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Idiom variation and decomposability Part II: Variation in the noun phrase

Abstract: Variant forms of idioms have been extracted from an American English corpus of 450 million words to test the idiom decomposition hypothesis, which proposes a dependence relation between the degree of idiom decomposability and the extent to which expressions are variable. The more decomposable the idiom is, the more flexibility it is expected to exhibit. In this second part of the study, morphological flexibility (number and determiner) as well as lexico-syntactic flexibility (the addition of various pre- and postmodifiers) of the noun have been assessed and related to three decomposability rankings. The results provide some support for the hypothesis. Of the individual flexibility dimensions, only number variation has been found to be significantly dependent on scalar decomposability. Of the overall measures, noun morphology and overall noun variation are significantly correlated. The relation between overall modifier variation and scalar decomposability is close to statistical significance, although premodifier and postmodifier variations taken separately do not show any dependence. None of the variation measures appear to be related to categorical decomposability.

Keywords: idiom, variation, decomposability

1 Introduction[1]

This second part completes the study of idiom variability and its relation to decomposability reported in Part I. While the first part is concerned with variation closely related to the verb of an idiomatic expression, this analysis deals

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with flexibility in the noun phrase of V NP idioms, especially the degree to which the idiomatic noun phrase allows expansion by the addition of various elements.

Part I examined the relationship between three decomposability ratings and various flexibility measures. Two scalar and one categorical decomposability ranking (Tabs. 1 and 2 in Part I) were compared with structural variation and morphological variation of the verb in terms of person, number, tense, aspect, mood, voice and negation. In addition, overall morphological variability and overall verb flexibility were also measured. Significant statistical correlation was found between idiom flexibility in terms of voice and categorical decomposability. However, it was not the highest decomposability class that displayed the highest variation in voice, but the second highest category of abnormally decomposable idioms. The other morphological variation dimensions and the two overall flexibility measures were not significantly correlated with decomposition.

2 Data and methodology

2.1 The idioms and the corpus

The reader is referred to Part I for a detailed description of the data, the decomposability scales and corpus extraction methodology.

2.2 Types of variation

Two major types of flexibility are distinguished within the noun phrase of the idiom. Morphological variation of the noun is further subdivided into number and determiner variation, whereas lexico-syntactic variation subsumes the addition of modifiers to the noun.

Number variation is restricted to two values: singular or plural (see Tab. 1), but determiner variation is more complex. In her study of idiom flexibility, Wulff (2008: 118) assigns determiners to subtypes based on what kind of noun they tend to co-occur with. One subclass (Type 1), for example, includes those that occur with singular count nouns, plural count nouns as well as noncount nouns, such as *the*, *no*, *what* or possessive determiners (Wulff 2008: 118). Another includes *some/any*, *enough*, which combine with plural count nouns and noncount nouns (Wulff 2008: 118). This methodology has not been adopted, because it does not treat the replacement of one determiner with another of the same subtype (*my*

replacing *the*) as variation. Instead, a corpus-driven approach is used, whereby all the different determiners attested in the data are assumed to represent the range of possible determiners. Possessives (*my*, *your*, etc.) and cardinal numerals (*two*, *three*) are viewed as exceptions in that different items are considered the same determiner (type). As a result, a total of 29 different determiners have been identified (Tab. 2).

Tab. 1: Number

Number	Frequency
Singular	5665
Plural	771

Some multiword items (*a lot of*, *plenty of*, *considerable amounts of*) which are traditionally regarded as determiners are included, but forms such as *all of her thunder* or *any of the beans* show embedding of the idiom's noun in a longer NP and are treated under structural variation.

Tab. 2: Determiners and their frequencies

the	my, etc.	zero	some	a(n)	that
4166	1470	102	10	522	29
this	those	these	no	every	any
24	16	4	4	2	11
enough	lots/a lot of	many	much	more	most
11	10	2	6	15	2
(a) little	less	(a) few	plenty of	amount(s) of	other
8	3	6	3	1	1
such	what	two, etc.	whatever	another	
1	2	3	1	1	

Various modifiers can accompany the noun, as shown in Tab. 3. Premodifiers take the form of adjective (phrases), nouns, or adverbs. A range of postmodifiers can be found, such as prepositional phrases, postnominal adjective phrases, adverbs, relative clauses, appositive clauses and *wh*-interrogative clauses.

Tab. 3: Modifiers

Modifier	Example	Frequency
Premodifier		
Adj	getting your guy to spill his emotional beans is no easy task	631
N	I'm not someone who hit the Silicon Valley jackpot	228
Adv	not a very large storm for this time, but it's still packing quite a punch	8
Subtotal		867
Postmodifier		
PP	Still carrying the torch for that secretary of yours?	1222
AdjP	they pack a punch 20 times more powerful than beta or gamma radiation	4
Adv	He hadn't realized that the wheels of commerce here weren't greased with favors and acquaintance and respect	1
Relative cl	He will try to crack a whip Saunders did not have	53
Nonfinite cl	The political ice separating Pretoria and other sub-Saharan capitals is broken	6
Appositive cl	And Tom Cruise spilled the beans to Larry King that ex-wife Nicole Kidman is with Lenny Kravitz	11
Interrogative cl	and sometimes it's really hard, I think, for people to grasp or to get a clear picture how they should think	2
Subtotal		1286
Total		2153

As in Part I, a given variation is excluded from the statistics if some idioms cannot be expected to undergo that variation for reasons independent of decomposability. Appositive clauses can be added to abstract nouns with senses related to 'fact', 'idea', 'proposition', 'remark', 'reply', 'answer', etc. (Quirk et al. 1985: 1260). The noun has to denote conceptual entities such as ideas, thoughts, opinions or speech entities with conceptual content such as remarks, answers, etc. This criterion is met in *spill the beans*, *speak one's mind* or *get the picture*, but not in *carry a torch*, *break the ice* or *lose one's grip*. Consequently, appositives are ignored. Similarly, interrogative clauses can normally occur only with *question* and its synonyms. This type of modifier is found only with *picture* in the corpus and in all the instances expansion into a prepositional phrase is possible: *a clear picture of how they should think*. They are also excluded from the statistics.

There is broad consensus in the literature that not all items that syntactically premodify the noun are modifiers of the same noun semantically. McClure (2011) identifies the following categories: expressives (*Bugsy kicked the goddamned*

bucket), metalinguistic words (*Bugsy kicked the metaphorical bucket*), hypallage or transferred epithets (*After years of alcohol abuse, Bugsy finally kicked the gin-soaked bucket*, where *gin-soaked* describes Bugsy), conjunctive modifiers (*we sat on a veranda in the Garden District shooting the jasmine-scented breeze*) and domain modifiers (*Bugsy kicked the social bucket (when s/he committed that faux pas at the party)*). The latter are called external modifiers by Ernst (1980: 52), since they are semantically associated with the whole expression, not with any internal component. *Kick the social bucket* is best interpreted as 'socially, kick the bucket' (Ernst 1980: 51). Expressives also intensify the whole verbal expression, not simply the object noun alone. The other modifiers may be associated with the idiomatic noun in its literal meaning (conjunctive and metalinguistic modifiers) or modify a noun outside the idiom (transferred epithets). None of these modifiers attach to the noun in its figurative sense. The examples above taken from McClure (2011) illustrate the point, as the noun *bucket* does not carry an idiomatic meaning, yet the sentences are all acceptable. Metalinguistic and expressive modifiers are excluded from the flexibility measures, but external modifiers pose a challenge.

The distinction between external and internal modifiers is often blurred. The absence of clearly delineated criteria and the high frequency of ambiguity result in different treatments from researchers. Nicolas (1995: 249) explores modifiers added to the noun of V NP idioms and concludes that all adjectives are external, being attached to the whole idiom semantically. Langlotz (2006a: 268–269) counters this claim and prefers to treat most adjectives occurring in his corpus as internal modifiers. Many highlight the possibility of the reinterpretation of external modifiers as internal in the same context (Ernst 1980: 63–65; Stathi 2007: 98–99; Langlotz 2006a: 268–269).

The identification of modifiers as external is relatively unproblematic if the idiom has no semantically autonomous noun. In (1), *desert* denotes the location of the process expressed by the idiom, rather than referring to properties of physical dust.

(1) It sure didn't look that way in 1989, after Lincoln bit the desert dust and Keating faced a series of highly publicized trials.

The categorization of the adjective is less straightforward if the noun carries a figurative sense. *Sexual* is usually viewed as a domain modifier, but in (2) the more natural interpretation is probably internal ('end period of sexual inactivity'), yet the external reading is also possible ('end period of inactivity sexually').

(2) Go away for the weekend sometime soon, or send the kids to Grandma's house. That way, there is no chance of being interrupted, and you and your husband can break the sexual ice.

External and internal modifiers cannot be easily distinguished. Paraphrase tests such as the *-ly* adverb derived from the adjective, *as far as…is concerned*, *from a… point of view* or *in a…manner/way* are usually applied to show the external nature of the adjective (Ernst 1980: 55; Nicolas 1995: 238–239). *Kick the social bucket*, for example, is equivalent to *socially kick the bucket* or *come apart at the political seams* means the same as 'politically come apart at the seams' (Ernst 1980: 51). These paraphrases are helpful to a certain extent, but not fully reliable. Stathi (2007: 89) also expresses her reservations concerning the *-ly* adverb paraphrase, finding it odd or misleading in some cases.

Finally, idiom analyzability is context-dependent (Dobrovol'skij 2011: 43). Langlotz (2006a: 241, and 2006b) introduces the notion of latent isomorphism to handle cases where the semantically non-autonomous noun of an idiom appears to develop an independent sense in some contexts. *Grease the wheels* 'support the development of sth' is treated as nondecomposable, since the entity that develops corresponds to the vehicle, not the wheels, in the metaphorical conceptualization. Despite this, *wheels* can have an independent sense in some contexts, which is facilitated by the metonymy WHEELS FOR VEHICLE (Langlotz 2006b). In the COCA corpus, *bullet* can often be interpreted as 'task, problem', although bullet in the literal scenario is not mapped onto the unpleasant situation in the target domain. However, speakers seem to interpret *bullet* as autonomous, due to the strong metonymic link between bullet and the unpleasant circumstances of biting it. All this complicates the analysis of modifiers. In this study, an inclusive approach is adopted, as a result of which ambiguous modifiers are treated as internal for the purpose of variability measurements. In other words, if a modifier allows the internal reading, it is included.

Postnominal prepositional phrases may be classified as clause-level adverbials or noun postmodifiers. The best evidence in favor of postmodifying status is the occurrence of the noun and the preposition without the verb in the context. While the presence of such a PP is sufficient evidence, the absence of the given preposition from the concordance lines is not informative enough to regard the PP as a clause-level adverbial rather than a noun postmodifier. Many nouns can be used in the given figurative sense only in the presence of the given verb. As in the case of premodifiers, an inclusive approach is used and all PPs that can be regarded as postmodifiers are classified as such. As a result, the following sequences are treated as containing noun postmodifiers: *break the ice with/between sb*, *break the ice on/about sth*, *bite the bullet on sth*, *bury the hatchet with/between sb*, *bury the hatchet on/over sth*, *crack the whip on/over sth*, *spill the beans about/on sth*, *clear the air on sth*, *pull the plug on sth*, *miss the boat on sth*, *speak one's mind about/on/over*, in addition to more obvious cases such as *carry a torch for sb*, *foot the bill for sth*, *get the picture on sth*, *pass the buck for/on sth*, *lose one's grip on/over sth*. Table 4 shows some examples.

Tab. 4: PP postmodifiers

Idiom	Postmodifying PP
He breaks the ice	with reserved visitors
thanks for breaking the ice	on this
he would not bite the bullet	on private property ownership
Paul refuses to bury the hatchet	with Dusty
if Hong Kong cracks the whip	on journalists
It cleared the air	about a lot of things
CBS pulled the plug	on the show in 1969
those executives missed the boat	on a multibillion dollar industry

2.3 Flexibility calculations

Entropy is used to assess idiom flexibility with respect to determiners. Part I provides an explanation of the concept. To reiterate briefly, applying entropy to determiners means that the more determiners occur and the more evenly they are distributed over tokens of an idiom, the more flexible the idiom is. Taking a hypothetical example, an idiom whose noun can take three different determiners has the highest flexibility if the three determiners occur an equal number of times. The closer the frequency figures of the determiners are to each other, the more flexible the expression is. An idiomatic noun which occurs only with one and the same determiner has the highest degree of frozenness. The same entropy measurement is also used to determine the flexibility of noun in terms of number.

Entropy is a useful concept, as long as each idiom token obligatorily instantiates one or another variant form out of a limited number of mutually exclusive options. This is true for number variation, where each corpus occurrence has either a singular or a plural noun, or determiner variation, where each example has one of the 29 determiners given in Tab. 3. The more variant options are found and the more evenly those options are distributed across the corpus occurrences, the more flexible the idiom is. However, entropy cannot suitably measure modifier variation (Wulff 2008: 85). Modifiers do not mutually exclude one another, and variability here is closely related to the number of added items.

To address this problem, Wulff (2008: 85–87) changes the original entropy notion by incorporating the concept of directionality. In particular, the essential feature of the original entropy measure is retained, since this modified directional entropy also captures "the magnitude of the randomness or chaos in the data", but what is added is the directionality of flexibility (Wulff 2008: 86). Directionality shows whether the expression in question occurs predominantly with or

without the given modifier. However, this modified entropy measure still presupposes the presence of a limited set of mutually exclusive options. Wulff (2008: 93) obtains these by recording how many modifiers of the given type accompany each instance of the idiom. "For each variation parameter, it is coded how often it is present in one instantiation. If say, no attributive adjective is present, the variation parameter [attributive adjective] is coded with 0. If one adjective is present, it is coded as 1, if there are two, with 2, and so on" (Wulff 2008: 93).

The original entropy concept would consider an expression with many zeros, ones and twos as more flexible than one with only twos, since each of the "mutually exclusive" options (zero, one, two) occurs in the former case, whereas only one of the options is present in the latter case. In other words, an idiom whose individual examples in the text occur sometimes with no adjectives, sometimes with one adjective and sometimes with two would be considered more flexible than an expression whose tokens are always accompanied by two adjectives. Moreover, an expression whose instances always occur with two adjectives would receive a similar entropy value to an expression whose tokens never take adjectives or always take one adjective (Wulff 2008: 86). This is clearly undesirable and a mechanism is needed to convert high entropy values (indicating randomness and lack of predictability) into low values (indicating fixedness and high predictability) and vice versa. To this end, Wulff (2008: 86) subtracts the original entropy value from 1, checks the data to see whether the absence or presence of the given modifier type is more common and adds positive or negative algebraic signs to the values accordingly. However, this modified concept of entropy is unable to capture the essence of modifier variation. First, it retains the notion of randomness and presupposes a type of data coding that establishes mutually exclusive options. Second, the conversion of originally high entropy values into low values and vice versa cannot eliminate the problem that idioms which differ in variability can have the same entropy values. An expression occurring with no modifier of a given type (option "zero") has a similar entropy value to an expression that always occurs with one modifier of the given type (option "1"). From the point of view of entropy, both are highly predictable and lack randomness; thus, both have low entropy values. Yet, we would like to treat the two expressions as different along the variability scale.

Instead of entropy, this study uses a flexibility value based on the average number of modifiers. Some refinement of this measurement is necessary with attributive elements, as well as postmodifying PPs. Flexibility here resides not only in the (average) number of added items but also in their diversity. An idiom is relatively fixed if its noun always co-occurs with the same adjective. The broader the range of adjectives it combines with, the more flexible the idiom is. The same applies to attributive nouns, adverbs and postmodifying PPs. It is the combined

effect of number and diversity that best captures flexibility. For PPs, only the preposition is checked for diversity; for adjectives, adverbs and nouns, the head adjective, adverb or noun are checked for diversity. For all other modifiers, the concept of average number is used alone, because no repeated occurrence can be found among the relative clauses, nonfinite clauses, postmodifying adjectives and adverbs.

Both diversity and number are calculated relative to the total number of idiom instances. Dividing the total number of adjectives by the total number of idiom instances that can take adjectives yields the average number of adjectives. Compound forms are excluded, as modifiers are attached to the whole compound rather than the noun of the idiom, but nominalization structures (see Tab. 3 in Part I) are included. Dividing the number of different adjectives by the total number of adjectives yields an average diversity value. The same principles are used for the other modifier types. To obtain the combined effect of number and diversity, the values are multiplied with each other.

Idiom flexibility is measured on a total of fifteen variation dimensions: ten individual measures (number, determiner, attributive adjective, attributive noun, attributive adverb, PP, relative clause, nonfinite clause, postmodifying adjective, postmodifying adverb) and five overall measures. An average of negation and determiner values provides an overall score for noun morphology. Premodifier variation is assessed by taking an average value of three parameters: attributive adjective, attributive noun and attributive adverb. Postmodifier flexibility is measured by calculating the average score of PP, relative clause, nonfinite clause, postmodifying adjective and postmodifying adverb variability. Overall modifier flexibility is established by taking the average value of premodifier and postmodifier flexibilities. Finally, overall noun flexibility is assessed by averaging the flexibility values of negation, determiner, premodifier and postmodifier. The values are found in the Appendix. The closer this flexibility value to 0 is, the more fixed the idiom is.

3 Results and discussion

All three decomposability rankings are related to each of the variation measures listed above. Pearson correlation was used to assess the relatedness between the two scalar decomposability rankings (see Table 1 in Part I) and flexibility, while one-way ANOVA measured the relation between variability and categorical decomposability as assessed by Gibbs and his colleagues in Gibbs and Nayak (1989), Gibbs et al. (1989a, 1989b) and Hamblin and Gibbs (1999) (see Tab. 2 in Part I).

An inspection of the results for scalar decomposability reveals that, of the individual variation dimensions, only number is significantly correlated (Decomposability 1: $r_{Pearson} = 0.343$, $p < 0.05$, Decomposability 2: $r_{Pearson} = 0.344$, $p < 0.05$). Correlations for the other individual measures do not reach statistical significance. Of the overall measures, noun morphology (Decomposability 1: $r_{Pearson} = 0.385$, $p < 0.05$, Decomposability 2: $r_{Pearson} = 0.386$, $p < 0.05$) and overall noun flexibility (Decomposability 1: $r_{Pearson} = 0.419$, $p < 0.05$, Decomposability 2: $r_{Pearson} = 0.420$, $p < 0.05$) are positively correlated with decomposability, while overall modifier flexibility is on the borderline of statistical significance ($r_{Pearson} = 0.316$, $p = 0.053$ for both Decomposability 1 and Decomposability 2). However, scalar decomposability has no observable effect on premodifier and postmodifier variation. None of the variation measures are statistically dependent on Gibbs and colleagues' (1989) categorical rating.

What may reduce the validity of the results is the lack of data. Some modifiers occur rarely: premodifying adverbs (8 items distributed over 3 idioms), nonfinite clauses (6 items distributed over 4 idioms), postmodifying adjectives (4 items distributed over 2 expressions) and postmodifying adverbs (a single item only). Relative clauses are somewhat more frequent (53 items distributed over 11 idioms). Therefore, the correlations were recalculated for the overall measures of premodifier, postmodifier, modifier and noun with only the relatively frequent variation dimensions included and the infrequent operations of premodifying adverb addition, postmodifying adjective and adverb addition as well as nonfinite clause attachment excluded.

After recalculations, overall noun flexibility remained significant (Decomposability 1: $r_{Pearson} = 0.426$, $p < 0.05$, Decomposability 2: $r_{Pearson} = 0.427$, $p < 0.05$). The significance level of premodifier and postmodifier variation did not increase considerably, but overall modifier flexibility moved above the significance threshold for scalar decomposability (Decomposability 1: $r_{Pearson} = 0.323$, $p < 0.05$, Decomposability 2: $r_{Pearson} = 0.322$, $p < 0.05$). The overall picture of modifier flexibility and noun flexibility in general reveals a positive correlation. The relationship is weak or moderately strong for all correlations. The $r_{Pearson}$ values fall between 0.316 and 0.427. None of the recalculated flexibility measures are correlated with the categorical ranking. The results suggest that decomposition has a global effect on noun variation and modifier variation, which no longer holds at the more specific level of the individual variation types except for number, or the slightly higher level of pre- and postmodifier, yet the cumulative effect of individual types is a dependence relationship between variation and scalar decomposition at a general level.

Part I and Part II explored verb-related and noun-related variations separately. To obtain an insight into idiom flexibility as a whole, overall verbal and

nominal values were combined for each idiom by calculating their averages. Overall idiom flexibility has been found to be positively correlated with scalar decomposability ($r_{Pearson}$ = 0.372, $p < 0.05$ for both Decomposability 1 and 2) but not with categorical decomposability. The same picture emerged with the recalculated values. Recalculations were performed as described above and in Section 4 of Part I.

The findings suggest that the effect of decomposability is subtle. It is not sufficiently strong to produce a statistically significant relationship at the level of the individual variation dimensions (except for number flexibility of the noun) or more schematic level of verbal morphology, overall verbal, overall premodifier and overall postmodifier variation. However, at the level of the idiomatic expression and the nominal constituent, the collective effect is statistically measurable, though not very strong.

Part I offered several explanations why most verbal variations did not display any correlation with decomposability. Some of the same reasons could also explain the lack of correlations for the individual nominal flexibility measures. It was argued in Part I that decomposability is a complex notion and intersubject disagreement is common. The rankings used in this study, especially the categorical ratings, may not capture the nuances of decomposability successfully. In addition, Titone and Connine's (1994) rating does not directly correspond to speakers' scalar judgments. In the future, scales such as Nordmann et al.'s (2014: 94–95) should be used to test the idiom decomposition hypothesis. Finally, the assignment of several expressions to the nondecomposable category by Gibbs and his colleagues (1989) may also explain why categorical decomposability is not correlated.

Decomposability may not be the only factor affecting variation. While idioms with high decomposability may have a higher potential for variation, this potential is not always realized in context. The significance of other factors is confirmed by the finding that idiom variability seems to be globally affected by decomposability, whereas the individual variation dimensions are unaffected. As Dobrovol'skij (2011: 57) notes, "we are dealing with tendencies rather than with rules". That these are only tendencies is confirmed by the finding that the strength of significant correlations is not very high.

The limitations of the study include the focus on the single canonical pattern of V NP and the absence of realizations for many variation types in the corpus. Although the corpus size is larger than in previous studies, many variation types do not occur with high frequencies and this reduces to some extent the validity of the statistics. To increase the validity, some recalculations were performed that combined infrequent structures (see Section 4 Part I) or excluded rare nominal modifiers (see above). In the future, this research could be expanded by the

exploration of a wider selection of base patterns. The new findings of the study confirm the significant effect of decomposability on the variability of the idiom as a whole and the nominal constituent, but this effect disappears at the more specific levels of individual variation dimensions. The verbal and nominal constituents also differ in how sensitive they are to decomposition. Verbal variation is unaffected at all levels, while nominal variation begins to show signs of affectedness at the level of the modifier in general.

4 Conclusion

The hypothesized relationship between decomposability and noun-related variation has been confirmed for number variation, overall noun morphology and overall noun flexibility, if decomposition is viewed as a scale, but not if it is interpreted as a categorical variable. Idiom variability as a whole is also subject to the effect of decomposability. No correlation has been detected for the individual noun flexibility dimensions. Premodifier and postmodifier variation taken separately do not depend on decomposition, but their combined measurement of overall modifier flexibility approaches or reaches significance, depending on which individual modifier types are included in the calculations.

Noun-related variation on the whole shows dependence on decomposition in contrast to verb-related flexibility, but this dependence is not very strong. Scalar decomposition seems to have a statistically significant effect on the general level of the nominal constituent, the noun modifier, and also at the level of the whole idiomatic expression. Individual types of variation are mostly unaffected by the degree of either scalar or categorical decomposability.

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Appendix

Relative entropy and average flexibility values are provided in the charts below. In each chart, the idioms are arranged from left to right in order of increasing degree of decomposability as assessed by Titone and Connine (1994).

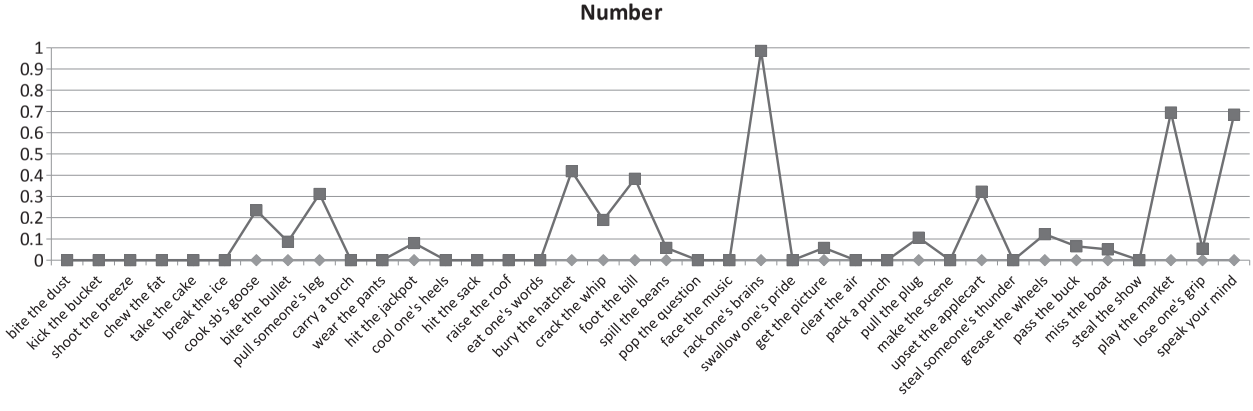

Fig. 1: Relative entropy values for number

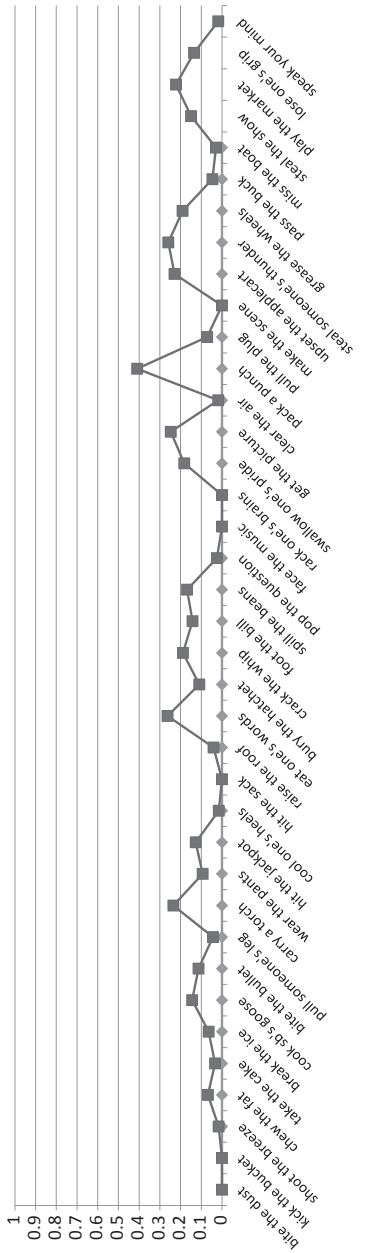

Fig. 2: Relative entropy values for determiner

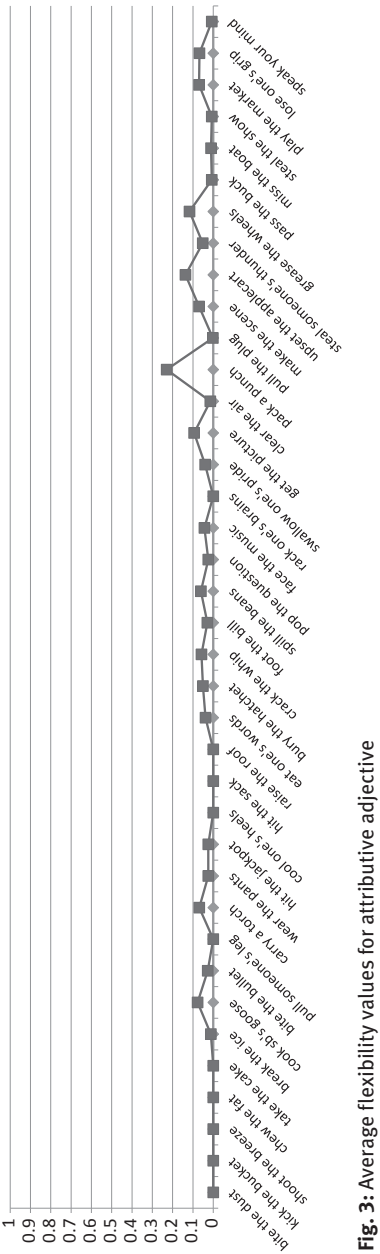

Fig. 3: Average flexibility values for attributive adjective

Fig. 4: Average flexibility values for attributive noun

Fig. 5: Average flexibility values for premodifying adverb

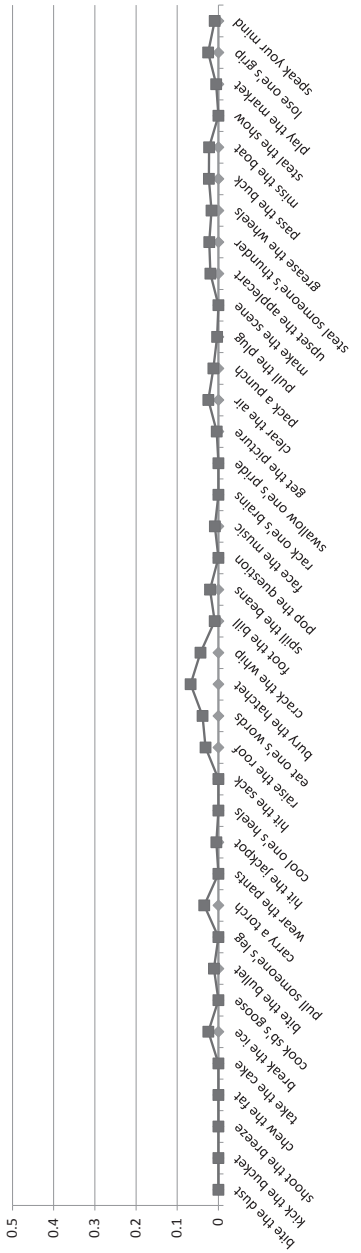

Fig. 6: Average flexibility values for PP

Fig. 7: Average flexibility values for relative clause

Fig. 8: Average flexibility values for nonfinite clause

Fig. 9: Average flexibility values for postmodifying adjective

Fig. 10: Average flexibility values for postmodifying adverb

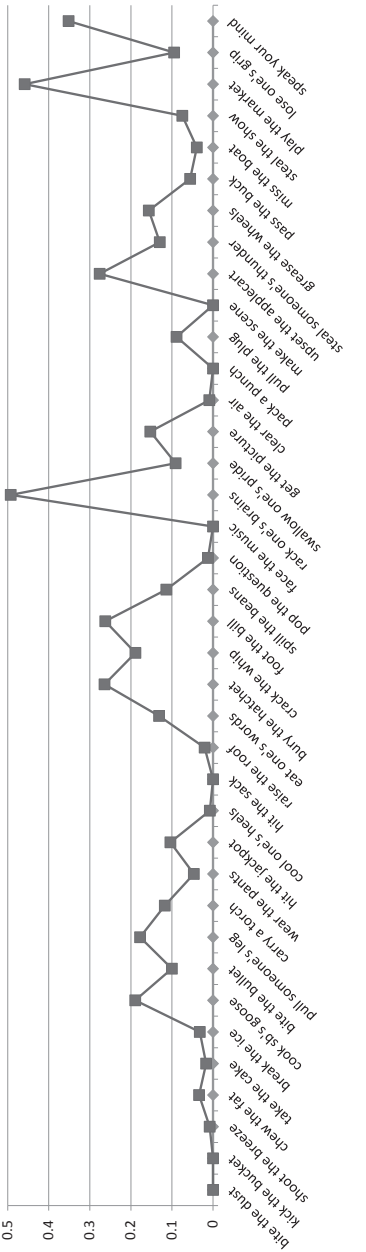

Fig. 11: Average flexibility values for noun morphology

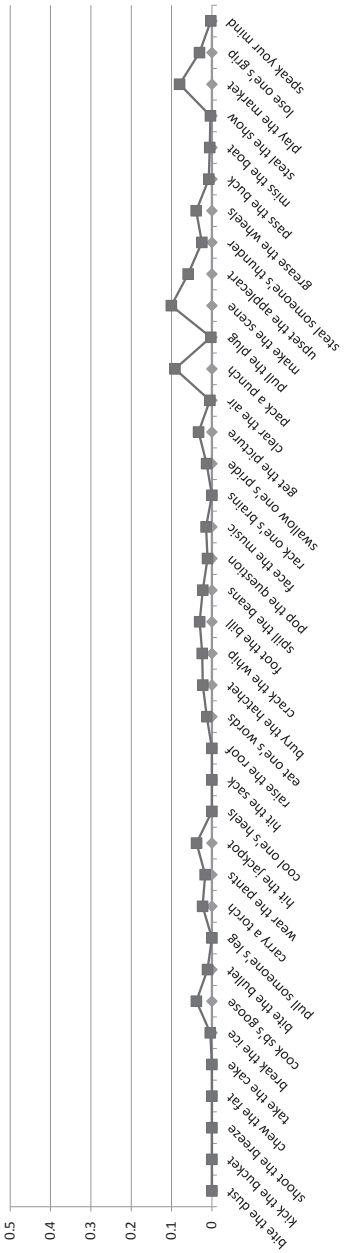

Fig. 12: Average flexibility values for premodifier

Fig. 13: Average flexibility values for postmodifier

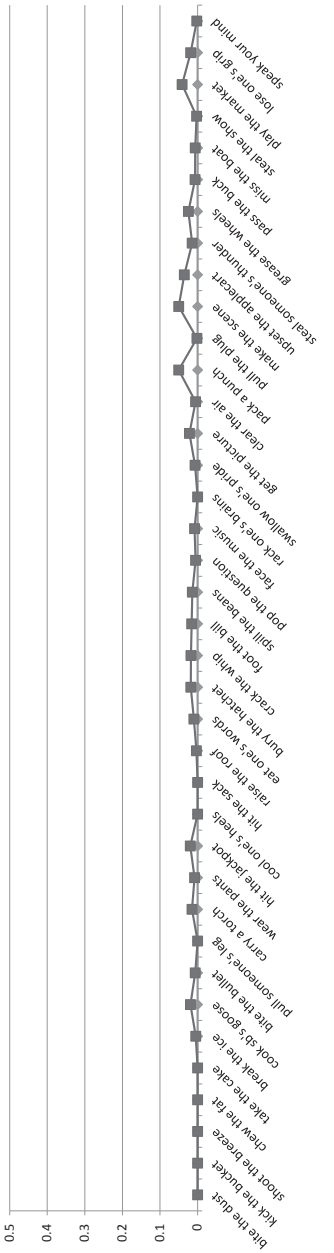

Fig. 13: Average flexibility values for modifier

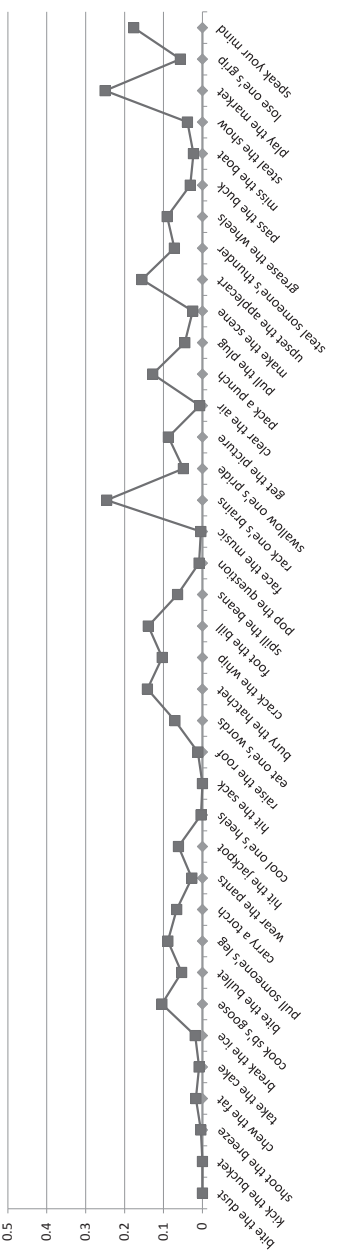

Fig. 14: Average flexibility values for noun

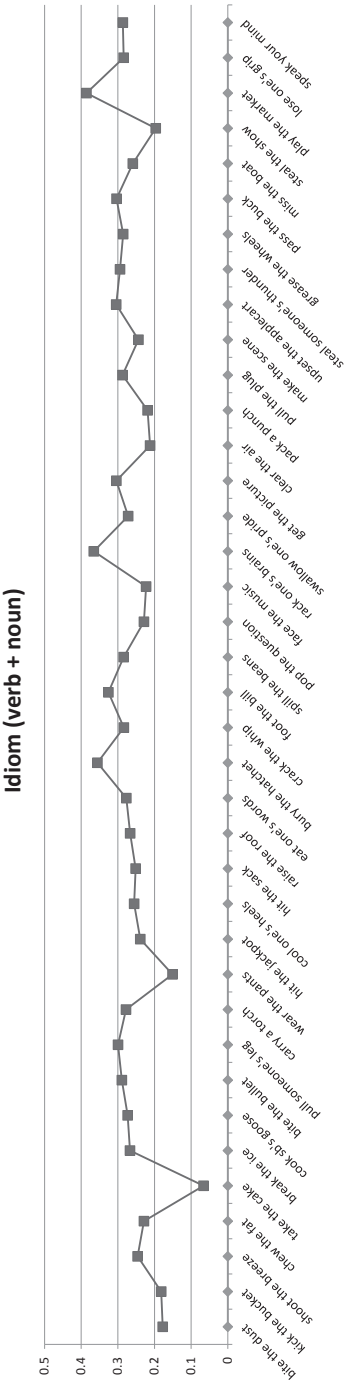

Fig. 15: Average flexibility values for idiom