Why *more* and *less* are never adverbs*

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August 25, 2023

1 Introduction

In this article, I argue that *more* and *less* are determinatives in all contexts, contrary to the categorization in *The Cambridge grammar of the English language* (*CGEL* 2002). *CGEL* posits that while *more* and *less* are generally determinatives, they are adverbs exclusively in the context of analytic comparatives, such as in *more interesting* or *less quickly*. The justification for this categorization is that analytic *more* "does not enter into any [degree modifier] contrast with *much*: we can say *This is more porous than that*, but not **Is this much porous?*" (*CGEL* 2002: 1123).

However, I show that such contrasts do exist, and I claim that the distributional facts can largely be explained by the semantics of *–er*/*more* and restrictions on *much*. Specifically, I adopt the position that *–er*/*more* establishes a salient minimum value in the discourse (Zhang & Ling 2021) where none might exists, and that *much* requires such a value (McNally & Kennedy 2005). This interplay between *–er*/*more* and *much* provides a pragmasemantic explanation for their distribution.

Finally, I argue, following Payne, Huddleston & Pullum (2010), that the lack of contrast should not be relied upon to make categorial determinations in any case. For these reasons, positing two different lexemes for *more* and *less* is neither necessary nor parsimonious and that the determinative analysis can account for all of the data.

2 The *CGEL* analysis

2.1 Terminology

CGEL distinguishes between categories and functions, using DETERMINATIVE as a lexical category term which includes the articles, demonstratives, cardinal numbers,

*This is a draft of a planned submission to a Festschrift volume, *English Language and Linguistic Theory: A Tribute to Geoff Pullum*. My thanks to John Payne, Nathan Schneider, Linmin Zhang, Chandra Hodgson, and Geoff Pullum for extremely helpful comments. Geoff has my deepest gratitude for all his guidance and support over the years, his relentless pursuit of clarity in linguistic thought, and his profound impact on the field of linguistics. His mentorship has not only shaped my academic journey but has also inspired a generation of linguists to approach language with rigor and curiosity.

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universals *all* and *both*, distributives *each* and *every*, etc. This use parallels that of such terms as ADJECTIVE, ADVERB, and NOUN. In contrast, *CGEL* uses DETERMINER as the function term for the role that determinatives typically perform in noun phrases (NPs; e.g., *every change*). Other phrases may also function as determiners, particularly genitive NPs (e.g., *my change*). Conversely, determinatives also have other functions, including that of MODIFIER in adjective phrases (AdjPs), adverb phrases (AdvPs), and verb phrases (VPs), among others.[1]

2.2 *CGEL*'s analysis of *more* and *less* as adverbs

In most cases, *CGEL* (2002: 539) analyses *more* and *most* as inflected forms of the determinative *much*. Similarly, *less* and *least* are inflected forms of the determinative *little*. But *CGEL* carves out an exception: "For the comparative category, analytic marking is by means of the adverb *more*, which we will represent as $more_{a}$ (with subscript 'a' mnemonic for 'analytic')", and this analysis is extended to $most_{a}$, $less_{a}$, and $least_{a}$ (*CGEL* 2002: 1123; see also p. 64). This is not because they function as degree modifiers (p. 549): "Apart from the interrogatives and relatives, virtually all determinatives that can occur in NP structure with a non-count singular head can also function as modifier to verbs and/or adjectives and adverbs" (*CGEL* 2002: 565). Rather, it is because of the claim, mentioned in Section 1, that *more* does not enter into any degree modifier contrast with *much*.

Nowhere is the claim made that adverbs *more* and *less* are entirely limited to $more_{a}$ and $less_{a}$, but neither are they discussed as adverbs in any other context. And *CGEL* is explicit that they are determinatives in modifier function in a wide range of contexts.

> *Much* and *little* (all forms) occur as degree adjunct in clause structure: *Jill little realised what they were planning*; *It didn't hurt as much as last time*. The plain forms *much* and *little* modify comparative expressions: *much better*, *little different*, *much more cheese*, *little less intrusive*. *Very much* modifies a wider range of expressions: *very much in control*, *very much an intellectual*. (*More* and *less* modify adjectives, adverbs, etc., but we take these to be degree adverbs, rather than comparative forms of *much* and *little*: see Ch. 13, §4.1.1.) *CGEL* 2002: 395

I will assume that, since this dual categorization (D/Adv) analysis is not extended to other determinatives, *CGEL* would have been explicit about other uses of adverbs *more* and *less*, should other cases have existed, and, therefore, that $more_{a}$ and $less_{a}$, along with $most_{a}$ and $least_{a}$, are the only cases to which the adverb analysis is extended.

In categorizing *more* and *less* as adverbs in analytic comparatives, *CGEL* follows all English grammars and dictionaries, as far as I know. For examples, this is the position of Quirk et al. (1985: 463) and the *Oxford English Dictionary* (*more*, §C.). Baker (1995) is not explicit about the category status of *more* and *less*, but it would seem that he treats them as adverbs (see pp. 54, 326, & 377). The English Web Treebank (Bies et al. 2012) similarly treats them as adverbs, as does the Penn Treebank (Santorini

[1] Strictly speaking, determinatives function only as the head of determinative phrases (DPs), and it is the DPs that function as determiners or modifiers.

1990) and the English Resource Grammar (Baldwin et al. 2004).[2] Nowhere do I find precedent for categorizing them as determinatives in analytic comparatives. The same is true, however, of *much* and *little*. And yet no argument is made for why, if *much* and *more* belong to distinct categories, it is *more* that should be the adverb, and not *much.*

Payne, Huddleston & Pullum (2010: 37) define the "distributional core" of Advs as follows: "Any item which can appear after a subject and before a verb (and does not by other distributional criteria belong to another category) will be adjudged to belong to the adverb distributional core." Though it is very rare for them to do so, *much* and *little* do meet this distributional criterion, as in (1).

(1) a. *I more danced than walked my way back.*
b. *I less walked than danced my way back.*

And yet here *CGEL* presumably analyses them as determinatives, as it does in cases like *He worries more than I do* (*CGEL* 2002: 534). Thus, *CGEL* broadly moves away from the traditional analysis of *more* and *less* as adverbs, only to step back in the one particular case of analytic comparatives. My position is that the reanalysis from adverbs to determinatives is the correct one and that the exception is not justified; *more* and *less* are always determinatives.

2.3 Analytic comparatives

CGEL holds that *more* and *less* are adverbs specifically and only in the case of analytic comparatives, and it discusses analytic comparatives only in the context of AdjPs and AdvPs as in (2; *CGEL*: 533), but it's worth considering other possibilities. There are gradable PPs, such as (3a), which clearly qualify as analytic comparatives. There are also VPs and NPs, like those in (3b & 3c), that appear structurally quite similar but which do not qualify as analytic comparatives because there they lack inflectionally comparative counterparts.[3]

(2) a. *no more interesting than before* [AdjP]
b. *no more quickly than before* [AdvP]

[2] See the list of lexical types (*List of all 1102 lexical types (ERG_1214)* n.d.).

[3] An analytic construction is one in which "separate words realize grammatical distinctions that in other languages [or in other contexts in the same language] may be realized by inflections" (Matthews 2003).

As for VPs, the term GRADABLE VERBS does not appear in *CGEL*, but the authors do employ it in other contexts with the example *I no more like her than you do* (Payne, Huddleston & Pullum 2010: 63). Nevertheless, there are no inflectionally gradable verbs in English and none, as far as I know, in other languages, so it is probably inappropriate to call these analytic comparatives, despite their structurally similarity to (a–d). Finally, *CGEL* makes two mentions of GRADABLE NOUNS (*CGEL*: 1104 & 1139), but the idea of a comparative NP is not broached. Nevertheless, (3) seems least like an analytic comparative, given its determiner + head construction as opposed to the modifier + head construction in (2 & 3).

In Macedonian, the comparative and superlative markers can also be added to nouns, so that *po-* "more" + *prijatel* "friend" becomes *poprijatel* "more of a friend", though they are considered analytic (Friedman 1993: 266). I thank Jonathan Bobaljik for alerting me to this.

If NPs were included in the analysis, then there would be no question that *more* and *much* enter into contrasts, but I will set this case aside for the rest of the paper, focussing instead on the cases in (2) and, to a lesser extent (3).

(3) a. *no more like it than before* [PP]
b. *no more enjoy it than before* [VP]
c. *no more food than before* [NP]

Gradable – and therefore comparative – PPs, like that in (3a), are only morphologically comparative in a very few cases, such as *closer* (*CGEL*: 639). Yet their existence should qualify comparative PPs such as (iii) or *more out of sorts* (*CGEL*: 533) as analytic, even though *CGEL* explicitly analyses *more* and *less* as determinatives in such cases (p. 395). And the lack of contrast mentioned by *CGEL* as the basis for the dual categorization of *more* applies equally here; this seems like an oversight.

2.4 Summary of the *CGEL* analysis

Overall, *CGEL* takes the position, contra every other analysis I have been able to find, that determinatives modify a wide range of phrase types and are rarely homonymous with adverbs. And rightly so! But then it sets out an exception for the case of *more* and *less* in analytic comparative and superlative AdjPs and AdvPs (but not PPs) on the sole basis of the claim that they do not enter into contrasts with *much* and *little*.

In the next section, I show that such contrasts do, in fact, exist, even in AdvPs and AdjPs. In most of what follows, I focus on *much* and *more*, but the general argument applies to *less* and *little*.

3 Contrasts in various contexts

In this section, I set out the contrasts between *much* and *more* across various syntactic contexts. These contrasts provide crucial evidence against the claim made in *CGEL* that *more* does not enter into any degree modifier contrast with *much* in analytic comparatives. The contrasts exist in the following groups: comparative governors, other AdjPs, other AdvPs, VPs, and PPs. Each category presents unique instances of contrast that further elucidate the interplay between *much* and *more*.

3.1 Contrasts with comparative governors

First, contrasts can be found in contexts governed by some but not all of what *CGEL* (2002: 1104) calls COMPARATIVE GOVERNORS:[4] That is to say that both *much* and *more*/*most* function as pre-head modifiers in phrases with the following uninflected heads, as do *little* and *less*/*least*.

(4) a. i. *different*, *similar*, *dissimilar*, *like*, *unlike* [Adj]
ii. *differently* [Adv]
b. i. *equal*, *preferable*, *superior*, *inferior*, *analogous* [Adj]
ii. *like*, *as* [P]
iii. *rather* [Adv]

[4] As early as 1973, Bresnan noted this possibility with *different* and *alike* (Bresnan 1973).

The comparative governors in (4a) allow the full range of contrasts (e.g., *much/more/most different*, *little/less/least alike*). This alone is sufficient to establish that *much* and *more* and *little* and *less* are not in fully complementary distributions.

In contrast to those in the first group, the comparative governors in (4b) present some restrictions. *More/most* isn't entirely compatible with all items. For example, *more equal* evokes the ironic meaning in *Animal farm*, while *more preferable* may seem redundant, and, at first blush, *more as happy* presents a conflict between inequality and equality. Nevertheless, *more* can function as a modifier with all the heads except *rather* and interrogative *how*.

Much is generally fine (e.g., *they're much alike*; *much as she did*; ?*much unlike your grandmother*), though it is mostly limited to a formal register and is better in negative or interrogative contexts. This restriction is eased when it occurs along with a pre-modifier (e.g., *very much/as much/pretty much equal*),[5] while the plain form *little* is mostly ruled out (*CGEL* 2002: 827 & 1130). The comparative governors *other*, *such*, and *else* (not listed above) do not typically allow degree modifiers of any kind (See Section 5 for an explanation).

3.2 Contrasts in other AdjPs

In this section, I examine the contrasts between *more* and *much* in other AdjPs – those that are not comparative governors – both in plain forms and in comparative and superlative forms.

3.2.1 With plain-form adjectives

A limited number of plain-form adjectives that are not comparative governors allow contrasts between *more* and *much*. Here, again, *much* works better in negative contexts (e.g., *not much involved*) or with a modifier (e.g., *as much true of China as of France*).[6] Contrasts between *little* and *less* is also possible here (e.g., *little/less concerned*), but *little* is quite rare overall.[7]

(5) a. *improved*, *recovered*, *diminished*, *interested*, *concerned* [participial Adj]
b. *alike*, *alive*, *aware*, *afraid*, *akin*, *alone*, *awake*, *amiss*, *asleep* [*a*– Adj]
c. *true*, *eager* [Other Adj]

The examples in (5a) are past-participial adjectives; *CGEL* (2002: 549) mentions two others: *They don't seem much inclined to leave/impressed by his argument*. The

[5] *Pretty much* has become an approximator (e.g., *That's pretty much perfect*) (Bolinger 1972: 215). *Very much* may be compositional, as in *x is not very much longer than x*,, such that it alters the magnitude of *much*, but it may also be non-compositional, as in *She is very much alive.* In the second case, *very much* means 'indeed' (*CGEL* 2002: 549). This use comes with the pragmatic implication that expectations are being contradicted (e.g., *I can assure you that I'm very much alive.*) The speaker is not claiming that they are alive to a high degree, but rather that they are indeed alive, contrary to expectations. I will, therefore, disregard *pretty much* and *very much* in what follows.

[6] I set aside non-compositional *very much* and *pretty much* (See Footnote 5).

[7] I find, for example, only nine instances of *little aware* in the academic subsection of the Corpus of Contemporary American English Davies 2008.

(b) examples are all *a–* adjectives. Some are de-prepositional from *a* meaning 'on' (e.g., *alive* & *amiss*), but others are not (e.g., *aware* & *alone*). *Alike* is arguably a comparative governor that licenses a coordination as subject (e.g., *A and B are alike.* Those in (c) are very rare, require modified *much* (e.g., *It was as much true in the past as it is today*), and don't obviously lend themselves to any kind of classification.

3.2.2 *Less* and *least* with comparatives and superlatives

It's rare to find *less* as a pre-head modifier with comparative adjective heads, but Jespersen (1956: 368) mentions *less happier*, and in the COCA, there are 22 relevant instances of *less worse*, four of *less happier*, and three of *less riskier*, along with a smattering of other examples. Obviously, these contrast with *little worse/happier/riskier*, etc. Similarly, there are examples of *least worst*, etc.

Also, while it is rare, it seems to me that there is nothing grammatically wrong with *less more likely*, which clearly contrasts with *little more likely*.

3.3 No contrasts in other AdvPs

It is not clear that *much* and *more* contrast in any AdvPs, apart from those headed by *differently*, as mentioned in Section 3.1. Two strings that look promising, *more so* and *more how*, are not AdvPs. In *tighter, but not much so/like yesterday but more so*, it's not entirely clear that *so* is an adverb there. And in examples like *this is much/more how we imagined it*, *much* and *more* are not modifiers in a *how* AdvP.

Finally, *much too* is a rare case of *much* as modifier in an AdvP with a plain-form head, as in *much too good*, but, unexpectedly, **more too good* is not possible, so there is no contrast. Nevertheless, this is an interesting case, which I return to in Section 5.8.

3.4 Contrasts in VPs

Though *CGEL* does not consider modifiers *more* and *less* in VPs to be adverbs, it is still worth briefly setting out the contrasts. One case where *much* and *more* (but not *little* and *less*) contrast is with gradable verbs. These are mostly limited to negative-polarity contexts, as shown in (6). Bolinger (1972: 192–214) gives many more restrictions on *much* as a modifier in VPs.

(6) a. *I don't think I much like the idea.*
b. *I no more like it than you do.*

Contrasts between *much* and *more*, along with *little* and *less*, as post-head modifiers are also common, as in (7a & 7b). Again, the contrasts for *much* are mostly limited to non-affirmative contexts.

(7) a. i. *It had not changed much.*
ii. *It had changed more than I expected.*
b. i. *It had changed little*
ii. *It had changed less than I expected.*

3.5 Contrasts in preposition phrases

In preposition phrases (PPs), *CGEL* appears to analyze *more* and *less* as determinatives, but, as shown in Section 2.3, there are synthetic comparatives in PPs like *closer to home*, and so it is reasonable to consider examples like (8) to be analytic comparatives. *CGEL*'s claim is that there are no contrasts in analytic comparatives, so examples like (8) are further evidence against that claim.

(8) *Age is much/more on my mind these days.*

3.6 Summary of contrasts

The goal of this section has been to show that *CGEL*'s claim that *more* and *much* never contrast in analytic comparatives is (very uncharacteristically) false. It is true that such contrasts are rare, but they do appear in a variety of comparative governors, AdjPs, and PPs. Because the supposed lack of contrast is the only reason given for classifying *more* and *less* as adverbs, the data in this section alone should be sufficient to show that the adverb analysis is unmotivated. Nevertheless, I provide evidence in the next section that it should not surprise us to find that intensifiers of a given category have dramatically different distributions.

4 The vagaries of modification

In this section, I examine the difference in contexts in which modifiers appear, even when they share the same category. I examine the restrictions on determinatives as modifiers in AdjPs, AdvPs, and PPs, finding that *no*, *any*, and *all* are the most restricted of the determinatives, while *less* and post-head *enough* show very few restrictions. I then examine the restrictions on adverbs, along with *more* and *less*, as modifiers in AdjPs and DPs, finding that *more* and *less* are by far the most restricted, while *not* and *very* are the least. I conclude that, even if the contrasts identified in Section 3 were somehow explained away, the distributional differences between *more* and *much* are well within the expected range for determinatives and do not support an adverb analysis.

4.1 An overview

Intensifiers in adjectives phrases are notoriously fussy. Chapter 2 of Bolinger (1972: 26) is entitled, "Some restrictions on intensifiers primarily with adjectives", but despite dedicating 30 pages to the issue, he describes the chapter as "perhaps better than a sampling, but ... far from complete." Restrictions may be dialectic (*right* functions as a modifier in adjective phrases in some dialects and not in others), register-specific (e.g., *We were little affected by what we saw* is stiffly formal), and positional (*enough* is only post-head), along with semantic and prosodic features (*highly frightful* doesn't work because "*frightful* is already stronger than *highly*, so that the combination is incongruous. . . . In addition to the semantic restriction there is a tendency to avoid monosyllabic adjectives" Bolinger 1972: 52).

This fussiness extends to the choice between analytic and synthetic comparatives. Jespersen (1956: 359), observing that "it is not always easy to see why writers prefer one or the other method of comparing adjs," gives us nine pages of cases in which the choice between periphrasis and inflection on the adjective seems to be unpredictable. That's followed by two more pages about the choice in adverbs. He comments, "the periphrastic comparatives and superlatives with preposed *more* and *most* are found not only in those cases in which the endings *–er* and *–est* cannot be used for phonetic reasons, but also extensively in other cases" (Jespersen 1956: 382).

4.2 Determinatives as modifiers

If analytic *more* and *less* patterned one way in AdjPs while the rest of the determinatives patterned another, there might be an argument that analytic *more* and *less* are of a different category. But there is no clear distinction between them, and there is significant variation among all the determinatives in modifier function, as Table 1 makes clear.

Table 1: Determinatives as modifiers in AdjPs

EXAMPLE	*more*	*less*/*enough*[a]	*much*/(*a*) *little*	*no*/*any*	ADJ TYPE[b]
big		✓			[plain synth]
recent	✓	✓			[plain ana]
bigger			✓	✓	[↑↓ synth]
different	✓	✓	✓	✓	[comp ≠]
equal	✓	✓	✓		[comp =]
afraid	✓	✓	✓		[*a*–]
improved	✓	✓	✓		[past-part]

[a] post-head *enough*, also *that*

[b] [plain synth] "plain-form gradables allowing *–er*", [ana] "plain-form gradables allowing *more*", [↑↓ synth] "synthetic comparatives of superiority/inferiority", [comp ≠] "plain-form comparatives of inequality", [comp =] "plain-form comparatives of equality", [*a*–] "adjectives formed with *a*–", [past-part] "past-participial adjectives"

In AdjPs, the determinatives *that* and *enough* are like *more* and *less* in being able to function as modifiers in a wide range of AdjPs, but not with synthetically comparative adjectives like *bigger*. In contrast, *much* and (*a*) *little* have somewhat complementary distributions, while *no* and *any* only modify comparatives of superiority and inferiority, along with the comparative governor *different*. If distributional arguments supported that *more* being an adverb, would they not also support *enough* and *that* being adverbs?

Similar splits appear in AdvPs (Table 2). Again, *that* and *enough* pattern with *more* and *less*, while *much* and *a little* are similar to each other, and *no* and *any* are the most limited. For reasons of space, I've removed *little*, but it's almost the same as *a little*, differing only in not being able to modify *too*. The determinative *all* could also be added to the table as modifying *too*.

Finally, the situation in PPs (Table 3), while being similar, differs slightly from

Table 2: Determinatives as modifiers in AdvPs

EXAMPLE	*more*	*less/enough*[a]	*much*	*a little*	*no/any*	ADV TYPE[b]
recently	✓	✓				[*–ly*]
fast		✓				[plain synth]
faster			✓	✓	✓	[↑↓ synth]
differently	✓	✓	✓	✓	✓	[comp ≠]
equally	✓	✓	✓			[comp =]
too			✓	✓		[*too*]

[a] post-head *enough*, also *that*

[b] [*–ly*] "plain-form *–ly* adverbs", [plain synth] "plain-form gradables allowing *–er*", [↑↓ synth] "synthetic comparatives of superiority/inferiority", [comp ≠] "plain-form comparatives of inequality", [comp =] "plain-form comparatives of equality", [*too*] "*too*"

that in Tables 1 and 2. Here, it's a little harder to assign the individual prepositions to types, and so the selection is even more opportunistic than above. The difference between *near* and *nearer* are similar to plain–comparative differences in AdjPs and AdvPs. Also, *no/any* are very limited, as above. But beyond that, no obvious pattern emerges. I've also added determinative *all* to the table, which is possible only with two of the PPs included here: *up to date* and *along the road*.

Table 3: Determinatives as modifiers in PPs

EXAMPLE	*more*	*that*	*less/enough*[a]	*much/little*	*no/any*	*all*
near		✓	✓			
nearer				✓	✓	
up to date	✓	✓	✓			✓
along the road						✓
short of the mark	✓	✓	✓	✓		
like her mother	✓		✓	✓		
above the ground	✓		✓	✓		

[a] post-head

What this highly selective comparison illustrates is that there is a good deal of variation among the determinatives in where they function as modifiers. This would seem to undermine the argument for assigning analytic *more* and *less* to a different category based on distributional facts. It suggests that any difference between their behaviour and that of *much* or *little* is within the expected variation for the determinative category, perhaps for semantic reasons.

4.3 Adverbs as modifiers

If analytic *more* and *less* patterned with adverbs as pre-head modifiers in phrases with gradable heads, this might provide evidence that they too are adverbs. But again, this is not what occurs. The data in Table 4 shows that *more* is quite unlike other adverbs. In

fact, there is no clear pattern; each of the eight selected adverbs has its own distribution.

Table 4: Selection of *more*, *less*, and adverbs as modifiers

	more	*less*	*how*	*amazingly*	*slightly*	*far*[a]	*not*	*very*
Plain Adj: *recent*	✓	✓	✓	✓	✓		✓	✓
Plain Adj: *big*		✓	✓	✓	✓		✓	✓
Comp Adj: *bigger*					✓	✓	✓	
Superl Adj: *biggest*							✓	✓
Det *much*			✓	✓			✓	✓
Det *little*			✓	✓				✓
Det *more*				✓	✓	✓	✓	
Det *less*				✓	✓	✓	✓	
Det *most*							✓	✓
Det *least*							✓	✓

[a] Also *much*.

Clearly, there is no typical adverb that functions as modifier in the contexts shown. Even so, analytic *more* appears to be an outlier in its inability to function as modifiers in any of the DPs or in AdjPs headed by adjectives like *big* that participate in synthetic comparatives and superlatives. *Less* is only slightly less of an outlier. At the very least, the selected data in Table 4 provides no support for *CGEL*'s claim that analytic *more* and *less* are adverbs; in fact, it seems to cast doubt on it.

5 The explanatory force of scales

Although their distributional behavior may not justify categorizing *more* and *less* as adverbs, the differences with *much* and *little* call for an explanation. Building on the distributional analysis presented in the previous sections, this section uses the scale structure of adjectives (and other categories) to explain the differing distributions of *more* and *less* and *much* and *little*.

5.1 Stevens's scale hierarchy

Stevens (1946) proposed a classification system for attribute data, divided into four levels, as shown in Figure 1 (from Zhang & Ling 2021: 250). These scales provide a framework for understanding the differing distributions of intensifiers and modifiers based on the scale structure of the adjectives they modify.

- NOMINAL SCALE: Categorizes data into distinct groups based on qualitative properties.
- ORDINAL SCALE: Categorizes and orders data, but does not provide information about the intervals between categories.
- INTERVAL SCALE: Categorizes, orders, and establishes equal intervals between categories, but lacks a true zero point.

- RATIO SCALE: Categorizes, orders, establishes equal intervals, and includes a true zero point.

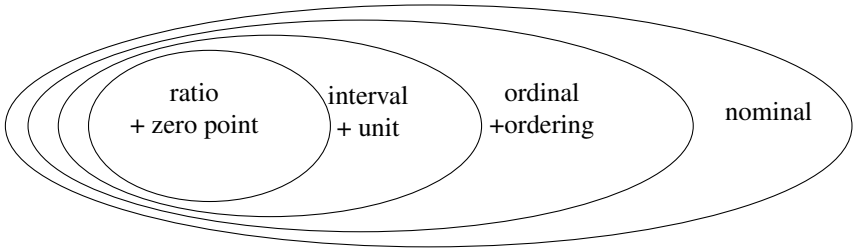

Figure 1: Venn diagram illustrating the hierarchy of Stevens's scales.

CGEL distinguishes between gradable and non-gradable adjectives. Already this hints at scalar restrictions on the possible modifiers in AdjPs; compare *the feeling is* (*very*) *important* and *the feeling is* (**very*) *mutual*.

But this only makes a first cut between nominal adjectives and those with other scale structures. Other distinctions can be made between the other three levels in the scale system. These are set out in Table 5. As more semantic scales are added, more constraints are imposed. *One sixth as dense* is possible because density is a ratio scale, but ?*one sixth as kind* seems anomalous, presumably because *kindness* isn't.

5.2 Scale structure

The various scales also have internal structure (McNally & Kennedy 2005) which further constrains the set of possible modifiers. Ordinal, interval, and ratio scales can have endpoints which close the top or bottom of the scale, as shown in (9 from Potts 2008: 2).

(9)

totally open	○——○	*short*, *expensive*
lower closed	●——○	*wet*, *bent*
upper closed	○——●	*pure*, *straight*
totally closed	●——●	*opaque*, *open*

Totalizing and approximating modifiers are best when there is an inherent top endpoint (e.g., *completely/almost straight*), but not without such an endpoint (e.g., ?*completely/almost bent*), and minimizing modifiers are best when there is an inherent bottom endpoint (e.g., *slightly bent*) and worse without one (e.g., ?*slightly straight*). In contrast, modifiers such as *extremely* work best when the top of the scale is open (e.g., *extremely expensive* but not ?*extremely straight*).

There can be other scale-internal reference points that are established contextually against expected norms. *Tall* is an example where a lower reference point is so established: *they're tall* means 'their height is noticeably greater than normal for the relevant

Table 5: Syntactic compatibility of intensifiers with plain-form adjectives of different semantic-scales.

		SYNTACTIC COMPATIBILITY		
		ORDINAL	INTERVAL	RATIO[a]
SEMANTIC SCALE	EXAMPLE ADJECTIVES	*extremely*, *slightly*, *too*, *very*, *enough*, *that*	*5cm*, *5Hz*, *5mph*, *5°*, *5 days*	*2.7 times as*, *one fifth as*
NOMINAL	*additional*, *equal*, *mutual*, *opposite*, *other*, *such*, *twelfth*[b]			
ORDINAL	*good*, *hard*, *important*, *interesting*, *kind*, *thirsty*	✓		
INTERVAL	*acidic*, *energetic*, *expensive*, *fast*, *hot*, *loud*, *massive*	✓		✓
RATIO	*high*,[c] *late*, *long*, *old*	✓	✓	✓

[a] It's common to say *it's only half as good* or *it's twice as nice* but these pseudo-ratio modifiers merely mean 'much worse' or 'much better' without invoking a genuine multiple.

[b] In *CGEL* an "ordinal adjective" is one like *first*, *second*, *third*, etc. The structure this whole group is ordinal, but the semantic-scale structure of each group member is nominal.

[c] The sense of these adjectives "corresponds to their interpretation when they are associated with units" (Sassoon 2007: 243), as opposed to being simply an impression such as that of *old* in *He retired before he grew old.*

reference group'.[8]

5.3 Scale-structure limitations on *much* and related modifiers

Since scale and scale structures have a considerable impact on the modifiers allowed in AdjPs generally, it should not be surprising that, restrictions should apply to *much* specifically. As a modifier in an AdjP, *much*, along with *no*, *little*, *far*, *even*, *a lot*, and *way*, require an ordinal, scale-internal, lower reference point (McNally & Kennedy 2005); the point may end up being a norm or average, but that is not the default. Establishing such a point is the function of *–er*/*more* (Zhang & Ling 2021). Though the point need not be stated explicit, it is typically possible to included it in a *than* PP. *They're taller than me* picks out my height as the relevant point of reference. With this point established, *much* and the related modifiers are now possible.

At the same time, other modifiers are now blocked, including *most*, *too*, *very*, and *extremely*. *Most*/*–est* is likely blocked because its function is to establish a compari-

[8] When *tall* is associated with units such as metres, it is closed at the bottom at 0m.

son set, which conflicts with the comparison point established by *more*. Similarly, as mentioned above, *too* establishes maximum acceptable degree, which seems to conflict with the comparison point established by *more*.

Very and *extremely* may be blocked because they pick out an absolutely high degree on the scale. In the comparative constructions, though, it is not the absolute degree but rather the difference in degrees that matters.

All of this is to say that the semantic scale structure of a given adjective has a significant impact on the modifiers that it allows as the head of a AdjP and that these restrictions, and not categorial differences, are why *much* and *more* generally appear in different contexts. As I showed in Section 3, though, there are contexts in which both *more* and *much* may alternate. I turn to an explanation of these next.

5.4 Comparative governors

In Section 3.1, I show that comparative governors such as *different* allow modification both by *more* and by *much*. In Section 5.3, I follow McNally & Kennedy (2005) in claiming that *much*-type modifiers require an established scale-internal reference point, and I follow Zhang & Ling (2021) in claiming that *more*/*–er* establish such a point. It's not surprising that the comparative governors would allow modification by *more*/*–er*, so it is now left to see why they allow *much* without *more*/*–er* to establish a point of reference.

I propose that, like *more*/*–er*, comparative governors allow modification by *much* because their semantics establish a point of reference, which may appear in a *than* or *from* PP. In (10a), the reference point is a different price, "that one", which is made explicit in the *from*-PP complement.

(10) a. *This price is different* (*from that one*).

b. *This price is more different from that one* (*than some other difference*).

If that's the case, though, why should *more* be possible? The answer is that it establishes a second point of reference on a second-order scale – a difference of differences – which is relative to the normal range of such differences and can be made explicit in a second PP complement. Metaphorically, *more different* is to *different* as acceleration is to speed. The first-order difference in (10a) and second-order difference in (10b) are illustrated in Figure 2.

In (10b), the reference point is not another price but rather the normal or expected difference between prices. The *from*-PP complement points to 'that one' as the point of reference on the y-axis scale in the left-side plot in Figure 2, while the *than*-PP complement points to 'the normal difference in price' as the point of reference on the y-axis scale in the right-side plot in Figure 2.

5.5 Participial adjectives

In Section 3.2.1, I show that non-comparative participial adjectives (e.g., *improved*, *refreshed*, *recovered*, *diminished*) may head AdjPs with *much* as a modifier. The explanation for these is the same as above: they tend to have a semantics that establishes

Figure 2: Comparison of price scales: The first plot shows the prices of two items, while the second plot represents the difference between these prices compared to some other difference. The red lines illustrate the concept of a difference of differences.

a scale-internal reference point, and this can sometimes be articulated in a PP complement, as in (11). In contrast, a participial adjective like *broken* lacks this reference point, which disallows *much* as a modifier in (12).

(11) a. *The paper seems much improved from the first draft.*
b. *She looks much recovered from her injuries.*
c. *The battery life is much diminished from when it was new.*

(12) a. *His nose looked* (**much*) *broken.*
b. *She was* (**much*) *frightened.*

As with the comparative governors, modification by *more* is a second-order modification – a difference of differences – adding a second reference point on a second scale.

However, this explanation does not cover all of the possible participial adjectives. The examples mentioned by *CGEL*, for instance *inclined* and *impressed*, do not seem to include the expected reference point.

5.6 The *a–* adjectives

As with the participial adjectives, some of the *a–* adjectives seem to have a natural reference point (e.g., *akin* & *alike*), while others do not (e.g., *alive* & *afraid*). I don't have a good story, though, for why examples like *I was much aware* should be possible, while **She was much adroit* seems not to be.

5.7 Other plain-form adjectives

I have found no other plain-form adjectives that accept simple *much* as a modifier (e.g., **that is much true*), but there are examples like *as much true of China as of France* or *as much eager to go as the others*. In such cases, the comparative-governor adverb

as seems to be what licenses the relevant reference point, which can be made explicit in the *as*-PP complement. The question then becomes, why this is not more broadly applicable. For this, I have no answer.

A syntactically identical construction, though with slightly different meaning, does seem to apply more broadly, an example of which is *Sanctions are as much psychological as they are punitive*.

5.8 *Too*

The semantics of *too* is surprisingly similar to that of *more/–er*: both of them require an ordinal adjective, adverb, or preposition. And both of the work with a lower reference level. The key relevant difference here is that *too* sets its reference level as the maximum acceptable level, without licensing a complement in the syntax by relying on pragmatics and social norms. Because *too* establishes a maximum acceptable level, *too dangerous* fine but ?*too excellent*, seems anomalous because the scalar structure of *excellence* is at odds with some kind of maximal goodness. The lower reference level of *too* is what allows AdjPs like *much too tall*.

5.9 Formalizing the account

I provide a semi-formal account in (13–19). In (15–17), I assume that the second individual, the base case y, is either explicit in the input (e.g., x *is wetter than* y) or can be retrieved from the discourse (e.g., *there are two, but this one's bigger*; y must be 'the other one'). I present the definitions as a group to facilitate comparison. An explanation of the elements and symbols follows.

$$\textit{water} = \lambda x.\exists d_x, d_y \left[\begin{array}{l} \text{Water}(x), \\ d_x = Q(x) \wedge d_y = 0 \end{array} \right] \tag{13}$$

$$\textit{wet} = \lambda x.\exists d_x \left[\text{wetness}(x, d_x) \wedge d_x > 0\right] \tag{14}$$

$$\textit{improved} = \lambda x, y.\exists d_x, d_y \left[\begin{array}{l} y \rightarrow x, \\ \text{good}(x, d_x) \wedge \text{good}(y, d_y), \\ d_x > d_y \end{array} \right] \tag{15}$$

$$\textit{different} = \lambda P, x, y.\exists d_x, d_y \left[\begin{array}{l} y \neq x, \\ P(x, d_x) \wedge P(y, d_y), \\ d_x \neq d_y \end{array} \right] \tag{16}$$

$$\textit{more/–er} = \lambda P, x, y.\exists d_x, d_y \left[\begin{array}{l} P(x, d_x) \wedge P(y, d_y), \\ d_x > d_y \end{array} \right] \tag{17}$$

$$\textit{too} = \lambda P, x.\exists d_x, d_y \left[\begin{array}{l} P(x, d_x) \wedge d_y = \text{Max}_{\text{good}}(P), \\ d_x > d_y \end{array} \right] \tag{18}$$

$$\textit{much} = \lambda d_x, d_y.|d_x - d_y| > \text{threshold-amount} \tag{19}$$

Here's an explanation of the elements used in these definitions:

- P: A predicate that takes individuals and degrees as arguments, representing a property or relation. For example P could be 'wet' in the definition for *–er* (17) if the assertion is that something is wetter.

- x, y: Variables representing individuals or entities. For example, in the definition for *wet* (14), x could be 'Edinburgh' if the assertion is that *Edinburgh is wet*.

- Q: A function that takes an individual and returns a degree or quantity associated with that individual. In the definition for *water* (13), Q could represent the quantity of water in a given entity.

- λ: The lambda symbol represents a function abstraction. It introduces a function that takes one or more variables and returns an expression involving those variables. For example $\lambda P, x$ is a function with a predicate and an individual as variables.

- d_x, d_y: Variables representing degrees or quantities associated with the individuals x and y. For example, in (15) as it applies to *an improved version*, x is 'the version after improvements', and d_x is 'the degree to which x is good'. Here, d_y is what I've been calling a salient minimum value.

- $\exists$: The existential quantifier, indicating that there exists some value satisfying the conditions that follow.

- $\rightarrow$: A symbol representing a change or transition from one state to another.

- $\text{Max}_{\text{good}}(P)$: A notation representing the maximum acceptable value of a predicate P. For example, in (18), if something is too tall, then P is 'tall', and $\text{Max}_{\text{good}}(P)$ is the tallest acceptable amount.

- threshold-amount: A constant representing a specific threshold or limit. For example, in (19), the threshold-amount is the amount at which you would agree that A is much P*–er* as opposed to, for instance, somewhat P*-er*.

These elements are combined to form expressions that capture the meanings of the words and phrases in question. For example, the definition of *more*/*–er* uses a lambda abstraction to define a function that takes a predicate P and two individuals x and y, and asserts the existence of degrees d_x and d_y such that P holds for x and y to those degrees, and $d_x > d_y$.

The definitions can also be combined, as in (21–23), to show why *wetter* and *much wetter* are possible, while **much wet* is generally not:

$$\textit{much water} = \lambda x.\exists d_x, d_y \left[\begin{array}{l} \text{Water}(x), \\ d_x = Q(x) \wedge d_y = 0, \\ |d_x - d_y| > \text{threshold-amount} \end{array} \right] \tag{20}$$

$$\textit{wetter} = \lambda x, y.\exists d_x, d_y \left[\begin{array}{l} \text{wetness}(x, d_x) \wedge \text{wetness}(y, d_y), \\ d_x > d_y \end{array} \right] \tag{21}$$

$$\textit{much wetter} = \lambda x, y.\exists d_x, d_y \left[\begin{array}{l} \text{wetness}(x, d_x) \wedge \text{wetness}(y, d_y), \\ |d_x - d_y| > \text{threshold-amount} \end{array} \right] \tag{22}$$

$$*\textit{much wet} = \lambda x.\exists d_x \left[\begin{array}{l} \text{wetness}(x, d_x), \\ |d_x - d_y| > \text{threshold-amount} \end{array} \right] = \text{undefined} \tag{23}$$

- *much water*: This definition represents the concept of a large amount of water. The function takes an individual x and asserts that there exists a degree d_x representing the quantity of water in x, and a degree d_y set to 0. The absolute difference between d_x and d_y must be greater than a threshold amount, indicating that the quantity of water meets the threshold value for 'much'.

- *wetter*: This definition represents the comparative form of *wet*. It takes two individuals, x and y, and asserts that there exist degrees d_x and d_y representing the wetness of x and y, respectively. The condition $d_x > d_y$ ensures that x is wetter than y.

- *much wetter*: This definition extends the concept of *wetter* by adding a condition that the absolute difference between the degrees of wetness, d_x and d_y, must be greater than a threshold value.

- $*$*much wet*: This definition attempts to combine *much* with *wet* but results in an undefined expression. The problem arises because the definition refers to a d_y without defining or providing it in the context of *wet*.

A *P* such as *wet* does not typically supply the d_y argument needed by *much*, except in the cases discussed in Section 3. The definitions also explain why **too more* and **more too* are impossible (as mentioned in Section 3.3): they would have competing d_y values.

The semantic requirements of *much* are echoed, though not duplicated, in the semantics of *far* (an adverb) and *no* (a determinative). Each of these is possible with *more*/*–er* and generally not possible with plain-form adjectives as predicates P.

(24) a. i. *much/far taller* ii. **much/far tall*

b. i. *much/no shorter* ii. **much/no short*

The behaviour of *far* and *no* suggest that this kind of semantics is not dictated by the lexical category of the word.

It would be interesting to consider whether a similar explanation may be possible for the unacceptability of modifiers like *extremely* and *very* with *more*/*–er*, illustrated in (25b), though I will not attempt this here.

(25) a. *much/slightly shorter*, *far/no more expensive*

b. * *extremely shorter*, *very more expensive*

5.10 Problems with this account

Though the explanation accounts for much of the data, it does not account for all of it. First, as mentioned above, there are past-participial adjectives and *a–* adjectives that may head AdjPs with modifier *much*, even though they do not establish any salient reference point.

Second, most adjectives allow a post-head *for* PP introducing a discourse-salient value as in (26a), but, as (26b) shows, this does not satisfy *much*'s need for such a value. It's not clear to me why this should be the case, though it may be that the *for* PP is a modifer instead of a complement.[9]

(26) a. *He is short for a basketball player.*

b. * *He is much short for a basketball player.*

Third, there are two senses of adjectives such as *tall*, one taking the standard expected tallness for the reference class as its base, as in (27a) and the other taking 0 as its base, as in (27b). Again, neither of these seems to satisfy *much*'s need for such a value, as illustrated by (27c), and again, I'm not sure why this should be the case, though perhaps it is because ds needs to be scale internal, and so the 0 base is not acceptable.

(27) a. *He is tall.*

b. *He is 2.13m tall.*

c. * *He is much tall.*

5.11 Payne's counter-proposal

John Payne (personal communication, Sep 4, 2022), speculated that a difference exists between the adverb *more*, which deals with degrees, and the determinative *more*, which deals with quantities.[10] If a case had already been made for the dual categorization analysis, and I hope I have shown that it has not, then this would be an interesting observation, but it doesn't seem to me like the stuff that would motivate distinct categories.

Moreover, it doesn't hold consistently across the *CGEL* analysis. For example, (1) is clearly a degree difference, as opposed to *I dance more*, which would be a quantity difference.[11] But there is also, *not so much in control* and *Kim isn't much of an actor*, which are explicitly a determinative uses of *much* (p. 395) and yet clearly require a degree interpretation (p. 415). Furthermore, as Payne acknowledges, it isn't the case

[9] It's slightly different with *much/slightly/far short of expectations* because this *short* is a preposition, not an adjective. The *of* PP is a complement here while the *for* PP is arguably a modifier. See, Payne (this volume) for a discussion of the difference.

[10] *CGEL* calls these "degree determinatives" (p. 393).

[11] "In clause structure [*more* and *less*] are forms of the determinatives *much* and *little* rather than adverbs" (p. 585, n17).

that determinatives in general do not deal with degrees. For instance, "*that* seems to be more flexible. As a demonstrative, it can point either to a particular degree for a degree concept or a particular amount for a quantity concept" (personal communication, Sep 4, 2022).

Nor does this clear up any of the difficulties with the explanation advanced in Section 5.10.

5.12 Summary

Overall, then, scales and the scale structures of individual adjectives have a significant impact on which modifiers are allowed with which heads in AdjPs. In other words, semantic factors play a huge role. This extends to most of the observed difference in distribution between *much* and *many* as modifiers in AdjPs. This does not preclude a categorial difference between *much* and *more* (and by extension *little* and *less*), but it certainly undermines the motivation for it.

6 The complementarity argument

Distinct from the question of whether or not *much* and *more* do in fact overlap in their distribution as degree modifiers is the question of whether a lack of overlap would justify dual categorization. Here I show that *CGEL* does not always follow such a rule by showing that there are pairs of arguably inflectionally-related overlapping words sharing a single category and those split between two categories, and that the same holds for non-overlapping words, as summarized in (28).

(28)

	OVERLAPPING	NON-OVERLAPPING
SINGLE CATEGORY	*much*$_{\text{D}}$ *more*$_{\text{D}}$	*this these*
DUAL CATEGORIES	*you*$_{\text{D}}$ *your*	*mere merely*

6.1 Overlap in a single category

This is the expected case. Different members of the same category should generally be able to appear in identical contexts with different meanings. And that's exactly what we find with the determinatives *much* and *more* in determiner function (e.g., *Do you have more/much stuff?*).

6.2 Overlap across categories

Next, consider *you*, normally a *CGEL* pronoun, which contrasts with *your* when functioning as a determiner in NPs such as *you*(*r*) *teachers*. *CGEL* calls *you* a determinative in *you teachers*, but never regards *your* as a determinative – it is always a pronoun in the genitive case. The word *you*, then, is dually assigned as a determinative and a pronoun specifically to avoid the pronoun *you* ever contrasting with *your* as a determiner.

6.3 Lack of overlap within a single categories

Now consider the demonstrative determinatives *this*, which has singular and plural forms *these* with non-overlapping distributions as determiners in NPs; that is, *this* appears exclusively with singular head nouns while *these* appears exclusively with plural head nouns.[12] *This* also functions as a modifier in various phrases (e.g., *It shouldn't be this hard*, but *these* does not, so again there is no overlap here. Despite this lack of overlap, *CGEL* is clear that both of these words are determinatives.

It could be argued that a mere singular/plural difference within the same lexeme does qualify as overlap, but if that's so, then the same should apply to a plain-form/comparative difference within the same lexeme in cases like *little bigger* and *less big*, where *CGEL* claims *little* is a determinatives while *less* is an adverb.

Or consider *your* and *yourself*, which have entirely different functions. However you look at it, there are single-category inflectional pairs that do not contrast.

Modification

Sometimes, *CGEL* uses different modifiers to motivate distinct categories. For example, *very* functions as a modifier in AdjPs but not VPs. In an NP, we can ask *how much water* and *how much more water*, but not **how more water*. Similarly, we can ask *how little water* and *how much less water*, but not **how less water*. This might motivate a categorial difference between *much* and *little* on one hand and *more* and *less* on the other, but unsurprisingly it doesn't because other factors undermine this analysis.

6.4 Lack of overlap across categories

Finally, consider pairs like the attributive-only adjective *mere* and the adverb *merely*.[13] Since *merely* cannot appear in attributive modifier function in a nominal, and that is the only possible function for *mere*, there are no contexts in which *mere* contrasts with *merely*, and this is more or less what we expect.

6.5 Summary

All told, then, distributional facts are not sufficient reason to dually categorize a word.

> Clearly, in these cases where the same forms are complementary in some environments and contrastive in others, it is not the distribution *per se* which leads us to think of a derivational relation between *wood* and *wooden*, and an inflectional relation between [the Russian nouns] *soldat* and *soldatom*. And even if, as a thought experiment, *wood* and *wooden* on the one hand and *soldat* and *soldatom* on the other always stood in complementary distribution, would this alter our decision? We think not: it seems that factors other than simple distribution are the crucial ones. Payne, Huddleston & Pullum 2010: 61

[12] As fused determiner-heads, *this* appears in singular NPs and *these* in plural NPs.

[13] Though *CGEL* considers the adverb-forming *–ly* morpheme to be derivational, and I don't disagree, Giegerich (2012) has argued that it is inflectional.

The quote above relates to splitting an entire lexical category in two (or lumping two into one), but it should apply equally to individual words. The question of whether we should think of the relations between *much* and *more* and between *little* and *less* as always inflectional or only sometimes so should not hinge on whether or not they stand in complementary distribution.

7 Conclusion

In this paper, I have argued that the words *more* and *less* are determinatives in all contexts, contrary to the categorization in *CGEL*.

I have shown that *CGEL*'s conception of analytic comparative overlooks PPs such as *closer to home* and *more like home*. Because *CGEL* analyzes *more* as a determinative in these cases, its analysis is internally inconsistent.

I have shown that contrasts between *more* and *much* do exist in various other contexts including comparative governors (e.g., *more*/*much different*) and certain participial adjectives (e.g., *more*/*much improved*), contradicting *CGEL*'s claim that *more* and *much* never contrast in analytic comparatives. Though I have focused my arguments on *more* and *much*, they extend to *most*, along with *less* in contrast to *little* and *least*.

The distributional facts can largely be explained by the pragmasemantic of *more*/*–er* and *much*. Specifically, *more*/*–er* establishes a salient minimum value in the discourse where none might exist, and *much* requires such a value. This not only explains why *much* tends to be limited to comparative contexts, but also why it appears with comparative governors, with certain participial adjectives, and with *too* (e.g., *much too long*). It can be extended to other modifiers like *no* and *far*, and it can explain why *more* and *too* cannot modify each other. There are, however, some remaining puzzles, such as why *much* is not possible in **He is much short for a basketball player*, even though the underlined phrase seems to provided the required salient minimum value in the discourse.

Furthermore, I have argued that the lack of contrast or complementarity should not be relied upon to make categorial determinations, as *CGEL* seems to have done. For these reasons, positing two different lexemes for *more* and *less* is neither necessary nor parsimonious: the determinative analysis can account for all of the data.

In conclusion, the evidence presented in this paper supports the view that *more* and *less* are always determinatives, and their categorization as adverbs is not justified in any context.

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