

The motivated unmotivated: Variation, function and context

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Abstract: Variation occurs when a language has two or more ways of achieving the same communicative goal. Cases of variation are currently approached in very different ways by two different strands of linguists. Variationists assume that variation is natural and common. On this view, change is due to naturally occurring variation interacting with language-external forces. Functionalists assume that variation is anomalous. On this view, change may reflect a language-internal drive to eradicate variation. In this paper, it is argued that these conflicting views can be reconciled by considering how variation functions in the broader context of the grammar. Drawing on a case study into the prepositional complements following emotion adjectives, it is proposed that variation (as Variationists maintain) is natural and that languages have no intrinsic tendency to reduce variability. Nevertheless, the synchronic availability and historical development of specific variants is (as Functionalists maintain) also internally motivated, typically by analogical relations.

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1. Introduction

Variation occurs whenever a language has two or more ways of achieving the same communicative goal. In (1), for example, the prepositions *with*, *by*, *at*, *in*, *about* and *over* all do a similar job marking the external source or cause of the emotional state denoted by *disappointed*.

- (1) a. The local residents were bitterly disappointed **with** the decision. (BNC)
- b. Although I will be better off, I am very disappointed **by** the outcome. (BNC)
- c. Stephen was disappointed **at** what he took to be a refusal. (BNC)
- d. He felt deeply disappointed **in** Eleanor's visit. (BNC)
- e. I'm real disappointed **about** the letter. (BNC)
- f. Gray said everyone at the club is deeply disappointed **over** the current situation but they [are] all trying to put it right. (BNC)

In current linguistic practice, situations of variation as in (1) may occasion very different responses. According to one tradition – the Variationist tradition – variation is widespread and natural. Seen from this perspective, “language is inherently variable” (Tagliamonte 2012: 3; see also Labov 1972). A Variationist is therefore likely to regard the examples in (1) as typical of what language is like – the different examples make up just one of many variable contexts in Present-day English. Once recognized as being

in variation, the Variationist might go on to determine whether the available options are constrained by speaker lect or register, and (if so) whether those constraints reflect ongoing language change. However, according to another tradition – which I will refer to here as the Functionalist¹ tradition – variation is never or rarely semantically neutral. On this view, “a difference in syntactic form always spells a difference in meaning” (Bolinger 1968: 127; see also Haiman 1980; Goldberg 1995). This view goes back all the way to Humboldt’s principle, and has been given firm theoretical grounding in Saussurian Structuralism. Backed by almost two centuries of linguistic theorizing, then, a Functionalist will probably object to the examples in (1) constituting a case of genuine variation. They would go on to argue that the different prepositional complements following *disappointed* come with different shades of meaning and are, as a result, not strictly interchangeable.

These different views are linked to different understandings of language change. On the Functionalist side, one finds expressed the idea that languages, in principle, strive to maintain or restore isomorphism over time (e.g. Dik 1988; Anttila 1989; Geeraerts 1997: 105). Even though the role of isomorphism in language change is regularly called into question (Lass 1998: 342–352; Croft 2000: 68), Functionalist thinking holds its ground in historical linguistics as a set of implicit assumptions. On the one hand, the literature abounds with claims that one form disappears or undergoes functional change *because* it is functionally equivalent to another (see De Smet et al. forthc. for examples and more elaborate discussion). On the other hand, some work in Grammaticalization Theory banks on the idea that the diachronic success of new forms may be due to their being different from established forms – for instance, in being more expressive (Haspelmath 1999).

On the Variationist side, there is a more articulate model of language change. As Poplack (2011: 211) puts it: “The standard variationist construal of change involves the progressive increase of one of a set of variant expressions of a meaning or function until it ousts its competitors from the grammatical sector.” This ‘ousting’ is believed to happen not so much to restore isomorphism – variation, after all, is perfectly natural to language – but because variation is “potentially unstable” (Montgomery 2007: 111). Speakers may at any time attribute social meaning to the variation around them and, as a result, develop selectional preferences for one variant or another. Such preferences are primarily motivated by speakers’ social ties and aspirations as individuals, but they can eventually lead to shifting usage preferences at the community level, amounting to language change proper (Labov 1972).

The contrast between different approaches to variation I have sketched here is of course stereotyped, but I believe the tension it highlights is real enough and, as will be shown below, it regularly surfaces both in Variationist and in Functionalist work. At the same time, there have already been attempts to reconcile Variationist and Functionalist thinking, and the goal of the present paper is to contribute to those efforts. Specifically, it is argued here that both variation and functional motivation can

¹ The term *Functionalist* is not used here with reference to any specific language model or research tradition (e.g. Functional Grammar, Westcoast Functionalism or Systemic Functionalist Grammar) but simply to group those linguists who assume that formal contrasts are necessarily meaningful.

only be meaningfully interpreted by taking into account the broader grammatical system that ‘generates’ the variants involved (De Smet et al. *forthc.*). In what follows, Section 2 starts by examining Variationism and Functionalism more closely, highlighting the tension between the two approaches. Section 3 considers two earlier attempts at resolving the tension. However, as argued in Section 4, these attempts inevitably raise new issues. Section 5 then outlines a way of addressing those issues, illustrating and supporting the argument with a case study into the area of variation illustrated in (1) above, that is the prepositional phrase complements following emotion adjectives in general, and *disappointed* in particular. Section 6 rounds off with concluding remarks.

2. Conflict

The Variationist tradition is grounded in work on phonological variation (Labov 1972), where semantics simply does not come into play. When Variationist thinking and methodology are extended into the domain of the lexicon or grammar, the neutrality of meaning becomes less self-evident. Nevertheless, the canonical Variationist position is to assume that between lexical or grammatical variants semantic differences may well exist but can be neutralized in context. An often-quoted passage arguing along those lines is the position statement by Sankoff (1988) on syntactic variation:

While it is indisputable that some difference in connotation may, *upon reflection*, be postulated among so-called synonyms whether in isolation or in context [...], there is no reason to expect these differences to be pertinent every time one of the variant forms is used. Indeed the hypothesis underlying the study of syntactic variation within a framework similar to that of phonological variation is that for certain identifiable sets of alternations, these distinctions come into play neither in the intentions of the speaker nor in the interpretation of the interlocutor. Thus we say that *distinctions in referential value or grammatical function among different surface forms can be neutralized in discourse*. Moreover, this is the fundamental discursive mechanism of (non-phonological) variation and change. [Emphases in the original.] (Sankoff 1988: 153)

There is little doubt that Sankoff (1988) here distances himself from Functionalist thinking, as is clear from the following:

[T]wo different lexical items or structures can almost always have some usages or contexts in which they have different meanings, or functions, and it is even claimed by some that this difference, though it may be subtle, is always pertinent whenever one of the forms is used. The contrary viewpoint is adopted here, however. (Sankoff 1988: 153)

In later Variationist work, this anti-Functionalist undertone sometimes becomes amplified. A striking example is Poplack’s (2015) portrayal of Functionalism as being akin to the practices of prescriptive

grammarians. Functionalists and prescriptivists alike, she argues, have a knack for correctly identifying variant expressions but then typically fail to acknowledge them as such. Rather, they revert to often dogmatic and poorly-informed attempts “to imbue each form with a privative context of occurrence, whatever it may be, so long as it is distinct from that of its counterpart(s)”. Other authors voicing scepticism or even hostility towards Functionalism include Mair (2003), Noël (2003), Bresnan & Nikitina (2009) or Cacoullos & Walker (2009).

Predictably, more Functionalist-leaning authors react to this. Of special interest here are attempts to incorporate meaning in the analysis of variation using Variationist methods. One way of doing this is by adding functional parameters to the statistical models describing the variation, factoring in semantic features of the contexts in which variants occur (e.g. Rosenbach 2002). Another technique is to perform various types of collocational analyses. Gries & Stefanowitsch (2004), for example, show that the English dative alternation is highly sensitive to verb type. Verbs like *give*, *tell* or *show* strongly favour the ditransitive construction, whereas verbs like *bring*, *play* or *take* strongly favour the prepositional dative construction.

Although some obscuring of the boundaries between Variationism and Functionalism seems to be going on here, there is still striking disagreement as to how the results are to be interpreted. The difficulty is that meaning always has to be approached indirectly through contextual clues. For example, it has been shown that the English *s*-genitive is preferred over the *of*-genitive when the relation expressed is one of inalienable possession (Rosenbach 2002). This is one reason why *Sue’s lungs* tends to be favoured over *the lungs of Sue*. Yet, even though inalienable possession is a semantic category, it does not follow that the *s*-genitive somehow marks inalienable possession. There is no contradiction in using *Sue’s lungs* to refer to the pair of lungs Sue is dissecting in biology class. The same could be said of collocational evidence, which may point to semantic differences between variants but does not actually identify those differences.

This, then, leaves room for interpretation. Gries & Stefanowitsch (2004), once they have made clear that their collocational analysis reveals “subtle differences between *seemingly* synonymous constructions [emphasis added]”, go on to conclude that “many alternations are much more restricted than has hitherto been assumed” (2004: 97). Similarly, Coleman, writing on the dative alternation in Dutch, maintains that collocational analysis can “provide the basis for [...] empirically valid generalizations about the semantic parameters driving the dative alternation” (2009: 593). But others, despite adopting similar techniques, are more cautious. Collocational differences between variants or associations to different semantic contexts may, for instance, reflect entrenched habits or persistent usage patterns rather than semantically driven choices (Noël 2003: 369; Torres Cacoullos & Walker 2009; Poplack & Torres Cacoullos 2015: 277; Blas Arroyo & Schulte 2017). This brings to mind Sankoff & Thibault’s (1981) foresighted suggestion that the conflict between Functionalist and Variationist thinking may well prove difficult to resolve on strictly empirical grounds.

3. A compromise

Can Variationism and Functionalism be reconciled then? Several solutions have been suggested, the common denominator of which is that the conflict between Variationist and Functionalist perspectives may actually matter less than at first sight appears.

At the Variationist end, we must again turn to Sankoff (1988). Even as he goes against Functionalism in introducing the concept of neutralization-in-discourse, Sankoff does not go so far as to reject Functionalism altogether. His position is best characterized as agnostic, as he treats both his own Variationist view and the Functionalist view as hypotheses:

[T]his notion [of neutralization-in-discourse] must remain a hypothesis, as must its antithesis – that at every use of a form its full complement of distinctions is somehow brought into play by the speaker and/or hearer. (Sankoff 1988: 154)

Ultimately, Sankoff does not seek to justify the Variationist approach by demonstrating the existence of functional equivalence between variants. Instead, he looks for justification in the observation of ‘weak complementarity’ (Sankoff & Thibault 1981; see also Schwenter & Torres Cacoullós 2010: 14; Tagliamonte 2012: 16). Weak complementarity means that the prevalence of one form in a lect or register negatively correlates with the occurrence of another form. Given such a correlation and given some degree of functional similarity, it is only reasonable to conclude that the forms are in variation and are potentially subject to change, with one form replacing the other – no matter their exact semantic specifications. Sankoff (1988: 155) even briefly speculates that variation may involve not only variant forms for (roughly) the same function, but also variant functions. In other words, speakers can differ in how they say things as well as in the things they say. As long as there is weak complementarity, the Variationist approach is vindicated.

At the Functionalist end, the idea has gained ground that a language may offer alternative coding options, if not quite for the same meaning, at least for the same language-external state of affairs to be linguistically represented (Langacker 1987; Taylor 2002). As Langacker puts it:

Grammatical structure is based on conventional imagery, which reflects our ability to construe a conceived situation in alternate ways. The full conceptual or semantic value of a conceived situation is a function of not only its content [...], but also how we structure this content with respect to such matters as attention, selection, figure/ground organization, viewpoint, and level of schematicity. In regard to all of these we are capable of making adjustments, thereby transforming one conceptualization into another that is roughly equivalent in terms of content but differs in how this content is construed. (Langacker 1987: 138)

For example, the transitive and intransitive constructions in (2a–b) can be used to describe the same scene. The variants highlight different aspects of the scene and meet different information-structural demands, but the scene itself does not impose either one of the construals the variants express. It is the speaker who chooses to construe the scene in whichever way meets his or her communicative goals or, simply, first comes to mind.

- (2) a. The defendant **dropped** the gun (1966, Google Books)
b. the gun **dropped** to the floor. (1967, Google Books)

From this, it is a small step to Croft (2010). Like Variationists, Croft looks for the origins of change in naturally occurring variation. Inspired by the notion of construal, he finds variation in the many options speakers have to verbalize the same experience. Croft argues that this type of variation is far more extensive than is generally recognized. To show this, he describes the variation in speakers' retellings of the *Pear Story* film. Even though the speakers in question are not only describing the same scenes, but share the same overall discourse goal, variation is the norm. Consider, for instance, some variant descriptions in (3), from Croft (2010: 10–11).

- (3) a. he comes off of the ladder
b. he comes down with a load of pears
c. and he comes down
d. climbs down the ladder

The extent of the variation implies that speakers not only have numerous ways to verbalize one and the same experience, but also have considerable freedom to choose between them:

Any single situation may be verbalized in multiply different ways. Because of the fundamental indeterminacy of communication – due to the fact that speakers cannot read each other's minds, speakers must rely on their own unique histories of prior uses of the linguistic forms, and every situation being communicated is unique – different verbalizations of the same experience are communicatively more or less equivalent, or at least not a priori distinguishable. (Croft 2010: 42)

This indeterminacy, according to Croft, gives rise to the variation over which socially-driven selection mechanisms can subsequently operate, leading to the propagation or loss of specific variants over time. Again the message is that variants may well enter into competition without necessarily having complete semantic equivalence.

4. New problems

The solutions discussed above suggest that the discrepancy between Variationist and Functionalist perspectives is only an apparent one. Fundamentally, there need be no conflict. If variants are interpreted as near-synonyms, the Variationist concedes that variants are not exact synonyms, while the Functionalist concedes that variants may be interchangeable in context. Each can attend to their own business without getting in the other's way. Still, even though a position along the lines of Sankoff (1988) or Croft (2010) may be preferable to a tug-of-war between more extreme Functionalist or Variationist views, there are problems left that need addressing. The following focuses on two general problem areas, one mainly relevant to Functionalism, the other to Variationism.

4.1. Motivation

One of the basic intuitions driving Functionalism is that the structure of language is more or less optimally adapted to its function, which is first and foremost communication (Nuyts 2007: 548). The isomorphic principle is one reflex of this underlying idea. Isomorphism states that for a communicative code to be clear and efficient, forms should be reliably associated with meanings, with a one-to-one mapping as the optimum. Many meanings mapped to one form would cause ambiguity, while many forms mapped to one meaning would needlessly burden memory.

The question, then, is how to account for violations of isomorphism. Ideally, from a Functionalist point of view, these can still be explained as somehow being functionally motivated. Indeed, in one respect, one-to-many mappings have already been recognized to have a functional advantage over one-to-one mappings. Without polysemy, the linguistic code would lack the flexibility to adapt to new situations. Croft therefore reformulates the isomorphic principle as follows:

Polysemy is both economically and iconically motivated [...]. The set of related meanings can be thought of as a connected region in conceptual space [...]. The actual iconic correspondence between meaning and form is between a single form and a single region in conceptual space. [... T]he larger the region, the fewer total words necessary to cover the conceptual space, and the more economically motivated the form-meaning correspondence. (Croft 2002: 106)

However, the other type of violation – synonymy, or near-synonymy – is harder to account for. Variation brings redundancy to the communicative code that is, from a Functionalist perspective, bereft of any obvious communicative advantage. At best, variants offer different construals, which can explain their distributional preferences, but as Taylor (2002: 281) recognizes, such alternate construals may be no more than functional ‘luxuries’ that a language could just as easily do without. At worst, semantic differences are so subtle that even Functionalists themselves fail to identify or agree on the semantic contrasts encoded by pairs of variants. Once the Functionalist admits to widespread near-synonymy, the question arises how to account for it in functional terms. In brief, where is the motivation in variation?

4.2. Delimitation

Variationists may be less concerned with motivation, but must face an issue that is arguably even thornier. Weak complementarity supports but also challenges Variationist practice and thought. As a phenomenon, it is common in diachronic data. The frequency of one form goes up, just as the frequency of another goes down. If the forms belong to the same semantic domain, it is sensible to assume, with Sankoff (1988), that they are in variation. However, complementarity may prove to be weak indeed.

Consider the diachronic relation between English *must* and *have to* as expressions of deontic necessity, as in (4). Historically, *must* has been on the decline while *have to* has been on the rise (Myhill 1995; Biber 2004; Leech et al. 2011).

- (4) a. ‘You **must** get something inside you,’ insisted Sukey bossily, ‘and you too, Daisy.’
(BNC)
- b. I mean, there must be meetings you **have to** go to. (BNC)

However, the rise of *have to* does not match the decline of *must* in magnitude, nor do their respective timings exactly align. In the meantime a score of other potentially rivalling expressions also need to be factored into the equation. Those include other modals and semi-modals like *be to*, *had better*, *need (to)*, *ought (to)*, *shall* and *should*, not to mention lexical alternatives (Leech et al. 2011: 114). Some of the other variants, moreover, feature in other alternations as well. For example, *must* is also a marker of epistemic necessity, alternating with epistemic adverbs and parentheticals, while *shall* varies with *will* and *going to* as a marker of future tense. Finally, in the midst of this chaos, one cannot help observing that *must* and *have to* are semantically different and to some extent syntactically complementary (Coates 1983; Myhill 1995). Even if such differences need not sit in the way of variation and change, as both Sankoff (1988) and Croft (2010) propose, there is the non-trivial question of how much difference between alleged variants can be tolerated before they cease to be variants? In sum, if we open the door to near-synonymy or mere functional relatedness, determining what Variationists call ‘the envelope of variation’ – that is, the range of contexts in which variants actually vary – may often turn out to be an intractable problem. For a Variationist analysis, this is not a promising starting point.

Variation that eludes circumscription in terms of discrete variables can be referred to as *hyper-variation*. Drawing attention to this type of variation, Van de Velde (2014) speaks of many-to-many mappings between forms and functions: any single form can realize many functions and any single function can be realized by many forms. As Van de Velde points out, many-to-many form-function mappings are a recurrent organizational principle in complex systems (see also Kuhle 2014). It is found, for instance, in physiology, animal behaviour and neural architecture. In terms of language variation, many-to-many mappings imply that a linguistic variable can subsume a range of variants and each of those variants may in turn be subsumed under a range of other variables.

To the extent that the problem of hypervariation is a methodological one, its consequence is that Variationist studies of grammatical variation mostly focus on a smaller subset of variations that allow an acceptable degree of delimitation. The usually tacit criterion is that variation must be delimited syntactically or lexically, as well as semantically. For example, the variation between *that* and zero in (5) is delimited by the syntactic context of a matrix predicate and a finite complement clause. The variation between a ditransitive and a prepositional dative construction in (6) is delimited lexico-grammatically by the presence of a verb that can select for two arguments and the overt expression of those arguments in context. This type of variation can be characterized as *choice-dependent*: a prior syntactic or lexical choice creates a variable context with a limited set of semantically-equivalent options.

- (5) a. I **knew that** you would want them back (BNC)
- b. We **knew** you were there. (BNC)
- (6) a. Here, **give me the phone**. I'll deal with it! (BNC)
- b. The phone was handed over to Erika, who confirmed the trip and then **gave the phone to her mother** (BNC)

The study of choice-dependent variation in grammar is perhaps not in itself problematic. In fact, phonological variation is likewise circumscribed by phonological, morphological or lexical structure. However, it should be clear that a considerable amount of variation in grammar is much less readily captured.

That said, let me also suggest that even though hypervariation primarily poses a methodological problem, it may have a theoretical sting. As Variationists assume that variation has the potential of turning unstable (Montgomery 2007: 111; see Section 1 above), it follows that variation must be potentially stable and that change happens when externally triggered. As Deumert & Mesthrie (2000: 116) put it: “all change is preceded by variation but not all variation leads to change”. This characterization, however, may be primarily one of narrowly circumscribed choice-dependent variation. Choice-dependent variation can be stable because it exists in what is a relatively closed system, barred from extensive interaction with other variations. In hypervariation, by contrast, variation and change may stand in a different relation. In the situation of interlocking variables that characterizes hypervariation, change can in principle run rampant, as it will have complex ripple effects beyond the grammatical context in which it first starts. If so, in hypervariation, instability is likely to be the rule rather than the exception. Moreover, in hypervariation, many changes may be happening without a language-external trigger or drive, but simply in response to other ongoing changes.

5. Grammatical context

The problems raised above do not have ready and easy solutions. However, one way to approach them is to analyse variation in relation to its broader grammatical context. Taking into account grammatical context is the obvious first step to describing and understanding hypervariation, but it can also offer insight into the linguistic motivation underlying variation.

To show this, the following sections return to the variation illustrated above, involving the various prepositional phrase complements that can mark the external source of emotion following *disappointed* and other emotion adjectives. As a first step, the variation in this domain of grammar is described on a synchronic basis, using data from the *British National Corpus* (BNC). The domain is subject to hypervariation, defying the usual descriptive methods. The variation is therefore described using a network-inspired model. This shows quite how pervasive and intricate variation can be, challenging both Variationist and Functionalist approaches. Next, the diachrony of one specific variable context is turned to by tracing the history of the prepositional phrase complements of *disappointed*. Using data from the *Hansard Corpus* (HC) it is shown that this context has a long history of variation and change. However, when this history is seen against the background of the broader grammatical system of adjective complementation, it also becomes clear that – despite what may appear to be excessive variation and random diachronic fluctuation – there is still good reason to believe in linguistic motivation underlying both variation and change.

5.1. Describing hypervariation

In English, predicatively used emotion adjectives optionally combine with prepositional phrase complements (henceforth PP-complements) to mark the source of emotion. Studies of complementation are often cast in terms of the ‘matching-problem’ (Noonan 1985), asking which predicate types pattern with which complement types. The same literature reveals various factors that determine likely matches, including semantics and syntax but also historical and extra-linguistic factors (see De Smet 2013 for an overview). The matching problem applies also to emotion adjectives and PP-complements. Predictably, it turns out that different adjectives combine with different PP-complements, as shown in (7).

- (7) a. He was **sorry about** the outcome of an affray that he had not started and in no way wanted. (BNC)
- b. This wedding is what he’s been **afraid of**. (BNC)
- c. Instead of the clarity and precision of Newtonian mechanics, we have to be **content with** a more fuzzy account of affairs. (BNC)

Also predictably, many adjectives allow more than one PP-complement, as shown in (8)–(9) (and see also (1) above). Since the alternative options are generally near-synonyms, this is where variation comes in.

- (8) a. Lisner wrote to me that John was **excited about** my plans... (BNC)
- b. I was **excited at** the thought of seeing her again. (BNC)
- c. There can be little doubt that Picasso was **excited by** the work that Braque brought back to Paris from l'Estaque (BNC)
- (9) a. It would be highly undesirable to be **confident about** a hard disk that has a question mark hanging over it. (BNC)
- b. The student who is **confident in** his library skills has a basis of trust upon which to build (BNC)
- c. It is easy to be tolerant of members of other races if one is **confident of** one's own standing in society (BNC)

Even when the general syntactic template is kept constant to predicative adjectives and their PP-complements, the variation defies easy delimitation.² For example, as (8)–(9) show, *about*-complements alternate with *at*-complements and *by*-complements following *excited*, but they alternate with *in*-complements and *of*-complements following *confident*. These interlocking patterns of variation are typical of hypervariation.

The first step to dealing with hypervariation is obviously to describe it. To do this for the grammatical subsystem of emotion adjectives and their PP-complements, data were extracted from the BNC. This was done in two rounds. In a first round, a query was run retrieving any forms of the verb *be* (i.e. having 'VB' as part of their pos-tag), followed by an adjective (i.e. any form tagged 'AJ0'), followed by any of the forms *at*, *about*, *by*, *in*, *of*, *over* or *with*. The results were randomly filtered down to a 5% sample (n=3,361). The sample was manually analysed to identify all emotion adjectives with a source-complement. This produced a list of 97 adjectives, which formed the input to the second query. The second query retrieved all instances of any of the 97 adjectives previously identified, again preceded by a form of *be* (i.e. having 'VB' as part of the pos-tag) and followed by any of the forms *at*, *about*, *by*, *in*, *of*, *over* or *with*. This produced a second concordance (n=17,592). The concordance was manually checked for any remaining false positives, eventually retaining a data set with 15,595 instances. The two-step procedure was meant to keep manual analysis manageable, as well as to reduce dependence on the pos-tagging of the corpus.³

² The emotional state of an experiencer participant and its external source or trigger can of course also be expressed by other means, including verbs (e.g. *the authorities deeply regretted the outcome* (BNC)) and verbal idioms (e.g. *she felt anger at his unfeeling attitude* (BNC)). Note also that the complement of an emotion adjective can be expressed by other means than a PP (e.g. *He was upset that Daisy was gone* (BNC)). Needless to say, all of this only complicates matters further. For the sake of the argument developed here, however, it suffices to focus on emotion adjectives and their PP-complements.

³ The search procedure is a compromise between precision and recall. The first sample-based query dramatically improves precision for the second query. At the same time, recall is optimized in that the procedure is predominantly bottom-up, rather than starting from preconceived lists of adjectives. However, recall is not completely optimal. In two respects, the procedure is *not* bias-free. First, the list of prepositions was compiled on the basis of

A word is in order on the manual part of the analysis, which excluded false positives from the data sets produced by the two queries. Hits in the data set were retained as relevant if they contained an adjective and a PP, with the adjective describing an emotional state, and the PP its cause. An ‘emotional state’ was understood as a mental state involving positive or negative valence (e.g. *content* vs *ashamed*) and/or increased or lowered arousal (e.g. *amazed* vs *bored*) felt in relation to a person, object or situation. While these dimensions fall far short of capturing the full meanings of the adjectives involved, they allow reasonably principled discrimination between emotion adjectives (e.g. *confident*, *horrified*, *obsessed*, etc.) and other adjectives (e.g. *adept*, *aware*, *capable*, *certain*, *unwell*, etc.). In case of doubt, adjectives were initially retained in the data set, but if all instances for a given adjective were doubtful, the adjective was eventually deleted from the data set. One recurrent coding issue involved the distinction between participial adjectives and verbs. Here, an inclusive policy was adopted: only if the verbal reading was the only option, was an instance excluded from the data set.

The final data set provides a detailed (if not exhaustive) picture of which emotion adjectives pattern with which PP-complements in the English represented by the BNC. The patterning proves to be extremely complex, however, and requires visualization for efficient description. To this end, a network plot was created, as shown in Figure 1, which captures as much of the information available in the data set as possible. The nodes in the network are the adjectives and prepositions found in the data set. The size of the nodes is proportional to the log-transformed frequency of the forms (within the data set). Forms with fewer than 50 occurrences were excluded from the plot. The links between the nodes reflect co-occurrence patterns between adjectives and prepositions. The weight of the links is proportional to the transitional probability for the adjective to be followed by the preposition (again, as calculated within the data set). Links with a transitional probability below 2% were excluded from the plot.⁴ Finally, the colour coding for the adjectival nodes reflects the degree to which adjectives are loyal to a single type of PP-complement, from yellow for maximal loyalty to red for maximal promiscuity.⁵ The layout of the plot was calculated using the Fruchterman-Rheingold algorithm.

introspection. Second, high-frequency adjectives had a better chance of making it into the final selection. The frequency bias is a defensible sacrifice, however, since it would in the end be difficult to properly describe the combinatorial behaviour of low-frequency adjectives anyway.

⁴ A transitional probability of 2% corresponds to the lowest-frequency link ($n=1$) for the lowest-frequency node ($n=50$) that can be included in the plot. This way, lower-frequency adjectives are treated with the same descriptive granularity as higher-frequency adjectives.

⁵ The loyalty measure is calculated as the standard deviation for the transitional probabilities between an adjective and all of the seven PP-complement types in the data set. A maximally loyal adjective occurs with only one PP-complement type, so the standard deviation is calculated over one transitional probability at 100% and six others at 0%, giving a standard deviation of 37.8. As an adjective patterns with more prepositions, its transitional probabilities become more evenly distributed over the different PP-complement types, so the standard deviation drops. A maximally promiscuous adjective would have the same transitional probability of 14.3% for each of the seven PP-complements, giving a standard deviation of 0.0.

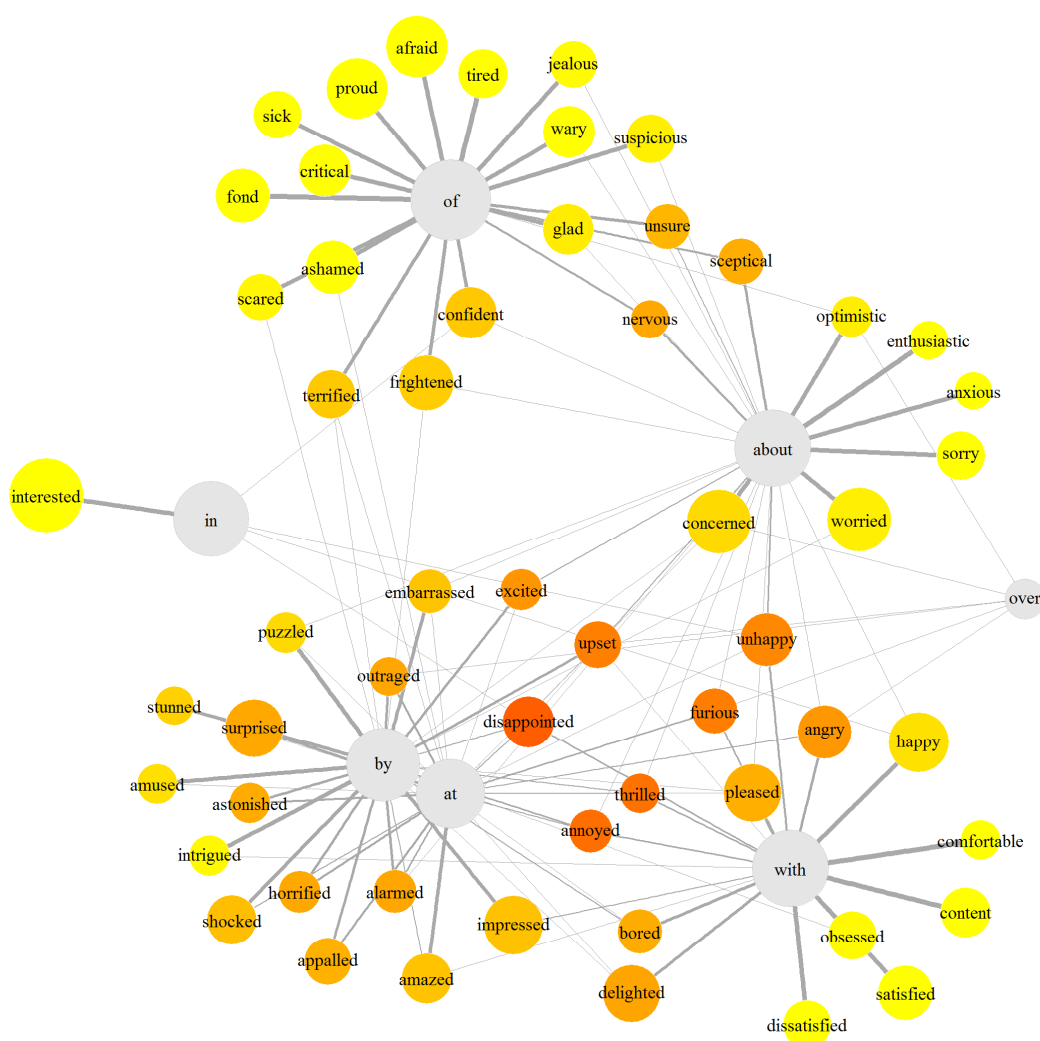


Figure 1. Emotion adjectives and their PP-complements in Present-day English (BNC).

Without going into the details, the following observations can be made from Figure 1. Clearly, variation is the rule. High-loyalty adjectives are a minority, with only 13 (or 23%) of the 56 adjectives depicted being exclusively linked to a single PP-complement type. Bear in mind that this is necessarily an over-estimation of adjectival loyalty, due to the limitations of the corpus and of how the data are visualized in Figure 1. For example, the share of maximally loyal adjectives drops further if those combinations are taken into account that have a lower than 2% transitional probability, such as the ones illustrated in (10).

- (10) a. he stared down at his Saturday suit and was **afraid at** the new possibility that he had become a man set in his ways, upset by change. (BNC)

- b. What it is that teachers are **dissatisfied about** we will return to later. (BNC)
- c. I am **interested by** the idea of the tempo that flows naturally. (BNC)

We can also look at this from the point of view of the PP-complements. Consider, for example, the patterns of alternation that arise from PP-complements occurring with the same emotion adjectives. With seven PP-complement types, there are 21 conceivable binary alternations. Figure 1 shows that, of these, almost every alternation is actually attested in the context of at least one adjective. The only pair of PP-complements that is not seen to alternate with any of the adjectives in Figure 1 is *of*-complements and *with*-complements. But even this alternation is in fact well-attested when combinations with a less than 2% transitional probability are taken into account, as illustrated in (11)–(12).

- (11) a. well I was pleased, I was **pleased of** it (BNC)
- b. He tested the noose with his foot. He pulled hard at it until he was **pleased with** it. (BNC)
- (12) a. I could see he was **ashamed of** what he was doing (BNC)
- b. they were **ashamed with** what they had done (BNC)

Observe further that variation is not only widespread, it is also strikingly intricate. For example, while essentially every PP-complement can alternate with every other PP-complement in at least some contexts, none of the PP-complements pattern identically and most do not even pattern very similarly. For most alternating pairs of PP-complements, it is clear from Figure 1 that the distributional overlap is restricted to a relatively small subset of adjectives. For instance, *of*-complements and *in*-complements only alternate as potential complements to *confident* (see (9) above); *of*-complements and *over*-complements only alternate following *optimistic*; etc. The pair of complements whose distribution is most similar is *at*-complements and *by*-complements. But even for this pair distributional overlap is incomplete: a small group of emotion adjectives pattern with *at*-complements but not with *by*-complements, including *angry*, *ashamed*, *furious*, *happy* and *unhappy*.

Finally, apart from being prone to variation, the behaviour of emotion adjectives and PP-complements also shows some other striking tendencies. First, Figure 1 above is suggestive of semantically-motivated patterning, with semantically related adjectives distributing in similar ways. For example, adjectives denoting *fear* (*afraid*, *frightened*, *scared*, *terrified*) tend to favour *of*-complements; adjectives denoting a more or less stable state of mild positive emotion (*comfortable*, *content*, *happy*, *satisfied*) tend to favour *with*-complements; adjectives denoting sudden surprised agitation (*alarmed*, *astonished*, *shocked*, *stunned*, *surprized*) tend to take *at*-complements; etc. Second, morphologically related antonyms like *satisfied* and *dissatisfied* or *happy* and *unhappy* show similar distributional preferences. Presumably, the distributional behaviour of the stem carries over to that of the derived form. Third, there is also a syntactic or at least formal regularity. All of the adjectives combining with *by*-complements are

formally past participles. This is no coincidence, as there is only a thin line between predicatively used adjectival past participles and verbal passives, which typically pattern with *by* as marker of the agent role in a passive clause.

These observations link back to the preceding theoretical discussion. Judging from the behaviour of emotion adjectives and PP-complements, Variationism will find itself ratified in the abundance of variation, but it may be challenged by the intricacy of the alternation patterns. Functionalism may find semantic differences between variants hinted at in their diverging distributional preferences, but would be challenged by the striking degree of tolerance to variation.

5.2. Motivation

While far from exhaustive, the above description goes some way towards putting variation in its grammatical context. At least, we can now focus on a more narrowly circumscribed pocket of variation and interpret the variation found there against the background of a more extensive system. Doing so, variation and change can be seen in a somewhat different light, revealing some of the linguistic motivation underlying it.

By way of example, let us turn to the most promiscuous of emotion adjectives – *disappointed*, as seen in Figure 1 above – and add the diachronic dimension to the picture. In the BNC data set described above, *disappointed* combines with *with*-complements (31%), *by*-complements (28%), *at*-complements (22%), *in*-complements (16%) and *about*-complements (3%), and (as shown by (1f) above) it is marginally attested with *over*-complements as well. To describe how this distribution evolved over time, use was made of the *Hansard Corpus* (henceforth HC). The HC consists of the written records of Parliamentary debates in the British Houses of Parliament, covering (approximately) the last two centuries. The HC was queried for all instances of *disappointed* immediately followed by *about*, *at*, *by*, *in*, *of*,⁶ *over* or *with*. The data for every second decade were retained and manually analysed to remove false positives. This eventually produced a diachronic data set covering the two centuries represented by the HC, made up of 11 synchronic ‘slices’, starting with the 1800s, 1820s, 1840s etc., containing all instances of *disappointed* followed by a PP-complement marking the source of disappointment (n=5,553). The share of the different complement types within this data set is plotted over time in Figure 2.

⁶ As it turns out, *disappointed* is sometimes followed by an *of*-PP, but in this use *disappointed* means ‘deprived of’ (e.g. *suddenly those who invested a large amount of capital in mills and the cultivation of the soil were disappointed of the fruits of their enterprise before they could get their first returns* (1848, HC)). Examples like this were eventually not retained, as *disappointed* is not an emotion adjective here.

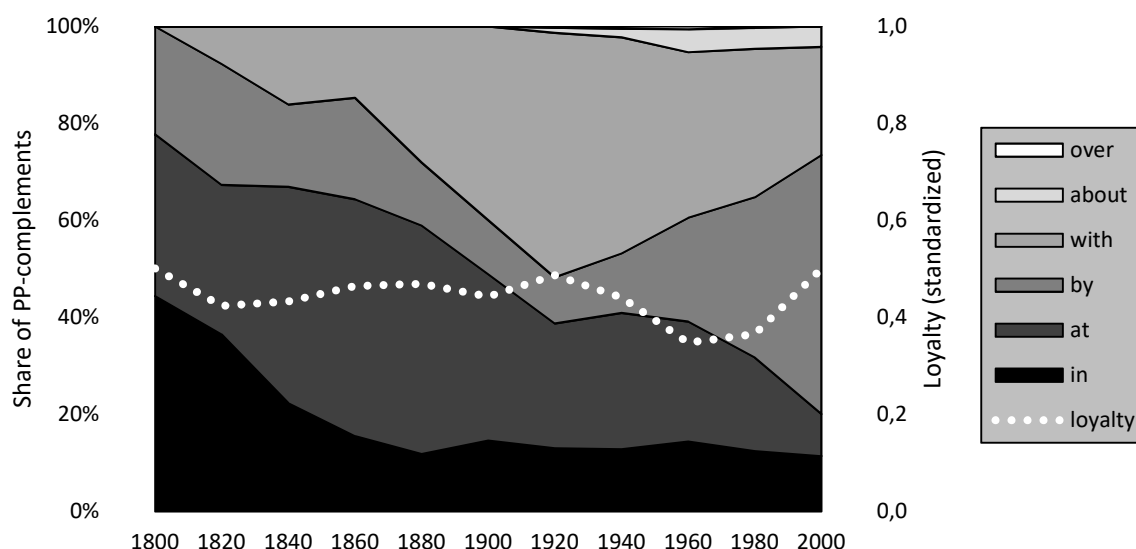


Figure 2. The PP-complements of *disappointed* over time (HC)

What can be learned from this? It is obvious from Figure 2 that *disappointed* has (as far as the data set goes) been a promiscuous adjective from the start and has over a period of two centuries shown no noticeable inclination towards mending its ways. A standardized loyalty score⁷ has been superimposed on the plot, confirming this general impression. The loyalty score rises somewhat in periods during which a single PP-complement dominates the distribution (*in*-complements in the 1800s, *at*-complements in the 1880s, *with*-complements in the 1920s, *by*-complements in the 2000s) but there is no overall trend towards increasing or, for that matter, decreasing loyalty. This is despite the fact that there has actually been a lot of change going on. The distributional profile of *disappointed* by the 2000s has changed markedly compared to what it looked like in the 1800s. Yet, the ideal of one-to-one mappings between form and function remains about equally far removed. The history of *disappointed*, then, is far from supporting the idea that languages might strive to get rid of variation over time. It could be countered that the variants might be expressing useful functional contrasts, but in light of the constant turnover in the preferred PP-complement type – from *in*, to *at*, to *with*, to *by* – this too is, at face value, doubtful.

While this again confirms the naturalness of variation, there is something remarkable about the variation. The distributional behaviour of *disappointed* in Present-day English was found to be extreme, in that *disappointed* has the lowest loyalty score of all of the 56 adjectives documented in the BNC data set. It is therefore somewhat surprising that this property is diachronically stable. After all, extreme values tend, statistically, to be short-lived. One could say that *disappointed* just seems to be the kind of adjective that attracts variation. But this comes down to saying that there must be a linguistic property

⁷ The loyalty score was calculated as explained in Section 5.1, footnote 6, and then standardized so that maximal loyalty corresponds to 1 (= exclusive selection of a single PP-complement) and minimal loyalty to 0 (= equal selection rates for all PP-complements).

of *disappointed* or of the overall system of PP-complementation with emotion adjectives that is responsible for the variation observed. In terms of the matching problem, one could speculate that the set of PP-complements just does not offer an ideal match for *disappointed* – or that it offers too many acceptable matches.

This need not be far-fetched. As an emotion adjective, *disappointed* has a comparatively complex semantic structure, as it involves negative feelings towards an object that had fostered positive feelings of hope or anticipation before but somehow failed to meet expectations. Such a complex semantic structure makes it difficult to semantically relate *disappointed* to other emotion adjectives. That is, it contains elements of meaning also found in the semantics of other adjectives, such as an implicit change of state (as in *upset*), an element of surprise (as in *alarmed*), and an element of negative feeling (as in *unhappy*), but it is nevertheless semantically dissimilar from any of those adjectives. As a result, it defies semantic classification and, by the same token, semantically-based PP-complement selection. In other words, *disappointed* may well have a sensible linguistic excuse for being promiscuous.⁸

If it is reasonable to suspect linguistic motivation in the prolonged state of extreme variability characterizing the distributional behaviour of *disappointed*, it also makes sense to see linguistic motivation in at least some of the specific changes that the distributional behaviour of *disappointed* underwent. Given no very strong propensity towards any specific PP-complement type, changes taking place elsewhere in the system may be enough to tilt the balance in favour of one complement-type or other in the context of *disappointed*. For example, the modest rise in *about*-complements from the 1920s to 1960s echoes an overall rise of *about*-complements with emotion adjectives and a more general simultaneous increase in the frequency of *about* across the board.⁹ This means that the appearance of *about*-complements with *disappointed* is really no coincidence. *About*-complements became more strongly entrenched, hence more easily available for selection, and *disappointed* – never picky when it comes to complement selection – welcomed the newcomer.

As another example, the increasing use of *by*-complements with *disappointed* could be linked to changes in the semantics of the corresponding verb *disappoint*. As an emotion adjective, *disappointed* marks a state resulting from dashed hopes or frustrated anticipation. As a verb, however, *disappoint* is polysemous. It can take an animate object and then typically has a causative meaning, ‘cause (someone)

⁸ I suspect a somewhat similar argument could be mounted to explain why there appears to be so much variation in the domain of PP-complementation with emotion adjectives (assuming that the variation described above is indeed extreme). Arguably, when combining with emotion adjectives, the original spatial ‘core’ semantics of prepositions are so attenuated that they do not produce reliable distributional predictions.

⁹ An automatic query in the HC for *about*, preceded by any of the adjectives found to combine with *about*-complements in Figure 1 above, shows that emotion adjectives with *about* were very infrequent before 1860 (with normalized frequencies below 2pmw), began to rise slowly from the 1860s onwards to just under 10pmw in the 1910s, then rose sharply between the 1910s and 1970s, to level again around 160pmw in the 1980s to 2000s. This development parallels an overall simultaneous rise in the frequency of *about* in the HC, from 316pmw in the 1800s to 882pmw in the 1910s (steady but slow increase), then suddenly to 2,729pmw in the 1970s (sharp rise), to end at 2,876pmw in the 2000s (stabilization).

to feel disappointed’, as in (13a). But it can also take an inanimate object and mean ‘fail to live up to (hopes, expectations)’ or ‘defeat, frustrate (plans)’, as in (13b–c).

- (13) a. There is one omission in the address which I own has a great deal **disappointed** me (1805, HC)
- b. Would the commons of England disregard the opinions, and **disappoint** the expectations of the people? (1805, HC)
- c. the bill could properly be denominated inefficient, because it was professedly to raise 27,000 men immediately, and it had wholly **disappointed** this design (1805, HC)

In Present-day English, the causative use in (13a) is most common, but in 19th-century English the non-causative uses in (13b–c) dominated. That the causative use became the default meaning of the verb *disappoint* implies that the semantic link between the passive form of the verb and the emotion adjective was strengthened (increasingly, the subject of the adjective aligns to the patient argument of the verb). As adjective and passive verb gravitated towards each other, the PP-type common to both began to receive stronger grammatical support and the frequency of *by*-complements with *disappointed* increased.

In sum, the history of *disappointed* gives little occasion to believe that the language system strives to maintain subtle semantic contrasts or to suppress needless variation. In that respect, language appears to have no drive towards functional optimization. Nevertheless, the history of *disappointed* suggests that both variation and change may arise for system-internal reasons. This in turn points to the kinds of linguistic motivation that really underlie the use of near-synonymous variants. At least in part, the use of specific variants with *disappointed* and other emotion adjectives is motivated by the network of associative relations between complex patterns, such as the semantic similarity relations between emotion adjectives, the morphological relations between adjectives and the forms from which they are derived, or the formal relation between past participial adjectives and passives. Broadly speaking, such relations can be labelled analogical, because they primarily depend on similarity. Motivation then resides in the fact that, by analogy, similar treatment is given to similar things. Because this is a form of cognitive efficiency (cf. Rosch 1978), it is fundamentally a functional principle.

6. Concluding remarks

The preceding discussion does not – and was not meant to – offer a conclusive analysis of the system of emotion adjectives and PP-complements. For this particular domain of grammar, the corpus analysis gives a detailed picture of where variation occurs, but without delving into the various factors that drive the selection of specific variants. It also hints at semantically motivated patterning, but without going into any great detail. What I hope the discussion makes clear, however, is how Variationist and Functional approaches might both benefit from taking into account grammatical context, and how this can eventually also help to reconcile both types of approach.

Even in the face of rampant variation, there is no reason to give up the Functionalist premise that linguistic structure is motivated. Only, what is motivated in variation is primarily the existence of the variants – not the semantic contrasts they code. While such contrasts will always exist, they need not be the *raison d'être* of the variation. Rather, variants can be thought of as coding solutions speakers come up with as they draw on their grammatical resources. Variation arises because grammars offer multiple near-equivalent solutions to the same coding problem. Even if variation observed in a given grammatical context appears redundant or excessive, each of the individual variants is likely to be a grammatically well-motivated structure, because they are somehow analogous to coding solutions that have been relied on under similar circumstances. Still, one could wonder why the grammar over-generates solutions – one solution would do, why have many? In fact, the abundance of solutions may in itself be communicatively efficient, particularly from the point of view of the speaker, who faces the problem of efficiently coding experience into an intelligible linguistic form. Just as a (coding) solution is more effective if it can be depended on to solve more than one problem, as in cases of polysemy, it is generally easier to solve a (coding) problem if it allows more than one solution, as in cases of variation. On this view, variation is natural *because* it is functional.

Once variation is thought of as linguistically motivated, it begins to make more sense to also think of change as being linguistically motivated. Language change is sometimes equated with the social propagation of a linguistic variable. However, in a system that exhibits hypervariation, instability is likely to be inevitable and perpetual, because any change in one variable context will also affect other variable contexts, in an unending cascade of linguistic causes and consequences. This is of course not to deny that social forces can interact with this, or that innovations, in order to become conventionalized, must spread across a speech community. But those facts do not preclude the possibility that the structure of grammar itself creates conditions that may be favourable or unfavourable to specific changes, or that change in one domain may interact with developments in other areas of the language. Variation and change are so interwoven that if there is linguistic motivation in variation, there must also be linguistic motivation in change.

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