrase (41), *few students* at the generalized quantifier level denotes the set of sets (properties) that do not contain an element of large cardinality composed of students, but that may contain a small plural individual composed of students, an atomic member of the set *student*, or no elements of the set *student* at all. This seems to capture the meaning of *few* as it was outlined above; it also correctly follows from (41) that *few* is monotone decreasing.

4.2 *A few*

With the analysis I have proposed above for *few*, the derivation of *a few* – the primary objective of this paper – is now straightforward.

As a first step, it is necessary to take a position on the semantics of the indefinite article *a*. While one standard approach would be to say that *a* introduces existential quantification, here I will again follow recent theories of indefinites as non-quantificational (e.g. Heim 1982; Landman 2004), and propose that the existential force of an expression such as *a student* (or for that matter, *a few students*) originates externally, again via an operation of existential closure. As a first approximation (to be revised below), we could therefore view *a* as a modifier (type $\langle\langle e,t\rangle,\langle e,t\rangle\rangle$) which is semantically vacuous.

Under this view, the semantics of an expression such as *a few students* at the set level (type $\langle e,t\rangle$) can now be derived in one of two ways. As the first option, *few* may first combine with *students* as above, with *a* then applying to the resulting combination:

(42)
$[\![\text{students}]\!] = \lambda x[{*}\text{student}(x)]$
$[\![\text{few students}_{\langle e,t\rangle}]\!] = \lambda x[\neg\text{large}^C(|x|)\ \&\ {*}\text{student}(x)]$
$[\![\text{a few students}_{\langle e,t\rangle}]\!] = \lambda x[\neg\text{large}^C(|x|)\ \&\ {*}\text{student}(x)]$

In this version of the derivation, *a few* is not a constituent. While this might initially seem counterintuitive, this option is necessary to account for the possibility of positioning a noun modifier between *a* and *few*, as in *a lucky few students*.

As the second option, *a* may first combine with *few*, with the resulting expression then combining with *students*:

(43)
$[\![\text{few}]\!] = \lambda x[\neg\text{large}^C(|x|)]$
$[\![\text{a few}]\!] = \lambda x[\neg\text{large}^C(|x|)]$
$[\![\text{a few students}_{\langle e,t\rangle}]\!] = \lambda x[\neg\text{large}^C(|x|)\ \&\ {*}\text{student}(x)]$

Here the constituency of *a few* has been restored, a welcome outcome from an intuitive point of view; this option will prove necessary below.

In either case, existential closure may apply to the resulting set expression to yield a generalized quantifier interpretation. Importantly, in this case, I propose that the presence of the indefinite article *a* blocks the raising of the negator over the existential operator, as occurs in (41). As evidence that *a* may have this effect, note that a similar pattern is seen when the overt negator *not* appears within the scope of *a*. For example, (44a) must mean that <u>some</u> students solved the problem; it cannot be true in the case where <u>no</u> students did so, as would be the case if the negator had scope over the existential operator. In this, (44a) contrasts directly with (44b), where negation has sentential scope, and which is clearly true in the case where there were no problem-solvers.

(44) a. A not large number of students solved the problem.
b. It is not the case that a large number of students solved the problem.

I propose that a similar pattern obtains in the case of *a few*. This gives (45) as the derivation of the generalized quantifier interpretation of *a few students*:

(45) $$[\![\text{a few students}_{\langle\langle e,t\rangle,t\rangle}]\!] = \text{EC}(\ [\![\text{a few students}_{\langle e,t\rangle}]\!]\ ) = \lambda Q \exists x[\neg \text{large}^{C}(|x|)\ \&\ {*}\text{student}(x)\ \&\ Q(x)]$$

To express this less formally, *a few students* is interpreted as the set of sets (properties) that contain a plural individual of not-large cardinality made up of students.

Thus the *a* of *a few* does have a semantic contribution, namely to ensure wide scope for the existential operator (that is, to maintain the ordering ∃¬ rather than ¬∃).

Before proceeding, it should be noted that the expression in (45) accurately captures the semantics of *a few* as discussed in Section 2 above.

First, the "at least" interpretation of *a few* falls out from the semantics of the existential operator: If there is some large plural student individual *y* within the denotation of the predicate Q, there also must be a not-large plural student individual *y'* (an individual part of *y*) within its denotation. This in turn establishes that *a few* is monotone increasing, as demonstrated above.

Second, regardless of how large^{C} is interpreted in a given context, the existential in (45) is only guaranteed to pick out the minimal element of the set *few students*, namely an element of cardinality two. This means that the proportionality or context dependence inherent to *few* is not passed along to *a few*. Thus with this analysis we have captured the fact that *a few*, unlike *few*, has a purely cardinal interpretation, and thus patterns consistently with weak determiners.

In short, the present analysis of *few* allows a compositional derivation of *a few,* and provides a neat account for the interpretive differences between the two.

In turn, facts relating to *a few* provide further support for the proposal that the denotation of *few* must include a negation operator. To see this, consider the expressions in (46):

(46) a. Not every student solved the problem.
b. Not many students solved the problem.
c. Not a student solved the problem.
d. Not five minutes later, the professor walked in.
e. Not a few students solved the problem.

We have here a puzzling contrast. In (46a-d), *not* + quantifier + N specifies a number of individuals <u>smaller</u> than would be specified by quantifier + N. Thus *not every student* is <u>less</u> than every student, *not many students* is <u>less</u> than many students, *not five minutes later* is <u>less</u> than five minutes later, and so forth. But oddly, in (46e) *not a few students* means <u>more</u> than a few students.

Under the present proposal, an explanation suggests itself: In *not a few students*, the negator in *few* is able to cancel with *not*. To capture this formally, I begin with the standard assumption that *not* is interpreted logically as the negation operator:

(47) $\llbracket \text{not} \rrbracket = \neg$

Then the denotation of *not a few students* can be derived as follows:

(48) $\llbracket \text{a few} \rrbracket = \lambda x[\neg \text{large}^C(|x|)]$

$\llbracket \text{not a few} \rrbracket = \lambda x \neg [\neg \text{large}^C(|x|)]$
$= \lambda x[\text{large}^C(|x|)]$

$\llbracket \text{not a few students}_{\langle e,t \rangle} \rrbracket = \lambda x[\text{large}^C(|x|) \ \& \ {}^*\text{student}(x)]$

$\llbracket \text{not a few students}_{\langle\langle e,t \rangle,t \rangle} \rrbracket = \lambda Q \exists x[\text{large}^C(|x|) \ \& \ {}^*\text{student}(x) \ \& \ Q(x)]$

This can be paraphrased as the set of sets (properties) that contain a plural individual of large cardinality composed of students. We can compare this back to the denotation of *a few students*, which references "a plural individual of not-large cardinality," to see that this gets the facts right, giving us an interpretation of *not a few* that is more than *a few*. Importantly, if we had not derived *a few* from *few*, as proposed, and if we had not specified that *few* incorporates a negation operator, it is not clear how we could approach capturing the facts in (46).

5 Constraints on the Distribution of *A* (Or: Why Not **A Many*?)

An obvious question arises from the preceding discussion, which can be simply stated as follows: "Why is there no *a many*?" If the indefinite article *a* is able to combine with a set of plural individuals such as *few* or *few students*, we would predict that this process would be more widespread. But of course examples such as the following are bad:

(49) a. *An every student came to the party.
b. *A most students came to the party.
c. *A many students came to the party.
d. *A three students came to the party.

Now, there is a relatively simple explanation for the ungrammaticality of (49a-b). *Every student* and *most students* are presumably interpretable only at the generalized quantifier level (type ⟨⟨e,t⟩,t⟩), not the appropriate type to combine with *a*.

But (49c-d) are more problematic for the present account. Under the theory proposed here, expressions such as *many students* and *three students* – like *few students* – have interpretations at the level of sets (type ⟨e,t⟩). But this implies that they should be able to combine with *a*, which in fact they do not.

In addressing this issue, note first that from the set *many students*, either existential closure alone or the application of *a* followed by existential closure would produce the same generalized quantifier. This is illustrated in (50):

(50) $\llbracket \text{many students}_{\langle e,t \rangle} \rrbracket = \lambda x[\text{large}^C(|x|) \ \& \ {}^*\text{student}(x)]$

EC | *a* + EC

$\llbracket \text{many students}_{\langle\langle e,t \rangle, t \rangle} \rrbracket = \lambda Q \exists x[\text{large}^C(|x|) \ \& \ {}^*\text{student}(x) \ \& \ Q(x)]$ = $\llbracket \text{a many students}_{\langle\langle e,t \rangle, t \rangle} \rrbracket = \lambda Q \exists x[\text{large}^C(|x|) \ \& \ {}^*\text{student}(x) \ \& \ Q(x)]$

Thus in the case of a nominal expression containing *many*, *a* does not make a semantic contribution beyond that which obtains through a non-lexical operation of existential closure alone. And the same point could be made for expressions involving the cardinal numbers, such as *three students*.

This contrasts directly with the case of *few*. The diagram in (51) recaps the material presented in the previous section. As is seen here, from the set *few students*, two different generalized quantifiers may be formed: a monotone decreasing expression derived via existential closure (namely *few students*), and a monotone increasing expression derived via the application of *a* followed by existential closure (namely *a few students*).

(51)

$$[\![\text{few students}_{\langle e,t\rangle}]\!] = \lambda x[\neg \text{large}^{C}(|x|)\ \&\ {*}\text{student}(x)]$$

EC $\swarrow$ $\searrow$ *a* + EC

$$[\![\text{few students}_{\langle\langle e,t\rangle, t\rangle}]\!] = \lambda Q \neg\exists x[\text{large}^{C}(|x|)\ \&\ {*}\text{student}(x)\ \&\ Q(x)] \;\neq\; [\![\text{a few students}_{\langle\langle e,t\rangle, t\rangle}]\!] = \lambda Q \exists x[\neg\text{large}^{C}(|x|)\ \&\ {*}\text{student}(x)\ \&\ Q(x)]$$

In light of these observations, I propose the following generalization: The distribution of *a* is limited by a requirement that *a*, when present, make a semantic contribution. This constraint effectively blocks the derivation of **a many students* or **a three students*, since in these cases *a* would not do any semantic "work" for us. However, it is not invoked in the case of *few*, since the generalized quantifiers *few students* and *a few students* have different semantics.

Thus here we see the source of the uniqueness of the pair *few*/*a few*: *Few* is the only lexically simple quantifying expression of the appropriate semantic type whose interpretation is such that the application of *a* is not vacuous; this follows from the presence of the negation operator, which allows for two different scope relationships between existential operator and negator.

6 Conclusions and Further Questions

In this paper, I have proposed an analysis of *few* as a one-place predicate that incorporates a negation operator. I have shown that this approach allows the compositional derivation of *a few* as *a* + *few*, and accurately captures the differences in interpretation and formal properties between expressions such as *few students* and *a few students*. I have further shown that parallel expressions such as **a many* and **a five* can be blocked by a constraint against the vacuous application of *a*.

In concluding, I will mention several further questions that arise from this analysis. The first relates to an apparent exception to the above-described restriction on the distribution of *a*: While *a* cannot directly precede *many* or the cardinal numbers, this is possible if a modifier intervenes (Ionin & Matushansky 2004; Kayne 2005):

(52) *(A) great many students came to the party.

(53) a. *(A) lucky five students will win fellowships.
b. It cost me *(a) whole ten dollars.
c. *(An) incredible ten thousand soldiers died in the battle.

What is particularly interesting about these cases is that *a* is not just <u>allowed</u>, it is <u>required</u>. For example, *a lucky five students* is fine, but *lucky five students* is not allowed. One possible explanation is that *a* is required here for some independent (e.g., syntactic) reason, in which case the existence of these constructions would be further evidence that *a* may combine with a plural expression. A second possibility is based on the observation that, in their requirement for an overt indefinite article, expressions such as *great many students* or *lucky five students* show precisely the behavior of singular count nouns such as *student*, raising the question of whether they could in some respect be singular.

Finally, this paper began with a particular contrast between *few* and *many*. There are several other puzzling contrasts of this nature that also would benefit from further investigation. For example (Kayne 2005):

(54) a. He visits every few/*many days.
b. Another few/*many students won fellowships.
c. The same few/*many students always get the best scores.

One approach would be to explore whether the present account of *a few* versus **a many* could be extended to capture these facts as well. However, there is one fact that suggests a different analysis will be required: With respect to combination with *a*, the cardinal numbers pattern with *many* rather than *few*, but in the constructions in (54), they pattern with *few* (e.g., such that *every five days* is entirely acceptable). I must leave this question as a topic for future research.

References

Barwise, J. and Cooper, R.: 1981, Generalized quantifiers and natural language, *Linguistics and Philosophy* **4**, 159-219.

Gamut, L. T. F.: 1990, *Logic, language and meaning*. Chicago: University of Chicago Press.

Heim, I. R.: 1982, *The semantics of definite and indefinite noun phrases*. Ph.D. dissertation, University of Massachusetts, Amherst.

Herburger, E.: 1997, Focus and weak noun phrases, *Natural Language Semantics* **5**, 53-78.

Hoeksema, J.: 1983, Plurality and conjunction, *in* A.G.B. ter Meulen (ed), *Studies in Model-Theoretic Semantics*, Foris, pp. 63-83.

Horn, L. R.: 1989, *A natural history of negation*. Chicago: University of Chicago Press.

Horn, L. R.: 2003, The border wars: a neo-Gricean perspective. Talk given at *The First International Workshop on Current Research in the Semantics-Pragmatics Interface*, Michigan State University.

Ionin, T. and Matushansky, O.: 2004, A singular plural. Talk given at *WCCFL 23*, U.C. Davis.

Jacobs, J.: 1980, Lexical decomposition in Montague Grammar, *Theoretical Linguistics* **7**, 121-136.

Kamp, H.: 1981, A theory of truth and semantic representation, *in* J. Groenendijk, T. Janssen and M. Stokhof (eds), *Formal Methods in the Study of Language: Proceedings of the Third Amsterdam Colloquium. Mathematical Centre Tracts*, pp. 277-322.

Kayne, R. S.: 2005, On the syntax of quantity in English, *in* R.S. Kayne, *Movement and Silence*, Oxford University Press, pp. 176-214.

Keenan, E. L. and Stavi, J.: 1986, A semantic characterization of natural language determiners. *Linguistics and Philosophy* **9**, 253-326.

Klima, E. S., 1964, Negation in English, *in* J. A. Fodor & J. J. Katz (eds.), *The Structure of Language*, Prentice-Hall, pp. 246-323.

Landman, F.: 2004, *Indefinites and the type of sets*. Oxford: Blackwell.

Lappin, S.: 1988, The semantics of ‘many’ as a weak determiner, *Linguistics* **26**, 977-998.

Lappin, S.: 2000, An intensional parametric semantics for vague quantifiers, *Linguistics and Philosophy* **23**, 599-620.

Link, G.: 1983, The logical analysis of plurals and mass terms: a lattice-theoretical approach, *in* R. Bäuerle et al. (eds), *Meaning, Use, and Interpretation of Language*, de Gruyter, pp. 302-323.

McNally, L.: 1998, Existential sentences without existential quantification, *Linguistics and Philosophy* **21(3)**, 353-392.

Milsark, G.: 1974, *Existential sentences in English.* Ph.D. dissertation, MIT.

Partee, B. H.:1986, Noun phrase interpretation and type-shifting principles, *in* J. Groenendijk, D. de Jongh and M. Stokhof (eds), *Studies in Discourse Representation Theory and the Theory of Generalized Quantifiers*, Foris, pp. 115-143.

Partee, B. H.: 1989, Many quantifiers, *in* J. Powers and K. de Jong (eds), *Proceedings of the 5th Eastern States Conference on Linguistics*, Ohio State University, pp. 383-402.

de Swart, H.: 2001, Weak readings of indefinites: type shifting and closure, *The Linguistic Review* **18**, 69-96.

Westerståhl, D.: 1985, Logical constants in quantifier languages, *Linguistics and Philosophy* **8**, 387-413.