

Through the prototypes of *through*: A corpus-based cognitive analysis

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Abstract

This paper empirically tests a number of criteria proposed in the literature to identify the prototype of a linguistic category in order to see how they compare with each other – and what this can tell us about the concept of prototypicality. The item under investigation is *through*, and the starting point is an intuition-based definition of prototypical *through*. The different criteria are frequency of use, ease of elicitation, historical origin, patterns in L1 acquisition and patterns in L2 use. All instances of *through* retrieved for testing each of these criteria are classified according to a taxonomy couched in Construction Grammar terms. The findings confirm the special status of the intuition-based prototype of *through* (the [X MOVES THROUGH Y] construction) according to some of the criteria, but also reveal divergent results, in particular a central use of the instrumental prepositional phrase with *through*. Conclusions are drawn about the theoretical concept of prototypicality and its possible multi-faceted nature, and more generally about the place of empirical evidence in Cognitive Linguistics.

Keywords: prototypicality, Construction Grammar, *through*, corpus, elicitation, diachrony, language acquisition

1 Introduction

Today, it may seem quite natural for scholars doing research in Cognitive Linguistics to use corpus data. However, this has not always been the case. Before Schönefeld (1999), the fields of corpus linguistics and Cognitive Linguistics, though already quite well established, were essentially distinct fields. It was this paper that acted as an eye-opener for many linguists, pioneering the thought that “the two trends – corpus linguistics and cognitivism – are compatible in that they complement each other” (Schönefeld 1999: 137).

The present article investigates the prototype of *through*. It builds on the complementarity between corpus linguistics and Cognitive Linguistics as first highlighted by Schönefeld (1999). The corpus data analysed include historical, child language and learner corpora. The very notion of prototypicality reflects the cognitive orientation of our study, as does the construction-based approach that we adopt to define the different uses and meanings of *through*. Going beyond this, the paper uses elicitation data and thus relies on methodological pluralism in the strive for robust and reliable evidence. By doing so, it follows the growing trend towards “converging evidence” in linguistics pioneered by Schönefeld and colleagues (Gries et al. 2005, 2010; Schönefeld 2011).

The paper is organised as follows. In Section 2, we briefly introduce the notion of prototypicality, showing how prototypes have so far been identified in the literature. We also describe the intuitive prototype of *through* as outlined, among others, in Lee (1998). Section 3 justifies the choice of the Construction Grammar framework to classify the different uses of

through and presents the main principles of our classification scheme. Section 4 provides the actual data analysis. It uses different criteria to identify the prototype of *through* empirically, namely frequency of use, ease of elicitation, historical origin, patterns in first language (L1) acquisition and patterns in second language (L2) use. Section 5 brings the results together, looking for possible convergence and discussing the theoretical consequences for the notion of prototypicality. Section 6 concludes the paper.

2 Prototypicality and the purported prototype of *through*

The notion of prototypicality originated in the field of psychology, as represented most notably by Rosch's work (see, e.g., Rosch 1973, 1975). Through a series of experiments, she demonstrated that categorization is usually not an 'either/or' matter, but that some members of a category tend to be better examples than others (the apple, for instance, is arguably a better example of the fruit category than the plum). The most representative member of a category is called the prototype and can be said to correspond to the centre of a network including all the members of a category, but with different degrees of representativeness. Prototypicality was later applied to linguistic categories. Hopper and Thompson (1980), though never actually using the term 'prototypicality', argued that transitivity is characterised by a number of parameters, such as punctuality, volitionality, affirmation or affectedness of the object. The combination of these parameters results in "cardinal Transitivity" (Hopper and Thompson 1980: 253) – or, one could say, prototypical transitivity. Other examples of linguistic prototypes can be found in Taylor (2003), who showed among other things that some adjectives (e.g. *cheap*) are more representative of the category than others (e.g. *asleep*). Different senses of a word also appear to display prototype effects, as claimed by Norvig and Lakoff (1987) for the verb *take*.

These early studies applying the notion of prototypicality to linguistic categories mostly relied on intuition. Later, however, linguists started to substantiate their claims about prototypicality by providing more robust empirical evidence, as illustrated by Gries's (2006) corpus-based analysis of the different senses of the verb *run*. Frequency of occurrence, in particular, has often been used as a shortcut to prototypicality on the grounds that it instantiates cognitive entrenchment (Schmid 2000: 39) and should thus give access to the sort of items that subjects tend to name first when asked to list members of a category in psychological experiments. Other criteria have been put forward as possible indicators of prototypicality in linguistics (see Winters 1990; Rice 1996; Tyler and Evans 2001; Taylor 2014, for reviews), some of them transferred from psychology, e.g. early acquisition, shown in psychology to be a sign of prototypicality (cf. Anglin 1976) and used in linguistics to identify prototypes, usually on the basis of corpora (e.g. Hallan 2001). Recently, it has become more common to combine different criteria in order to establish prototypicality in linguistics, thus seeking converging evidence to confirm the special status of a purported prototype (see, e.g., Dobrić 2015). This is the approach that will be adopted in this paper, using *through* as our object of study.

Prepositions have quite often been investigated in the light of prototype theory. Relying on intuition or empirical evidence, linguists have sought to establish the most prototypical usage of certain prepositions (e.g. *over* in Brugman 1981; Lakoff 1987; Hallan 2001; Tyler and Evans 2001; see also Lindstromberg 2010). One preposition that has received comparatively little attention is *through*. The few publications that have focused on this preposition largely agree on what its prototype should be. Lee (1998: 333), following King (1988: 579), claims that "[t]he preposition *through* prototypically involves a situation in which a physical object or

substance enters a container, follows a path within the container, and then exits”, as exemplified by *The train went through the tunnel* (Lee 1998: 341) and illustrated in Figure 1. A similar prototype is described in Tyler and Evans (2003: 218), who refer to “a spatial relation denoting a TR [Trajector] and a bounded LM [Landmark] in which two locations on either side of a LM are related (the entrance point and exit point respectively)”.¹ This purported prototype is in line with the cognitive view that “our thinking about abstract domains is grounded in our experience of physical space” (Lee 1998: 334), since more abstract senses of the preposition (as in *They went through a terrible experience*) are seen as deriving from this central, spatial sense. However, this view of *through* is based on intuition and can therefore not claim to have strict empirical validity. In what follows, we will see whether this intuitive prototype surfaces when we apply different empirical tests to occurrences of *through*.

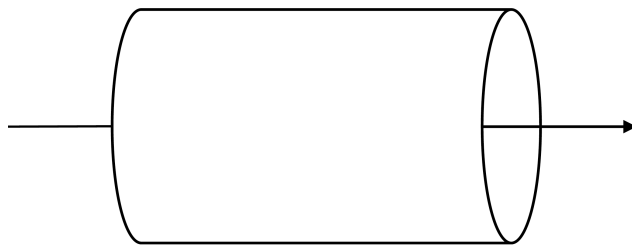


Figure 1. The purported prototype of *through*

3 Grammatical constructions and the polysemy of *through*

Testing different prototypicality criteria empirically requires clear principles to make it possible to describe and compare results. The theories of Construction Grammar as laid out by Lakoff (1987), Goldberg (1995) or Croft (2003) are a natural choice to study polysemous items in complex environments. Lakoff’s (1987) case study of *over* (inspired by Brugman 1981 and Lindner 1981) paved the way for the analysis of prepositions in networks of meanings. Goldberg’s (1995) focus on the argument structure of verbs provided the framework to describe the influence of syntax on meaning. It also offered a terminology and a basic model to describe the form/meaning pairings. Croft (2003) refined the model by specifying the verb class: “there is a distinct syntactic schema for each constructional ‘sense’ specifying the verb classes found with each meaning, with corresponding specific meaning” (Croft 2003: 56). Together, these provide a descriptive framework that will help us explore the full semantics of *through* within various syntactic environments. Indeed, the item belongs to several grammatical categories (e.g. preposition, particle or adjective) and thus occurs in different grammatical configurations. To illustrate our approach, we use Lee’s (1998) prototype of *through* with a slightly adapted version of Croft’s (2003) constructional representation system [[form]/[semantics]] combining both syntactic structure and semantics:²

[[SBJ VERB_{INTRANS} THROUGH OBL]/[X MOVES THROUGH Y]]

The main difference between this representation and Croft’s is that Croft’s focus lay on one syntactic structure (the ditransitive), which required further semantic specification on the verb

¹ The Trajector (TR) is “the entity construed as being located” (Langacker 2008: 70), whereas the Landmark (LM) is the “reference point with respect to which [the Trajector] is ... situated” (Langacker 1987: 231). See also Lindner (1981) and Lakoff (1987).

² SBJ = Subject; OBL = Oblique.

class. By contrast, we aim to do something which has not usually been done in Construction Grammar so far, viz. provide a detailed description of the full range of constructions bound to one specific lexical item. In our item-based representation, what all constructions have in common is the presence of *through*, rather than similar or identical syntactic patterns. Our goal is to identify all constructions that contain *through* and describe their form as well as their semantic peculiarities. If they have the same syntactic structure, then finer-grained features such as verb class can be used to distinguish constructions. In the case of *through* constructions, we need to classify other features than just the verb, since some constructions, e.g. prepositional phrases (PP) functioning as Adjuncts or adjectives functioning as Predicates, do not have a verb.

The semantics of *through* is often associated with space, which justifies the addition of two descriptive tools, namely the Source/Path/Goal (SPG) schema and the notions of Trajector (TR) and Landmark (LM). Using the SPG schema, the Source, the Path or the Goal meaning of *through* can be profiled as part of the semantics of the construction. TR and LM correspond to the X and Y arguments within the construction, respectively. These arguments have specific attributes that depend on the construction (semantic roles) and, in some cases, on certain contextual cues (architectural references, communication situations, etc.) or participants in the event that are not realised as arguments.

We also have to account for metaphorical extensions of the meaning of some constructions. Following Bybee (1985) and Croft (2003),³ we consider that a shift in meaning creates a different construction. The constructions may be related syntactically, but they are assumed to remain clearly distinct in the speaker's mind. Time and space, for instance, are not considered to be the same thing at the constructional level. That they are related at a conceptual level in the speaker's mind is, after all, still to some extent hypothetical. On the other hand, we have to constrain the number of constructions in some way. One metaphorical extension is allowed in our treatment of the LM. It is hard to determine if a LM has three dimensions (e.g. *tunnel*, a prototypical LM according to Lee 1998) or two dimensions (e.g. *door* or *sheet*). We therefore group these under one term, LM, without creating a new construction.

Taken together, the syntactic form, the constructional meaning, the verb class, the profiled part of the SPG schema, the TR and LM, the semantic roles of the arguments, the contextual cues and additional participants provide a rich and varied description of the construction. Table 1 is an illustration of Lee's (1998) prototype.⁴

³ Cf. Croft (2003: 59): "This implies that for at least these two verbs, and probably many other verbs, the verb-specific constructions are AUTONOMOUS (Bybee 1985), that is, independently represented in the mind, even though their syntax and semantics are predictable from the verb-class-specific construction. Their subsequent semantic divergence from the ditransitive construction meaning is the constructional analog to lexical split, where for example 'something can be *dirty* without involving real *dirt* at all' (Bybee 1985:88)".

⁴ The detailed list of verbs, which reveals a high number of manner-of-motion verbs, comes from our analysis of a corpus of spoken utterances (cf. Section 4.1). The boldface in the SPG schema indicates that the Path meaning of *through* is profiled. AGT = Agent; LOC = Locative. Note that in the analysis, we will refer to constructions by means of the second part of the construction (Cx) form (here, [X MOVES THROUGH Y]).

Table 1. Construction Grammar description of the purported prototype of *through*.

Cx form	[[SBJ V _{INTRANS} (ADVERB) THROUGH OBL]/[X MOVES THROUGH Y]]
X	Animate entity, typically human, that initiates the event denoted by the verb. AGT
V	<i>be, climb, come, crash, creep, cut, dance, dive, dodge, drift, drive, drone, enter, escape, extend, fall, fly, get, go, got, grow, hurry, jump, lead, paddle, pass, ploomp, plough, poo, pop, progress, read, reel, ride, run, rush, sail, scream, seep, shine, shit, sidle, sleep, slip, slop, spread, squeal, squeeze, swivel, talk, thread, traipse, travel, walk, wander, whiz, work</i>
THROUGH	Passes into, along and out of (Source + Path + Goal) the LM entity Y. Can be pre-modified with Adverbs such as <i>straight, right, halfway, all the way</i> and other adverbial expressions including spatial adverbs, typically <i>down</i> or <i>up</i> .
Y	Denotes a thing, a group of things or a place constituting or having an existing passageway. LOC

4 Empirical tests of the *through* prototype

In this section, we will apply different criteria to the case of *through* that arguably make it possible to identify the prototype of a linguistic category. These criteria are:

- frequency of use (as attested in a spoken corpus),
- ease of elicitation (tested through a sentence production task),
- historical origin (determined on the basis of etymological dictionaries and historical corpus data),
- patterns in L1 acquisition (investigated through a child language corpus),
- patterns in L2 use (investigated through a learner corpus).

For each criterion, reference will be made to the literature to justify its relevance to the concept of prototypicality. Then, we will describe the data used and introduce the methodology employed to examine the criterion. Finally, we will present the main results of the analysis. The Construction Grammar principles outlined in Section 3 will be used to categorise all the data collected and establish which *through*-construction emerges as the most prototypical one according to each of the criteria applied.

4.1 Frequency of use

4.1.1 Rationale

Frequency of use has regularly been associated with prototypicality (e.g. Fenk-Oczlon 1988, Geeraerts 1988a). Tummers et al. (2005: 240) point out that “all sorts of prototype-theoretical analyses may use frequency as an indication of prototypicality and usage tendencies”. Such an association is perfectly plausible in a usage-based perspective: if a member of a category is encountered in language more frequently than the other members, we can assume that it is somehow central to the category and more highly entrenched in language users’ mental representations. This is the idea underlying Schmid’s (2000: 39) “From-Corpus-to-Cognition Principle”, which claims that “frequency in text instantiates entrenchment in the cognitive

system”. Although Schmid (2010) subsequently questioned this principle and some scholars demonstrated the possible discrepancy between frequency as attested in corpora and centrality in mental representations (e.g. Roland and Jurafsky 2002; Nordquist 2004; Gilquin 2008), frequency continues to be cited as one of the factors that should somehow be taken into account when investigating prototypicality (cf. Stamenković and Tasić 2013; Dobrić 2015).⁵

4.1.2 Data and methodology

Frequency of use was analysed on the basis of the demographically sampled section of the *British National Corpus* (BNC), corresponding to 4,233,962 words of spontaneous conversation. Speech, rather than writing, was chosen as it is assumed to better reflect conceptual structures (Baayen et al. 2006, for example, have demonstrated that the results of experimental tasks come closer to naturalistic speech than to naturalistic writing).

All occurrences of *through* were automatically extracted from the corpus. This resulted in 2,347 hits, that is, a relative frequency of 554.33 instances per million words in the BNC sample. Using a bottom-up process, we examined each of these hits and identified the different form/meaning pairings, starting with the purported prototype of *through*. Mainly due to the spoken nature of the corpus data, as exemplified in (1) and (2), some hits had to be discarded because it was impossible to decide what construction they represented.

- (1) I'll try and get *through* the <unclear> neutrally. (KDM 722)
- (2) I think it's *through* the, it's difficult to lose them again now, I don't know, I don't know. (KCV 2473)

After manual inspection, we ended up with 2,244 instances of *through*, on the basis of which we gradually built a taxonomy of *through*-constructions, adopting the approach described in Section 3. Taking into account the syntactic structure as well as semantic differences (including most metaphorical extensions; see Section 3) with respect to the TR, verb and LM, we identified a total of 53 distinct constructions.⁶ Since the synchronic corpus data from the BNC represented the largest set of data among those used to investigate the different prototypicality criteria, we relied on this taxonomy of 53 constructions to analyse the other types of data (elicitation data, historical corpus, child language corpus, learner corpus). Occasionally, we found new constructions when analysing those data, which means that our taxonomy makes no claim to completeness. New constructions will be introduced whenever this is relevant. Note that, except for the historical analysis, we will not provide results for all constructions, but only present the top five, which is where prototype effects are expected to be found.

4.1.3 Results

Table 2 displays the five most frequent *through*-constructions in the corpus data. The construction with the highest frequency is the [X MOVES THROUGH Y] construction, which occurs 369 times and represents a proportion of 16.44% of all the instances of *through*. It is followed by the use of *through* as the head of a locative/directional prepositional phrase (10.52%) and the [X MOVES THROUGH] construction, which in effect corresponds to a phrasal

⁵ One should also bear in mind that different types of frequency can be compared to cognitive entrenchment (contingent frequency, probabilistic frequency, etc.). We thank Susanne Flach for making this point.

⁶ While distinct, these constructions are related to each other in various ways, ultimately forming a network of constructions centred around different families. In our analysis, however, we will neither deal with this constructional network nor with the links between the constructions.

verb (8.42%). The fourth and fifth constructions are more abstract, representing an ‘examine’ construction ([X PERUSES Y], 7.53%) and an instrumental prepositional phrase (7.35%), respectively.

Table 2. Five most frequent *through*-constructions in the BNC sample.

	Construction	Example	Freq.	%
1	[X MOVES THROUGH Y]	I’m not gonna go <i>through</i> Bowgreen I don’t wanna go that way. (KCL 1372)	369	16.44
2	[PP PLACE]	Did he have a ring <i>through</i> his nose? (KDK 136)	236	10.52
3	[X MOVES THROUGH]	Oh the sun’s trying to come <i>through</i> now. (KE2 7485)	189	8.42
4	[X PERUSES Y]	I should of gone <i>through</i> the book to find that (KE6 848)	169	7.53
5	[PP INSTRUMENT]	It’s his son, who’s related to Jim <i>through</i> marriage. (KCT 12443)	165	7.35

These results point to the ‘motion through space’ constructions as being particularly common in spontaneous speech. Among those, the most frequent construction, [X MOVES THROUGH Y], corresponds to the prototype as described by Lee (1998), cf. example (3).

(3) When the water comes back out the filter it goes *through* this pipe (KC2 3566)

4.2 Ease of elicitation

4.2.1 Rationale

Ease of elicitation is cited by Rice (1996) as one of the characteristics of prototypes. As Taylor (2003: 162) puts it, “[i]f a person is asked to come up with sentences exemplifying a target word, then, with remarkable consistency, certain uses will be cited earlier, and more frequently”. This criterion corresponds most faithfully to the original psychological notion of prototypicality, which Rosch (1975) and colleagues identified by asking subjects to name the first example of a category that they could think of (e.g. the first bird or the first piece of furniture that they could think of). The idea behind this type of elicitation task is that items that are more entrenched in language users’ mental representations should come to mind first when prompted with the name of the category.

4.2.2 Data and methodology

We used Rice’s (1996) sentence generation task, which consists in eliciting a number of sentences on the basis of a stimulus word. We asked informants to write the first ten sentences

with *through* that they could think of. The informants, 30 in total, were aged between 20 and 87, and were all native speakers of English (mainly from Great Britain, but also from Ireland, USA, Canada and Australia). We identified the construction of *through* in all sentences produced by the informants, with special focus on the first sentence produced by each informant, as we assumed that the first sentence should illustrate a usage that is particularly central in subjects' mental representations.

4.2.3 Results

Both overall and for the first sentence produced, the [X MOVES THROUGH Y] construction is most frequently elicited, as shown in Tables 3 and 4. In fact, the proportion of this construction is even higher if we only consider the first sentence produced: 53.33% compared with 28.42% for all results. This most frequently elicited construction is illustrated in (4), a perfect example of Lee's (1998) prototype.

- (4) The train went *through* the tunnel.

Table 3. Five most frequent *through*-constructions in the elicitation test (all sentences).

	Construction	Example	Freq.	%
1	[X MOVES THROUGH Y]	The ball went <i>through</i> the window.	79	28.42
2	[PP INSTRUMENT]	<i>Through</i> hard work you can succeed.	29	10.43
3	[PP TIME]	<i>Through</i> the years I have learned that honesty is the best policy.	24	8.63
4	[ADJ FINISHED]	We were <i>through</i> with work.	23	8.27
5	[PP PLACE]	We took a short cut <i>through</i> the store to get to the bus station.	23	8.27

Beyond the [X MOVES THROUGH Y] construction, results vary depending on whether all sentences are taken into account or only the first sentence produced by each informant. What is common to Tables 3 and 4, however, is that instrumental and locative/directional prepositional phrases as well as the use of *through* as an adjective meaning 'finished' are regularly produced by the informants.

While we were able to analyse most of the elicited occurrences of *through* using the corpus-driven taxonomy (see Section 4.1), the task brought to light two constructions that had not been encountered in the corpus data, namely the [X TO Y] construction (unlikely to occur in the BNC since British English uses *to* rather than *through* in this context) and the [X CAUSES Y TO UNDERSTAND Z] construction. These two constructions are exemplified in (5) and (6).⁷

⁷ Interestingly, although the word *through* was clearly spelt by the experimenter or shown in written form, as many as 15 out of the 300 sentences produced by the informants contained not the word *through*, but a form of

- (5) Do numbers 3 *through* 7 first.
 (6) The doctor talked me *through* the diagnosis.

Table 4. Five most frequent *through*-constructions in the elicitation test (first sentences only).

	Construction	Example	Freq.	%
1	[X MOVES THROUGH Y]	She walked <i>through</i> the garden.	16	53.33
2	[PP PLACE]	Alice <i>through</i> the looking glass.	3	10.00
3	[ADJ FINISHED]	I'm <i>through</i> with you.	2	6.67
4	[PP INSTRUMENT]	It is <i>through</i> language that we communicate.	2	6.67
5	[X LOOKS THROUGH Y]	You can see <i>through</i> a window.	2	6.67

To sum up, the elicitation test suggests that [X MOVES THROUGH Y] has a special status in language users' mental representations. This is most visible in the first sentences produced by the subjects, 53% of which exhibit this construction. These results converge with those of the corpus analysis, which also brought the [X MOVES THROUGH Y] construction to the fore, although with a much lower proportion (16% of all occurrences in the BNC sample).

4.3 Historical origin

4.3.1 Rationale

Diachronic research arguably gives access to prototypicality, too. The prototype of a polysemous item is claimed to be its historically earliest sense (see Tyler and Evans 2001: 734; Luraghi 2003: 12; among others). The prototypical sense is argued to subsist through time, whereas more peripheral meanings do not usually survive for very long (Geeraerts 1992: 186–187). The diachronic analysis is based on McMichael (2006).

4.3.2 Data and methodology

In order to identify the historically earliest sense, we relied on both etymological dictionaries and historical corpus data. For the corpus data, we had to find the oldest texts possible. In the Germanic branch, the oldest text is in Gothic, an Eastern Germanic dialect. It is a 6th-century translation of parts of the Bible from Greek. Being a translation, we decided that the risk of contamination by the original language of the text would be too high. On top of that, the text is relatively short. In Old English (OE), it is also extremely difficult to find texts that are not translations from Greek or Latin. The epic poem of Beowulf would have been a good candidate,

the verb *throw*: *threw* (e.g. *I threw the ball*) or, more surprisingly, *throw* itself (e.g. *Don't throw it, push it*), which seems to point to a possible confusion between sound and word.

but the poetic form made the interpretation of the respective sense instantiated somewhat contentious. We finally decided to use *Bald's Leechbook*, a recipe book for medical practitioners from the 9th century, most of which was written in the vernacular and was clearly an Anglo-Saxon rewriting of its Latin and Greek sources. We used the OE version in spite of the difficulty of retrieving the instances of *through*, due to its many variant spellings in OE (as many as 200). The original version allowed us to check, as far as possible, the LM and the verb. This was cross-checked using the translation into Late Modern English by Cockayne (1865). In total, 87 instances of *through* were retrieved and analysed.

4.3.3 Results

According to etymological dictionaries, the earliest ancestor of *through* is Proto Indo-European *terə-, a verb related to such words as *through*, but also *thrill* and *nostril* in Contemporary English. The verb moved from the lexical category to the more grammatical category of preposition through a process of grammaticalisation. The oldest reconstructed meanings were 'crossing over, passing through, piercing, overcome'. In OE *þrū*, *þurh* was already a preposition, but also found as a verb *þýrlian* from *þýrel* (perforation) meaning 'boring a hole' (as apparent in *nostril*, literally 'nose + hole'). This 'original' meaning of motion through a LM can arguably be related to the supposedly prototypical sense of *through*. Nevertheless, OE *þrū* also had the meaning of 'by the agency or means of'.

Table 5. *Through*-constructions in *Bald's Leechbook*.

	Construction	Example	Freq.	%
1	[X CAUSES (Y) TO MOVE THROUGH Z]	boil the worts in the butter thoroughly, skim the foam off clean, strain <i>through</i> a cloth, put it on a saucer	54	62.07
2	[PP INSTRUMENT]	after the body is cleansed <i>through</i> the blood-letting, the man's diet is to be examined	18	20.69
3	[X MOVES THROUGH Y]	as long as from the liver the blood gushes <i>through</i> the whole body.	6	6.90
4	[PP MEANS]	For chronic disorder of the head or of the ears or of the teeth <i>through</i> foulness or <i>through</i> mucus, extract that which aileth there	4	4.60
5	[PARTICLE THROUGH]	if thou may not <i>through</i> -carry that, scarify for him his shanks	3	3.45
6	[ALL THROUGH]	and reek him therewith till he sweat, and reek the house all <i>through</i> .	2	2.30

In *Bald's Leechbook*, *through* is typically used as a preposition, but there are three uses as a prefixed particle on the verb meaning ‘completed’ which could also be related to *thoroughly* – etymologically related to *through* – and two uses with *all* which can be interpreted as meaning ‘completely’. Among the prepositional uses, Table 5 shows that most of the instances are caused motion constructions: [X CAUSES (Y) TO MOVE THROUGH Z] (62.07%). Twelve instances display an explicit Patient argument, e.g. (7), while the remaining instances display an implicit Patient participant, e.g. (8).

- (7) [0109 (2.21.16)] Wyr̃c eagsealf̃e, cymen & streawbergean wise gecnuwa swiþe wel & of geot mid geswette wine, do in cyperen fæt oþþe on æren, læt standan fela nihta on, *awring ða wyrte ðurh clap & ahluttra swiðe wel*, do ðonne on ða eagan ðonne ðu wille restan. (‘wring the wort through a cloth and refine most well’)
- (8) [0112 (2.22.1)] Wiþ æsmælum niðeward æscðrotu gecowen on muðe & *awringen ðurh clap on eage* gedon wundorlice hælð. (‘wring through cloth on the eye heals wonderfully’)

A closer examination of the caused motion constructions, however, reveals that the prepositional phrase can very often be interpreted as an instrument, cf. (9). That is, the *through* prepositional phrase is the means by which the result is achieved. For instance, the many cases of straining, sieving and refining the mixtures were done using a cloth or sieve as an instrument. In other words, since the meaning of the verbs is usually self-contained, the typical meaning of constructions with *through* in *Bald's Leechbook* is instrumental. This use corresponds to 68 instances (50 of the 54 caused motion constructions⁸ and 18 instrumental prepositional phrases), that is, 78.16% of the tokens. This is to be compared to only six instances, i.e. 6.9%, for the [X MOVES THROUGH Y] construction, the prototype as described by Lee (1998). The nature of the document, an instruction manual for doctors, could arguably explain the high proportion of causative structures with *through*. We may also be witness to the stage of grammaticalisation in which *through* was polysemous (in the sense of having two distinct yet related meanings). It would later become more clearly homonymous (spatial vs. instrumental meanings). However, we note that in etymological dictionaries such as the *Oxford Dictionary of English Etymology* (Onions et al. 1966), the instrumental use is put at the end as an additional meaning whereas it is arguably the dominant one in the corpus.

- (9) [0205 (28.1.15)] Gif ðonne git sio adl egle gebringe inne *ðurh pipan oþþe horn* swa læcas cunnan. (‘If the disease still annoys, introduce this, through pipes or horn, as leeches know how to.’)

To conclude, we seem to be at the point where there is polysemy of *through* which would eventually lead to lexical ambiguity (or homonymy) (Tuggy 2009) in later periods of English. In OE, the instrumental use of the word is however surprisingly frequent, which could be indicative of its prototypical nature according to the historical criterion. On the other hand, in the oldest texts that we have, it is hard to find the spatial value of *through* with sufficient frequency to posit its prototypical status. Even in later texts, such as the *Ancrene Riwele* (c. 1225), the instrumental use is dominant.

⁸ The remaining four instances were ambiguous between an instrumental and a locative use, and hence were not included in our counts.

4.4 Patterns in L1 acquisition

4.4.1 Rationale

Rosch (1975), talking about natural categories such as birds or furniture, claimed that children acquire the prototype earlier than the other members of the category. The same claim was made with respect to linguistic categories, for example by Rice (1996). In this section, we consider the evidence provided by first language acquisition by looking at the earliest acquired sense of *through* among children.

4.4.2 Data and methodology

The L1 data come from the CHILDES (*Child Language Data Exchange System*) database, and more precisely the Manchester corpus (Theakston et al. 2001), which consists of data from twelve English-speaking children from Manchester and Nottingham, aged between 2 and 3 years old, who were recorded regularly for a year. 206 occurrences of *through* were extracted from the corpus (children's turns only). All of them were classified into constructions according to the principles set out in Section 3. In what follows, we distinguish between the first occurrence of *through* found in the production of each child and all occurrences of *through* in the whole corpus.

4.4.3 Results

Looking at the first occurrence of *through* produced by each child (as attested in the corpus), it appears that out of the twelve children, four start with a locative/directional prepositional phrase ([PP PLACE]), for example:⁹

- (10) CHI: hippo back.
MOT: mmhm hippo.
CHI: a back *through* hole.
MOT: where do you want it?
CHI: *through* the hole.
(John12b 1175)

Three out of the twelve children start with the [X MOVES THROUGH Y] construction, as in (11). The other constructions are less frequent.

- (11) CHI: I make a car tunnel.
CHI: go *through* it.
CHI: a train could.
(Warr23b 1285)

However, if we pool the data from the entire Manchester corpus, it appears that the [X MOVES THROUGH] construction (phrasal verb) becomes dominant later on. As shown in Table 6, it represents almost 40% of the children's total usage. The second most frequent use, with 17.48%, is the [X MOVES THROUGH Y] construction, followed by the locative/directional prepositional phrase (16.99%). It is noteworthy that over 10% of the instances of *through* are

⁹ CHI represents children's turns, while MOT represents mothers' turns.

not part of any construction, corresponding to an isolated use, typically a noun followed by *through*, as in (12).

Table 6. Five most frequent *through*-constructions in the Manchester corpus (children's turns).

	Construction	Example	Freq.	%
1	[X MOVES THROUGH]	MOT: why's he doing that? CHI: <because because because> [/] because Postman Pat can't get <i>through</i> . MOT: oh right. MOT: so you've used your bulldozer to push everybody out of the way so Postman Pat can get to the post office on time. (Aran26a 454)	81	39.32
2	[X MOVES THROUGH Y]	MOT: where's Thomas going? CHI: going <i>through</i> that [/] that the door. MOT: that door? MOT: that's not a door. (Domin26a 1768)	36	17.48
3	[PP PLACE]	MOT: who's that then? CHI: it's <i>through</i> there. CHI: oh. CHI: can't see it. (Anne25a 1212)	35	16.99
4	[Isolated use]	CHI: mmhm. MOT: there we are. CHI: people <i>through</i> . MOT: people went through? CHI: yeah. (Becky03b 1863)	22	10.68
5	[X CAUSES Y TO MOVE THROUGH Z]	CHI: he [/] he did [/] got it <i>through</i> the hole. MOT: what hole? CHI: not [/] the one in [/] in his ladder's holes. (Gail26b 1428)	10	4.85

- (12) MOT: Carl.
 MOT: Carl.
 CHI: legs *through*.
 MOT: are you putting your legs through there?
 MOT: well be careful.
 (Carl10a 406)

Likewise of interest is the presence, in the top five list, of the caused motion construction (4.85%), [X CAUSES Y TO MOVE THROUGH Z], arguably a relatively complex construction for a two- or three-year-old child.

The L1 data have thus brought to light two constructions which seem to be easier for children to acquire than the other constructions: [PP PLACE] and Lee's (1998) prototype, [X MOVES THROUGH Y]. They appear very early on in child speech and are among the most frequent constructions overall. The phrasal verb construction [X MOVES THROUGH], similar to Lee's (1998) prototype but with no LM, comes first in terms of overall frequency.

4.5 Patterns in L2 use

4.5.1 Rationale

Apart from child language acquisition, Rice (1996: 162) also mentions second language acquisition, and more specifically "the ease or difficulty with which second language learners acquire prepositional usages", as possible evidence for prototypicality. Our final criterion thus concerns the use of *through* by learners of English.

4.5.2 Data and methodology

A sample of about 700,000 words from the *International Corpus of Learner English* (ICLE; Granger et al. 2009), annotated for errors, was selected for analysis. The sample was made up of argumentative essays written by higher intermediate to advanced foreign language learners of English from twelve L1-backgrounds (Bulgarian, Czech, Dutch, Finnish, French, German, Italian, Japanese, Polish, Russian, Spanish and Swedish). All occurrences of *through* were extracted from the error-tagged sample, which included occurrences of *through* (correctly or incorrectly) produced by the learners as well as the annotator's corrections (i.e. cases in which the learners should have used *through*). While the former show how learners use *through* (with what frequency and with what percentage of errors), the latter reveal what the learners cannot do (yet). Both are indicators of how easy or difficult different uses of *through* are for foreign language learners. For each occurrence of *through* in the corpus sample, we identified the construction in which it was used, relying on the Construction Grammar principles outlined in Section 3.

4.5.3 Results

The ICLE sample contains 400 occurrences of *through*, 358 of which represent instances of *through* produced by the learners.¹⁰ As shown in Table 7, in a majority of cases (56.15%),

¹⁰ The remaining occurrences are corrections suggested by the annotator and a few cases where the learner arguably meant something else (e.g. *what we need is a **through** and complete reform*, where the learner very probably meant *thorough*).

through is used with an instrumental function, which suggests that learners are very familiar with this use of *through*. The second construction in the list is much less frequent, with some 10%. It is a construction that has not been predominant according to any of the criteria considered so far, namely [X LIVES THROUGH Y], which involves a relatively abstract meaning of *through*. [X MOVES THROUGH Y], a more concrete construction which corresponds to Lee's (1998) definition of the prototype of *through*, accounts for less than 10% of the total. The uses of *through* in temporal and locative/directional prepositional phrases complete the top five.

Table 7. Five most frequent *through*-constructions in the ICLE sample (with number of errors and corrections).

	Construction	Example	Freq.	%	Errors	Corrections
1	[PP INSTRUMENT]	Life experiences are not available <i>through</i> textbooks or classes, nor something that can be transmitted by teachers. (ICLE-JP)	201	56.15	22	24
2	[X LIVES THROUGH Y]	It is our imagination that helps us go <i>through</i> the difficult moments in life. (ICLE-BG)	36	10.06	1	4
3	[X MOVES THROUGH Y]	I can choose if I want to cycle <i>through</i> a city, a wood or along meadows. (ICLE-GE)	33	9.22	4	1
4	[PP TIME]	Experience acquired in the same job <i>through</i> many years without University degrees could become like having an University degree. (ICLE-SP)	28	7.82	15	1
5	[PP PLACE]	She used to listen to "Bayern 3" and its Bavarian music very loudly so that I could distinctly hear it <i>through</i> the walls. (ICLE-GE)	14	3.91	0	0

Out of 358 occurrences of *through*, there are 54 that are incorrectly produced by the learners, that is, the learners have used *through* where they should have used something else. This corresponds to an error rate of about 15%. Among the different constructions, it is the instrumental use of *through* that displays the highest number of errors (22 errors, see Table 7). The error usually consists of a mistaken preposition, e.g. using *through* instead of *by*, *with*, *in*,

from or *thanks to*. This is illustrated by example (13), where the corrected form appears between dollar signs. However, this high error rate for the instrumental use of *through* is only to be expected, since it is also the most common construction in the learner corpus. In fact, errors with instrumental *through* represent only 11% of all instrumental uses of *through* (22/201). This can be compared with errors for temporal prepositional phrases, which amount to over 50%: 15 uses of [PP TIME] out of 28 are incorrect, most of which involve the use of *through* instead of *throughout*, as in (14). It should also be pointed out that the second most frequent construction in the learner corpus, [X LIVES THROUGH Y], has a very low error rate, namely less than 3% (1 error out of 36 occurrences). As for the locative/directional prepositional phrase, it is the only construction in the top five that does not lead to any errors among the learners.

- (13) Furthermore advocates of the motorway maintain, that trade would prosper *through* \$thanks to\$ the new motorway, because there will be better possibilities for shipment. (ICLE-GE)
- (14) All *through* the history \$Throughout the history\$ of mankind there have been several ways of punishing murderers and thieves, depending on the different cultures, races and religions of that specific group of people. (ICLE-SP)

Finally, it is interesting to consider the number of corrections involving *through*, that is, cases where the learners have used another item instead of the correct *through*. There are 32 such instances in the corpus, and in 24 of them (i.e. 75%), the correction concerns the instrumental use of *through* (see Table 7). Most of the time, this is due to a confusion between instrumental *through* and another preposition like *by*, *with*, *in*, *from* or *by means of*, as exemplified in (15).

- (15) The role of parents is so difficult because nobody can learn how to be a good mother or father unless they experience what it means by *through* \$their own errors. (ICLE-IT)

All in all, we can say that [PP INSTRUMENT] is one of the easiest *through*-constructions for L2 learners of English. It is the most frequently used construction in the ICLE sample, and although it is quite often used incorrectly (or not used where it should have been), this can at least partly be explained by the sheer frequency of the construction (and, one could imagine, of instrumentals in general).

5 Discussion

Over the course of this study, five potential criteria to test prototypicality empirically were examined, namely frequency of use, ease of elicitation, historical origin, patterns in L1 acquisition and patterns in L2 use. Table 8 summarises the main results, showing the construction(s) which could qualify as the prototype of *through* according to each of the criteria applied, together with the percentage of tokens that instantiate this ‘prototype’. The [X MOVES THROUGH Y] construction, which corresponds to the prototype as described by Lee (1998), emerges as the most frequent construction in spoken corpus data (16%) and as the most often elicited construction (28% overall and 53% among the first produced sentences). A similar construction, but with no LM, is found most frequently in the child language corpus when we consider all the occurrences of *through* (39%).

Another use of *through* turns out to have a special status in the empirical data, namely its use as an instrumental prepositional phrase, which appears to be dominant in the historical corpus data (78% after reinterpretation of some of the caused motion constructions), and also easy to use for L2 learners (56% of the tokens they produce are of this type, and incorrect uses of this construction represent only 11% of all instrumental uses of *through*). Finally, the locative/directional prepositional phrase with *through* seems to be important in terms of L1 acquisition, being the use that is acquired first by most children according to our data (33% of all first occurrences).

The prototype of *through* as based on intuition ([X MOVES THROUGH Y]) is thus no more than one among several constructions that are empirically validated by means of the criteria examined here, as only two criteria out of five point to this construction as being the prototype. If we examine the proportion of the purported prototype according to the different criteria (see Table 9), we see that its frequency of occurrence almost always remains under 30% – and this includes criteria that do point to [X MOVES THROUGH Y] as the prototype (frequency and elicitation [all occurrences]). The only percentage that indicates a real predominance is the 53% of the first produced sentences in the elicitation test. It should also be noted that a closer examination of all the data and a more fine-grained analysis reveal that in most instances of the [X MOVES THROUGH Y] construction, the LM is not a covered container as described in Lee’s (1998) prototype (see Figure 1), but some bounded surface construed metaphorically as a container, such as a town, a country or a road, whose depth is less clearly physical. Such LMs are illustrated in (16) and (17), both taken from the BNC. The nature of the LM thus arguably challenges the validity of the intuition-based prototype of *through* even further.

- (16) he lives in Calverton, he comes *through* Nottingham to get to Derby (KCY 1015)
 (17) we discovered we could have come *through* this road here (KBW 12256)

Table 8. Summary of the dominant uses according to the different criteria.

Criterion	Result	%
Frequency	[X MOVES THROUGH Y]	16%
Elicitation	[X MOVES THROUGH Y]	28% (all occurrences) 53% (first occurrences)
History	[PP INSTRUMENT]	78%
L1 acquisition	[PP PLACE] [X MOVES THROUGH]	33% (first occurrences) 39% (all occurrences)
L2 use	[PP INSTRUMENT]	56%

The above results point to (partial) divergence of the criteria used to identify the prototype of *through*, rather than (full) convergence. In view of the range of criteria examined, this is perhaps not so surprising. As Gries (2006: 75) puts it, “given such an inventory of criteria, conflicts of criteria are the rule rather than the exception”. The dimensions in which prototype effects can be observed (phylogeny, ontogeny, synchronic language use, cognitive entrenchment) are so diverse and the text types (recipe book for medical practitioners,

spontaneous speech, argumentative essays, etc.) so different that we must expect such conflicts to occur. They are problematic, however, only if one considers prototypicality as a monolithic phenomenon, in which all criteria should necessarily point in the same direction. If, on the other hand, prototypicality is seen as a multi-faceted concept, conflicts of criteria can easily be resolved. Each criterion then appears as one of the factors contributing to the prototypicality of an item. Convergence of the effects of different criteria is possible and indicates a very ‘strong’ prototype, but the model also allows for cases where some criteria go in a different direction, resulting in a ‘weaker’ prototype. Such a model could explain the discrepancy displayed by *through* in our study, and why scholars disagree as to whether certain criteria converge or diverge. Furthermore, it confirms the idea, suggested, for example, by Posner (1986) or Geeraerts (1988b), that prototypicality is itself a prototypical concept, with some prototypes being more prototypical than others.

Table 9. Percentage of the purported prototype of *through* ([X MOVES THROUGH Y]) according to the different criteria.

Criterion	% of [X MOVES THROUGH Y]
Frequency	16%
Elicitation	28% (all occurrences) 53% (first occurrences)
History	7%
L1 acquisition	25% (first occurrences) 17% (all occurrences)
L2 use	9%

This conceptualisation of prototypicality opens the way for further developments and refinements. This would involve drawing up a list of factors that potentially play a role in prototypicality and measuring the impact of these factors. The more exhaustive the list, the better the model would be. One should also decide whether the factors are equally weighted or whether some factors are more important than others in determining the prototype. If factors are competing, multifactorial statistics should be made to sort this out. Finally, a multi-faceted concept of prototypicality has the obvious advantage of accommodating several types of empirical evidence, thus giving more substance to the notion of a prototype. It should also encourage linguists to use empirical evidence in the first place and to explore different avenues through triangulation of data in order to establish prototypicality.

6 Conclusion

Although it has become more common nowadays to use empirical evidence in Cognitive Linguistics, there are still notions that could benefit from more empirical foundations. This is the case with prototypicality. As linguists, we tend to have a pretty good idea of what the prototypical member of a linguistic category is. However, such intuition-based prototypes may not straightforwardly map onto the reality outside our linguist brains. In this paper, we sought

to test the empirical validity of one such prototype, namely the prototype of the word *through*, which supposedly involves a subject moving to another location by passing inside a kind of container. With this aim in mind, we applied five criteria regularly cited in the literature to identify a prototype: frequency of use, ease of elicitation, historical origin, L1 acquisition and L2 use. Relying on a taxonomy framed in terms of Construction Grammar, we identified the most prototypical construction according to each of these criteria. The intuition-based prototype of *through* received empirical support from two criteria (frequency and elicitation), but other ‘prototypes’ emerged from the analysis, most notably the instrumental prepositional phrase. While full convergence was therefore not obtained, the study still highlighted a number of meanings that seem to be particularly central to the use of *through*.

Through the example of *through*, this study has shown that adopting empirical methods in Cognitive Linguistics not only provides more reliable results, especially if methodological pluralism is involved, but that it can also offer insights into more theoretical issues. In the present case, the partial divergence between the criteria led us to redefine prototypicality as a multi-faceted concept, which could account for different results for different criteria. Further research will be necessary to establish how this multi-faceted view of prototypicality relates to similar models such as exemplar theory, in which “each occurrence of a structure (e.g., a sound) is stored, and new occurrences are shaped by analogy with ‘clouds’ of stored exemplars (denser clouds exerting a stronger influence)” (Langacker 2016: 54; see also Baayen and Ramscar 2015 for a review of some of these models). However, we should keep in mind that, as Stefanowitsch and Flach point out,

we cannot directly measure degrees of entrenchment, or even verify the existence of entrenchment, by any currently available means. Regardless of whether we attempt to measure entrenchment experimentally or on the basis of corpora, we must rely on operational definitions that approximate the theoretical construct but are not identical with it. (Stefanowitsch and Flach 2016: 101)

Our knowledge of prototypicality and, more generally, our insights into the workings of human cognition will thus only be as good as the linguistic proxies (experimental methods, corpus data, etc.) that we use to investigate them. As linguists, we should therefore strive to operationalise these concepts as efficiently as possible and by using as much converging evidence as is necessary.

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