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COMPOUND NOMINALS, CONTEXT, AND COMPOSITIONALITY

ABSTRACT. There are good reasons to think natural languages are compositional. But compound nominals (CNs) are largely productive constructions that have proven highly recalcitrant to compositional semantic analysis. I evaluate existing proposals to treat CNs compositionally and argue that they are unsuccessful. I then articulate an alternative proposal according to which CNs contain covert indexicals. Features of the context allow a variety of relations to be expressed using CNs, but this variety is not expressed in the lexicon or the semantic rules of the language. This proposal accounts for the diversity of contents CNs can be used to express while preserving compositionality. Finally, I defend this proposal against some recent anti-contextualist arguments.

1. INTRODUCTION

English and other natural languages are learnable, productive, and systematic, and the standard explanation for these facts is their compositionality. However, it has long been noticed that there are expression classes that do not obviously conform to compositionality. Some of these are idiomatic (e.g., 'kick the bucket', 'get the ball rolling'), but so long as idioms are finite, they are little threat to the general compositionality claim, since finite idioms can be acquired one at a time. Truly challenging cases are productive: indefinitely many instances of them can be generated. One such class is compound nominals (CNs).

CNs present an interesting challenge for compositional semantic theories. In English and many other languages they appear to be productively generated.[1] The lexical constituents of CNs make a regular semantic contribution to the meaning of the whole, even if that meaning is not exhaustively determined by their contribution, and this contribution is substantially greater than that present in even those idioms that inherit some semantic features from their constituents. So we can formulate and interpret compounds like 'apple pie plate tray accident' (=*accident involving the tray for*

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plates used to serve pie made from apples), or, borrowing an example from Gleitman and Gleitman (1970, 67), 'volume feeding management success formula award'. Somewhat easier to parse examples of nominal compounds are:[2]

(1) astronaut pen = *pen used by astronauts*

(2) bubble boy = *boy who lives in a bubble*

(3) soup Nazi = *person who behaves like a Nazi about soup* (?)

(4) man hands = *hands like those of a man*

(5) rat hat = *hat made from rat fur*

(6) earth outfit = *outfit worn by those on earth*

What these cases have in common is that it is *prima facie* difficult to see how to account for their semantics in compositional terms. This stands in sharp contrast to the semantics for many common NPs. 'Black cat', for example, picks out the intersection of the black things and the cats. As a predicating combination, it can be paraphrased 'cat that is black'.[3] No such account works for CNs. 'Dog house' does not pick out the intersection of the dogs and the houses, since that intersection is empty. Neither does 'jewel heist' pick out the intersection of the jewels and the heists. 'Dog house' means *house for dogs*, and 'jewel heist' means *heist of jewels*. But neither of these meanings can be derived given the meanings of the constituent expressions plus their mode of combination, at least not if we assume that the default mode of semantic combination corresponding to syntactic or morphological concatenation is set intersection, as consideration of more straightforward cases suggests.[4]

The semantic difficulty posed by CNs can be seen by considering cases such as 'axe murderer' and 'child murderer'. Here the surface structure of the CNs is identical except for their first word, and the semantic contribution of their constituents is the same as that contributed to other expressions. However, the former compound is usually read as *one who murders with an axe*, while the latter means, on a readily available reading, *one who murders children*. The latter also has an agentive reading on which it means *child who murders*. But the agentive reading *axe who(?)/that murders* is not usually available for the former compound; neither is the instrumental reading *one who murders with a child* readily available for the latter compound. Since the surface form of the CNs in each case is apparently identical, and the semantic value of their constituents is

constant, we will have to look to factors besides surface structure to determine their meanings.

I argue that the appropriate semantic analysis of CNs treats them as expressions that are fully compositional, but context-sensitive. Specifically, I claim that their context-sensitivity can be traced to a tacit or 'hidden' indexical element. I develop and present this analysis by contrast with two alternative kinds of analysis according to which CNs are (1) compositional but 'unspecific' in their meaning, or (2) compositional but semantically many-ways ambiguous. I then defend the hidden indexical analysis by showing how it can deal with problem cases for the alternative analyses, and with some recent objections to contextualism.[5]

2. THEORETICAL PERSPECTIVES ON COMPOUNDING

2.1. *Singular Unspecific Meanings*

2.1.1. *Sainsbury's Analysis*

Sainsbury (2001) offers a unified compositional account of a number of alleged counterexamples to compositionality, including CNs. He suggests that we treat these expressions as having context-invariant *unspecific* meaning. 'On the unspecific account, the determinate meaning does not supply specific information about how the satisfiers of the nouns are related' (Sainsbury 2001, 400).[6] So 'axe murderer' would mean *axe somehow related to a murderer*, 'child murderer' would mean *child somehow related to a murderer*, 'whiskey bar' would mean *bar somehow related to whiskey*, etc. Rather than assigning several possible meanings to such expressions, the strategy is to assign a single unspecific meaning that can be *satisfied* in many ways, by many different circumstances. The semantic mode of combination for CNs is thus a univocal one. We can express such meanings as, for instance:[7]

(7) $\|\text{traffic light}\| = \lambda x[\mathbf{light}'(x) \& \exists R \exists y(\mathbf{traffic}'(y) \& R(x, y))]$

showing that the expression is satisfied by things that are lights and such that there is some relation that they bear to something that is traffic. The unspecific compounding rule would then be[8]

(8) $\|N_1 N_2\| = \lambda x[\mathbf{N}'_2(x) \& \exists R \exists y(\mathbf{N}'_1(y) \& R(x, y))]$

That is, CNs tacitly quantify over possible relations that might hold between head and modifier.

Sainsbury motivates this unspecific meaning analysis with the claim that advocates of contextualist strategies for preserving compositionality (e.g., Stanley 2001) have confused two separate things: (1) a single construction's having two different readings or meanings; and (2) a single construction's being satisfiable by two different 'ways in which one and the same meaning could be true' (Sainsbury 2002, 396). Where we might be tempted, in the face of the apparent semantic diversity of CNs (and genitives, adjectives, and other cases Sainsbury treats in a similar manner), to posit either massive ambiguity or covert indexicality, the appropriate response is to realize that we have been locating the diversity at the wrong level, so to speak. There is not a diversity of meanings (or contents), but instead a diversity of entities, relations, and properties that can satisfy one and the same univocal construction class.

A problem for the unspecific meaning view of CNs is that it gives overly general, and intuitively incorrect, truth conditions for sentences containing them. For it does not constrain in any significant way the circumstances that can satisfy those expressions. Suppose 'traffic light' means *light having something to do with traffic*, as the formalization above suggests. Hence it is true of anything that satisfies such a description. The unspecific meaning account does not say what relation R the lights and traffic must stand in so that the expression applies to such objects. But consider the following possible objects and situations:

- the lights at the front of my car illuminate the road and the surrounding traffic;
- the lights in the windows of houses that can be seen while in traffic;
- the light on my car's dashboard, which I use to read the map while in traffic;
- a light that regulates its brightness by the amount of traffic passing on the nearby freeway; and
- the light by my bed, which is 500 meters from the traffic on the freeway.

All of these are lights that stand in some relation or other to traffic. The relations may be fairly strange, but relations they are, even if we

would not often choose to remark on them. Are they all things to which 'traffic light' applies in one and the same sense?

According to Sainsbury's analysis, it seems so. One way to decide the issue is by examining quantified CNs. I might assert: 'There are three traffic lights in my garage'. This is partially analyzed as

(9) **three**′(λx[**light**′(x)&∃R∃y(**traffic**′(y)&R(x, y))])

Upon examination, the garage contains one device with three colored lights for guiding traffic, one lamp that is visible to the passing traffic, and one small light by which I read maps while in traffic. You might reasonably conclude that I spoke falsely, or at least misleadingly. Those are all in some sense traffic lights; but not in the *same* sense.

Notice that the appearance of falsity here is not dispelled by adding hedges such as 'strictly speaking' or 'literally'.

(10) Strictly speaking, there are three traffic lights in my garage

(11) There are literally three traffic lights in my garage

Both of these sentences seem false as well. This is significant because hedges often function to direct attention towards the highest standards of applying or assessing the truth conditions of the statements they modify (e.g., 'Strictly speaking, Richard Nixon is a Quaker'; 'There are literally a million ants in my pants'). If effects of tacit quantification over all possible relations between head and modifier appear anywhere, they should appear in hedged constructions. But they don't seem to.

Sainsbury might accept these consequences, given his intention to distinguish between multiple meanings and multiple satisfiers. Further evidence against the unspecific view is the fact that generic statements involving CNs appear to come out false on this analysis. Note first that not every modifier–head construction can easily be read generically. Many Adj–N combinations, in particular, seem to resist this reading: 'green bottle' or 'big trout' are not easily read as the names of kinds, since they don't seem to denote classes that have any interesting sort of unity.[9] But there are still CNs that can be so interpreted, e.g. 'traffic light', 'jewel thief', 'log cabin', and 'fire door'. Consider the following sentences, which plausibly have generic readings:

(12) Traffic lights are colored green, yellow, and red.

(13) The traffic light was invented in Detroit in 1920.

(14) A traffic light can be found at most intersections.

It's a familiar point that generic claims need not be true of every instance of a kind. Some traffic lights lack a yellow light, for example, but (12) is still true. 'Invented' is a predicate that is best used to describe kinds, not individuals or classes, so 'traffic light' in (13) must be interpreted as kind-expressing. How to give an adequate semantics for genericity is a complex matter, and not one on which I take a decisive stand here. But if 'traffic lights' means *lights having something to do with traffic*, these generic statements are false.

To see this, suppose that some generic statements involve attaching an operator to an expression that restricts its extension to just the stereotypical or prototypical members of the category that it expresses. While this is an oversimplified analysis, and one that has been criticized, it is useful for my purposes since it captures the intuition that generic statements are true only of the best examples of the category itself. The statistically typical (or otherwise 'normal') member of the extension of 'traffic light', on the unspecific analysis, does not have three colored lights, if that CN includes the examples listed above in its extension. Given the number of ways that lights can be 'involved' with traffic, there is little reason to expect lights unspecifically related to traffic to have anything much in common. Quantifying over all possible relations between Ns only generates an arbitrary collection of objects, not a collection that constitutes a kind or has a coherent stereotypical member. Lights that regulate traffic in the way typical traffic lights do can be found at most intersections; but lights somehow unspecifically related to traffic cannot. The generic statements plainly seem true, but they would not be on an unspecific meaning analysis of CNs.

Does this occur because compounds such as 'traffic light' are highly familiar and thus lexicalized? One might argue that the reason 'traffic light' cannot receive the eccentric interpretations given above is that it is listed with an independent meaning in the lexicon. The correctness of the unspecific account would then be shown by considering truly nonce compounds like 'tape cat' or 'rosemary book', where the only way that we can interpret them is as 'N_2 having something to do with N_1'. Absent a context, this quantified expression is the best that we can do to guess their meaning, and this is just what the unspecific analysis predicts.

It might be true that absent a context all we can do is say that 'rosemary book' means *book having something to do with rosemary*. But this datum does not decide between the unspecific account and the contextualist account that I offer in Section 3.1. Direct comparison of the two positions will have to wait. However, we should note that other context-sensitive expressions also display this pattern. All that can be said about the meaning of 'He is tall', considered out of context, is that it means that *some (male) person is tall*. Absent a context, we cannot say what male person the pronoun picks out (since, absent a context, it doesn't pick out *any* person in particular). Analogously, absent a context, 'rosemary book' does not express any relation in particular. In a context, however, it does. So the fact that non-lexicalized compounds, considered outside of a particular context of use, only permit us to gloss their meaning as N_2 *having something to do with* N_1, doesn't by itself argue in favor of the unspecific analysis, since this fact by itself is compatible with the contextualist analysis I will present.[10]

2.1.2. *Dowty's Analysis*

Dowty (1979) offers a sophisticated, but still unspecific, interpretation rule for CNs. Changing his formalism slightly, it states

(15) $\|N_1N_2\| = \lambda x \exists P[P\{x\} \& \exists R[\textbf{appropriately-classificatory}'(R) \& \forall y[P\{x\} \rightarrow [\textbf{N}'_2(y) \& \textbf{typically}'(\hat{}\exists z[\textbf{N}'_1(z) \,\&\check{}R(y, z)])]]]]$

Prescinding from some of the rule's complexity, we can see that he adopts essentially the strategy I ascribe to Sainsbury, namely taking CNs to contain tacit quantification over possible relations. However, Dowty's rule includes two significant refinements. First, following Zimmer (1971, 1972), he restricts the possible relations to those that are 'appropriately classificatory'. The effect is to restrict the domain of quantification in the hope of ruling out some of the bizarre counterexamples to Sainsbury's analysis. Second, he adds a clause indicating that the relation between N_1 and N_2 must be one that 'typically' obtains. I will say more about whether we should always include such a clause in Section 3. For now I will focus on the notion of appropriateness.

What makes a relation appropriately classificatory is not easy to specify. The intent, though, is clear: to rule out some of the bizarre relations listed above as counterexamples. For instance, one doesn't in general find readings of 'migraine medicine' that make it mean

medicine sold by a person who has a migraine. That isn't a relation between migraines and medicine that we usually view as appropriately classificatory of a kind of medicine. But I am not certain – and I am not certain how to demonstrate – that one could *not* get such a reading. Maybe it would just require some rather elaborate back story. One point that is clear about the relation of being appropriately classificatory, though, is that its extension has to be relativized to a speaker, an audience, a conversational and cultural background, and other contextual properties. It seems fruitless to look for a set of relations that are appropriate independent of such factors.

Dowty's rule, then, depends on a restriction that is sensible only when linked to elements of context. But there is no apparent place in the rule itself for context to play a role. As it happens, though, we already have ways of incorporating dependence on context into semantics, namely via indexical expressions. In Section 3.1, I'll show how appropriateness can play a role in interpretation of CNs without including an unrelativized predicate such as **appropriately-classificatory**′ into their logical form (LF). (Another point is that we need to acknowledge more possible quantificational relations than the Dowty rule allows. Again, the approach I recommend satisfies this desideratum.)

Dowty might refine the rule to address the first point about context-sensitivity by adding an explicit context parameter to the restrictive predicate, such as **appropriately-classificatory**′**(R, c)**, meaning that R is appropriately classificatory in context c. This would have the effect of making context-dependence explicit. The question of how to decide between this approach and the indexical approach would then turn on more indirect considerations, such as whether the relational material can be quantified by higher expressions. The indexical approach, on one interpretation, predicts that this material should be quantificationally bindable, while Dowty's rule predicts the opposite. This is not an easy question to decide, but I will say a little more about it in Section 3.

2.1.3. *A Pragmatic Enrichment Analysis*

Another alternative view of CNs can be derived from the work of advocates of so-called 'primary pragmatic processes' (p-processes). Here, in order to have a concrete and familiar exemplar, I will focus on the analysis given of these processes by François Recanati (1993, 2004). I don't know that Recanati himself would endorse this

view of CNs; my interest here is only in exploring the resources that p-processes can bring to CN interpretation. On Recanati's view, p-processes are local processes that can affect the content of subsentential elements prior to the composition of a complete proposition. They contribute novel semantic content to what is said. Examples of these processes are saturation, enrichment, loosening, and transfer. Saturation is mandatory, because open variable places such as indexicals need to be filled in for a complete proposition to be expressed; the other processes are optional. These processes all operate below conscious awareness and are non-inferential, relying instead on associations among intrasentential, within-discourse, and extralinguistic contextual elements for their operation.

The view of CN interpretation to be defended in this paper posits tacit indexicals that need contextual completion; hence it is based on primary pragmatic processes (namely saturation) in Recanati's sense. The present issue, then, must be whether it is plausible to view CN interpretation as *non*-saturation-based but still involving p-processes. The most plausible analysis along these lines would posit optional free enrichment of the head N of a compound. So, e.g., in 'cat flap', 'flap' might be enriched to mean *flap for use by (a)*, which combines with *cat* to produce the content *flap for use by a cat*. In another context, it might be enriched differently, perhaps to *flap covered by a picture of a cat*. This process, though, is local in that it functions before the semantic composition of what is said takes place, and optional in that it is always possible simply to let 'cat flap' mean what it means without enrichment: *cat flap*.

This last point highlights the way in which this is an unspecific meaning analysis: it posits that CNs have a conventionally determined meaning consisting only of the juxtaposed meanings of their constituents. This conventional meaning need not be computed, though. It can be, and typically is, elaborated by p-processes in a context-sensitive way.[11] Because of its context-sensitivity, this analysis does not fall prey to the objections to Sainsbury's account. In different contexts, a CN can be specialized in a way that restricts its truth conditions to rule out some of the implausible examples I listed. This is a virtue. However, the account is still open to objection. The primary objection is that it isn't clear that we should think that *cat flap*, taken simply as the juxtaposition of *cat* and *flap*, expresses a complete semantic constituent. If it doesn't, then no expression containing it expresses a complete

proposition, which in turn means that there cannot be any such thing as the complete conventional meaning of a CN-containing expression. The argument for thinking that 'cat flap' is semantically incomplete turns again on the fact, noted in Section 2.1, that independent of any context it is unclear what things it is true of. Profligate context-sensitivity often gives rise to intuitions of incompleteness (although it is obviously not decisive, as Recanati (2004) discusses at length).

The p-process theorist cannot allow that CNs are incomplete, since incomplete expressions trigger grammatically mandated saturation. The account would then collapse into an indexical analysis. So he might reply that the conventional meaning of 'cat flap' is straightforwardly complete, and is given by the conjunction $\lambda x[\mathbf{cat}'(x)\&\mathbf{flap}'(x)]$. The morphological juxtaposition of N_1 and N_2 is set intersection; in terms of conventional meaning, all CNs are predicating combinations. This meaning is probably satisfied by virtually nothing, but it is at least complete, hence open to enrichment by optional p-processes.

This analysis, however, does not seem especially plausible. An objection comes from considering hedged statements like those described in Section 2.1.1. Hedged statements, including those containing 'literally', do not appear to have the alleged conventional truth conditions the p-process analysis posits. Saying that something is 'literally' (or 'strictly', or 'really') a jazz cat is not to say that it is an *x* that is both a cat and jazz; it's more likely to say that it's a cat that enjoys (or seems to enjoy) hearing jazz. The conventional readings of CNs would then be accessible only under wildly counterfactual conditions. Moreover, the account leaves unexplained why the language would provide a productive device the semantics of which, taken in its conventional meaning, is almost always used to say something absurd (e.g., to describe something that is both a cat and jazz). Even if sentences in use are almost always subject to modification by p-processes, this is an awkward posit to accept.

To sum up, then, the challenge for the p-process theorist would be to say what the complete conventional meaning of a CN is, and to show that it is compatible with judgments made under hedging operators. I haven't shown that answering this challenge is impossible, but its difficulty has to be reckoned against the background of available alternatives such as the indexicalist analysis defended here.

2.2. *Multiple Specific Meanings*

Judith Levi, in a widely discussed book (Levi 1978), argues that compound nominals, as well as non-predicating adjective–noun combinations and certain nominalizations ought to receive a uniform semantic treatment.[12] On her influential analysis, CNs are ambiguous, and their ambiguity is accounted for by the fact that they are potentially derived from twelve underlying logical structures, each of which contains a different specific relationship between head and modifier. Underlying CN formation are nine Recoverably Deletable Predicates (RDPs) that are present at deeper levels of syntactic analysis, but lexically instantiated and deleted during surface transformations: CAUSE, HAVE, MAKE, USE, BE, IN, FOR, FROM, and ABOUT. There are a total of twelve possible underlying forms because CAUSE, HAVE, and MAKE can occur in either active or passive forms: CAUSES/CAUSED-BY, etc. So 'traffic light' in its dominant reading might be derived from the underlying structure:

(16) $[_{NP}\ [_{N}\text{light}]\ [_{S}\ [_{V}\text{FOR}]\ [_{NP}\ [_{N}\text{traffic}]][_{NP}[_{N}\text{light}]]]]$

to which we might assign the LF:[13]

(17) $\lambda x[\mathbf{light}'(x)\&\exists y(\mathbf{traffic}'(y)\ \&\ \mathbf{FOR}'(x, y))]$

Levi's analysis can be seen as involving a set of separate rules, each introducing such an abstract predicate at the level of LF. The surface expression type itself would then be ambiguous among the twelve possible readings. For any token utterance, it is a matter of pragmatic decision to select the conversationally appropriate one, as in other cases of lexical, syntactic, and semantic ambiguity.

There are two major difficulties for the multiple meanings strategy.[14] Both are familiar, so I review them only briefly. One is that to keep the list of possible meanings small they must be relatively unspecific. This again raises problems akin to those faced by a maximally unspecific analysis such as Sainsbury's. The second difficulty is that the list of possible semantic material filling in a compound is extensive, and subject to surprising new additions. Hence no small list of sanctioned relations seems likely to capture all uses of CNs (Zimmer 1971, 1972; Downing 1977; Selkirk 1982).

Take the unspecificity objection first. Consider 'city folk', 'urban riots', 'terrestrial life', and 'polar climates' (her examples). Each of

these might have as its dominant reading an expression including an underlying IN: *folk IN city*, *riots IN urban (areas)*, *life IN terra*, *climates IN polar (areas)*. But IN here must correspond to something more general than the English preposition 'in', since it includes relationships such as being located on or at. For example, does IN mean the same in 'Italian book' (=*book IN Italian*) as it does in 'pocket lint' (=*lint IN pocket*)? It isn't easy to see what this common sense might be. Italian books are written in the Italian language, while pocket lint is lint that has its origins in one's pocket (but needn't be there anymore). The same problem can be seen with CNs involving FOR. Take the analysis of 'traffic light': *light FOR traffic* might be general enough to include some of the examples cited in Section 2.1.1. Compare this to 'migraine medicine' (=*medicine FOR migraine*), where the sense of FOR seems to require getting rid of the thing that it's for. 'Bus money' and 'lunch money', meanwhile, are for acquiring, not getting rid of, bus rides and lunch. Similar questions can be raised about other RDPs.

On this interpretation, Levi's proposal is a more constrained sort of unspecific meaning account. It posits several possible meanings for CNs that rule out some highly exotic relations between their constituents. The particular meanings she does posit, though, must be sufficiently general to capture the diversity of semantic relations that can be expressed in CNs. But insofar as these relations are highly general, the account still seems to assign CNs insufficiently discriminating truth conditions.[15]

A maximally specific meaning strategy might pursue Levi's analysis to its natural conclusion by including in the semantics a rule for every possible relation that can hold among constituents of a CN. Levi argues against this possibility on the grounds that such an approach obscures theoretically useful generalizations. I've suggested that these generalizations may not be as useful as they might appear. Levi might reply along the following lines. The grammar delivers only such rather abstract or unspecific meanings for CNs, but we may narrow these meanings in various ways in order to express propositions containing the more specific relations I have sketched so far. We plausibly require these processes in order to account for the varying senses of nouns such as 'rabbit' in 'He eats rabbit (meat)', 'He wears rabbit (fur)', and 'After the accident, the road was covered in rabbit (stuff)'.[16] Combining vague linguistic meanings with processes of semantic specification might address the

unspecificity worry: pragmatics lets us sharpen general or unspecific senses as the context demands.

However, this suggestion naturally leads to the second objection to the proposal: the list of RDPs does not merely include highly general members, but is also crucially incomplete. Certain attested relations do not seem to be merely specifications or refinements of existing RDPs. How might we amend the RDP list?[17]

Adding TO seems necessary, given 'moon mission', 'Everest expedition', 'home delivery', 'stage door', etc. Another needed construction is DURING and related temporal prepositions, as in: 'halftime show', 'afternoon tryst', 'summer soldier', 'bedtime story', and 'honeymoon argument'. MADE-OF makes numerous appearances: 'alligator shoes', 'bear rug', 'leather upholstery', 'rat hat'. Note, too, that MADE-OF tends to suggest extra semantic material denoting the part of the animal being used. A 'rat hat' isn't just a hat made of rat, or rat parts in general, but, typically, a hat made of rat *fur*. This material is specifically dependent on the semantic properties of the head.[18]

A rather productive relation that appears nowhere in Levi's scheme is LIKE, or a similarity-denoting predicate. 'Man hands', 'chicken legs', 'shark lawyer', 'crocodile grin', are examples. These aren't just *hands OF (a) man* or *legs OF (a) chicken*, which is probably the nearest RDP reading. They're hands that are somehow, in some respect, like a man's; e.g., *hands that are large like those of a man*. Levi argues that these resemblance readings are derived pragmatically, not semantically, by a rule such as: 'If no literal meaning of a CN makes sense (or is relevant, or applicable, or internally consistent) *in a given context*, interpret a CN of the form N_1N_2 on a reading comparable to "N_2 which is like N_1N_2"' (p. 115, emphasis in original).[19] This raises the question, though, why we cannot appeal to similar pragmatic principles whenever we have some degree of mismatch with RDPs. How far must the use of a CN in context depart from its RDP before pragmatic departures are licensed? The question is especially pressing given the vagueness of the RDPs themselves. In the account I will defend, no such decisions are necessary.

One might argue that LIKE is infrequent enough that Levi's pragmatic rule will not be needed often. But Wisniewski and Love (1998) draw attention to the existence of what they call 'property interpretations' of CNs, which are read as something like: N_2 *that has a relevant property of* N_1. Property interpretations clearly invoke

a resemblance predicate. Examples include 'umbrella tree', 'butcher surgeon', 'skunk beggar', 'leopard lizard', 'candy barrel cactus', and 'kangaroo rat'. A kangaroo rat, for instance, is a rat that jumps like a kangaroo. Such interpretations are often produced when N_1 and N_2 are similar (e.g., a 'book magazine' is interpreted as *magazine that is as thick as a book*), and subjects can be primed to generate property interpretations of CNs in preference to relational interpretations. Further, in a corpus study of catalogs, wildlife guides, and a dictionary, Wisniewski and Love found 40% of animal, plant, and clothing denoting CNs admit property interpretations. (By contrast, only 14% of artifact naming CNs are easily seen as involving property interpretation.) This suggests that property interpretations are not a marginal linguistic phenomenon. Yet they cannot be subsumed under any of Levi's categories.[20]

Finally, Levi's approach neglects one of the major uses of compounds, which is as 'nonce sense' designators for individuals and the classes they instantiate (Clark 1983). Consider compounds like 'watermelon seat', which might be used to denote the place at a picnic table that has a piece of watermelon on the table in front of it. Downing (1977, 828) also lists 'plate length' (=*length sufficient for one's hair to drag in one's plate when eating*) and 'pancake stomach' (=*stomach full of pancakes*). Nonce senses such as these pose a problem for systematic accounts of CNs. Do we include an IN FRONT OF relation in our listing to deal with 'watermelon seat'? Alternatively, do we try to subsume it under an existing relation – IN or HAVE, perhaps? It is difficult to see a principled place to stop if we adopt the former line, in which case the semantics of CNs becomes littered with more and more particular semantic rules, and thus becomes increasingly difficult to learn. If we adopt the latter line, we have the problem that less specific accounts generate overly general truth conditions.

An alternative would be to simply declare that nonce sense uses, insofar as they are coined for particular, limited communicative purposes, and typically do not involve relations that will recur in future CNs, are not part of the proper domain of a theory of linguistic meaning. But this is an unsatisfactory solution insofar as we do use these expressions in ways that are readily understood in context, and we do often seem to intend to express rather articulated contents with them. That the CN construction provides room for linguistic innovation is itself a fact that a semantic theory should account for.

3. AN INDEXICAL ANALYSIS

3.1. *The Analysis*

I suggest that the linguistic meaning of CNs contains a phonologically unrealized open variable or otherwise indexical expression that picks out the relation among their constituents, and this relation is filled in by pragmatic mechanisms that draw on features of the context of utterance. The lexical meaning of a CN, then, specifies that it expresses a contextually determined relation between the Ns that constitute it. Formally, the proposal can be expressed with three semantic rules:

Rules of CN Interpretation:

I. $\|N_1\ N_2\| = \lambda x[\mathbf{N}'_2(x) \& R^*(x, \mathbf{N}'_1)]$
II. $\|N_1\ N_2\| = \lambda x[\mathbf{N}'_2(x) \& Qy(\mathbf{N}'_1(y) \& R^*(x, y))]$
III. $\|N_1\ N_2\| = \lambda x[\mathbf{N}'_2(x) \& \mathbf{typically}'(R^*(x, \mathbf{N}'_1))]$

In all rules, R^* is an indexical, context-sensitive expression.[21] In Rule II, Q represents a contextually specified quantifier. R* shares features with other, more obviously indexical expressions. R*'s semantic value is given by its character: it picks out, to a first approximation, the most relevant and conversationally sensible relation obtaining between N_1 and N_2. In Zimmer's terms (see Section 2.1.2), we can encapsulate these considerations by calling R^* an 'appropriately classificatory' relation. Such constructions are fit to be satisfied when contextual factors provide a relevant relation; for some discussion of how this relation is determined, see Section 3.2. Since these rules all specify meanings for CNs that are determined wholly by the interpretation of their constituents, they satisfy compositionality. The indexical element here is 'hidden' just in the sense of being phonologically unrealized. (Indeed, given the morphological rules governing how CNs are generated, this semantic material *cannot* be realized at the surface level.)

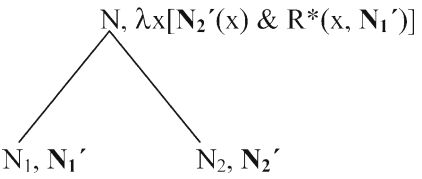
Szabó (2001) claims that counterexamples to compositionality must be such that their content changes within a context despite the content of their constituents remaining the same. In these rules for interpreting CNs, the content of all constituent *lexical* expressions does remain constant, yet the expression as a whole is context-sensitive. CNs as I analyze them are not a counterexample to compositionality in Szabó's sense, however, since the interpretation of

the morphological structure itself contributes the indexical semantic element. This interpreted structure can be regarded as a semantic constituent of the entire CN, and one that makes a constant semantic contribution within a context.[22]

Formal analyses similar to the one advocated here have been proposed by Moortgat (1987) and Partee (1989). An informal account that is grounded, broadly, in pragmatics is given by Downing (1977). An indexical analysis of adjectives along similar lines is presented in Szabó (2001). Bauer (1979) advocates a pragmatic account of CNs as well, although his does not rest on the distinction between linguistic meaning and utterance content. However, the present approach differs significantly from these antecedents. None of them specifically link CN interpretation with other indexical phenomena, and none discuss the range of possible quantifications that CNs can incorporate. I have already discussed some problems with Dowty's unspecific analysis. The present account thus represents an advance over its predecessors.[23]

Three distinct interpretation rules appear to be needed at a minimum, to deal with the variety of CN-internal quantification that appear, and to deal with the optional habitual reading of compounds. Rule I is applied in compounds where what is asserted is a relation between an individual N_2 and the class of N_1s, or between the class of N_2s and the class of N_1s. An example would be 'dog house', which need not be any particular dog's house, but might just be a house intended for use by dogs in general. Similarly, a 'fire department' is, in its standard use, a department in charge of managing and extinguishing fires generally, even if there haven't yet been any specific fires. We can represent the form of CNs constructed using Rule I as follows:

(18) Rule I compound:



Each node on the marker is labeled as: ⟨syntactic category, semantic value⟩. Other rules can be similarly represented, *mutatis mutandis*.[24]

Note that CNs with proper names as modifiers, e.g., 'Chomsky hierarchy', 'Montague grammar', 'Microsoft job', or 'Bush doctrine', can be handled best by Rule I, with the help of some type-shifting principles. If we follow Montague and suppose that proper names are lexically given type $\langle\langle e, t\rangle, t\rangle$, corresponding to generalized quantifiers, then Rule I applies as long as Partee's (1986) BE-operator is applied to shift them to $\langle e, t\rangle$. If, on the other hand, we suppose that they are lexically assigned type e, then the *ident* function can be applied to shift them to the characteristic function of their singleton set, also of type $\langle e, t\rangle$.

Rule II is used for compounds that express a quantified relation between N_2 and N_1. For example, this quantification might be existential: a 'hamburger plate' might be used in context to describe a plate that has some hamburgers on it, and thus it embodies a relationship to some particular burgers or other. Here it would clearly be false to say that the plate has the entire class of hamburgers on it, as a Rule I interpretation would suggest, so a narrower interpretation is needed. Similarly for 'murder weapon', which is generally the weapon used in a *particular* murder (although it can be read as *weapon that is good to use for committing murder*, without such a particular implication). Often the quantifier filling in Q is simply '$\exists$'. Other compounds express different quantifiers. For example, 'mink coat' might be read as *coat made from some minks*, where we mean no definite number of minks, but certainly intend more than one. We can force such readings as well: 'bear rug' might be used appropriately of a rug made from the skin of one bear, the teeth of another, the claws of yet another, etc.

Plausible quantifiers that can fill in for Q include, at least, 'a', 'some', 'many', and 'most'. 'No' or 'none', and other negative quantifiers are very likely not attested (Downing 1977). One does not interpret 'tree pile' as *pile bearing R* to no trees*, since doing so would violate the pragmatics associated with using a modifier–head construction in the first place, which demand that at least some of the modifier's extension be related to the head's (see also Section 4.2 for more on the pragmatics of these constructions). For similar reasons, R* does not include material such as *bearing no relation to*. The morphosyntax of the construction overwhelmingly demands that *some* positive relation be expressed.

Other evidence that quantification internal to CNs makes sense comes from considering cases in which the quantifier occurs explicitly: 'five-mink coat' and 'three-bear rug' are examples, the former

meaning *coat made from five minks*, the latter meaning *rug made from three bears*. It is *prima facie* unlikely that more specific quantifiers such as 'forty-eight' or 'two' would be used tacitly, since such expressions are too difficult to retrieve appropriately in context. However, it doesn't seem to be impossible. Suppose that you work for a catering company, and you are charged with preparing a large number of plates of food. Some plates will contain hamburgers, some will contain tacos, and some will contain hot dogs, but your supervisor tells you that, whatever kind of food it contains, each plate should have exactly two things of that kind on it. Given this situation, if you are told to prepare a 'hamburger plate', you know that you should prepare a plate containing *two* hamburgers. You could readily extend the use of this quantifier to other expressions, as well; e.g., if you were told to make a 'truffle plate', you might assume, given the context, that such a plate should contain two truffles as well. So sometimes a more specific quantifier can be raised to relevance.

Rule III is needed to express habitual, regular, or recurrent relations that obtain between an N_2 and N_1s. **Typically′** is a propositional operator that gives a sentence a habitual reading. Gleitman and Gleitman's (1970) example of such a CN is 'garbage man', a man who habitually or typically removes the garbage. The Gleitmans note that generic uses of CNs, in which we emphasize the 'unitary character to the relationship among the elements' (87), are commonplace. Nonce formations may express this habitual sense as well as lexicalized formations. If every time we have gone to the diner there is an overweight baby at the counter eating pancakes, one of us can inquire about it by asking whether the 'pancake baby' was there today, yet 'pancake baby' is unlexicalized.

It is worth noting that not all compounds have a habitual sense; 'hamburger plate' is a counterexample, since a hamburger plate needn't typically be affiliated either with hamburgers in general or with any particular set of hamburgers. It might be a disposable plate that, *pro tem*, is the locus of the burgers. Neither does 'murder weapon' describe a weapon that is habitually or typically used to murder; one such use is sufficient. A 'kangaroo cloud' might be a cloud that is presently shaped like a kangaroo, but may not be in a moment, since the shapes of clouds are mutable; and so on.

Can these three rules be reduced in number? The obvious strategy for doing so would be to reduce Rules II & III to instances of Rule I. Rule III encodes the special case where the relationship

between N_2 and N_1 is habitual. The justification for separating this rule out is not that it *cannot* be eliminated; rather it is that Rule III marks a distinctive and frequently-used kind of construction. Absorbing habitual compounds under the same umbrella as non-habituals ignores the fact that habitual interpretations are often the default, psychologically speaking. A taxonomy of semantic relations in compounding should reflect such facts about their primary usage. Levi makes this point, and I agree with it. A similar argument could be given against reducing Rule II to Rule I. The defense of separating them is the same as given above for Rule III: quantificational CNs form a semantically distinctive class which would be obscured if subsumed under the more general rule. The goal of capturing significant generalizations such as those marked by habitual and quantificational CNs suggests that, while in principle such a reduction is possible, it would not best serve the ends of semantic theory construction.

3.2. *Motivations for the Analysis*

The indexical-based analysis is motivated by taking into account the distinction between the linguistic meaning of a construction and what is (or can be) said using that construction. For many expressions, linguistic meaning is a context-invariant contribution common to all uses of a construction. Context-invariant expressions always make the same contribution to a proposition, or what is said in uttering a sentence. In Kaplanian terms, their character is a constant function. For context-sensitive expressions, on the other hand, what is said depends on the relevant contextual parameters being provided. 'I am hungry now', uttered by me at 6:00 pm on one day and at the same time the next day, means the same thing on each occasion, but expresses a different proposition on each occasion. The proposition expressed on each occasion contains the same individual (me), the same property (being hungry), but a different time index in each case. Since the propositions expressed differ, the truth conditions of the utterances differ. In a similar way, I claim, an utterance of 'baby formula' may denote one class in a maternity ward (=*formula for feeding to babies*) and quite another in a mad scientist's laboratory (=*formula for building a baby*), the varying relation between the nouns being contributed by the context.

A major motivation for viewing CNs as containing tacit or unrealized indexicals stems from the fact that they display a central

characteristic of prototypical indexicals: the content they express on an occasion shifts from context to context. Indeed, Kaplan refers to this property as 'the mark of indexicality' (Kaplan 1989b, 593). While contextual shiftiness may not be sufficient for demonstrating indexicality, it is certainly suggestive of it. What more is required beyond shiftiness? One possibility is semantic incompleteness or gappiness: indexical expressions express no truth-evaluable content independent of contextual supplementation. So, for instance, 'He is tall' expresses no truth-evaluable proposition until 'he' is assigned a referent by context. Arguably this feature belongs to CNs as well. Consider the various 'traffic light' interpretations presented in Section 2.1.1. Without some supplementary contextual information, it is impossible to choose which of these is expressed by that CN. This suggests that sentences containing CNs are indeed gappy when taken out of context.

An indexical account locates the variability in the meaning of CNs in the content (what is said in particular utterances of CN-containing sentences), rather than in the linguistic meaning of the CNs themselves. Their linguistic meaning is constant but incomplete – it does not determine a content – pending assignment of a relation to the indexical. Pragmatic inferences operate to make such assignments in particular utterance contexts. The result is that individual uses of CNs can express either general or highly articulated contents, depending on what relation is being highlighted by the context. Strongly available 'readings' of CNs are not taken to be linguistic meanings that are frequently selected from a set of possible disambiguations. Rather, they are most common or most frequently sensible values of R* in context. These readings are determined by what we usually intend to *say* using CNs.

This contextualist approach has a number of benefits. For one, nonce sense uses such as 'watermelon seat' or 'coffee meeting' (imagine a situation in which that expression is used to mean *meeting to discuss who will make the coffee*) are captured in precisely the same way as more common uses: contextual factors determine a relevance ranking among possible relations, and the relations are selected by their place in the ranking. The indexical account thus has the virtue of accounting for both entrenched uses of CNs and nonce uses with a single mechanism.

A full explanation of how context contributes to content is beyond the scope of this discussion, but something can be said about how we use details of the conversational, cultural, and

physical environment to choose appropriate relations. First, the context here essentially includes the speaker's intentions. CNs are more like demonstratives than like pure indexicals; their content is given by what speakers intend to express in using them. This still leaves for the hearer the problem of figuring out what is said by a CN-utterance. From this perspective, a default set of relations might be generated by hearers on the basis of degree of familiarity. To the extent that relations have been used and experienced in the past, they are likely to be used and recovered in the future. Interestingly, despite the general semantic dominance of heads, the frequency with which a modifier has been used in conjunction with a particular relation seems to bias subjects towards reusing that relation when the modifier recurs; e.g., 'mountain' tends to contribute a locative interpretation to CNs (Gagné 2002). There are also local discourse effects on relation selection. Hearers will more readily recover relations that have recently been mentioned in discourse (Gerrig and Murphy 1992). For example, if subjects read about a woman who makes sculptures out of stale olives, 'trumpet olive' is comprehended more quickly than if it is encountered in a neutral context. In addition, after encountering 'trumpet olive' in context, subjects readily transfer the relation to wholly new CNs such as 'kitten apple' (=*apple carved into the shape of a kitten*).

Levi's short list of RDPs might reflect a coarse generalization over relations that are readily recoverable in nearly any context. But these relations are typically sharpened in different ways depending on the particular members of the CN, and not all of these specifications can be given an independent semantic rule. As an analogy, consider that often we don't wish to be very specific about the precise relation we intend in a CN, just as we sometimes intend to demonstrate a rather vague extent of physical space. But sometimes we can intend both a rather specific relation, or a specific region of space. The constructions we use in each case give us this flexibility.

For an interpreter, ascertaining the precise nature of the relation that the speaker intends between two or more constituents of a CN may require drawing on world knowledge and general reasoning capacities more akin to abductive inference than the relatively straightforward mechanical processes of constructing complex linguistic meanings. This is entirely typical of how indexicals are interpreted. Consider the variety of cognitive, perceptual, and social skills that go into determining the reference of a demonstrative or a discourse anaphoric expression. Reliance on such cognitive

skills does not show that CNs have non-compositional meanings. It does, however, suggest that the meanings determined for them by the language are *incomplete*, and require content contributed by the speaker's intentions to fill in their content. This comports, too, with one plausible account of why languages possess CNs, namely for reasons of communicative economy. Rather than include lexical material expressing every relation that we can intend to communicate, we can rely on our interlocutors to infer the contextually sensible material that we omit.

Another similarity is that indexical expressions retain the content they inherit from their context of utterance when embedded in intensional contexts. Consider the following examples:

(19) Every day I drink whiskey in the morning. (*temporal shift*)

(20) In Canada I drink whiskey in the morning. (*spatial shift*)

If Amira utters sentence (19), that expresses the proposition that every day Amira drinks whiskey in the morning. If Mary utters it, it expresses the proposition that every day Mary drinks whiskey in the morning. Other modals work the same. If Amira utters (20), it expresses a different proposition than if Mary utters it. Context-sensitive expressions such as 'I' contribute their content to a proposition before that proposition is evaluated relative to a shift in index (Lewis 1980; Kaplan 1989a).

This property also attaches to CNs. Suppose the context is that Amira is saving up her pennies to buy a bus, while Mary is saving hers to buy a ride on the bus. If Amira says 'I almost have enough bus money', she expresses the proposition that Amira almost has enough money to buy a bus. If Mary utters that sentence, she expresses the proposition that Mary almost has enough money to ride the bus. Now consider intensionally embedded occurrences of these CNs:

(21) Every day I am closer to having enough bus money. (*temporal shift*)

(22) In Canada I have enough bus money. (*spatial shift*)

Amira's utterance of (21) expresses the proposition that every day Amira is closer to having enough money to buy a bus. Mary's utterance of that sentence, meanwhile, expresses the proposition that Mary is closer to having enough money to buy a ride on the bus.

CNs maintain the content that they acquire from their context of utterance in various shifted circumstances of evaluation.

Partee (1989) offers three conditions that are diagnostic of indexical expressions: they should have uses that are bound, discourse anaphoric, and deictic.[25] In further support of the parallel between indexicals and CNs, I note that CNs possess at least anaphoric and deictic uses. For an example of deixis, imagine that we are walking in the woods and come upon a striking and salient sight: a squirrel standing bolt upright on a stump, staring at us. I might say: 'Look at that stump squirrel'. Here I clearly intend to draw your attention to the squirrel itself, but in doing so I use an expression ('stump squirrel') that gets part of its content from a perceptually salient feature of the squirrel, namely that it is standing upright on top of a stump. Borrowing an example from Downing (1977), if we are having breakfast and your hair is long enough to fall into your food, I might say: 'It's plate length again; time for a hair cut'. Here, 'plate length' can be understood to refer to the length your hair is when it's falling in your plate, a property that is made perceptually and socially salient in the right circumstances.

Discourse anaphoric uses are also readily generated. Compare the two following discourse fragments:

(23) The US Postal Service is issuing a new stamp bearing an image of the older, fatter Elvis. The *Elvis stamp* is not expected to sell very well.

(24) The curators of Graceland are auctioning a stamp that is believed to have been licked by Elvis himself. The *Elvis stamp* is expected to fetch a high price at auction.

Here, 'Elvis stamp' varies in its content depending on the previous sentence. The explicitly introduced (underlined) relational material determines the content of the CN. So CNs pass at least two of Partee's diagnostic tests for indexicality.

Binding is substantially more difficult to demonstrate convincingly. At least, I am unable to generate any *thoroughly* convincing examples in which R^* is bound. If R^* is interpreted as an open variable, it ought to be bindable somehow, whereas if it is a constant indexical, it ought not to be. As I've noted earlier (Section 2.1.2), the potential bindability of R^* may help to decide between my approach and a Dowty-style bound variable approach to CNs.

For my present purposes, though, what is important is R*'s indexical character, not its status as a constant or an open variable. So I leave the decision between these two possibilities open for now.[26]

3.3. *Capturing the Data*

An indexical account can also handle quantified CNs and generics, cases that reveal the incorrect assignment of truth conditions in Sainsbury's analysis. 'Three traffic lights' is interpreted as denoting three lights that bear the contextually relevant and appropriate relations to traffic. Since the context is normal (no other possible relation has been specially highlighted), the particular relation *designed and used for regulating* might be selected. Since 'three' has scope over the entire CN, the resulting DP means, approximately:[27]

(25) $\mathbf{three}'(\lambda x[\mathbf{light}'(x) \,\&\, R^*(x, \mathbf{traffic}')]) \Rightarrow$ (by indexical assignment)
$\mathbf{three}'(\lambda x[\mathbf{light}'(x) \,\&\, \mathbf{for\text{-}regulating}'(x, \mathbf{traffic}')])$

And this has the intuitively correct truth conditions.

The case of generic statements is similar. In their generic uses, CNs pick out the kind that bears a particular, contextually specified relation to another class of things. This kind is treated the same as any other generic semantic value (e.g., the kinds *lemon* or *cat*) for the purposes of evaluating the truth of generic statements. What is important to avoid the problem faced by the unspecific account is that CNs have uses in which they pick out relatively constrained collections that can plausibly be seen as kinds (e.g., traffic lights are a kind of artifact, designed and intended for regulating traffic; mountain lions are lions that live in mountain regions; etc.), as opposed to collections of objects that don't seem to be candidates for kinds. By picking out the relevant relation in determining the content of a CN, we insure that we have fixed on the appropriate kind when we assess the truth of the generic statement.

The indexical analysis can also handle Wisniewski's property interpretations. Take 'skunk beggar', read roughly as *beggar who smells bad*. Here we can apply either Rule I or Rule III, depending on whether this is a momentary or a recurrent and habitual property of the person in question. The full interpretation of the CN is *beggar who smells bad, like a skunk does*. What R* contributes is *__ who smells bad, like __ does*. The first open slot receives **beggar′**, the second receives **skunk′**. There is substantial extra content given by

R* in this case, but the same rule covers these property interpretations as covers the relational interpretations. And the same mechanism could also account for the addition of content such as *fur* to compounds like 'rat hat'. So these two problem cases for Levi's analysis fall into line in the same way.

3.4. *An Objection*

Sainsbury argues that indexical analyses such as the one advanced here are inadequate. One reason for this alleged failure involves our ability to understand utterances of CNs despite (apparently) not having assigned any particular value to such hidden indexicals. He notes that 'chemical purifier factory' may have at least four plausible, available interpretations (corresponding to the pairings of *makes/uses chemical purifiers* and *purifies chemicals/purifies with chemicals*), but that understanding an utterance of (26)

(26) A chemical purifier factory is to be built at the end of your garden.

does not necessarily involve knowing which one in particular was selected. Knowing that (26) is true tells you that that something unpleasant is to be built in your backyard, independent of the precise form of the unpleasantness.

I disagree with Sainsbury's claim that understanding an utterance of (26) does not require assigning relations to the hidden indices, at least not if understanding entails grasping what is said by the utterance – that is, the complete proposition that is being expressed. But the fact that we know that the factory (whatever exactly it is) will be unpleasant can be explained even if we assume that we have not yet assigned a particular pair of relations to the CN in question. For all we need is the belief that there is no plausible, relevant, or salient pair of relations that could fill in the context slots in a way that would make the factory in question seem to be a good or desirable thing. That fact can be known in advance of having in mind a particular assignment of content to the utterance as a whole. We may not know precisely which of the four likeliest, most relevant possible assignments is the actual one intended by the speaker. But given that none of them describe a desirable object, and that there are no other assignments that are relevant that do, we are entitled to think that the possibility being described is undesirable even in advance of settling on a particular assignment of relations to indexed variables.[28]

4. ANTI-CONTEXTUALIST ARGUMENTS

Recently, Cappelen and Lepore (2002, 2003, 2005; henceforth C&L) have argued that so-called 'hidden indexical' accounts, among which is included the present analysis, face insuperable difficulties.[29] They marshal four arguments for this anti-contextualist conclusion. One is that if there are hidden variables, then they ought to enter into anaphoric relationships. Specifically, they should be able to be the antecedent of overtly realized anaphoric elements. (Or, if they cannot be the antecedents of such anaphora, there should be independent reasons why not.) A second argument is that indexicals generate certain *a priori* truths, and they should do so whether they are overt or hidden. A third argument involves the behavior of quoted indexicals, and a fourth deals with how indexicals behave in conjunction-introducing argument forms. I'll deal with these arguments one at a time.

4.1. *Anaphora*

First, consider the anaphora argument. Contextualists such as Stanley and Szabó (2000) argue that quantified expressions contain hidden indexicals for domains.

(27) Many students$_i$ failed.

In (27), for example, the nominal 'students' in 'many students' should be understood as containing an open position for the domain from which the students are drawn; e.g., many students *in Professor McEvil's calculus course* failed, where that course has been made relevant in the conversation so far. Without such slots being filled in by the context, they say, sentences like (27) fail to express complete propositions. C&L argue in response that if there is tacit reference to such a domain being made, then we ought to be able to refer back to that domain using anaphoric expressions like 'it' and 'himself', as in (28) and (29).

(28) That's a table but *it* isn't a book.

(29) He's a senator who likes *himself*.

In these cases, overt indexicality is borne by pronouns with overt antecedents. But sentences containing overt pronouns whose antecedents

are the content introduced by alleged hidden variables appear to be defective:

(30) *Many students failed, and *it* is a big domain.

(30) is arguably defective due to the lack of an antecedent for 'it'. Hence, C&L conclude, there can be no hidden variable picking out the domain in question.[30] Let's call this the Anaphora Test: If an expression contains a hidden variable, then that variable's content should be anaphorically available, where an expression is anaphorically available iff it can serve as the antecedent of an anaphoric expression.

A question one might have about C&L's test is whether it can really uncover the phenomenon they are looking for. Partee (1989) observes, for instance, that in general phonologically realized anaphoric expressions seem to require *overt* antecedents. So even if there are covert anaphoric expressions, we might be blocked from referring to what they pick out using overt pro-forms. But to give the anti-contextualist the strongest case possible, I'll just stipulate that Partee's constraint doesn't obtain. After all, one reason that sentences containing overt anaphora (purportedly) on covert elements are defective might be that there *are* no covert elements to contribute their antecedents. So sticking to Partee's constraint here would be question-begging without a well-motivated argument in favor of covert context-sensitive elements, which is what we are seeking now.

How does the indexical analysis of CNs fare on the Anaphora Test? It is not very easy to construct cases that sound convincing one way or the other. Part of the reason for this is that the material that is contributed indexically in CNs is relational. Often it is expressed overtly only by a preposition; e.g., 'of', 'about'. English pronouns are not well-suited to taking prepositions or other relation-expressing forms as antecedents. Consider:

(31) *My daughter has a cat book (=*book* $about_i$ *cats*) and a record bearing $that_i$ relation to cats, too.

(32) *There was a wedding fire (=*fire* at_i *a wedding*) and a fire bearing $that_i$ relation to a hospital, too.

(31) and (32) are certainly peculiar. (If you don't find them that peculiar, so much the better for my view.) If we accept that passing

the Anaphora Test is necessary for an expression to contain a hidden indexical, the CN analysis appears to be in trouble.

One possible explanation is that, for independent reasons, anaphoric reference taking part of a word as its antecedent is prohibited. In fact, precisely such an Anaphoric Island Constraint was argued for by Postal (1969). If the constraint obtains and words are anaphoric islands, it would be no surprise that C&L-style Anaphora Tests fail for them. I will briefly review some of the evidence concerning anaphoric islands, and suggest that it isn't clear that there is an absolute prohibition on word-internal anaphora. Still, perhaps some of the oddity of cases like these can be accounted for by partial anaphoric islandhood. I'll then suppose no strict Anaphoric Island Constraint obtains. In that case we should, under some circumstances, be able to get anaphora into words. This is the most challenging case for my position. Nevertheless, I believe that with the right choice of pro-form, we can in fact get C&L-style anaphora on the hidden indexical semantically embedded in CNs.

4.1.1. *Anaphoric Islands*

The debate over anaphoric islandhood is concisely reviewed in Ward et al. (1991) and Garnham (2001). Here I mention only a few relevant details. Postal (1969) argued that certain expressions are incapable of participating in inbound or outbound anaphoric relations. In Postal's terms:

> Inbound anaphora is the relation between a chunk, part of which is interpreted anaphorically, and some antecedent outside that chunk. Outbound anaphora is the relation between a chunk, part of which is interpreted as antecedent, and some anaphor outside that chunk. (p. 206)

Sentences like the following examples allegedly show that outbound anaphora with constituents of CNs as antecedents is impossible:

(33) *The best wombat_i meat comes from young ones_i.

(34) *Max is a wild animal_i hunter but Pete only kills domesticated ones_i. (both from Postal 1969)

(35) *I met a really odd truck_i driver who likes to sleep in it_i. (from Ward et al. 1991)

In (33)–(35) 'ones' and 'it' are difficult to read as referring back to a constituent of the preceding CN. If the outbound anaphoric island constraint obtains, we would have a neat explanation of why it is

difficult to get the readings C&L are looking for: the contextually contributed semantic material is word-internal, hence not accessible from the outside.

The following cases allegedly show the impossibility of inbound anaphora:

(36) *When Murphy$_i$ entered the room, all of the him$_i$ists began to applaud.

(37) *When he poked her in the legs$_{i,j}$ the long-them$_{i,j}$ed girl started to scream.

These examples suggest that anaphora involving overt pronouns as components of larger words is prohibited. Since what I am arguing for is an account on which there can be inbound anaphora involving CNs, this might seem to be a damaging conclusion. However, Ward et al. (1991, 450) note that such examples are prohibited on grounds that have nothing to do with anaphora *per se*. Rather, they are ruled out by independent prohibitions on derivation from closed-class items, including overt pronouns.[31] Since these inbound anaphora data don't illustrate the point that Postal takes them to, I will ignore them and focus instead on outbound anaphora.

There are two points to make about outbound anaphora. One is that it is a graded phenomenon, not a categorical one. There are some cases in which it seems extremely awkward, some in which it seems quite natural, and many intermediate cases. Thus Corum (1973) coined the term 'anaphoric peninsulas' to refer to expressions that, in many dialects, are relatively permissive about allowing outbound anaphora.[32] This suggests that a simple all-or-nothing constraint in the style of Postal (1969) is unlikely to be adequate.

The second point is that, given this gradedness, contextual factors can raise the acceptability of outbound anaphora. This was demonstrated in a psycholinguistic experiment by Ward et al. (1991). They manipulated whether a discourse entity was topicalized or not, and whether the entity was referred to as part of a CN (deer hunting) or as a verbal argument (hunting deer). There were two main results. First, in the non-topicalized conditions subjects were reliably slower to process pronouns when the antecedent was introduced as part of a compound than when it was introduced in a VP. Second, within both the compound and verbal argument conditions, non-topicalization slowed reading times. This confirms the pattern of the observed acceptability gradient for outbound

anaphora. Anaphora into compounds is more difficult than into phrases, but still not impossible; and topicalization generally aids interpretation of anaphora. The conclusion Ward et al. (1991) reach is that pragmatic factors, not morphosyntactic ones, are the major determinant of the acceptability of outbound anaphoric sentences.

So we probably cannot appeal to strict anaphoric island constraints to block C&L-style arguments. We might reasonably expect that the relevant kind of anaphora ought to be quite difficult to generate, though, for several reasons: (1) the discourse entities are highly abstract (e.g., relations between properties, classes, or individuals); (2) the relations are not introduced via an overt expression; (3) the relations are word-internal; (4) there are few 'natural'-seeming pro-forms in English that express such relations. Obviously, this is a significant challenge, but I think it can be met.

4.1.2. *Anaphora After All?*

I suggest that the apparent difficulty that C&L isolate with anaphora may be a result of the particular choice of pro-form they employ, namely the pronouns 'that' and 'it', sometimes accompanied by complement clauses. The following examples suggest that using more apt pro-forms may reduce or eliminate the oddity:

(38) Waldo wore a zebra tie and *matching* suit.

(39) In the living room was a barrel table and a *similar* chair.

(40) I hear that the soup Nazi is *like that* about stew, too.

(41) That unicycle bear was still *doing it* an hour later.

(42) We saw a stump squirrel in the morning, and on the way back he was still *at it*.

To be perfectly explicit, for (38), let 'zebra tie' mean *tie with a zebra pattern*; for (39), let 'barrel table' mean *table made from a barrel*; for (41), let 'unicycle bear' mean *bear riding a unicycle*; for (42) let 'stump squirrel' mean *squirrel standing on a stump*.

'Matching' and 'similar' are terms that are used to denote likenesses between objects, events, relations, situations, etc. Of course, entities are that are similar are always so in some respect or other. But if no such respect is overtly specified, we may have to resort to the context in order to fill one in. Here, I claim, these expressions function to pick out the material introduced by R* in the antecedent CNs. A suit that matches a zebra tie is one that has a zebra-like

pattern, too. A chair similar to a barrel table is one made from a barrel, and so on. The CN itself delivers the respect in which the objects match or are similar to their antecedents.

'Do so', 'do it', and 'do thus' are also pro-forms. It is perhaps slightly misleading to call them pro-VPs, since the pronominal element follows the verb itself. Nevertheless, they function as anaphors taking material expressed by verbs as their antecedents. Since verbs often function to express events, where a CN introduces content that adverts to an event we may be able to refer to it with one of these forms.[33] Thus if a bear seen riding a unicycle is still doing it (or doing so) later, we can generate anaphoric reference to such an unusual event, even where the event itself is only introduced by means of a hidden indexical. If a squirrel standing on a stump is still at it later, we can refer back to that state of affairs as well.

Finally, 'like that' denotes a characteristic or property of a person or other entity. As with 'similar' and 'matching', this is often a property that is made relevant by the context, and in example (40) this would be the property of behaving (with respect to foodstuffs) in a way reminiscent of a Nazi – authoritarian, fascistic, etc. 'Like that' often does not require an overt antecedent. Consider the following exchange:

(43) A: Walter yelled at me when I called him after 10:00 last night.
B: He's been like that since Sheila had the twins.

Here, 'like that' is interpreted as referring to the way that Walter has been (edgy, for example), which is exemplified by the action described by A's sentence. As with the CN cases, no overt mention of such a property is needed for successful interpretation here.

What these examples suggest is that, with the right choice of anaphoric expression, we can refer back to content introduced by CNs. So the indexical analysis passes C&L's Anaphora Test.

4.2. *A priori truth*

Following Kaplan, C&L (2002) argue that expressions containing overt indexicals generate certain *a priori* truths. Generation of such truths is, allegedly, a necessary condition on marking the presence of an indexical element. In Kaplan's familiar system, the meaning of indexical expressions is analyzed into their character and content.

Character is a function from contexts of use to content, and content is a function from possible worlds to truth values. For our purposes, all that is important is that the linguistic meaning of an indexical is identified with its character. So knowing the meaning of (44) and (45) is sufficient for knowing that they cannot be falsely uttered:

(44) I am the person who utters this sentence.

(45) You are the addressee of this sentence.

An utterance of either is true no matter what the context is, since the post-copular material just expresses the character of the indexical in subject position. Any other indexical, hidden or overt, ought to have a character, and so similar constructions should be possible. Further, it ought to be possible to generate *a priori* falsehoods by similar means. Call this the *A Priori* Truth Test: If an expression contains a hidden variable that functions as an indexical, then that expression should participate in *a priori* truths and falsehoods related to the character of that indexical.[34]

Again, supposing for argument's sake that this is a good test for the presence of indexicals, CNs do in fact appear to display the right pattern. Consider:

(46) Every bear rug is a rug related in some appropriately classificatory way to a bear.

(47) *This is a telephone pole, but it isn't a pole related in any appropriately classificatory way to telephones.

Example (46) appears to be *a priori* true; it doesn't seem possible to imagine a bear rug that isn't somehow related to a bear, or to bears. So the sentence appears to pass the test. Example (47) appears to be *a priori* false, and again this would be predicted if there were an indexical element linking the constituents of the compound. The character of this indexical is as difficult to specify explicitly as for many other expressions, but it must be something like, at a minimum, 'related in the contextually appropriate way'.[35]

C&L might reply, however, that these judgments are not driven by the presence of an indexical, but only by the morphosyntactic mode of combination of the compounds. For consider the following parallel examples involving predicating A–N modification:

(48) Every black cat is a cat related in some way to blackness/to black things.

(49) *This is a spicy curry, but it isn't a curry related in any way to spiciness/spicy things.

Barring any awkwardness stemming from the need to nominalize the adjectives so that they can follow 'to', these seem to parallel the CN-containing examples for acceptability. Yet these A–N constructions don't appear to contain hidden indexicals; their semantics is straightforward set intersection: $\|\text{spicy curry}\| = \lambda x[\textbf{spicy}'(x)\ \&\ \textbf{curry}'(x)]$. The principle at work here is: whenever we have a syntactically modifier–head construction, an overt denial that the modifier and head are related will be defective, and an overt assertion that they are related will seem redundant. So examples (46) and (47) are inconclusive, given that combinatorial structure by itself would be sufficient to explain the data, without adverting to the character of hidden indexicals.

I think that this actually suggests that the *a priori* truth test is not adequately sensitive to diagnose hidden indexicals embedded in CNs. Here the presence of the hidden indexical is inescapably conflated with the presence of the syntactic modifier–head construction. This construction carries the powerful implication that the head and modifier are somehow related. So even if, as I claim, there is an indexical embedded in the LF of CNs, we cannot be certain that we are detecting its presence when we affirm or deny that the constituents of the CN are related in an appropriately classificatory way. The *a priori* truth test gives a scotch verdict.

4.3. *Quotation*

A third argument C&L propose against contextualism involves the behavior of indexicals and other putatively context-sensitive expressions in quotational contexts. Quotation marks nullify the context-sensitivity of indexical expressions. Consider the contrast between direct and indirect quotation:

(50) James said 'I am lazy'.

(51) James said that I am lazy.

In (50), 'I' cannot be read as referring to the speaker of (50), but only to James.[36] Yet 'I' in (51) must be read as referring to the speaker of (51), not James. (English, at least, appears to impose this restriction; other languages might not.) Quoted indexicals hold

onto the content that they expressed in the original utterance being quoted. C&L (2003) use this feature of indexicals against allegedly hidden indexicals. They propose that any genuine contextually sensitive expression of English *S* can be substituted into the following Inter-Contextual Disquotation schema:

(**ICD**) There is a false utterance of '*S*' even though *S*.

Traditional indexicals and demonstratives, as they note, pass this test. For example:

(52) There is a false utterance of 'I want a beer' even though I want a beer.

Such a false utterance might be made by a teetotaler. And:

(53) There is a false utterance of 'That is the ugliest cat that ever lived' even though that is the ugliest cat that ever lived.

The latter utterance might be one during which the speaker is pointing at Bill the Cat, while the former demonstration might take my non-ugly cat as its object. We can assert the existence of a false utterance if we can envisage such contexts. Tacit indexicals ought to pass this test as well.

As the following examples show, CNs do pass (**ICD**):

(54) There is a false utterance of 'Dog ties are cute' even though dogs ties are cute.

(55) There is a false utterance of 'Chris likes TV parties' even though Chris likes TV parties.

(56) There is a false utterance of 'Sally owns an accordion bag' even though Sally owns an accordion bag.

(57) There is a false utterance of 'Max ate a whole zebra cake' even though Max ate a whole zebra cake.

To see how these readings can come off, consider the following pairs of interpretations. For (54), suppose that the false, quoted utterance of 'dog ties' reads it as *ties made from dog tails*, while unquoted utterance reads it (as I think is more natural) as *ties with pictures of dogs on them*. For (55), read the two occurrences of 'TV parties' as, respectively: ⟨*parties at which we smash a TV*, *parties at which*

we watch TV⟩. For (56), read 'accordion bag' as: ⟨*bag for storing an accordion*, *bag with accordion-like pleats*⟩. For (57), read 'zebra cake' as: ⟨*cake baked from zebras*, *cake decorated with zebra stripes*⟩. If we consider the quoted sentence being uttered in a context that contributes the first reading in these pairs, the utterance might be made false, despite the fact that using the quoted sentence in a context that contributes the second reading renders it true. This is a parallel strategy to that employed by C&L when dealing with classical indexicals. So CNs seem to pass their fourth test.[37]

4.4. *Collective Descriptions*

A final objection has to do with the validity of collective description arguments, also known as conjunction-introducing inferences. For example, from 'Düsseldorf is in Germany' and 'Berlin is in Germany' we can draw the conjunctive conclusion 'Düsseldorf and Berlin are both in Germany'. Generally, from *a* is F, *b* is F, *c* is F, etc., we may infer that *a*, *b*, *c*, etc., are all F. In addition, from *a* is F, *a* is G, *a* is H, etc., we may infer that *a* is F, G, H, etc. But it's well-known that indexicals are liable to render these arguments invalid:

(1) I am in France.
(2) I am in Germany.
(3) So I am in France and in Germany.

There might be a context in which (1) is uttered truly (when the speaker is in Paris), a different context in which (2) is uttered truly (when the speaker is in Düsseldorf), yet no context in which (3) can be uttered truly. (Assuming there are no locations that are both in France and in Germany.) In general, when evaluating arguments containing context-sensitive elements, we need to ensure that the premises and conclusion are being considered relative to the same sets of contexts. When we define validity for a logic including indexicals and demonstratives, we need to relativize it to contexts. Roughly, an argument containing context-sensitive expressions is valid iff in all contexts in which the premises are true, the conclusion is true as well.

Consider now the following inference:

(1′) Jack is a pool guy.
(2′) Waldo is a pool guy.
(3′) So Jack and Waldo are both pool guys.

Such an argument illustrates the commonalities between CNs and other indexicals. For instance, suppose that in context C_1 'pool guy' expresses *guy who cleans the pool*, and in context C_2, 'pool guy' expresses *guy who builds and installs pools*. Now, the guy who cleans the pool needn't be the guy who installed it, and vice versa, so these seem to be different contents. Suppose, for argument's sake, that there isn't a context in which (3′) can be truly uttered.[38] In that case, we can't conclude that the argument form instantiated by (1′)–(3′) is a *generally* valid one: we have to ensure that the premises and conclusion are all being produced within the same context. The behavior of CNs is thus parallel to that displayed by 'I', which is consistent with there being a semantic element of CNs that is fixed by context. Since this is the pattern illustrated in the previous, overtly indexical argument as well, CNs seem to pass C&L's fourth test.

C&L might object as follows. It is true that the argument as stated is not an instance of a valid form. But its invalidity is not due to any covert indexicality. Rather, it is due to simple lexical ambiguity. This is the very same sort of lexical ambiguity that is illustrated in the following:

(1″) Sam spent the day at the bank.
(2″) Gloria spent the day at the bank.
(3″) So Sam and Gloria spent the day at the bank.

If by 'bank' in (1″) we mean *financial institution* and in (2″) we mean *side of a river*, the argument is invalid. We do not therefore conclude that 'bank' is context-sensitive, or contains a tacit indexical. Why should we draw that conclusion for the CN-containing cases?

The answer is given, in effect, by my arguments in Section 2.2 against Levi-style analyses that posit finite ambiguity underlying all CNs. If we suppose that all CNs are simply ambiguous, they must be finitely ambiguous. Further, for reasons of learnability, the ambiguity must be over a reasonably small set of possibilities. But as I argued earlier, the range of possible relations that Ns can stand in when compounded is potentially very large, possibly indefinitely so. Unless we can treat CNs as simply ambiguous, so that their meanings can be derived straightforwardly from a learnable list of relations, positing lexical ambiguity to account for the invalidity here is inappropriate. It is true that two uses of the same CN (same in the sense of containing the same lexical constituents combined by the same semantic rule) may not express the same content. This is not

for reasons of ambiguity, but for reasons of covert context-dependence.

I conclude that CNs, interpreted as containing indexicals, can either win or draw on the C&L tests. No general anti-contextualist argument cuts against the analysis.

5. CONCLUSIONS

Semantic compositionality can explain many central facts about natural language– its productivity and learnability most significant among them. Hence, preserving compositionality is a widely held constraint on theories of meaning. Many phenomena have been held to be evidence against compositionality, and there is no *a priori* guarantee that it actually obtains. But compositional semantics is better than non-compositional semantics, all things considered; and the case for compositionality needs to be argued construction by construction.

Several notable attempts to secure compositionality of meaning for CNs end up assigning them what are arguably incorrect truth conditions. Seeing clearly how to accommodate in a compositional framework the peculiar features of CNs – the flexibility attached to their use, as well as the regularity – is a significant goal for the theory of meaning, given that CNs are productive constructions. We can make the needed accommodations by employing the distinction between linguistic meaning and what is said, and letting context determine the appropriate relations between the elements of a CN by setting the value of a tacit indexical. Such tacit indexicality, I've argued, must be supplemented with separate semantic rules covering cases in which CNs contain internal quantifiers and cases in which they have generic or habitual connotations. This proposal makes room for both the context-invariant (if incomplete) semantics of CNs as well as their context-sensitivity, and hence seems to strike precisely the needed balance.

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NOTES

[1] For discussion of the productivity of compounding, and issues about productivity in morphology generally, see Bauer (1983), Ch. 6, and Lieber (1992).

[2] These examples are taken from the television show *Seinfeld*, a rich source of amusement and linguistic data.

[3] But as Lahav (1989), Szabó (2001), and Reimer (2002) have argued, this may be deceptive. Semantics for adjectives is not trivial. The semantics for CNs that I will propose has much in common with attempts such as Szabó's (2001) to outline contextually sensitive compositional truth conditions for adjectives.

[4] Although I won't be discussing them here, privatives (e.g., 'fake gun', 'phony prince', 'former senator', 'imitation leather', 'ex-lineman') are another notable case in which set intersection is not the appropriate semantic operation.

[5] Some limits on the current study: I will focus here only on the most productive kinds of compounds (in English), namely nominal compounds, specifically N–N combinations. I will restrict my analysis to endocentric compounds, which tend to be concatenations of restrictive modifiers to a head, which in English is the rightmost word in the compound. Discussion of exocentric and copulative compounds will be omitted, as will neo-classical (based on Greek and Latin borrowing) compounds. Copulative compounds are those in which the constituents are semantically 'equal' in some way. Examples are 'girlfriend', 'warrior-priestess', and 'north-west'. Exocentric compounds are those that lack a semantic head; examples are 'blockhead' and 'butterfingers'. I suspect that exocentric compounds could be treated along the lines sketched in this paper, but such a treatment will have to wait for a later occasion. For further descriptions of compounding in English, see Adams (1973), Bauer (1983), Marchand (1969), and Selkirk (1982).

[6] Bauer (1979) states (although doesn't endorse) a similar view: 'If only one verb is to account for the range of semantic relations that exists between the two elements of compounds it will have to be very abstract and have a vague meaning: I suggest something like "there is a connection between"' (p. 46).

[7] On notation: I use double bars ('$\|\|$') to express the interpretation function. Following standard practice in truth-conditional semantics, I assume that this function maps linguistic expressions onto model-theoretic structures that are their semantic values.

[8] Sainsbury does not offer this formalism, but it seems to capture what he has in mind. I will later question whether a single rule can adequately capture CN-internal quantifications, but I defer this subject until Section 3.1.

[9] That isn't to say that it's impossible to read these expressions generically. But it does require some heavy lifting by the context. If green bottles were customarily used to warn of a hazard, for example, we might say that 'The green bottle saved many children's lives' (Krifka et al. 1995).

[10] I would add that if the quantifier in the unspecific analysis is unrestricted, some of the other objections raised in this section still apply. Not every relation listed in the possible glosses of 'traffic light' is one that we can commonly use 'traffic light' (or any other compound) to express. So it may be that even the unrestricted analysis would need to appeal to elements of context to restrict the permissible relations that can be introduced by a CN. See Section 2.1.2 for more discussion.

[11] Because the number of possible contextually specified enrichments of a given CN is very large, possibly unbounded, it is not a multiple specific meanings view such as the one to be considered in the next section.

[12] To keep terminological confusion to a minimum, I will continue to use 'CN' to abbreviate 'compound nominal', although Levi uses it to abbreviate 'complex nominal'. My interest in this paper is principally in the narrower class, although the analysis might be extended to cover the broader class of complex nominals as well. I focus on Levi's account specifically because it is by far the most sophisticated theoretical analysis of CNs, but similar remarks could apply to other transformational accounts such as Lees (1960).

[13] There is some question about how to map the 'logical structure' representation proposed by Levi onto the truth-conditional representation I am employing. For example, should we treat the initial logical structure as receiving the truth-conditional interpretation, or some intermediate structure level? At one point in the derivation of 'traffic light', we have a representation like [$_{NP}$ [$_{NP}$ [$_{N}$ light]] [$_{ADJ}$ [$_{PREP}$ for] [$_{N}$ traffic]]], which might be more appropriate for model-theoretic interpretation. Since for my purposes it isn't important which level is best given a truth-conditional interpretation, I won't select any one in particular. Dowty (1979), however, notes correctly that it's a challenge in interpreting these structures that they are largely inexplicit about quantification. The solution I propose is explicit about the variety of CN-internal quantificational relations, which gives it an advantage.

[14] Of course, Levi is working within a Generative Semantics framework, which assumes some form of lexical decomposition. Those who are opposed to lexical decomposition approaches will therefore not find her position congenial. To keep things manageable, I will set to one side objections that are grounded primarily in opposition to lexical decomposition as such.

[15] It should be said that Levi herself notes that the RDPs are vague (pp. 82, 98). She holds that this level of vagueness ensures that we can hold onto semantic generalizations concerning CNs. I suggest that these generalizations are not as useful as they might appear.

[16] See Recanati (2004) for extensive discussion of specification and other free enrichment processes.

[17] An extensive summary of relations discovered by other compound researchers can be found in Ryder (1994).
[18] Levi claims that this 'extra' semantic material is part of our association with such compounds, but should not be included as part of their meaning. Nevertheless, it seems reliably to be part of what is said with these CNs. Levi might appeal to semantic specialization again in order to account for the addition of this content; but the issue here is whether the relation itself can be seen as the specialization of grammatically contributed material.
[19] There are other, more technical difficulties for introducing resemblance readings into Levi's system, stemming from the place of the predicate in the transformational cycle (roughly, on her view, deletion of LIKE would *mandate* deletion of another, embedded RDP, a demand that no other RDP imposes). Because these arguments depend so heavily on the details of her own system, I omit discussion of them here.
[20] See Wisniewski (1997) for a review of other studies involving compound interpretation.
[21] A technical note here: R^* should be numbered, just as variables are, to deal with multiple CN embeddings in a single sentence. So what's needed is actually a set of distinguishable relations. I'll largely ignore this in what follows.
[22] See also Pelletier (2003). One might object that this account preserves compositionality only *formally*, by simply providing a device through which context can fill in extra semantic material. There is a sense in which this is true. But it is equally true of many other analyses of disparate phenomena such as the interpretation of mass terms, quantifier domain restriction, adjectival modification, etc. It's precisely because straightforward compositional analysis doesn't seem to work for these cases that such alternatives invoking context or other content-introducing semantic rules exist. So although there is an appeal to formal devices in all of these cases, they nevertheless seem well-motivated, especially considering the alternatives.
[23] Contextualist semantics for particular constructions such as the possessive have also been proposed; see Barker (1995), Storto (2003). For specific discussion of the relationship between compounding and possessives, see Taylor (1996), Ch. 11.
[24] I follow the standard analysis of lexical structure in assuming that compounds have internal bracketing structure and can be recursively generated.
[25] An anonymous referee points out to me that these conditions are not true for all indexicals, and that the bindability criterion in particular is problematic. This point is correct. However, binding is the most difficult phenomenon to demonstrate for CNs, so if it is not a general condition on indexicals that they be bindable, the present account is no worse off for that fact.
[26] For discussion of the role of binding arguments in showing the presence of tacit indexicals in LF, see Stanley (2000) and Recanati (2004), Ch. 7. Stanley notes that binding is not always essential to show tacit indexicality; he mentions that possessives may be interpreted indexically, but do not seem to have bound readings. Further, I'd note that since my arguments for the indexicality of CNs doesn't turn on a Stanley-style binding argument, it is not open to Cappelen and Lepore's (2002) objection to such arguments. See Section 4 for discussion of their other objections to contextualism.

[27] Whether indexical satisfaction happens before or after functional application of the generalized quantifier to the N doesn't change the resulting interpretation here.

[28] In fact, in Sainsbury's example, the head noun might be doing all of the work: if I am told that a factory is to be built at the end of my garden, I am likely to be upset no matter what the factory itself is. So there might be independent reasons I don't bother the compute the full proposition expressed before making the judgment that the object described is undesirable.

[29] Cappelen and Lepore have not, of course, argued against the particular position that I present here. Their principal opponents are Stanley (2002), Stanley and Szabó (2002), and Szabó (2001), who argue that hidden indexicals explain unstated domain restrictions on quantifiers and adjectival modification. Nevertheless, it is pretty clear that they intend their arguments to be generally sound against all hidden indexical views, of which my own is a species.

[30] I'm not certain that all attempts to refer to the contextually relevant domain fail, though. It might just be an artifact of C&L's example. Most of us don't use the term 'domain' in everyday discourse. The following example seems more plausible to me: 'Many students failed, and *it* was a big class.' (I mean 'class' in its academic, not set-theoretic sense.) Here, 'it' is intended to refer to the contextually relevant class that restricts the domain of 'many students', namely Professor McEvil's calculus class. It matters a lot how one characterizes the entity one is trying to refer to anaphorically.

[31] It isn't clear that compounding is as strict about pronominal incorporation as derivational morphology is. Imagine a celebrity whose face is on a lot of products saying (1) 'I just saw a pair of me pajamas!'. We could easily say (2) 'Madonna pajamas' to refer to such an object. But (1) seems acceptable as well, despite including an overt pronoun.

[32] See Browne (1974) for criticism of the examples on which Corum bases the notion of an anaphoric peninsula.

[33] Sproat and Ward (1987) argue this point, and also point out that reference to nominal-contained events is more felicitous with 'do it' than 'do so'.

[34] This could be made more precise, but this formulation is good enough, and certainly not less precise than C&L's way of putting the argument.

[35] Focus on 'I' and 'you' may obscure the difficulties inherent in expressing the linguistic rules that embody the character of indexicals. See Nunberg (1993) on the difficulties of 'we' for further discussion.

[36] At least insofar as we can talk about the reference of a quoted expression at all.

[37] To clarify my position, I am conceding to C&L for dialectical purposes that ICD is in fact a test for indexicality. Given their anti-contextualist stance, I would not expect C&L to agree that CNs are in fact tacitly indexical. They deny, for instance, that adjectives like 'ready' and 'tall' are indexical on the grounds that they don't pass the ICD test. For the record, I am not necessarily committed to such adjectives being tacitly indexical, although they are on my view context-sensitive. Different forms of context-sensitivity need to be handled in different ways.

[38] I'm not sure how to establish that a context like this doesn't exist, but I'm prepared to stipulate it. One possible context in which (3′) could be uttered that would make it true would be one in which the speaker intended only to say that

Jack and Waldo are both *guys who work with pools*. But as I've said, stipulating that there isn't any such context grants my opponent the strongest possible case.

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