

The place of prototypicality in corpus linguistics: Causation in the hot seat¹

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Abstract

This paper seeks to define prototypical causation as applied to English periphrastic causative constructions. More precisely, it compares three models of prototypical causation described in the literature with the most frequent types of constructions found in corpus data. It is shown that, on the whole, and despite some reconciling factors, linguistic frequency does not coincide with (what is presented in the literature as) cognitive salience. A number of hypotheses are put forward to explain this discrepancy, all of which underline the need to investigate the notion of prototypicality more thoroughly.

Key words: prototypicality, causation, cognition, salience, corpus, frequency.

1. Introduction

The notion of prototypicality lies at the heart of cognitive linguistics. As Geeraerts (1988: 207) nicely puts it, “[p]rototype theory is as it were part of the prototypical core of the cognitive paradigm in semantics, particularly in lexical semantics”. So much so, in fact, that prototypicality has come to be used in different senses and has become some sort of “catch-all notion” (Wierzbicka 1985: 343), a label under which diverse phenomena have been lumped together (Geeraerts 1989: 606). In particular, cognitivists tend to consider the prototype as the cognitively most salient exemplar, while corpus linguists often equate it with the most frequently corpus-attested item (cf. Stubb’s (2004) equation of ‘prototypical’ and ‘high frequency’ exemplars). Most of the time, the (often implicit) assumption is that the two coincide with one another. Yet, some voices have risen to claim that corpus linguists and cognitivists examine different things when they study frequency and salience, respectively (e.g. Shortall, in preparation; see later). Taking causation as a starting point, I will compare the models of cognitive salience found in the literature with the most frequent patterns as attested in corpus data. More precisely, I will investigate how English periphrastic causative constructions (i.e. constructions such as *He makes me laugh* or *I had my watch repaired*) behave according to these two definitions of prototypicality.²

After giving an overview of the way prototypicality was born and later extended to the field of linguistics, I will present three models of prototypical causation, one concerning the ordering of the participants, and two describing their

nature. I will also show how corpus data reflect the notion of prototypicality, and how they have indeed been used as a tool to pinpoint prototypes. Using data from the British National Corpus (BNC), I will then investigate the link between prototypical causation and frequency in authentic language. This analysis will lead me to some concluding remarks on prototypical causation and on the nature of prototypicality itself.

2. The notion of prototypicality

The notion of prototypicality originated from the field of psychology, mainly in the work of Eleanor (Heider) Rosch. Through various experimental tests, she established the existence, within a category, of more representative and less representative members. Thus, a robin is considered a better example of the bird-category than a penguin or a bat, and a chair, a better example of the furniture-category than a telephone (see Rosch 1975). The most representative member of a category is called the prototype,³ i.e. “the best, clearest and most salient exemplar among the members of a category and [serving] as a kind of cognitive reference point with respect to which the surrounding, ‘poorer’ instances of the category are defined” (Radden 1992: 519-520). As demonstrated by Rosch, prototypes have particular features. They are acquired earlier by children, tend to be produced more rapidly in naming tasks, are perceptually more salient (see Rosch’s experiments on focal vs. non-focal colours; Heider 1971, 1972) and are more easily memorised (cf. her experiments on square-like shapes among the Dani, a non-Westernised culture in Papua New Guinea; Rosch 1973).

The emergence of prototypicality has revolutionised the conception of categorisation.⁴ While the classical, so-called Platonic view preaches the discreteness of categories and the existence of a limited set of necessary and sufficient properties defining them (see Givón 1986), cognitivists claim that natural categories contain good and less good examples, which possess a larger or smaller number of characteristic properties. To illustrate this with a classic example (Fillmore 1977: 68-69), a “bachelor” is defined, in the classical perspective (or “checklist theory of meaning”, see Fillmore 1975), by the properties [+ male] and [+ single], which are both necessary (a person must have these two properties to be called a bachelor) and sufficient conditions (a person need only have these two properties to be called a bachelor). In the cognitive perspective, on the other hand, the bachelor-category is organised around a prototype, namely a 30-year-old single man who has not yet married, but it includes other, more marginal members (e.g. a baby boy, a pope or a divorced man).

While the notion of prototype was first used with reference to concrete objects (furniture, vehicles, colour chips, etc.), and then with respect to the meaning of words (cf. “bachelor”), it was later “extended to additional levels of linguistic representation” (Tsohatzidis 1990: 2). One of the first attempts to describe a prototypical linguistic category is Hopper & Thompson’s (1980) study of transitivity. Whereas transitivity is traditionally characterised by the presence of a direct object, Hopper & Thompson regard it as a continuum and claim that clauses can be ranked according to their degree of transitivity. Their hypothesis is that transitivity is the result of the combination of a number of parameters (number of participants, affirmation, mode, individuation of the object, etc.). The more

features a clause has, the more transitive it is, and the closer it is to what Hopper & Thompson call “cardinal Transitivity”.

Similarly, Taylor (1989) demonstrates the pervasiveness of prototypicality in linguistic categorisation. The past tense, for example, is primarily used “to locate an event or state at some point or period in time prior to the moment of speaking (or writing)” (Taylor 1989: 149) – as its name indicates. Nevertheless, it has at least two other meanings in English, viz. counterfactuality, as in *if*-conditionals or suppositions, and “pragmatic softening”, e.g. *Excuse me, I **wanted** to ask you something* (Taylor 1989: 149-151). The reference to past time is the prototypical use of the past tense, while the other two meanings are more peripheral.

Syntactic constructions too exhibit prototype effects (Taylor 1989: 197-221; see also Taylor 1998 and Winters 1990). To give but one example, the central use of the possessive genitive “identifies one entity, the ‘possessed’, with reference to its possession by another, the ‘possessor’” (Taylor 1989: 202), e.g. *John’s house*. The other uses somehow diverge from this central sense. In *the dog’s bone*, the possessor is non-human and therefore non-prototypical. In *the secretary’s typewriter* (meaning “the typewriter assigned to the secretary for regular use”), the rights of the secretary to use the typewriter are only limited, thus differing from a prototypical construction such as *John’s car*, where John has unlimited rights over the car.

Besides this extension to more abstract categories, studies have also revealed the prototypical organisation of apparently discrete categories such as odd numbers or squares, for which informants acknowledge the existence of good and less good examples (Armstrong et al. 1983, Fehr & Russell 1984).

3. Prototypical causation

Causation, like other abstract concepts, has been described in the cognitive literature in terms of prototypicality. Here, we will see how these descriptions can be applied to periphrastic causative constructions. A distinction will be made between two aspects of prototypical causative constructions, viz. the ordering of the different elements that make up the construction and the nature of these elements. Note that, while these two aspects examine fundamentally different things, it will be shown that there is actually considerable overlap and that the presence of prototypical participants⁵ almost always implies prototypical ordering.

3.1. Ordering of the participants

The definition of the prototypical ordering of the participants in a causative construction is based on the principle of iconic sequencing (see e.g. Haiman 1985: 91), which establishes a relationship between the ordering of the linguistic elements and the sequence of events as we mentally conceive them. This principle, for example, accounts for the oddity of a sentence such as *He poured himself a glass of wine and opened the bottle*, taken from Ungerer & Schmid (1996: 251), where the ordering of the linguistic elements does not reflect the sequential order of events in reality or, for that matter, events as we mentally conceive them.

A periphrastic causative construction can be described as an action chain

(Langacker 1991: 283), as shown in Figure 1, where a “head”, the CAUSER, transmits its energy to a second entity, the CAUSEE, which can consume the energy or transmit it further to a third entity, the PATIENT, which absorbs the energy and thus represents the “tail” of the action chain (as indicated by the jagged arrow in Figure 1). The two cases can be illustrated, respectively, by:

- (1) That’s my fear coming, that’s what **makes** me run away from her <BNC:S:KBX 625>
- (2) Or **get** your father to run us out and taxi back. <BNC:S:KE6 9074>

The transmission of energy can also be of a more symbolic nature, as in:

- (3) It has become common form to invoke the magic names of the French theorists, as if the names alone would **cause** a torpid academic establishment to collapse. <BNC:W:A1A 172>

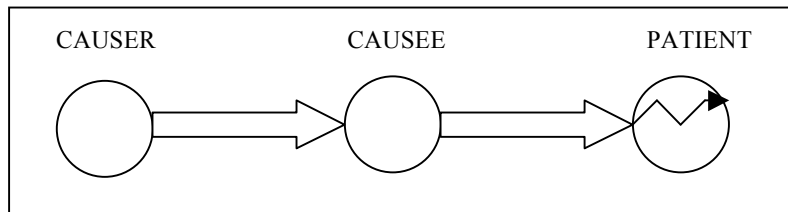


Figure 1. Action chain of a periphrastic causative construction with a PATIENT

Following the principle of iconic sequencing, the most likely ordering of the linguistic elements in a periphrastic causative construction is CAUSER, CAUSEE and PATIENT, if any, since it reflects the ordering of the participants along the action chain. A sentence such as *I got him to close the door* is therefore more prototypical than one such as *He was made to close the door*, which begins with the CAUSEE, or *I had the door closed (by him)*, where the CAUSER is followed by the PATIENT.⁶

3.2. Nature of the participants

The second aspect of prototypicality concerns the nature of the different elements making up the causative construction. The cognitive literature contains two major definitions of prototypical causation, viz. “billiard-ball causation” and “direct manipulation”.

The billiard-ball model is to be linked to the notion of action chain, as it represents the flow of energy from one object to another. More precisely, Langacker (1991: 13) explains this model as follows:

We think of our world as being populated by discrete physical objects. These objects are capable of moving about through space and making contact with one another. Motion is driven by energy, which some objects draw from internal resources and others receive from the exterior. When motion results in forceful physical contact, energy is transmitted from the

mover to the impacted object, which may thereby be set in motion to participate in further interactions.

Brugman (1996: 33) refers to billiard-ball causation as the “typical” model of causation. Along the same lines, Itkonen (1983: 18) defines the “paradigmatic type of causation” as “an object A colliding with an object B and making it move in a way it would not otherwise have moved”. Talmy’s (2000: 418) definition of prototypical causation, which he calls “onset causation of motion” and which is illustrated by (4), seems to subscribe to the billiard-ball model as well.

- (4) The ball’s hitting it **made** the lamp topple from the table.

Put simply, the model of billiard-ball causation can be expressed as follows:⁷

BILLIARD-BALL CAUSATION

A single, specific, physical CAUSER transmits energy to a single, specific, physical CAUSEE, which can absorb the energy or transmit it further to a single, specific, physical PATIENT.
 e.g. *The rolling circle causes the central circle to rotate.*
The tree falling on it made the lorry lose its loading.

The second type of prototypical causation is that of direct manipulation, described by Lakoff & Johnson (1980: 69-76) and Lakoff (1987: 54-55) as a cluster of the following interactional properties:

- 1) There is an agent that does something.
 - 2) There is a patient that undergoes a change to a new state.
 - 3) Properties 1 and 2 constitute a single event; they overlap in time and space; the agent comes in contact with the patient.
 - 4) Part of what the agent does (either the motion or the exercise of will) precedes the change in the patient.
 - 5) The agent is the energy source; the patient is the energy goal; there is a transfer of energy from agent to patient.
 - 6) There is a single definite agent and a single definite patient.
 - 7) The agent is human.
 - 8)
 - a) The agent wills his action.
 - b) The agent is in control of his action.
 - c) The agent bears primary responsibility for both his action and the change.
 - 9) The agent uses his hands, body, or some instrument.
 - 10) The agent is looking at the patient, the change in the patient is perceptible, and the agent perceives the change.
- (Lakoff 1987: 54-55)

The examples that exhibit all ten properties are the most prototypical ones (cf. Lakoff’s examples: *Max broke the window*, *Brutus killed Caesar*). Those that lack a number of characteristics are less prototypical. This is the case of, say, non-human agency or involuntary causation, but also of periphrastic causative

constructions, which fail at least property 3.⁸ In order to apply to periphrastic causative constructions, however, Lakoff's list of ten properties has to be slightly adapted. The main change has to do with the nature of the second participant (what has here been called the CAUSEE), which is both agent and patient. In *The teacher made Susan read the book*, Susan is affected by the teacher's action (an affected state which is indicated by the grammatical case of the pronoun, if any, cf. *The teacher made her read the book*), but she also performs an action herself by reading the book. As can be expected from this agentive nature, and as confirmed by other scholars (e.g. Kemmer & Verhagen 1994: 129), the prototypical CAUSEE should be human, resulting in "person-to-person" causation (Goldsmith 1984: 126). As for the PATIENT, it is optional in periphrastic causative constructions (compare *The teacher made Susan read the book* and *The teacher made Susan laugh*).⁹ Finally, although it is implicit in Lakoff's definition of prototypical causation (cf. "There is a single definite agent **and** a single definite patient"), it should be emphasised that the participants should be distinct from one another. (5) is more prototypical than (6), where the CAUSEE takes the form of a reflexive pronoun (*myself*), or (7), where the CAUSEE, albeit not mentioned, is co-referential with the CAUSER ("I'll get myself to do my geography project").

- (5) So *he* **got** *you* to move it in the end? <BNC:S:KCY 363>
- (6) I wanted to get ready to come away but *I* **made** *myself* sit and really give him time. <BNC KBF 952>
- (7) Then *I*'ll **get** my geography project done, I can't do anything until I've got this bloody project out the way, can I? <BNC KCE 6364>

The model of direct manipulation can therefore be expressed succinctly in the following way:

DIRECT MANIPULATION

A single, definite, human CAUSER manipulates a single, definite, human CAUSEE, distinct from the CAUSER, into producing a volitional and material EFFECT, which can affect, or not, a single, definite and distinct PATIENT.

e.g. *I'll **make** her go up there.*

*I **got** John to repaint the wall.*

3.3 Foundations of prototypical causation

Up to now, the three prototypical models presented above have been taken for granted and their origins have not been questioned. Yet, a close look at the literature reveals that the exact nature of these models is far from clear. True, they seem to rely on some deeply-rooted (and elsewhere demonstrated) cognitive principles, such as the primacy of the concrete over the abstract in neural representations (see MacLennan 1998). But on the whole, the sources of prototypical causation as it is described in the literature remain rather obscure. Lakoff (1987: 55) vaguely refers to "representative examples of *humanly relevant* causation" [emphasis added] and Lakoff & Johnson (1980: 75) maintain that their

model of direct manipulation “emerges directly from our experience”, but there does not seem to be any experimental basis for their claims.¹⁰ The same holds true for the billiard-ball model, which Langacker (1991: 13) simply introduces with the words “we think of our world as...”.

When we move from a purely cognitive approach to a more corpus-based cognitive approach, the establishment of the prototype apparently has stronger empirical foundations, relying as it does on the frequency of linguistic items in naturally-occurring language. Kemmer (2001) and Stefanowitsch (2001), for instance, both seem to equate the notion of prototypicality with what is most frequent in their corpus data.¹¹ Contrary to Langacker or Lakoff, they do not seek to define prototypical causation as a whole, but the prototypical *have*-causative, the prototypical CAUSEE in *make*-constructions, etc. However, it may reasonably be assumed that what is true of (the elements making up) the causative constructions equally applies to causation itself. In other words, we may hypothesise that what is presented as prototypical causation in the literature corresponds to causation as it is most frequently expressed in authentic language. This is what will be explored in the next sections.

4. Prototypicality and corpus linguistics

4.1 Fuzziness of corpus data

“[I]f there is one lesson to be learnt from studying and analysing corpus examples”, Mair (1994: 128) points out, “it is the ‘basic non-discreteness of categories’” (see also Teubert 1996: v). Before use was made of authentic data in the form of large machine-readable collections of texts, linguistic categories were largely presented as clear-cut and well-defined. Corpus linguistics, however, by confronting linguists with large quantities of real data, revealed the fuzziness of category membership in language, as well as the prevalence of continua, as opposed to dichotomies. The difference between animacy and inanimacy (Yamamoto 1999), for instance, or between nouns and pronouns (Sugamoto 1989) turned out to be best described as a cline, and even the (apparently) fundamental distinction between lexis and grammar was shown to be invalid (cf. the concept of “lexico-grammar” found in e.g. Sinclair 1991). This radical shift, made possible by the advent of corpus linguistics, can be summarised by quoting Čermák (2002: 273; emphasis original), who notes that

the historical scarcity of data (...) evoked the impression that language data is comfortably discrete and of an entity-like quality. What huge corpora show is rather different: most of the information is scalar, obtainable in stepwise batches with hazy edges only, where the best help available is often statistics and fuzzy approaches and no longer black-and-white truths and clear-cut classification boxes. To put it differently, instead of insisting on getting straightforward answers of the *yes-no* type we have to elicit answers of the type *rather this than that*, or *more of this and less of that*.

So it seems as if, almost by definition, corpus data reflect the cognitive notion of prototypicality, with some elements more representative of a linguistic category

and others, more marginal.

4.2. Link between prototypicality and frequency

Some linguists have elevated the link between corpus data and prototypicality to the status of principle. Thus, Schmid (2000: 39) proposes the “From-Corpus-to-Cognition Principle”, according to which “frequency in text instantiates entrenchment in the cognitive system”. Put differently, what is most frequent in language is claimed to be most salient and so, most prototypical (remember Radden’s (1992) definition of the prototype as the “most *salient* exemplar”). Consequently, establishing a prototype would simply mean determining the most frequent exemplar of a category. Given the vagueness surrounding the term “prototype”, as well as the complexity involved in testing linguistic prototypicality experimentally (how does one get people to judge the “goodness-of-example” of, say, a particular transitive clause?), it comes as no surprise that frequency in linguistic usage has regularly been used as a methodological shortcut to establish the prototype. In his study of two Dutch verbs, for example, Geeraerts (1988) examines the actual facts of language in an attempt to uncover the quantitatively most prominent, and so most salient, kinds of usage.

The role of frequency in prototypicality cannot be denied. Aitchison (1998: 229), referring to Rosch’s (1975) experiments, which were carried out in California, notes that, since nectarines and boysenberries are more common in California than mangoes or kumquats, it is not surprising that the former were regarded by informants as more representative of the fruit-category than the latter. No doubt the results would have been different if the experiments had taken place, say, on the African or Asian continent. Geeraerts (1988: 221-222), giving a similar example, goes even further and establishes a link between *linguistic* frequency (not just *referential* frequency) and prototypicality. Nectarines being more common than mangoes in California, people are more likely to talk about the former – hence a higher linguistic frequency. Frequency of linguistic occurrence, therefore, can be seen as a “heuristic tool in the pinpointing of prototypes” (Geeraerts 1988: 222) – which, incidentally, seems to be confirmed by Geeraerts’s results.

However, not everybody agrees that cognitive salience is reflected in linguistic usage. Shortall (in preparation) points out that, while all language users have prototypes about aspects of language use, these may conflict with the evidence of what is most frequent. He illustrates this with the example of *there*-constructions. Whereas in elicitation tasks people tend to produce sentences with a concrete noun, e.g. *There is a book on the table* (about 60% of the cases), in the British spoken section of the Bank of English, abstract nouns are predominant (59%). Similarly, Sinclair (1991: 36) notes about common words that, as a rule, “the most frequent meaning is not the one that first comes to mind”. This hypothesis is confirmed by other studies which compare the results of elicitation tests, aimed at bringing to light the most salient elements (i.e. those that first come to mind), and the results of corpus analyses, revealing the most frequent kinds of usage, and which come to the conclusion that the two do not necessarily coincide with one another (see e.g. Roland & Jurafsky 2002; Nordquist, 2004). And Aitchison (1998: 229) herself, although she notes the link between frequency and prototypicality (see above), suggests that word frequency does not explain

everything, as appears for instance from the fact that rare items such as “love seat” or “davenport” rate higher on Rosch’s (1975) furniture list than a more common item like “refrigerator”. The next section seeks to provide an answer (if only partial) to the question of the relation between frequency and prototypicality with respect to the phenomenon of causation in English.

5. Prototypical causation in corpus data

5.1 Material used

The corpus data against which the cognitive models of prototypical causation will be compared consist in a 10-million-word subcorpus from the British National Corpus (5 million words of spoken English and 5 million words of written English). All the constructions with the main periphrastic causative verbs (*cause*, *get*, *have* and *make*) were extracted, which represents a total of 3,574 constructions (see Table 1). Each of these constructions was analysed according to the parameters defining prototypical causation, and summarised in Table 2.¹²

Table 1. Absolute frequency (n) and relative frequency (per 100,000 words) of the causatives

	N	Relative Frequency
<i>CAUSE</i>	200	2.04
<i>HAVE</i>	813	8.29
<i>MAKE</i>	1,251	12.76
<i>GET</i>	1,310	13.36
TOTAL	3,574	36.46

The analysis presented in the next section relies on a strict definition of prototypicality, according to which prototypical members should manifest *all* the prototypical features (see Cruse 1990: 391). If the data pass this extreme test, we can be sure that the models have empirical validity. If they fail, it might be that a looser definition would produce better results, a possibility that will be briefly discussed in Section 5.3.

5.2 Results

Table 3 gives the results for the three models of prototypical causation presented in Sections 3.1 and 3.2. Before going on to the discussion of these results, let us underline a point that does not appear from this table, viz. the large degree of overlap between iconic sequencing on the one hand and the models of billiard-ball causation and direct manipulation on the other hand. A causative construction displaying one of the two last mentioned models almost always displays iconic sequencing too. There are just two exceptions in the data, namely (8) and (9), which use the model of direct manipulation, but whose participants are not ordered

Table 2. Parameters of the models of prototypical causation

	Iconic Sequencing	Billiard-Ball Model	Direct Manipulation
CAUSER	1 st participant	- single - specific - physical	- single - definite - human
CAUSEE	2 nd participant	- single - specific - physical	- single - definite - human - distinct from CAUSER
(PATIENT)	(3 rd participant)	(- single - specific - physical)	(- single - definite - distinct from CAUSER and CAUSEE)
EFFECT		- material	- material - volitional
CLAUSE		- affirmative	- affirmative

iconically.

- (8) Our period opens with the imperial coronation of 962; shortly after its close, in 1165, Frederick Barbarossa **had** Charlemagne canonized by his anti-pope Paschal III. <BNC:W:BMV 1285>
- (9) I **had** it [hoe] <pause> sharpened by Hector <BNC:S:KC0 6551>

Taking this overlap into account, we can say that the models of prototypical causation presented in the literature only account for some 45% of all the causative constructions (1,632 out of 3,574), which leaves about 55% of the data unaccounted for (i.e. exhibiting neither prototypical ordering, nor prototypical participants) – constructions such as (10), where the participants (CAUSER and CAUSEE) are neither human beings nor physical objects, or (11), which starts with the CAUSEE and whose EFFECT is neither material nor volitional.

- (10) The regulation of population density can only be a consequence of migration, not the reason why natural selection **causes** the habit to evolve. <BNC:W:GU8 672>
- (11) At the same time, the reader can be **made** to feel that, on closer inspection, the country's politics might prove to be antics too. <BNC:W:A05 70>

So clearly, these models do not seem to be fundamental organising principles in naturally-occurring language. This is particularly true of the billiard-ball model which, with a percentage of 0.06%, is insignificant in the data, and the model of direct manipulation, which represents a proportion of some 5% only.

Table 3. Models of prototypical causation in corpus data

	Iconic Sequencing		Billiard-Ball Model		Direct Manipulation	
	N	%	N	%	N	%
<i>CAUSE</i>	150	75.0	0	0.00	0	0.0
<i>HAVE</i>	133	16.4	0	0.00	17	2.1
<i>MAKE</i>	947	75.7	1	0.08	51	4.1
<i>GET</i>	400	30.5	1	0.08	121	9.2
TOTAL	1,630	45.6	2	0.06	189	5.3

A closer look at Table 3 also reveals a great deal of variation among the different verbs. Using the chi-square test, one can test the distribution for significance so as to determine which model of causation is correlated with which verb. With the exception of the billiard-ball model, which exhibits very low values and so cannot be tested for significance, the distribution of the other two models is highly significant ($\chi^2 = 504.03$ for iconic sequencing and 68.38 for direct manipulation¹³). While iconic sequencing significantly prefers *cause* and *make* and significantly disprefers *have* and *get*, direct manipulation significantly prefers *get* but disprefers the other verbs.

Let us now briefly comment on some of the most striking correlations between the verbs and the models of causation, starting with iconic sequencing and its significant dispreference for *have* and *get*.¹⁴ It is interesting to note that the non-canonical ordering with these two verbs is almost always coupled with the ellipsis of the CAUSEE. Sentences such as (12) and (13), where the CAUSEE is mentioned and follows the PATIENT, are very rare indeed (3 instances with *get* and 10 with *have*).

- (12) Marriages of persons over that age, but under 18, are completely valid; and the only check on such marriages without the consent of parents or guardians is the difficulty of **getting** them celebrated *by the clergyman or proper officer* without making a false declaration, which involves penal consequences. <BNC:W:ABP 384>
- (13) This stands for Cooperative Awards in Science and Engineering and erm under this scheme, a company erm can **have** a problem tackled *by a research student working in a university and erm a supervisor*, and indeed in this case, the input, the financial input, by the company may be quite small, may only amount to a few hundred pounds. <BNC:S:KRH 874>

This can be explained, especially in the case of *have*, by the common reference to established scenarios, e.g. the “hairdressing” scenario in (14), where the mention of the CAUSEE (here, a hairdresser) would be redundant.¹⁵ In the case of *get*, the ellipsis of the CAUSEE is mainly a result of its co-referentiality with the CAUSER, as in (15). Making the two participants explicit, here, would result in unnecessary repetition.

- (14) I just told them you’d **had** your hair cut really short <BNC:S:KC2 3072>

- (15) Sorry, I've nearly finished this. <pause> I'd like to **get** it done before I ...
<BNC:S:KB0 3215-3216>

Turning to the billiard-ball model of causation, it should be emphasised that this model is associated with the natural sciences (Lakoff 1987: 55) and is typically used to describe scientific experiments. We would therefore expect it to be most frequent with the verb *cause*, which is predominantly used in scientific and technical genres (over 50% of its occurrences, see Gilquin 2004). Yet, it appears from Table 3 that *cause* never expresses billiard-ball causation in the corpus data. While it shares a number of characteristics with this model, the main problem has to do with the semantic category of the participants, and more particularly that of the CAUSER. Most of the CAUSERS involved in a causative construction with *cause* refer to abstract entities (almost 80%), as in (16), whereas it will be remembered that according to the billiard-ball model, they should be concrete and physical objects, cf. (17).

- (16) *The importance and complexity of financial matters have **caused** special procedures to be evolved to deal with them.* <BNC:W:C8R 703>
(17) Some children get worried or feel uncomfortable because they fail to chew and then try to swallow *large lumps of food which **cause** them to gag and vomit.* <BNC:W:CGT 1363>

Get, *have* and *make*, by contrast, are hardly ever used in a scientific context (5% with *make* and less than 1% with *get* and *have*). Accordingly, *have* never expresses billiard-ball causation and *get* and *make* are only used once each with this model, see (18) and (19).

- (18) It's got a tube that would **make** the <pause> the other one go.
<BNC:S:KC1 1042>
(19) Yes, that should physically click on the pin to **get** the wire to connect.
<BNC:S:KD5 9113>

It is therefore obvious that, albeit regularly mentioned in the literature as a model of prototypical causation, the billiard-ball model may be said to have no impact in language usage.

The situation is slightly different for the model of direct manipulation, although, here too, the percentages of constructions corresponding to the model are surprisingly low, as illustrated in Table 3. They range from 2.1% with *have*, to 4.1% with *make* and 9.2% with *get*. *Cause* is never found with this model in the corpus data. The latter result mainly follows from the inanimacy of the participants in causative constructions with *cause*, as noted by e.g. Chuquet & Paillard (1989: 170). On the basis of the statements found in the literature with respect to the nature of the participants with the other three causatives, however, one would have expected these verbs to rate much higher. It is often claimed that *get* and *have* are used with animate participants only (see e.g. Belvin (1993: 64) for the CAUSER of *have*). And while a corpus analysis reveals some cases where the CAUSER or the CAUSEE is inanimate with *get* and *have* (see Gilquin 2004), these are indeed extremely infrequent. As for *make*, it is very often presented in the literature as implying coercion, on a par with *force* (e.g. Faure & Casanova 1968: 192, Werner

et al. 1990: 392), which makes it an ideal candidate for expressing direct manipulation. So how can we explain the low results exhibited by the corpus data for these three verbs? For *get* and *have*, the results should be seen in parallel with the remarks concerning iconic sequencing. As noted earlier, the two verbs tend to prefer a non-prototypical ordering of the elements, together with an ellipsis of the CAUSEE. Now, the model of direct manipulation requires that the CAUSEE should be single, definite, human and distinct from the CAUSER, but also, of course, that there should be a CAUSEE in the first place. Moreover, as already mentioned, *get* has this particular characteristic that the CAUSER is clearly co-referential with the (often implicit) CAUSEE, and hence non-prototypical, in 40% of the cases (as compared to 10% with *have*, 3% with *make* and 0% with *cause*), e.g.

- (20) Anyway, I'm going to get ready or we'll never **get** the shopping done before you go to work. <BNC:S:KB8 4041>

With *make*, the explanation for the low percentage of the model of direct manipulation essentially lies in the distorted picture that is given of this verb in the literature. Contrary to what is often suggested, the combination of an animate CAUSER, animate CAUSEE and volitional EFFECT, which underlies the meaning of coercion and the model of direct manipulation (see (21)), represents a proportion of 18% only. The most frequent combination, actually, is that of an inanimate CAUSER, animate CAUSEE and non-volitional EFFECT, as in (22).

- (21) At least by the eleventh century every king expected to recruit a part of his army by paying mercenaries, or from knights who received a fee not in land, but in cash; though he did his best to **make** his great nobles provide contingents for which he did not have to pay, or (at least in the twelfth century) pay him in cash if they did not serve him in person. <BNC:W:BMV 184>
- (22) Er I, I was going in the evening you know, doing the tailoring class but of course my <pause> illnesses have stopped me doing all of that and **made** me realize I can't do it all. <BNC:S:KBF 5023>

All in all, what this analysis shows is that the models of prototypical causation described in the cognitive literature account for an astonishingly small proportion of the corpus data. This conclusion, however, should be qualified in a number of ways, as will be shown presently.

5.3 Bridging the gap between prototypicality and corpus data

The first qualification has already been alluded to before and concerns the structure of the construction considered. An infinitive structure such as *He got me to open the door* is more likely to reflect one of the models of prototypicality than a past participle structure like *He had the door opened*. This is true, obviously, for the model of iconic sequencing, but also, to a certain extent, for the other two models, since in the second sentence, one of the participants, the CAUSEE, is left unmentioned and so cannot participate in the elaboration of the model. This explains why, for example, the proportion for the model of direct manipulation

with *get* rises from 9.2% to 26.6% if we only take infinitive constructions into account.¹⁶

Second, it should be reminded that the analysis of Section 5.2 relies on a strict definition of prototypicality, requiring the presence of *all* the prototypical features. If we accept a looser definition of prototypicality, where the prototype possesses the greatest number of features (but not necessarily all of them, see e.g. Givón 1986: 79), the picture changes somewhat, for it appears that, although the particular combination of elements making up the model may be infrequent, some of the individual properties can be quite common. As an illustration, let us examine how *make* fares with respect to the different parameters defining direct manipulation, disregarding the PATIENT (see Figure 2). We can see that, while some parameters represent a small proportion (cf. volitionality of the EFFECT), others, such as the distinction between the CAUSER and the CAUSEE or the definiteness of the CAUSER or CAUSEE, respect the model much better.

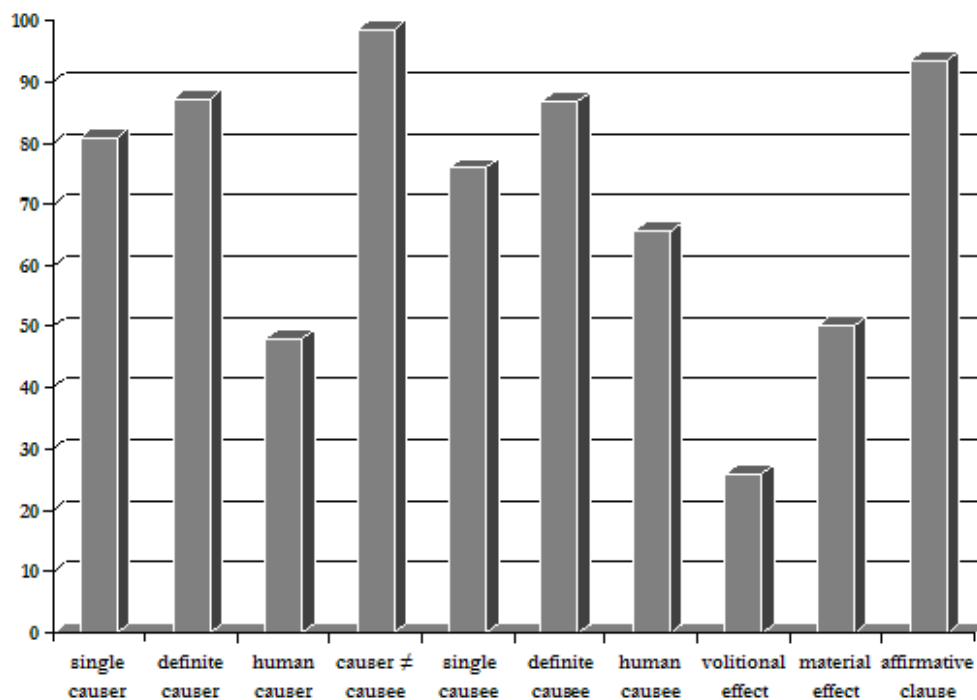


Figure 2. *Make* and the model of direct manipulation

The next step would be to determine whether all the parameters equally contribute to the model or whether some of them are more important than others, in which case a particular “weight” would have to be assigned to each parameter defining the prototype. This is what Gries (2003) undertakes in his analysis of the dative alternation. On the basis of corpus data and using the notion of “cue validity”,¹⁷ he mathematically identifies the attributes that most strongly support the choice of the ditransitive construction and those that most strongly support the choice of the prepositional construction. He also shows that the high cue validity of these attributes is confirmed by the results of an experiment where subjects were asked

to rate the naturalness of several instances of both constructions. Since we are not starting from the corpus data here, but instead are comparing the theoretical models against authentic language, and since the models as described in the literature do not assign any particular weight to the different parameters,¹⁸ this question will not be elaborated on.

Finally, medium also seems to play a role in the establishment of prototypical causation, at least as far as the nature of the participants is concerned (iconic sequencing shows no such variation). A comparison of spoken and written corpus data reveals a number of significant differences, as illustrated in Figure 3 for the model of direct manipulation with *make*, with a tendency for speech to come closer to prototypicality than writing. Thus, human CAUSERS and human CAUSEES are significantly more frequent in speech than in writing ($\chi^2 = 11.96$ and 30.97 respectively, $p < 0.005$)¹⁹ and the ‘single CAUSEE’ and ‘definite CAUSEE’ parameters display a marginally significant difference ($\chi^2 = 6.78$ and 7.66 respectively, $p < 0.01$). No parameters rate significantly higher in writing than in speech.

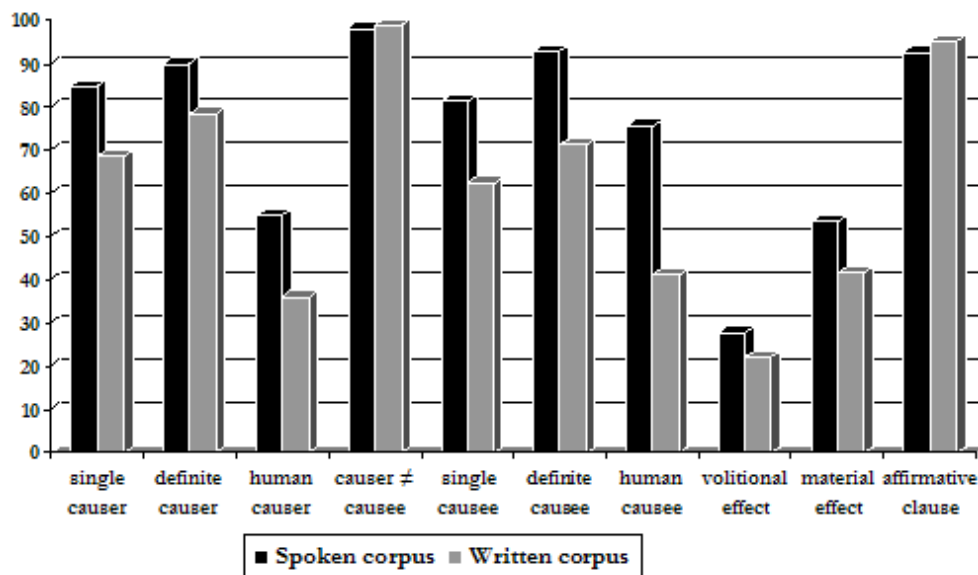


Figure 3. *Make* and the model of direct manipulation in spoken and written corpus data

While these elements bridge the gap between prototypicality and frequency to some extent, it is nonetheless true that what is presented in the literature as prototypical causation does not account for a large proportion of the use of causative constructions in authentic language. This discrepancy calls for an explanation, which I will try to offer in the next section.

5.4 Interpretation

A number of hypotheses can be put forward to explain the lack of correspondence between the literature and the corpus data. The first one is that cognitive salience

(i.e. “prototypicality”) is simply different from frequency in language. What comes first to people’s minds may rely on principles, such as the primacy of the concrete over the abstract, which are not at work (or, at least, not to the same extent) in language usage. Several studies have already been alluded to which seem to point in that direction, and preliminary investigations carried out on causative constructions actually confirm this (Gilquin 2004). But the same investigations also show that informants’ elicited production of a causative construction does not reflect the models found in the literature either, which suggests a problem with the models themselves.

Another hypothesis, therefore, is that the models proposed in the literature are not valid descriptions of prototypical causation. It will be reminded that these models do not seem to have any experimental foundation and, given the haziness surrounding their origins, we may assume that they (partly) rely on their authors’ intuition. Now, one thing that corpus linguistics has clearly brought to light since its advent is the limitations of intuition – whether it comes from linguistically naïve people or from the most competent linguists.²⁰ So perhaps the models of iconic sequencing, billiard-ball causation and direct manipulation are just theoretical constructs that do not correspond to anything concrete in the English language.

Alternatively, these models may not be appropriate for the description of periphrastic causative constructions. The phenomenon of causation can be expressed through a wide variety of linguistic devices and these may not all exhibit the same prototypical properties. The model of direct manipulation, for example, had to be adapted in order to apply to periphrastic causative constructions and Lakoff (1987: 54-55) himself, although he mentions the periphrasis *cause to die*, quotes as typical examples of direct manipulation the sentences *Max broke the window* and *Brutus killed Caesar*, both of which contain a lexical causative. On the basis of these two examples, and taking the reasoning one step further, maybe Lakoff’s model can be said to describe prototypical transitivity, rather than prototypical causation.²¹ Causation has often been compared, sometimes confused, with transitivity (e.g. Croft 1994). Kemmer & Verhagen (1994) establish a correspondence between transitive clauses and what they call “intransitive causative constructions” (i.e. periphrastic causative constructions with an intransitive EFFECT, e.g. *I made Mary cry*) and the description they give of the prototypical transitive event is indeed very similar to the models of prototypical causation that have been used here, the main difference being the presence or not of an intermediate participant.²²

[The prototypical transitive (or two-participant) event] has an agentive participant, that is, a highly individuated entity capable of volition, and volitionally exerting physical energy on a second participant, which is also a highly individuated participant. This participant absorbs the energy, whereby it undergoes a change of state that would not have taken place without the exertion of energy. The effect on the second participant is direct, that is, there are no observed intermediaries such as a third participant; the effect is complete; there is physical contact between the two participants; and this contact is seen as giving rise to the change of state. (Kemmer & Verhagen 1994: 126)

If the models of prototypical causation found in the literature do not characterise causation *per se*, we can expect problems to arise if we try to apply

them to causative constructions.

Finally, a more radical explanation consists in claiming that there is no such thing as prototypical causation. Hampton (1981) has shown that the prototype structure of abstract concepts cannot always be demonstrated, and perhaps causation is one of these. In this case, the literature would seek to describe, and we would try to track down in a corpus, something that simply does not exist – and so cannot be found.

These are only hypotheses, and pinpointing one of these as the actual reason for the discrepancy between prototypicality and frequency would require further research, including psycholinguistic experiments on periphrastic causative constructions. There is certainly a lot to be done in this area for, while many such studies have been devoted to causal relations expressed by means of connectives (e.g. Noordman & de Blijzer 2000, Roebben 2004), periphrastic causative constructions, on the other hand, have been sorely neglected. But the hypotheses proposed here, shaky though they may be, make it possible to gain some insight into the very nature of prototypicality, as will be briefly set out in the next section.

6. The nature of prototypicality

The one thing that should be obvious by now is that the notion of prototypicality is far from straightforward. In fact, Geeraerts (1989) has demonstrated that prototypicality is itself a prototypical notion, with fuzzy boundaries and central and more peripheral instances. And the incursion of prototypicality into linguistics seems to have added to this fuzziness. As rightly pointed out by Tsohatzidis (1990: 8), the “undeniable heuristic value of the notion of prototypicality should not obscure the fact that its exact theoretical shape is less clear than one might have wished, *especially when it is transferred from purely psychological to specifically linguistic domains of investigation*” [emphasis added].

In view of the results of this and other studies, it looks as if prototypicality is perhaps best described as a multi-faceted concept, bringing together (1) theoretical constructs found in the cognitive literature and relying on deeply-rooted neurological principles such as the primacy of the concrete over the abstract, (2) frequently occurring patterns of (authentic) linguistic usage, as evidenced in corpus data, (3) first-come-to-mind manifestations of abstract thought, as revealed through elicitation tests and (4) possibly other aspects that contribute to the cognitive salience of a prototype.²³ The various facets of prototypicality can converge, when they all point in the same direction, but they can also be (wholly or partly) divergent and reflect different realities. In the former case, the prototype may be said to be more prototypical than in the latter case.

At the same time, this analysis has underlined the necessity to investigate the phenomenon of prototypicality more thoroughly. Having a clear idea of what is meant by “prototypicality” is a *sine qua non* if one wants to extend the scope of this notion, not only within the fields of psychology and linguistics, where its existence is already quite well established, but also beyond these fields, in domains as diverse as pedagogy (Niemeier 2003), marketing (Veryzer & Hutchinson 1998) or graphology (Caffray, Schneider, and Devaux 1998), where it is gradually setting up, and perhaps other, less expected domains which will perceive the relevance of the concept to their discipline.

7. Conclusion

In an attempt to come to a better understanding of the concept of prototypicality, and in particular prototypical causation, this article has compared two competing tools for pinpointing prototypes, viz. the theoretical constructs found in the literature and claiming to describe cognitively salient models, and frequency of linguistic usage as evidenced in corpus data. This analysis has revealed a discrepancy between the results obtained through the two methods. While some factors can be introduced which reduce the distance between cognitive salience and frequency (e.g. medium), this lack of overlap nonetheless questions our deepest intuitions and calls for an explanation.

This article is also a plea for a more thorough investigation of prototypicality, which, though one of the most popular concepts in cognitive linguistics, is still extremely obscure. What is most definitely needed at present is a refined and more detailed description of this concept, which might involve multifaceted characterisation and/or additional adjustments, such as assigning a particular weight to each parameter defining the prototype. Hopefully, thanks to this clarification, the “uses” of prototypicality (see Wierzbicka 1990) will progress, while its “abuses” will melt away.

Notes

1. This work was carried out with the gratefully acknowledged support of the Belgian National Fund for Scientific Research (FNRS). Special thanks are due to the editors of this book, Stefan Th. Gries and Anatol Stefanowitsch, for their insightful comments.
2. I will use the following terms when referring to the different elements making up the periphrastic causative construction: *He* <CAUSER> **got** *the boy* <CAUSEE> *to open* <EFFECT> *the door* <PATIENT>. The CAUSER is an entity, force or event that changes or influences the CAUSEE, and thereby produces an EFFECT. The PATIENT, when present, represents the entity that is acted on by the CAUSEE.
3. A term which, as noted by Ungerer & Schmid (1996: 10), Rosch borrowed from earlier research on pattern recognition (e.g. Reed 1972).
4. Posner (1986: 54) talks of the “Roschian revolution”, describing it as a genuine revolution “because it was a part of a general new conceptualization of human thought in terms of bounded rationality that has important implications for psychology and the social sciences”.
5. I use the term “participant” in a broad sense, here, to cover all the elements making up the causative construction, including the verbal element (the EFFECT).
6. See also Van Valin (2001), who argues that *Jean* in (i) is “in the **canonical** position for interpretation as direct object (undergoer) of *laisser* and as subject (actor) of *manger*” [emphasis added], unlike *Jean* in (ii), which is coded as an indirect object, a function which, in simple clauses, is not interpreted as being an actor-like argument.
 - (i) Je laisserai **Jean** manger les gâteaux. (‘I will let John eat the cakes’)
 - (ii) Je ferai manger les gâteaux **à Jean**. (‘I will make eat the cakes to John’)
 Van Valin also notes that sentences such as (i) appear before structures like (ii) in child language – a property which, it will be reminded, is considered as characteristic of prototypes.
7. Langacker’s (1991: 13) idea of discreteness of the objects interacting energetically with one another has here been equated with the linguistic notion of specificity (as opposed to generic entities).
8. As noted by Fodor (1970) and others, the main difference between morphological causative verbs such as *kill* and periphrastic causative constructions such as *cause to die* is that the former, unlike the latter, imply an overlap in time and space between the causing event and the caused event. Compare: **John killed Bill on Sunday by stabbing him on Saturday* and *John caused Bill to die on Sunday by stabbing him on Saturday* (Fodor 1970: 433). See, however, Lemmens (1998: 23-4) for an (authentic) example where *kill* involves a temporal separation between the *kill*-component and the *die*-component, and for an explanation for this apparent counter-example.
9. As far as I know, nothing in the literature allows us to decide whether a PATIENT should be present or not in a prototypical periphrastic causative construction. In Degand’s (2001) corpus of Dutch, causative constructions with an (explicit) PATIENT are more frequent, but this does not imply that they are prototypical (see later). Both types of structures will therefore be taken into account here.
10. In fact, Lakoff (1982: 164) himself admits that “the question of how accurate [the] conditions [making up the model of direct manipulation] are, and what other properties there might be” “is a matter for further empirical study”.
11. See e.g. Stefanowitsch’s (2001: 133) remark that the service frame with the *have*-causative “accounts for 72.0% of all examples in the corpus, *and can thus clearly be seen as the prototype*” [emphasis added].

12. The classification of the data according to the different parameters was in fact more complex than it may sound, for some category boundaries are themselves fuzzy and difficult to draw at times. As a rule, only unquestionable cases were included. Thus, human-like participants were not taken into account in the model of direct manipulation (i), nor were constructions where the relation between the CAUSER and the CAUSEE (co-referential or not) is ambiguous (ii).
 - (i) Even *the famine area* was **made** to pay one-half of the supplemental tax levied for famine relief. <BNC:W:A64 1127>
 - (ii) I'll have to <pause> see if I can **get** some banana skins put on the stairs [to bump him off]. <BNC:S:KB7 15681>
 Intermediate cases for the other parameters were handled in the same way.
13. Strictly speaking, a chi-square test is not possible for the model of direct manipulation either, given that one of the cells equals zero. However, a test based on random sampling of 1,000,000 tables with the same marginal totals yielded the same result.
14. It might be argued that such preferences or dispreferences in sequencing are not effects of prototypicality, but of complementation possibilities. However, it should be noted that, although past participle constructions represent the most frequent complementation pattern with *have* and *get* (82% and 61% respectively), which might explain the dispreference of these two verbs for iconic sequencing, speakers still have the possibility of organising the participants iconically if they want to, by choosing an infinitive or a present participle construction – even if, of course, there are many other elements that contribute to the choice between a past participle, present participle or infinitive. In the same vein, while past participle constructions are impossible with *cause* and highly restricted with *make* (Van Ek & Robat (1984: 327) limit the *make* + past participle construction to instances where the EFFECT denotes “the exercise and recognition of influence in the widest sense”), there are other ways in which the prototypical ordering of the sentence with these two verbs can be disrupted, namely by passivising the main clause (*He was caused/made to...*) or, in the case of *cause*, using a passive infinitive (*He caused it to be removed*) – two possibilities which do not exist (or only very marginally) with *get* and *have*.
15. Albeit possible, such constructions with *get* are less common and when they do occur, the focus is more on the idea of difficulty, typical of *get* (see Gilquin 2004), than on the scenario, as clearly appears from a comparison of the following two sentences, taken from the British component of the International Corpus of English (ICE-GB):
 - (i) Ironical, since fashion has gone full-circle and kids actually ask to **have** their hair cut short now. <ICE-GB:W2F-004#23:1>
 - (ii) Alternatively, they might rebel and become violently opposed to short hair, refusing to allow their children to **get** their hair cut. <ICE-GB:W2B-017#77:1>
16. The rise, admittedly, is less sharp for *make* and *have* (from 4.1% to 4.4% for the former and from 2.1% to 9.1% for the latter).
17. As Rosch & Mervis (1975: 515) point out, “the validity of a cue is defined in terms of its total frequency within a category and its proportional frequency in that category relative to contrasting categories”.
18. Lakoff (1982: 164) notes that the ten properties making up the model of direct manipulation “are obviously not all equally important”, but he leaves it for further research to investigate their relative importance.
19. Because a chi-square test has to be carried out for each of the ten parameters of the model, the so-called Bonferroni correction has to be applied and the p-value normally used to determine significance has to be divided by the number of tests. Consequently, each of the ten results has to be significant at the level of 0.005 in

- order to be regarded as statistically significant and at the level of 0.01 for marginal significance.
20. See, for instance, Sampson's (1980: 152) observation that "[s]peakers are often straightforwardly, and startlingly, wrong in their sincere convictions about even the most elementary facts of their own languages" or Fillmore's (1992: 35) remark that every corpus that he has examined, however small, has taught him facts that he could not have found out about in any other way.
 21. I thank Maarten Lemmens for this observation. In 1977, Lakoff actually described this model (with minor differences) as that of "prototypical agent-patient sentences" (Lakoff 1977: 244).
 22. Notice, also, the reference to counterfactuality ("a change of state that would not have taken place without the exertion of energy"), reminiscent of the definitions of causative relations found in the literature, e.g. Shibatani (1976: 1-2), who notes that the dependency between the causing event and the caused event in a causative construction "must be to the extent that it allows the speaker to entertain a counterfactual inference that the caused event would not have taken place at that particular time if the causing event had not taken place, provided that all else had remained the same".
 23. Winters (1990) makes a similar point when she lists the different features of a syntactic prototype, including among other frequency, salience and naturalness.

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