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doi:10.1017/S0022226724000239

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

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(Received 15 November 2023; revised 24 May 2024; accepted 28 May 2024)

I argue that *more* and *less* are always determinatives, contrary to the categorization in *The Cambridge Grammar of the English Language (CGEL)*, which treats them as adverbs in analytic comparatives. Evidence is presented of contrasts between *more/less* and *much/little* in various contexts, challenging *CGEL*'s empirical claim that such contrasts never occur in analytic comparatives. The observed distributional patterns can largely be explained by the semantics of *more/-er* and *much* without positing a category distinction: *more/-er* establishes a salient scale-internal reference point, while *much* requires such a point to already be present. Furthermore, mere distributional differences should not be relied upon for category assignment, following arguments by Payne, Huddleston & Pullum (2010). For these reasons, analyzing *more* and *less* as adverbs in any context is unnecessary and unparsimonious. The determinative analysis can account for all the relevant data. Beyond the narrow point about categorization, the paper illustrates the contributions of semantic, pragmatic, and distributional evidence in resolving category assignment.

KEYWORDS: adverbs, analytic comparatives, *CGEL (The Cambridge Grammar of the English Language)*, determinatives, distributional patterns, scale structure, semantics

## 1. INTRODUCTION

Geoff Pullum's career has been characterized by meticulous reevaluations of established linguistic conventions on a remarkably broad range of topics, from the philosophical basis of linguistics to the rigorous categorization of individual words (e.g. Huddleston & Pullum 2002, Payne, Huddleston & Pullum 2007, 2010). In a similar spirit of reevaluation, I argue that *more* and *less* are always determinatives, contrary to the categorization in *The Cambridge grammar of the English language (CGEL)* (Huddleston & Pullum 2002).

*CGEL* holds that while *more* and *less* are generally determinatives, they are adverbs exceptionally 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?*' (Huddleston & Pullum 2002: 1123).

This paper challenges that claim, arguing that such contrasts do in fact exist. I propose that the distributional facts can largely be explained by the semantics of *-ER/MORE* and *MUCH*. Specifically, following Zhang & Ling (2021), I adopt the position that *-ER/MORE* establishes a salient minimum value in the discourse (Zhang & Ling 2021) where none might otherwise exist. And following Kennedy & McNally (2005), I argue that *MUCH* requires such a value in order to function as a modifier. This semantic interplay between *-ER/MORE* and *MUCH* provides a pragma-semantic explanation for their distribution, without needing to posit a category distinction.

Furthermore, I argue that a mere lack of contrast should not be relied upon for making categorial determinations in any case, following the arguments by Payne et al. (2010). 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 relevant data.

The paper is structured as follows: Section 2 lays out *CGEL*'s analysis of *MORE* and *LESS* and the notion of analytic comparatives. Section 3 presents contrasts between *MORE/LESS* and *MUCH/LITTLE* in various syntactic contexts, challenging *CGEL*'s empirical claim. Section 4 examines the complex factors influencing the distribution of degree modifiers and argues that *MORE* and *LESS* do not pattern distinctly from other determinatives. Section 5 proposes a semantic explanation based on scale structure for the distributional patterns observed. Finally, Section 6 argues against relying on distributional complementarity for making categorial distinctions, before the paper concludes in favor of a unified determinative analysis of *MORE* and *LESS*.

## 2. *CGEL* ANALYSIS

This section introduces the *CGEL* framework that are essential for understanding the subsequent analysis.

### 2.1. Terminology

*CGEL* (24) distinguishes between lexical and phrasal categories on one hand and syntactic functions on the other. The lexical category of a word is what you would find in the dictionary – its part of speech. Phrasal categories are derived from these lexical categories. Syntactic functions, in contrast, are relational notions. For example, *HAPPY* is always and only a member of the adjective category, but the adjective phrase (AdjP) *VERY HAPPY* can function as a modifier in a *VERY HAPPY CHILD* or as a predicative complement in *THE CHILD IS VERY HAPPY*. I argue that the lexemes *MORE* and *LESS* belong to the lexical category of *DETERMINATIVE*. In *CGEL*, determinatives include articles, demonstratives, cardinal numbers, universals such as *ALL* and *BOTH*, and a few other items. These elements head determinative phrases (DPs), which should not be confused with the notion of a ‘determiner phrase’ in the DP hypothesis. Perhaps surprisingly, *CGEL* and Chomsky (2020) agree on this point: the widely accepted DP hypothesis is mistaken, despite its prevalence in generative

syntax. In this paper, a phrase like FAR FEWER is analyzed as a DP, while a phrase like THIS WORD is considered a noun phrase (NP).

The main syntactic function that DPs perform is the DETERMINER function in NPs (e.g. EVERY CHANGE). But this is a many-to-many relationship: DPs serve other functions as well, such as MODIFIER in AdjPs (e.g., THIS HAPPY). Conversely, other constituents besides DPs – primarily NPs – can also function as determiners in NPs (e.g. THE GROUP'S OUTPUT).

## 2.2. CGEL's analysis of more and less as adverbs

CGEL (539) analyzes MORE and MOST as inflected forms of the determinative MUCH, and similarly LESS and LEAST as inflected forms of LITTLE, with one exception: in analytic comparatives, they are considered adverbs (MORE<sub>a</sub>, LESS<sub>a</sub>). CGEL states: 'For the comparative category, analytic marking is by means of the adverb *more*' (1123), and extends this analysis to MOST<sub>a</sub>, LESS<sub>a</sub>, and LEAST<sub>a</sub> (64). This adverb classification is not due to their role as degree modifiers (395, 459, 549), since CGEL notes that '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' (565). Rather, it hinges specifically on the claim that MORE fails to enter into any degree of modifier contrast with MUCH in this environment.

*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 395)

Notably, *more* and *less* are the only determinatives in CGEL that are argued to be homonymous with adverbs. In categorizing them as adverbs in analytic comparatives, CGEL aligns with the long tradition in English grammars and dictionaries. For example, this is the position taken by Quirk et al. (1985: 463) and the *Oxford English Dictionary*. Payne et al. (2010: 37) define the 'distributional core' of adverbs 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.

Although rarely, *more* and *less* do meet this criterion, as in Example (1).

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

However, CGEL analyzes such cases as containing determinatives, diverging from the traditional adverb analysis (534). The adverb categorization is applied

specifically to analytic comparative constructions. In the following sections, I argue that this restricted dual categorization is unmotivated, and that a unified determinative analysis is preferable.

### 2.3. *Analytic comparatives*

The term ANALYTIC COMPARATIVE refers to a construction where ‘separate words realize grammatical distinctions that in other languages [or in other contexts in the same language] may be realized by inflections’ (Matthews 2003). While *CGEL* restricts its discussion of analytic comparatives to AdjPs and AdvPs as in (2; 533), it’s worth considering other possible analytic comparative constructions.

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

There are clearly gradable preposition phrases (PPs) which allow comparative forms, either inflectionally as in CLOSER TO HOME or analytically, as in Example (3a). These would seem to qualify as analytic comparatives. Verb phrases (VPs) and NPs like Examples (3b and 3c) appear structurally quite similar, but lack inflectionally comparative counterparts in English, so it may be inappropriate to consider them true analytic comparatives.

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

Interestingly, while *CGEL* explicitly analyzes *more* and *less* as determinatives in PPs like MORE OUT OF SORTS (395, 533), it does not extend the adverb analysis to these clear cases of PP-based analytic comparatives. This seems like an inconsistency, especially since the lack of contrast with MUCH that *CGEL* uses to justify the adverb categorization applies here as well.

### 2.4. *Summary of the CGEL analysis*

In summary, while *CGEL* generally analyzes determinatives as being able to modify a wide range of phrase types without exhibiting homonymy with adverbs, it makes an exception for *more* and *less* in analytic comparative AdjPs and AdvPs, though not PPs. The sole basis given for this dual categorization is the claim that MORE fails to contrast with MUCH in these environments.

In the following sections, I demonstrate that such contrasts do in fact occur, even in AdjPs and AdvPs. For the remainder of this paper, I focus primarily on MUCH and MORE, but the general argument applies equally to LESS and LITTLE.

## 3. CONTRASTS IN VARIOUS CONTEXTS

This section presents evidence of contrasts between MUCH and MORE in various syntactic environments, challenging *CGEL*’s claim that such contrasts never occur in analytic comparatives.

### 3.1. *Contrasts in AdjPs with plain-form heads*

To identify which adjectives head AdjPs that allow modification by MUCH, I searched the Corpus of Contemporary American English (COCA, from which all examples are taken unless otherwise specified; Davies 2023).<sup>1</sup> The query [be] much JJ returns hits for all forms of BE (e.g. IS, WERE, BEING) followed by MUCH plus an adjective, excluding negated forms like ISN'T. As expected, the results are dominated by comparative adjectives, but some plain-form adjectives also appear.<sup>2</sup> Similar searches with [seem] much JJ and [become] much JJ produce the set of adjectives in Table 1. I then searched for each of these adjectives preceded by BE/SEEM/BECOME + MORE (e.g. [be] more akin). The resulting frequencies are shown in Table 1.

Strikingly, MUCH not only modifies plain-form adjective heads in these AdjPs, but sometimes does so more frequently than MORE (e.g. with DIFFERENT). Moreover, despite MUCH being a negative polarity item (NPI) in many contexts, it exhibits little polarity sensitivity with the adjectives in Table 1. The distribution of MUCH is even broader when it is itself modified (e.g. VERY/AS/PRETTY MUCH EQUAL; Huddleston & Pullum 2002).<sup>3</sup>

The existence of these contrasts undermines CGEL's motivation for a dual-category analysis of MORE by demonstrating that MUCH and MORE are not in strictly complementary distribution. The adjectives in Table 1 appear to fall into four main groups: comparative governors, past participials, A- adjectives (see §3.1.3), and others.<sup>4</sup>

#### 3.1.1. *Comparative governors*

MUCH–MORE contrasts occur with what CGEL (1,104) calls COMPARATIVE GOVERNORS, items which license comparative complements: DIFFERENT, SUPERIOR, INFERIOR.<sup>5</sup> Additional comparative governor adjectives occurring in the relevant contexts in COCA, though tagged as other categories, are given in Example (4).

- (4) (a) like, different, inferior  
 (b) similar, unlike, preferable, akin, superior

[1] COCA (<https://www.english-corpora.org/coca/>) was 1,002,889,754 words when the data were collected, in late 2023, including 24–25 million words each year from 1990–2019.

[2] Tagging errors (e.g. MUCH GOOD tagged as a noun), determiner uses of MUCH (e.g. MUCH RECENT INVESTMENT), and clear errors like \*MEN ARE MUCH LIKELY TO BE BLOGGERS THAN WOMEN WERE excluded.

[3] PRETTY MUCH has become an approximator (Bolinger 1972: 215). VERY MUCH may be compositional, as in *x* IS NOT VERY MUCH LONGER THAN *y*, but can also be non-compositional, meaning 'indeed' as in SHE IS VERY MUCH ALIVE (Huddleston & Pullum 2002: 549). To control for this, the present searches were limited to MUCH immediately following BE/SEEM/BECOME.

[4] See Appendix A for a cluster analysis supporting a three-way distinction.

[5] Jespersen (1956: 402) observed certain adjectives derived from Latin comparatives take 'much, if the comparative meaning is clear, and very, if not', and that 'different is felt as a kind of comparative'. Bresnan (1973) also noted the possibility of MUCH DIFFERENT.

Word	MUCH	MORE	Ratio	Word	MUCH	MORE	Ratio
LIKE <sup>a</sup>	955	9,458	0.10	DEPENDENT	4	253	0.02
DIFFERENT	841	482	1.74	PERPLEXED	4	7	0.57
IMPROVED	239	2	119.50	PREOCCUPIED	4	59	0.07
INTERESTED	74	3,207	0.02	ANNOYED	3	58	0.05
CONCERNED	44	2,703	0.02	WORRIED	3	735	0.00
ALIKE <sup>a</sup>	30	166	0.18	APPRECIATIVE	3	51	0.06
ANTICIPATED	25	5	5.00	ALIVE	3	108	0.03
BELOVED	18	11	1.64	AVAILABLE	2	178	0.01
SURPRISED	18	228	0.08	DISMAYED	2	6	0.33
PREFERABLE	17	13	1.31	DISSATISFIED	2	17	0.12
PLEASED	17	154	0.11	IMPORTANT	2	9,931	0.00
SUPERIOR	15	14	1.07	ESSENTIAL	2	76	0.03
INVOLVED	15	919	0.02	AGGRIEVED	1	1	1.00
INDEBTED	12	3	4.00	PROFITABLE	1	301	0.00
INFERIOR	10	3	3.33	IMPOVERISHED	1	3	0.33
HARD <sup>b</sup>	9	30	0.30	GUILTY	1	29	0.03
AFRAID	9	315	0.03	FAMILIAR	1	632	0.00
AKIN	8	306	0.03	INTERESTING	1	1,125	0.00
AWARE	7	1,256	0.01	FLAWED	1	4	0.25
AMUSED	6	43	0.14	TIRED	1	63	0.02
DISPLEASED	6	2	3.00	EXCITED	1	424	0.00
DELIGHTED	5	31	0.16	UNWILLING	1	6	0.17
ASTONISHED	5	16	0.31	ALONE	1	31	0.03
DISAPPOINTED	5	79	0.06	DISEASED	1	0	—
INCLINED	5	919	0.01	WELL-VERSED	1	0	—
				SIMILAR	1	361	—
				UNSINUED	1	0	—

<sup>a</sup> These counts unfortunately conflate adjective and preposition uses due to tagging errors.

<sup>b</sup> Four of these are determiner uses of MUCH, and the rest appear to be errors (e.g. \*It's MUCH HARD TO ANTICIPATE).

Table 1

The counts of all words tagged as adjectives in COCA heading AdjPs modified by MUCH and MORE in complement function for any form of BE, SEEM, or BECOME, along with the ratio of MUCH:MORE tokens.

The comparative governors in Example (4a) co-occur with MUCH, MORE, MOST, LITTLE, LESS, and LEAST in COCA. Those in Example (4b) are unattested with LITTLE, and there are no instances of LEAST AKIN/SUPERIOR, though all seem possible. LITTLE is generally rare as an AdjP modifier. Some other comparative governor adjectives like OTHER, SUCH, and ELSE tend to resist degree modification altogether (see Section 5 for discussion).

### 3.1.2. Past-participial adjectives

Jespersen (1956: 399) observes that with past participles, '*much*, which was required on account of the verbal character', was increasingly being replaced by

VERY.<sup>6</sup> Some of the lower-frequency items in Table 1 seem marginal to me, but all except UNSINUED, DISEASED, and WELL-VERSED qualify as adjectives by CGEL's criteria (Ch. 16, §10.1.3).

- (5) improved, interested, concerned, anticipated, beloved, surprised, pleased, involved, indebted, amused, displeased, delighted, astonished, disappointed, delighted, inclined, preoccupied, perplexed, annoyed, worried, dismayed, dissatisfied, aggrieved, impoverished, flawed, tired, excited, unsinewed, diseased, well-versed

Other cases such as *much broken* and *much frightened* do not occur in the corpus with non-modified MUCH (see footnote 3) and seem less acceptable. Many of these adjectives also exhibit LITTLE/LESS contrasts (e.g. LITTLE/LESS CONCERNED).

### 3.1.3. A adjectives

The adjectives in Example (6) start with A, resist attributive use, and are not participles. Those in Example (6a) contain the originally prepositional prefix A-meaning 'on, in, into'. Both ALIKE and ALIVE seem to be comparative governors in that they require two semantic arguments: the subject of ALIKE must be plural or conjoined (X AND Y ARE ALIKE, WE/MY BROTHERS ARE ALIKE), while AKIN explicitly licenses a PP complement. The A in the adjectives in Example (6b) is not the same prefix, but they may pattern similarly by analogy.

- (6) (a) alike, akin, alive, alone  
(b) afraid, aware

Expanding the search beyond the BE/SEEM/BECOME frames, there are two instances of MUCH AVERSE versus 23 of MORE AVERSE in COCA, AVERSE being another A-prefixed adjective from CGEL's list (559).

### 3.2. Less and least with comparatives and superlatives

LESS rarely occurs as a pre-head modifier of comparative adjectives, but Jespersen (1956: 368) mentions LESS HAPPIER, and COCA contains 22 instances of LESS WORSE, four of LESS HAPPIER, and three of LESS RISKIER, along with a few other sporadic examples. These clearly contrast with LITTLE WORSE/HAPPIER/RISKIER. Similarly, LEAST occurs with WORST and other superlatives. COCA also has three instances of LESS modifying analytic comparatives: LESS MORE LIKELY/EFFICIENT/VULNERABLE, contrasting with LITTLE MORE LIKELY/EFFICIENT/VULNERABLE.

[6] Jespersen (1940: 423) notes, 'the use of *very* with a second [i.e. past] participle is not very old', citing an example from 1760, though Annesley (1690) contains an earlier example of VERY CONCERNED.

### 3.3. *Contrasts in other phrases*

Having shown in detail in [Section 3.1](#) that contrasts exist in analytic comparative AdjPs, I use this section to briefly illustrate similar patterns in other phrasal categories.

#### 3.3.1. *Contrasts in AdvPs*

Contrasts in AdvPs are even rarer than in AdjPs. MUCH DIFFERENTLY (181 instances) contrasts with the analytic comparative MORE DIFFERENTLY (16 instances), and WOULD MORE RATHER contrasts with WOULD MUCH RATHER. MUCH TOO (e.g. MUCH TOO GOOD) is a rare case of MUCH with a plain adverb head, but curiously, \*MORE TOO GOOD is impossible, so there is no contrast in this case. Nevertheless, it is an interesting construction, to which I return in [Section 5.1.1](#).

### 3.4. *Contrasts in PPs*

In PPs, *CGEL* analyzes *more* and *less* as determinatives, but given the existence of synthetic comparatives in PPs like CLOSER TO HOME, it is reasonable to consider examples like Example (7) as involving contrasts in analytic comparatives (see [Section 2.3](#)).

- (7) (a) Each day he was **more on my mind**.  
 (b) This is **much on my mind** this evening.

Many of the hits for LIKE in [Table 1](#), and perhaps ALIKE as well, are actually in preposition phrases. As is also common in these PPs, as in Example (8).

- (8) (a) These membranes act **much as human eardrums do**.  
 (b) I see you **more as a leader of men**.

### 3.5. *Contrasts in VPs*

Although VPs modified by MORE are not considered analytic comparatives by *CGEL*, contrasts with MUCH do occur (mostly limited to negative polarity contexts), as shown in Example (9).

- (9) (a) I didn't **much** enjoy the experience.  
 (b) I can no **more** understand Russian than I can fly. (constructed)

Relevant contrasts in post-head modifiers are also common, as in Example (10).

- (10) (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**.



### 3.6. *Summary of contrasts*

The data presented in this section challenge *CGEL*'s claim that MORE and MUCH never contrast in analytic comparatives. While such contrasts are not especially frequent, they do occur across a range of AdjPs, AdvPs, and PPs. The next section investigates whether the observed distributional differences between MORE and MUCH, even if not strictly complementary, could still justify a category distinction.

## 4. THE VAGARIES OF MODIFICATION

In this section, I examine the differences in the distribution of modifiers within a given category across different phrase types. I conclude that, even if the contrasts identified in Section 3 could somehow be explained away, the distributional differences between MORE and MUCH fall within the expected range of variation for determinative intensifiers and do not by themselves justify a dual-category analysis for MORE.

Intensifier distribution in adjective phrases is notoriously idiosyncratic. Bolinger (1972) devotes an entire 30-page chapter to 'Some restrictions on intensifiers primarily with adjectives', yet describes it as 'perhaps better than a sampling, but ... far from complete'. Restrictions may be dialectal (e.g. RIGHT PLEASED), register-specific (e.g. WE WERE LITTLE AFFECTED BY WHAT WE SAW), or positional (ENOUGH only occurs post-head). Semantic and prosodic factors also play a role: HIGHLY FRIGHTFUL is odd because '*frightful* is already stronger than *highly* ... In addition to the semantic restriction there is a tendency to avoid mono-syllabic adjectives' (Bolinger 1972: 52).

This idiosyncrasy extends to the choice between analytic and synthetic comparatives. Jespersen (1956: 359), noting that 'it is not always easy to see why writers prefer one or the other method of comparing adjs', dedicates nine pages to apparently unpredictable cases of periphrasis versus inflection in AdjPs, plus two more pages on AdvPs. He observes, '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).

### 4.1. *Determinatives as modifiers*

If *more* and *less* in analytic comparatives patterned distinctly from other determinatives in AdjPs, this could potentially support an adverb analysis. But the distribution of determinative modifiers in AdjPs is quite varied, as shown in Table 2.<sup>7</sup>

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[7] The tables in Section 4 reflect my judgments. See Appendix B for a corpus-based analysis.

Cluster	MORE	LESS	ENOUGH <sup>a</sup>	THAT	MUCH	NO/ANY
OLD		✓	✓	✓		
RECENT	✓	✓	✓	✓		
Comparative		✓			✓	✓
DIFFERENT	✓	✓	✓	✓	✓	✓
AFRAID	✓	✓	✓	✓	✓	
IMPROVED	✓	✓	✓	✓	✓	

<sup>a</sup> Post-head

*Table 2*  
Determinatives as modifiers in AdjPs.

The OLD cluster includes OLD, FAST, SMALL, HARD, YOUNG, STRONG, and HIGH. The RECENT group includes INTELLIGENT, DANGEROUS, FORTUNATE, GENEROUS, EMBARRASSING, EXPENSIVE, and COMFORTABLE. The comparative group includes all words tagged as comparative adjectives (e.g. much JJR). The DIFFERENT group comprises DIFFERENT, SEPARATE, PREFERABLE, SUPERIOR, UNEQUAL, and INFERIOR. The AFRAID group includes AFRAID, ALIKE, AFRAID, ALIVE, ALONE, and AWARE. And the IMPROVED group contains IMPROVED, PLEASED, DELIGHTED, CONCERNED, BELOVED, INTERESTED, and SURPRISED.

ENOUGH and THAT pattern similarly to MORE in their ability to modify a wide range of AdjPs, but not synthetic comparatives like BIGGER. In contrast, MUCH is more restricted, while NO and ANY are the most limited. Viewed in this broader context, the distributional data do not single out MORE as exceptional.

For AdvPs (Table 3), I've included A LITTLE, which patterns like MUCH in modifying TOO, in place of LITTLE which does not occur in this context. The determinative ALL (not shown) also modifies TOO. Once again, no distributional pattern clearly identifies MORE as belonging to a distinct category.

Example <sup>a</sup>	MORE	LESS	ENOUGH <sup>b</sup>	THAT	MUCH	A LITTLE	NO/ANY
RECENTLY	✓	✓	✓	✓			
FAST		✓	✓	✓		✓	
Comparative		✓			✓	✓	✓
DIFFERENTLY	✓	✓	✓	✓	✓	✓	✓
EQUALLY	✓	✓	✓				
TOO					✓	✓	

<sup>a</sup> Just for the words given + all tagged as JJR for Comparative  
<sup>b</sup> Post-head

*Table 3*  
Determinatives as modifiers in AdvPs.

Example	MORE	LESS	ENOUGH <sup>a</sup>	THAT	MUCH	A LITTLE	NO/ANY	ALL
NEAR		✓	✓	✓		✓		
NEARER			✓		✓	✓	✓	
UP TO	✓	✓		✓		✓		✓
ALONG THE	✓	✓			✓	✓		✓
SHORT OF	✓	✓		✓	✓	✓		
LIKE HER	✓	✓	✓	✓	✓	✓	✓	
ABOVE THE	✓	✓	✓	✓	✓	✓		✓

<sup>a</sup> Pre- or post-head

Table 4  
Determinatives as modifiers in PPs.

Table 4 shows determinative modifiers in PPs. It is difficult to identify relevant preposition classes, so the items included are more opportunistic and reflect strings rather than constituents. For example, UP TO covers UP TO DATE, UP TO THE INDIVIDUAL, and similar cases. Still, no clear pattern emerges suggesting that MORE alone is an adverb.

What this highly selective comparison illustrates is considerable variation in the distribution of determinatives as modifiers. This undermines the argument for assigning *more* and *less* in analytic comparatives to a distinct category based solely on distributional facts. The differences between their behavior and that of MUCH or LITTLE appear to fall within the expected range of variation for determinatives, potentially explainable by semantic factors.

#### 4.2. Adverbs as modifiers

If *more* and *less* in analytic comparatives patterned similarly to adverbs in their distribution as pre-head modifiers in phrases with gradable heads, this could provide evidence for an adverb analysis. However, as shown in Table 5, MORE exhibits a

Example	MORE	LESS	HOW	AMAZINGLY	SLIGHTLY	MUCH/FAR	VERY
Plain Adj: RECENT	✓	✓	✓	✓	✓		✓
Plain Adj: BIG		✓	✓	✓	✓		✓
Comp Adj: BIGGER					✓	✓	
Det MUCH			✓	✓			✓
Det LITTLE			✓	✓			✓
Det MORE				✓	✓	✓	
Det LESS				✓	✓	✓	
Det MOST							✓
Det LEAST							✓

Table 5  
Selection of MORE, LESS, and adverbs as modifiers.

distribution quite distinct from other adverbs. In fact, there is no clear pattern; each of the eight adverbs considered has its own unique distribution.

Clearly, there is no typical pattern for adverbs functioning as modifiers in these contexts. Even so, *MORE* appears unusually restricted in its distribution, with *LESS* only slightly less so. At minimum, [Table 5](#) provides no positive evidence for *CGEL*'s claim that *more* and *less* in analytic comparatives are adverbs.

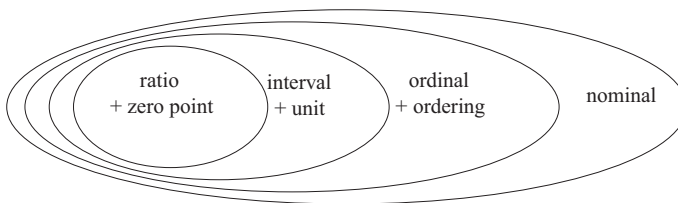
## 5. THE EXPLANATORY FORCE OF SCALES

Although distributional evidence may not justify categorizing *more* and *less* as adverbs, their differences from *MUCH* and *LITTLE* still call for explanation. Building on the distributional analysis in the previous sections, this section appeals to the scale structure of adjectives (and other categories) to account for the differing distributions of *more* and *less* versus *MUCH* and *LITTLE*.

Stevens (1946) proposed a classification system for attribute data, divided into four levels, as shown in [Figure 1](#) (adapted 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.

*CGEL* distinguishes between gradable ( $\approx$  ordinal, e.g. *IMPORTANT*) and non-gradable ( $\approx$  nominal, e.g. *MUTUAL*) adjectives, hinting at scalar constraints on possible modifiers in AdjPs. But further distinctions can be made based on the other scale levels ([Table 6](#)). As more semantic scale levels are added, more constraints are imposed. For example, *ONE SIXTH AS DENSE* is possible because density is a ratio scale, but <sup>?</sup>*ONE SIXTH AS KIND* seems anomalous, presumably because kindness is not a ratio scale.



*Figure 1*  
Venn diagram illustrating Stevens (1946)'s scales hierarchy.

		Syntactic compatibility	
		Ordinal	Ratio <sup>a</sup>
Semantic scale	Example adjectives	EXTREMELY, SLIGHTLY, TOO, VERY, ENOUGH, THAT	2.7 TIMES AS, ONE FIFTH AS
Nominal	ADDITIONAL, EQUAL, MUTUAL, OPPOSITE, OTHER, SUCH, TWELFTH <sup>b</sup>		
Ordinal	GOOD, HARD, IMPORTANT, INTERESTING, KIND, THIRSTY	✓	
Ratio <sup>c</sup>	HIGH, LATE, LONG, OLD	✓	✓

<sup>a</sup> HALF AS GOOD OF TWICE AS NICE are pseudo-ratio modifiers merely meaning ‘much worse’ or ‘much better’ without a genuine multiple.

<sup>b</sup> The ORDINAL ADJECTIVES assign an ordinal rank, but each rank has only a nominal scale (something is or is not first).

<sup>c</sup> The sense of these adjectives ‘corresponds to their interpretation when they are associated with units’ (Sassoon 2007: 243), in contrast to the general sense in HE RETIRED BEFORE HE GREW OLD.

Table 6

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

Scale structure can impose further constraints on possible modifiers. Scales can be open or closed at either end (Kennedy & McNally 2005). Totalizing and approximating modifiers work best with an inherent upper bound (e.g. COMPLETELY/ALMOST STRAIGHT), but are odd with open-ended scales (e.g. ?COMPLETELY/ALMOST BENT). Conversely, minimizing modifiers prefer a lower bound (e.g. SLIGHTLY BENT), and are degraded without one (e.g. ?SLIGHTLY STRAIGHT). Scales can also have contextually determined reference points based on expected norms, as with TALL meaning ‘of a height noticeably greater than normal for the relevant reference group’ (vs. e.g. 1.7 M TALL).

While the existence of the contrasts in Section 3 undermines CGEL’s motivation for a dual-category analysis, MORE and MUCH (and LESS and LITTLE) do exhibit different distributions. I propose that these differences can largely be explained by their semantics and the scale structure of the expressions they modify, without positing distinct syntactic categories. Specifically, I argue that the limited distribution of MUCH and LITTLE AS modifiers follows from their requirement for a discourse-salient reference point on the relevant scale, while the broader distribution of MORE/-ER and LESS stems from their ability to establish such a reference point. This semantic account captures the observed distributional patterns while maintaining a unified categorial treatment of these items as determinatives.

### 5.1. Scale-structure limitations on much and related modifiers

As shown in Section 4, the semantic properties of adjectives, particularly their scale structure, play a significant role in determining which modifiers they allow. For

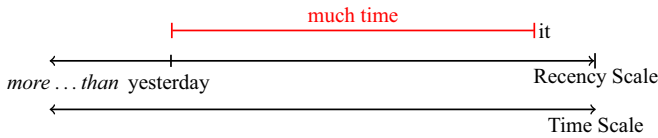


Figure 2

Illustration of the interaction between MORE/-ER'S THAN-complement and MUCH in IT HAPPENED MUCH MORE RECENTLY THAN YESTERDAY.

example, adjectives that inherently encode a limit or boundary on a scale, such as STRAIGHT or PURE, are more compatible with modifiers like COMPLETELY or ALMOST that pick out the endpoints of a scale, while adjectives that lack such boundaries, like BIG or INTERESTING, are not. This is because the semantics of the modifier must be compatible with the scale structure of the modified expression.

Given this general principle, it should not be surprising that specific restrictions might apply to the modifier MUCH. As a modifier in an AdjP, MUCH requires the presence of a discourse-salient, scale-internal reference point for comparison (Kennedy & McNally 2005). Crucially, this reference point need not coincide with a norm or average value on the relevant scale, although it may do so coincidentally. Rather, the reference point is typically established explicitly in the discourse context, often by a comparative complement. For instance, in the AdjP MUCH TALLER THAN ME, the reference point is the height of the speaker, not the average height for a person. Thus, while MUCH requires a reference point, it is not necessarily a norm or average, but rather a contextually salient scale value.

Establishing such a point is one function of -ER/MORE (Zhang & Ling 2021), an idea with precedents in earlier work on the semantics of comparatives.<sup>8</sup> The point may be implicit, but it can typically be made explicit in a comparative complement like a THAN-PP. For instance, IT HAPPENED MUCH MORE RECENTLY THAN YESTERDAY picks out yesterday as the relevant point of reference. Once this point is established, MUCH and related modifiers become possible, as shown in Figure 2. Without such a point, MUCH is anomalous because the comparison size is indeterminate.<sup>9</sup>

At the same time, other modifiers are blocked, including MOST, TOO, VERY, and EXTREMELY. \*MUCH MOST/-EST is likely ruled out because MOST/-EST has a strictly ordinal semantics, while MUCH – like SLIGHTLY, SOMEWHAT, SIGNIFICANTLY, GREATLY, and other similar degree adverbs (?) – requires an interval semantics. VERY and EXTREMELY may be incompatible because they target an absolutely high degree on

[8] For example, Faller (2000: 154) notes that in von Stechow (1984)'s account, measure phrases specify the value of a 'difference degree' between two compared objects, implying a scale with a lower bound. Similarly, Faller (2000: 163) discusses Bierwisch (1984)'s analysis, in which comparative morphemes denote relations between individuals and 'directed degrees.'

[9] This approach has the nice consequence of 'reducing' the modifier function of MUCH to its determiner function, at least schematically. For example, MUCH MORE recently can be conceived as having a 'much time' component.

the scale, without establishing the relevant reference point. In comparative constructions, it is the difference in degrees, not the absolute degree, that matters.

### 5.1.1. Too

Too presents an interesting case. As noted in Section 3.3.1, plain-form adverbs generally disallow modification by MUCH, but TOO is an exception, as in MUCH TOO BIG. Notably, TOO resembles MORE/-ER in its semantics and syntax. Jespersen (1956: 391) calls it a ‘latent comparative’, and von Stechow (1984) analyzes it as a degree operator involving universal quantification over degrees, similar to comparative morphemes. Both TOO and MORE/-ER function primarily as modifiers in phrases headed by plain ordinal adjectives, adverbs, or prepositions; both license a complement (a TO-infinitival for TOO); and in both cases, the complement’s semantic value establishes the scale-internal, lower reference point. The key difference is that, without an overt complement, TOO sets its reference level to the maximum acceptable level based on pragmatics and social norms (Meier 2003). It is TOO’s lower reference level that allows MUCH to occur in AdjPs like It’s MUCH TOO BIG (TO FIT), as shown in Figure 3.

Conversely, even though MORE can often modify plain-form adverbs, \*MORE TOO BIG (TO FIT) (THAN THAT) is impossible because MORE and TOO establish competing points of comparison, making it unclear whether the comparison is with the size of another object or with the fit size.

It’s worth noting, however, that the unacceptability of these constructions could potentially be explained by factors other than the semantic incompatibility proposed here. As pointed out by an anonymous reviewer, the difficulty in processing sentences like KIM IS LESS HAPPIER THAN LEE THAN PAT might contribute to their perceived unacceptability. The complex structure of such sentences, with multiple embedded comparisons, poses a significant cognitive challenge. This raises the possibility that the unacceptability is due more to grammatical or processing constraints than to any fundamental cognitive limitation on combining these degree modifiers.

In sum, an adjective head’s semantic scale structure significantly impacts the modifiers it allows, and these restrictions offer a compelling explanation for why MUCH and MORE generally appear in different contexts. However, as shown in Section 3, there are contexts where both MORE and MUCH may alternate. I now turn to explaining these.

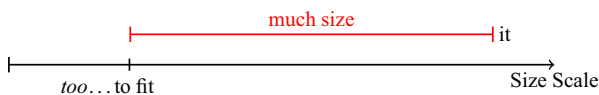


Figure 3

Illustration of the interaction between TOO’s TO-complement and MUCH in It IS MUCH TOO BIG TO FIT.

### 5.2. Comparative governors

In Section 3.1.1, I showed that comparative governors like *DIFFERENT* allow modification by both *MORE* and *MUCH*. In Section 5.1, following Kennedy & McNally (2005), I claimed that *MUCH*-type modifiers require an established scale-internal reference point. And following Zhang & Ling (2021), I claimed that *MORE/-ER* establish such a point. It's unsurprising that comparative governors allow *MORE/-ER* modification, but it remains to be seen why they allow *MUCH* without *MORE/-ER* to establish a reference point.

I propose that, like *MORE/-ER*, comparative governors allow *MUCH* modification because their semantics establish a reference point, which may be expressed in a *THAN OF FROM* PP complement. In Example (11a), the reference point is a contextually salient price made explicit in the *FROM*-PP.

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

But if that's the case, why is *MORE* also possible? The answer is that it establishes (implicitly or explicitly) a distinct reference point on a second-order scale – a price-difference scale. Metaphorically, *MORE DIFFERENT* IS TO *DIFFERENT* AS *ACCELERATION* IS TO *SPEED*. In Example (11b), the reference point is not another price, but rather the normal or expected difference between prices. In Example (11b), the reference point is not another price but rather the normal or expected difference between prices.

### 5.3. Participial adjectives

In Section 3.1.2, I showed that non-comparative participial adjectives like *IMPROVED*, *REFRESHED*, *RECOVERED*, and *DIMINISHED* may head AdjPs in which *MUCH* is a modifier. The explanation is the same as above: these adjectives tend to have a semantics that establishes a scale-internal reference point, which can sometimes be expressed in a PP complement, as in *IT'S MUCH IMPROVED FROM THE FIRST DRAFT* and the examples in Example (12), as illustrated in Figure 4.

In contrast, participial adjectives like *BROKEN* lack this reference point, which disallows *MUCH* as a modifier in Example(13).

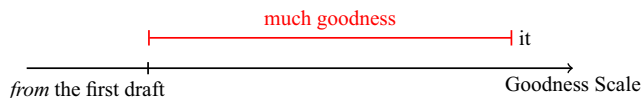


Figure 4

Illustration of the interaction between *IMPROVED*'S *FROM*-complement and *MUCH* in *IT'S MUCH IMPROVED FROM THE FIRST DRAFT*.



- (12) (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**.
- (13) (a) Her nose looked (\*much) broken.  
 (b) He was (?much) frightened.

However, this explanation does not cover all of the possible participial adjectives. For instance, *INCLINED* and *IMPRESSED* do not seem to establish the expected reference point. Perhaps, then, it is ‘on account of the verbal character’ (Jespersen 1956: 399), and/or other factors.

An anonymous reviewer suggested Kennedy & McNally (2005)’s analysis of participial adjectives as a different explanation for why these words resist modification by *MUCH*. Under this analysis, rather than lacking a reference point entirely, these adjectives may have a fixed reference point at the minimal element of their scale. For example, *BROKEN* always refers to the state of an object just as it becomes broken, not to intermediate states of partial brokenness. This fixed minimal reference point may be incompatible with the semantics of *MUCH*, which requires a contextually salient reference point that can be shifted.

#### 5.4. *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* seem much better than ?*SOMETHING WAS MUCH AMISS*.

#### 5.5. *Other plain-form adjectives*

I have found no other plain adjectives that accept simple *MUCH* as a modifier in Modern English (e.g. *\*THAT IS MUCH TRUE*),<sup>10</sup> but there are rare examples like *AS MUCH TRUE OF CHINA ...*. In such cases, the comparative-governor adverb *AS* may license the relevant reference point. The question then becomes why this is not more broadly applicable. In fact, modified *MUCH* (e.g. *SO MUCH*) is more flexible than *MUCH* alone (see footnote 3) for reasons that are unclear to me. A syntactically identical construction with different semantics does seem to apply more broadly, an example of which is *SANCTIONS ARE AS MUCH PSYCHOLOGICAL AS THEY ARE PUNITIVE*.

#### 5.6. *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

[10] Middle English allows examples such as *[THEY] WERE MOCHE FATTE* ‘they were very fat’ (Jespersen 1956: 399).

that may head AdjPs with modifier *MUCH*, without establishing any obvious reference point.

Second, most adjectives allow a post-head *FOR* PP introducing a comparison class, as in Example (14a), but as Example (14b) shows, this does not satisfy *MUCH*'s need for a discourse-salient reference point.

- (14) (a) He is short **for a basketball player**.  
 (b) \*He is much short **for a basketball player**.

An anonymous reviewer suggested an explanation, argued for by Fara (2000) and Kennedy (2007): *FOR*-phrases specify comparison classes relative to which standard values are computed, but they do not determine those values directly. The actual reference points remain indeterminate, and can vary across contexts, even within the same comparison class (Qing 2020). This indeterminacy may explain why *FOR*-phrases do not license *MUCH* modification: they do not provide the definite reference point that *MUCH* requires.

Third, there are two senses of adjectives such as *TALL*, an ordinal one taking the standard expected tallness for the reference class as its base, as in Example (15a), and a ratio one taking 0 cm as its base, as in Example (15b). Again, neither seems to satisfy *MUCH*'s need for such a reference value, as illustrated by Example (15c).

- (15) (a) He is tall.  
 (b) He is 2.13 m tall.  
 (c) \*He is much tall.

The same anonymous reviewer observes that the distribution of measure phrases with non-comparative adjectives is highly idiosyncratic, with somewhat arbitrary variation both within and across languages (Schwarzschild 2005, Grano 2012). For example, while *TALL* accepts measure phrases in English, its equivalent in some other languages may not. This idiosyncrasy poses a potential problem for the proposed analysis of *MUCH*: if the acceptance of measure phrases is taken as a diagnostic for the presence of a reference point, then the variable acceptability of measure phrases across adjectives and languages suggests that the availability of a reference point is similarly variable.

However, a more regular pattern emerges if we focus on comparative constructions. As noted by Schwarzschild (2005) and Grano (2012), comparatives consistently accept both measure phrases and *MUCH*-equivalents across languages. This suggests that whatever factor underlies the idiosyncratic distribution of measure phrases with non-comparative adjectives, it is distinct from the factor that licenses *MUCH*. The consistent acceptability of *MUCH* in comparatives, which all provide a reference point, supports the proposed analysis of *MUCH* as requiring a definite reference point.

Nevertheless, the idiosyncratic distribution of measure phrases with non-comparative adjectives remains a puzzle.

Fourth, the story about TOO may not be the whole story. If it were, then EXCEEDINGLY might be expected to behave similarly. On the other hand, TOO generally has a negative affective orientation to it, while EXCEEDINGLY can have a positive affect, so perhaps their semantics simply aren't similar enough in the right ways.

### 5.7. Payne's counter-proposal

John Payne (personal communication, September 4, 2022), speculated that a difference exists between the adverb MORE, which deals with degrees, and the determinative MORE, which deals with quantities.<sup>11</sup> 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 sufficient to motivate distinct categories.

Moreover, it doesn't hold consistently across the CGEL analysis. For example, Example (1) is clearly a degree difference, as opposed to I DANCE MORE, which would be a quantity difference.<sup>12</sup> But there are also NOT SO MUCH IN CONTROL and KIM ISN'T MUCH OF AN ACTOR, which are explicitly determinative uses of MUCH (CGEL 395) and yet clearly require a degree interpretation (CGEL 415). Furthermore, as Payne acknowledges, it isn't the case 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, September 4, 2022). Nor does this proposal clear up any of the difficulties with the explanation advanced in Section 5.6.

Payne has also suggested (personal communication, October 30, 2023) that perhaps there are two MUCH items, one being an NPI, and the other not. Indeed, in the modifier cases discussed in Section 3, MUCH shows little polarity sensitivity, while elsewhere MUCH is polarity sensitive. But Israel (2011: 41) has observed that 'even the most robustly polarity sensitive forms tend to have usages which belie their status as polarity items.' In fact, the overwhelming majority of examples in the OED before 1950 show no polarity sensitivity, while only about half since do (Oxford English Dictionary 2002). Given the above, it wouldn't do to base a category distinction on polarity sensitivity, nor does such a move have any precedence in CGEL.

### 5.8. Summary of the explanatory force of scales

Overall, then, scales and the scale structures of individual adjectives have a significant impact over the selection of modifiers allowed by various heads in

[11] CGEL (393) calls these 'degree determinatives'.

[12] 'In clause structure [MORE and LESS] are forms of the determinatives MUCH and LITTLE rather than adverbs' (CGEL 585, n17).

AdjPs. In other words, semantic and pragmatic factors play an important role in (dis)allowing modifiers. 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

In arguing that adverbs are a distinct category from adjectives, Payne et al. (2010: 61) conclude that,

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.

Although this quote pertains to the entire lexical category of adverbs, the principle should apply equally to individual words. The question of whether the relations between MUCH and MORE and between LITTLE and LESS should be considered inflectional in all cases or only sometimes should not hinge on whether or not they stand in complementary distribution. And yet, the fundamental assumption underlying the categorization of MORE as an adverb relies on precisely this reasoning. Table 7 demonstrates the lack of a consistent relationship between distributional contrast and category assignment in CGEL's analyses.

### 6.1. Little *and* less?

The arguments in this paper have focused primarily on the MUCH/MORE distinction, but they apply equally to LITTLE and LESS. This contrasts with CGEL's original claim about the lack of contrast. While AdjPs like LESS WORSE and LESS HAPPIER are not common, an example like Example (16) seems perfectly acceptable to me. In this case, there was a deal which was worse than the current situation, and now there's a third deal which is still worse, but slightly less so.

	Contrasting	Non-contrasting
Single category	MUCH <sub>D</sub> MORE <sub>D</sub>	MERE <sub>ADJ</sub> ELECT <sub>ADJ</sub>
Dual categories	YOU <sub>D</sub> YOUR <sub>PRON</sub>	MERE <sub>ADJ</sub> MERELY <sub>ADV</sub>

Table 7  
Distribution and category contrast.

(16) It could finally settle on a slightly less worse deal with the unions.

If only half of the analytic comparative pair (MORE/LESS) truly lacked contrast – and to be clear, I argue that neither lacks contrast – then in which direction should a complementarity argument pull, assuming such arguments had any force to begin with? It's not at all clear that it would necessarily group LESS with MORE into a different category from MUCH and LITTLE.

## 6.2. Categorization options

Even if all the evidence and arguments presented here were set aside, and it could be shown conclusively that MORE and MUCH belonged to different categories, the question of which specific categories they belong to would still need to be addressed. While determinative and adverb are plausible options, *CGEL* offers no principled reason for assigning MORE to the adverb category as opposed to MUCH. The choice seems arbitrary.

## 7. CONCLUSION

In this paper, I have argued that the words MORE and LESS are determinatives in all contexts, contrary to their categorization in *CGEL*. I have shown that *CGEL*'s conception of analytic comparatives 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 demonstrated that contrasts between MORE and MUCH exist in various contexts, including with 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. Although I have focused on MORE and MUCH, the arguments extend to MOST, LESS, LITTLE, and LEAST.

I have proposed an explanation for the distributional patterns in AdjPs based on the pragmasemantics of MORE/-ER and MUCH. Specifically, MORE/-ER establishes a salient minimum value in the discourse where none might otherwise exist, while MUCH requires such a value. This explains not only why MUCH tends to be limited to comparative contexts, but also why it appears with comparative governors, certain participial adjectives, and TOO. It also explains why MORE and TOO cannot modify each other. However, some puzzles remain, such as the variable applicability of MUCH among the A- adjectives.

Finally, I have argued that *CGEL*'s reliance on the lack of contrast is theoretically unsound.

I conclude that MORE and LESS are most parsimoniously categorized as determinatives, and that their categorization as adverbs is not justified in any context.

Beyond the specifics of MORE and LESS, this study highlights the importance of empirical evidence in grammatical analysis. By rigorously examining corpus data, we can test existing grammatical descriptions and propose refinements where

necessary. Even widely accepted analyses should be subject to ongoing scrutiny and revision in light of new evidence, as Geoff Pullum has demonstrated throughout his career.

Moreover, the categorization of MORE and LESS serves as a case study in the contribution of various linguistic sub-fields to the resolution of grammatical categorization. While traditional approaches have often prioritized distributional criteria for category assignment, this study suggests that semantic and pragmatic factors can also play a crucial role. The fact that the distribution of MORE and LESS can be largely explained by their meaning and pragmatic context raises questions about the primacy of syntactic criteria. More broadly, it suggests that a comprehensive understanding of linguistic categories requires an approach that integrates insights from multiple aspects of linguistic analysis.

#### SUPPLEMENTARY MATERIAL

To view supplementary material for this article, please visit <http://doi.org/10.1017/S0022226724000239>.

#### ACKNOWLEDGMENTS

Many thanks to John Payne, Chris Potts, Nathan Schneider, Peter Evans, Linmin Zhang, Chandra Hodgson, Michael Israel, Dan Lassiter, and Geoff Pullum for extremely helpful comments! Thanks to Humber College for travel support and research time, and to my friend, Bert Remijsen, for lodging. Thank you, Geoff, for so much more!

In compliance with Humber College's policy on use of AI, I acknowledge using GPT-4 (OpenAI 2023) to draft R and LATEX code. I also acknowledge using Claude 3 Opus (Anthropic 2024) to draft responses to reviewer comments.

#### APPENDIX A. STATISTICAL ANALYSIS OF ADJECTIVES IN COCA

In the main body of the paper (Section 3.1), I discussed the patterns of adjectives that head AdjPs modified by MUCH based on the Corpus of Contemporary American English (COCA). This appendix provides a more detailed statistical analysis of these adjectives, along with a visual representation, to support the arguments made in the paper.

Principal component analysis (PCA) was performed on the pointwise mutual information scores of the adjectives as modified by the determinatives (e.g. MUCH BIGGER, details follow) to reduce the dimensionality of the data. With the elbow method, I determined that three clusters were optimal. Then I applied the  $k$ -means clustering algorithm, with the resulting clusters shown in Figure A1. The first two principal components (PC1 and PC2) are used to visualize the data in two

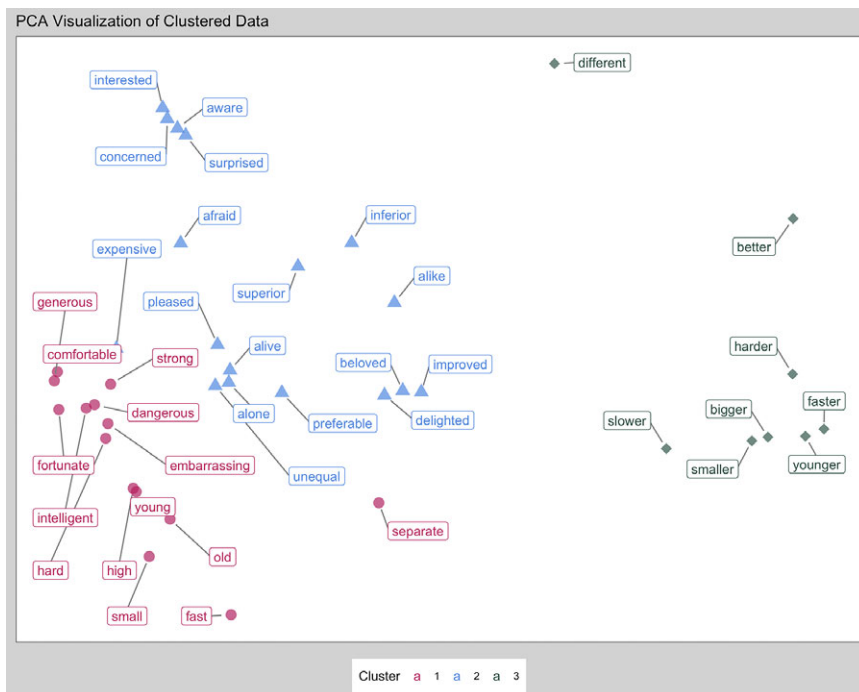


Figure A1

Visualization of adjective types based on pointwise mutual information scores. Points represent individual adjectives positioned by principal component analysis. Colors differentiate three  $k$ -means clusters: PINK CIRCLES: basic adjectives + SEPARATE, GREEN DIAMONDS: comparatives + the outlier DIFFERENT, and BLUE TRIANGLES: other adjective forms (the comparative governors, the A- adjectives, and the past-participial adjectives) + EXPENSIVE.

dimensions. The R code (R Core Team 2023) used to generate the figure is as follows:

```
# Install and load required packages
if (!requireNamespace("ggplot2", quietly = TRUE)) install.packages("ggplot2")
if (!requireNamespace("ggrepel", quietly = TRUE)) install.packages("ggrepel")
library(ggplot2)
library(ggrepel)

# Load the data
data <- read.csv("adjnpxmi.csv", row.names = 1)

# Keep only numeric columns
data_numeric <- data[sapply(data, is.numeric)]
```

```

# Scale the numeric data
data_scaled <- scale(data_numeric)

# Perform k-means clustering with 3 clusters
set.seed(123)
km_result <- kmeans(data_scaled, centers=3)

# Add cluster assignments to the data
data$cluster <- as.factor(km_result$cluster)

# Perform PCA for visualization
pca_result <- prcomp(data_scaled)
pca_data <- as.data.frame(pca_result$x[, 1:2])
colnames(pca_data) <- c("PC1", "PC2")
pca_data$cluster <- data$cluster
pca_data$label <- row.names(data)

# Define a custom color-blind friendly palette
cb_friendly_palette <- c("#D81B60", "#1E88E5", "#004D40")

# Create the plot
ggplot(pca_data, aes(x=PC1, y=PC2, color=cluster, shape=
cluster)) +
  geom_point(size = 4, alpha = 0.7) +
  geom_label_repel(aes(label=label),
                  box.padding = 1, point.padding = 1,
                  segment.color = 'grey50', max.overlaps = 1000) +
  scale_color_manual(values = cb_friendly_palette) +
  scale_shape_manual(values = c(16, 17, 18)) +
  theme_bw() +
  theme(axis.title = element_blank(),
        axis.text = element_blank(),
        axis.ticks = element_blank(),
        panel.grid.major = element_blank(),
        panel.grid.minor = element_blank(),
        legend.position = "bottom",
        plot.background = element_rect(fill = "lightgrey", color
= NA)) +
  labs(title = "PCA Visualization of Clustered Data",
       color = "Cluster", shape = "Cluster")

# Save the plot
ggsave("pca_cluster_plot.png", width = 10, height = 8, dpi =
300)

```

The PCA visualization (**Figure A1**) shows that comparatives (in green diamonds) form a tight cluster, indicating shared linguistic characteristics, with DIFFERENT as an



outlier. The pink circle cluster includes the most typical adjectives that participate in synthetic and analytic comparatives. EXPENSIVE, though in the blue triangle cluster, could fit into the pink circle one. SEPARATE, in the pink circle cluster, was included as a quasi-comparative governor (governing a FROM PP). The blue triangle cluster contains the other comparative governors (except DIFFERENT), the A- adjectives, and the past participial adjectives, which are kept distinct in the paper to explain their compatibility with both MUCH and MORE.

Overall, the clustering aligns well with the observations in the main text, reinforcing the distinctions between adjective types in terms of determinative modification. This supports the paper's main arguments about the distributions of MUCH and MORE. The `adjnmpi.csv` file is available from [supplementary material](#), along with the Excel file from which it is derived. The csv includes normalized pointwise mutual information scores (NPMI, ranging from  $-1$  for no occurrences to  $+1$  for  $N - 1$  occurrences; see [Equation 1](#); Bouma 2009) for adjectives modified by determinatives from the set {MORE, LESS, ENOUGH, THAT, LITTLE, MUCH, NO, ANY} in two contexts: Mod + Head + punctuation and Mod + Head + preposition (ENOUGH only post-modified). The 'DQ' (disqualified) column counts the number of irrelevant or false positive examples that were manually identified and removed from the analysis. For modifier-head pairs with over 100 hits, a random sample of 100 was checked, and the proportion of disqualified examples was extrapolated to the full count. After this manual verification process, I'm confident the NPMI scores in the csv file are not distorted by false positives, though some false negatives may exist.

$$\text{NPMI}(x; y) = \frac{\log_2 \left( \frac{n_{xy}}{N} \times \frac{N}{n_x \times n_y} \right)}{-\log_2 \left( \frac{n_{xy}}{N} \right)}.$$

Here,  $N$  is the COCA size: 1,002,889,754 words (personal communication, Mark Davies, October 21, 2023).

## APPENDIX B. NPMI SCORES FOR MODIFIER-HEAD PAIRS

This section examines specific adjective, adverb, determinative, and preposition heads, showing their pairings with different modifiers. NPMI scores from COCA assess the grammaticality of these pairings, empirically evaluating the judgments in [Tables 2–5](#) in the main text. The results are visualized as heatmaps.

While there is no widely accepted statistical measure of grammaticality, NPMI serves as a reasonable proxy when investigating modifier constraints in AdjPs. For instance, MUCH strongly correlates with comparative adjectives, yielding an NPMI of 0.38, whereas the ungrammatical \*ANY OLD has no relevant instances, resulting in an NPMI of  $-1$ .<sup>13</sup>

[13] To provide a bit more context for comparison, in COCA, PUERTO RICO has an NPMI of 0.93, VICE PRESIDENT is 0.71, and GOOD MORNING is 0.46.

Figure B1 was produced using the following R script, with minor variations for subsequent figures:

```

# Load necessary libraries
library(ggplot2)
library(reshape2)

# Load data
data <- read.csv(' /path/to/your/d-adj-table.csv' )

# Melt data for ggplot2 using the corrected column
name
data_melted <- melt(data, id.vars = "Adjective.group")

# Set the factor levels for "Adjective.group" to
retain the original order
# Reverse the order so that it matches the original
table
data_melted$Adjective.group <- factor(data_melted$
  Adjective.group, levels = rev(unique(data$
  Adjective.group)))

# Define colors for heatmap
midpoint <- (-1 + 0.28) / 2
color_scale <- scale_fill_gradient2(low = "#F26161",
  mid = "white", high = "#5DB56E",
  midpoint =
  midpoint,
  limits =c(-1,
  0.28))

# Plot heatmap
ggplot(data_melted, aes(x = variable, y = 'Adjective.
  group', fill = value)) +
  geom_tile() +
  color_scale +
  theme_minimal() +
  labs(x = "Modifier", y = "Head")

```

#### APPENDIX B1. DETERMINATIVE MODIFIERS + ADJECTIVE HEADS

Figure B1 displays NPMI scores for determinative modifiers and adjective heads, grouped as in Figure A1. The OLD group contains basic adjectives; the RECENT group includes other plain adjectives; comparative adjectives are grouped together; the DIFFERENT group has comparative governors; the AFRAID and IMPROVED groups contain A- and participial adjectives, respectively.

### WHY MORE AND LESS ARE NEVER ADVERBS

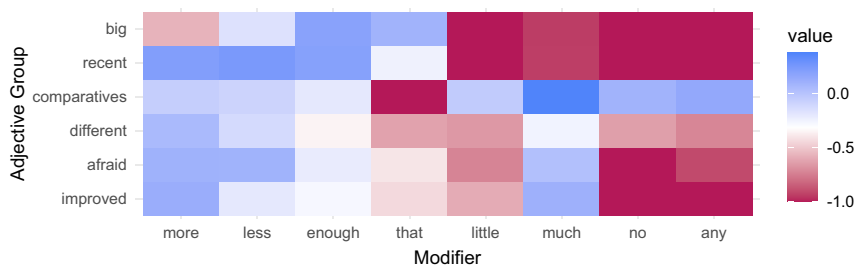


Figure B1

Heatmap of normalized pointwise mutual information (NPMI) scores between adjective Heads and determinative Modifiers in COCA. Scores range from  $-1$  (red) to  $0.38$  (blue), with neutral associations centered in white.

### APPENDIX B2. DETERMINATIVE MODIFIERS + ADVERB HEADS

Figure B2 shows NPMI scores for determinative modifiers with individual adverb heads.

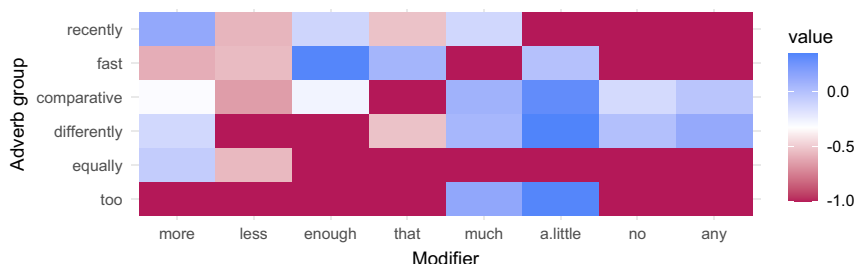


Figure B2

Heatmap of normalized pointwise mutual information (NPMI) scores between adverb Heads and determinative Modifiers in COCA. Scores range from  $-1$  (red) to  $0.34$  (blue), with neutral associations centered in white.

### APPENDIX B3. DETERMINATIVE MODIFIERS + PREPOSITION HEADS

Figure B3 displays NPMI scores for determinative modifiers with preposition heads.



Figure B3

Heatmap of normalized pointwise mutual information (NPMI) scores between preposition Heads and determinative Modifiers in COCA. Scores range from  $-1$  (red) to  $0.22$  (blue), with neutral associations centered in white.

#### APPENDIX B4. ADVERB MODIFIERS + VARIOUS HEADS

Finally, Figure B4 presents NPMI scores for adverb modifiers with various heads.

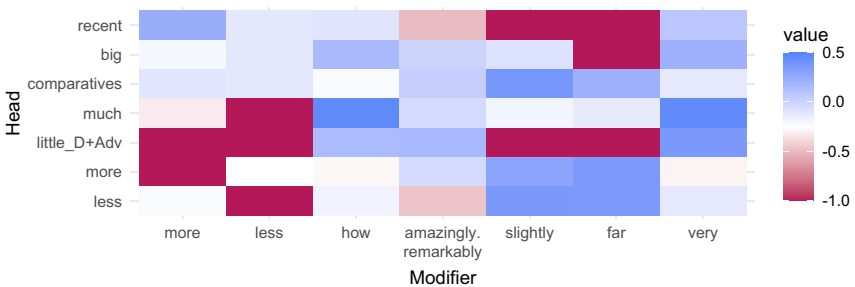


Figure B4

Heatmap of normalized pointwise mutual information (NPMI) scores between various Heads and adverb Modifiers in COCA. Scores range from  $-1$  (red) to  $0.46$  (blue), with neutral associations centered in white.

#### REFERENCES

- Annesley, Samuel. 1690. Casuistical morning-exercises the fourth volume. Early English Books Online (EEBO). <https://quod.lib.umich.edu/e/ebo2/A25466.0001.001> (12 November, 2023).
- Anthropic. 2024. The Claude 3 model family: Opus, Sonnet, Haiku. Technical report OpenAI San Francisco. <https://www-cdn.anthropic.com/de8ba9b01c9ab7cbabf5c33b80b7bbc618857627/Model{ }Card{ }Claude{ }3.pdf> (19 May, 2024).
- Bierwisch, Manfred. 1984. The semantics of gradation. In Manfred Bierwisch & Ewald Lang (eds.), *Dimensional adjectives*, 71–262. Berlin & Heidelberg: Springer. doi:10.1007/978-3-642-69980-3\_4.
- Bolinger, Dwight. 1972. *Degree words*. The Hague: Mouton & Co. N.V. doi:10.1515/9783110877786.
- Bouma, Gerlof. 2009. Normalized (pointwise) mutual information in collocation extraction. *Proceedings of German Society for Computational Linguistics (GSCL)* 30, 31–40.
- Bresnan, Joan W. 1973. Syntax of the comparative clause construction in English. *Linguistic Inquiry* 4 (3), 275–343.

- Chomsky, Noam. 2020. The UCLA lectures (April 29 – May 2 2019). <https://lingbuzz.net/lingbuzz/005485> (19 May 2024).
- Davies, Mark. 2023. Corpus of contemporary American English (COCA). <https://www.english-corpora.org/coca/> (12 October 2023).
- Faller, Martina. 2000. Dimensional adjectives and measure phrases in vector space semantics. In Martina Faller, Stefan Kaufmann & Marc Pauly (eds.), *Formalizing the dynamics of information*, 151–170. Stanford, CA: CSLI Publications.
- Fara, Delia Graff. 2000. Shifting sands: An interest relative theory of vagueness. *Philosophical Topics* 28 (1), 45–81.
- Grano, Thomas. 2012. Control and restructuring at the syntax-semantics interface: Evidence from mandarin chinese. *Journal of East Asian Linguistics* 21(3), 219–266.
- Huddleston, Rodney & Geoffrey K. Pullum. 2002. *The Cambridge grammar of the English language*. Cambridge: Cambridge University Press.
- Israel, Michael. 2011. *The grammar of polarity: Pragmatics, sensitivity, and the logic of scales*. Cambridge: Cambridge University Press.
- Jespersen, Otto. 1940. *A Modern English grammar on historical principles. Part V: Syntax*. Copenhagen: Ejnar Munksgaard.
- Jespersen, Otto. 1956. *A Modern English grammar on historical principles. Part VII: Syntax*. London: George Allen & Unwin Ltd.
- Kennedy, Christopher. 2007. Vagueness and grammar: The semantics of relative and absolute gradable adjectives. *Linguistics and Philosophy* 30(1), 1–45.
- Kennedy, Christopher & Louise McNally. 2005. Scale structure, degree modification, and the semantics of gradable predicates. *Language* 81(2), 345–381.
- Matthews, Peter Hugoe. 2003. *The concise Oxford dictionary of linguistics*. Oxford: Oxford University Press. doi:10.1093/acref/9780199675128.001.0001.
- Meier, Cécile. 2003. The meaning of *too*, *enough*, and *so... that*. *Natural Language Semantics* 11(1), 69–107. doi:10.1023/A:1023002608785.
- Oxford English Dictionary*. 2002. much, adj., adv., pron., n. OED online <https://doi.org/10.1093/OED/4758555602> (15 August 2023).
- OpenAI. 2023. GPT-4 technical report. Technical report OpenAI. San Francisco. <http://arxiv.org/abs/2303.08774>.
- Payne, John, Rodney Huddleston & Geoffrey K. Pullum. 2007. Fusion of functions: The syntax of *once*, *twice* and *thrice*. *Journal of Linguistics* 43(3), 565–603. doi:10.1017/S002222670700477X.
- Payne, John, Rodney Huddleston & Geoffrey K. Pullum. 2010. The distribution and category status of adjectives and adverbs. *Word Structure* 3(1), 31–81.
- Qing, Ciyang. 2020. *Semantic underspecification and its contextual resolution in the domain of degrees*. Stanford, CA: Stanford University dissertation.
- Quirk, Randolph, Sidney Greenbaum, Geoffrey Leech & Jan Svartvik. 1985. *A comprehensive grammar of the English language*. London: Longman. doi:10.1075/eww.8.1.10wei.
- R Core Team. 2023. *R: A language and environment for statistical computing, v4.3.1*. R Foundation for Statistical Computing. Vienna. <https://www.R-project.org/>.
- Sassoon, Galit W. 2007. *Vagueness, gradability and typicality: A comprehensive semantic analysis*. Tel Aviv: Tel Aviv University dissertation. [https://www.researchgate.net/publication/275345469\\_Vagueness\\_Gradability\\_and\\_Typicality\\_-\\_A\\_comprehensive\\_semantics\\_analysis](https://www.researchgate.net/publication/275345469_Vagueness_Gradability_and_Typicality_-_A_comprehensive_semantics_analysis) (5 May 2023).
- Schwarzschild, Roger. 2005. Measure phrases as modifiers of adjectives. *Recherches Linguistiques de Vincennes* 34, 207–228.
- von Stechow, Arnim. 1984. Comparing semantic theories of comparison. *Journal of Semantics* 3(1–2), 1–77. doi:10.1093/jos/3.1-2.1.
- Stevens, S. S. 1946. On the theory of scales of measurement. *Science* 103(2684), 677–680.
- Zhang, Linmin & Jia Ling. 2021. The semantics of comparatives: A difference-based approach. *Journal of Semantics* 38(2), 249–303. doi:10.1093/jos/ffab003.

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