Conceptual onomasiology as blending in Ancient Greek.
The sense of COMPLETION as generic space in the polysemic network of *plēróō*.

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This is a theoretical and methodological exploration into the phenomenon of diachronic polysemy from a conceptual onomasiological perspective, where the notion of 'bridging context' is reinterpreted as an integration process between two situations. The use of a term for expressing some aspect of a conceptually negotiated situational context is analysed as an ad hoc choice. In this light, the work operationally maps the notion of 'generic space' in conceptual blending with the diachronic emergence of featural configurations on a multiple correspondence analysis visualisation, enriched with the confidence ellipses around the centroids of the various senses for the polysemous term. These ellipses appear to partially overlap with two distinct senses, at the same time being immanent to the gestalts of both. The data come from the diachronic development of the verb plēróō in Ancient Greek, between the 6th and 3rd c. BCE, for 833 instances of the term, encountered for this period.

Keywords: *Conceptual integration, polysemy, conceptual onomasiology, Ancient Greek, behavioural profile, multiple correspondence analysis.*

1. Introduction

For any scientific inquiry, a felicitous pairing of theory and method represents a challenge. Similarly, the choice on the methods implemented for addressing a given phenomenon has repercussions on the theoretical conception of the object of inquiry itself. Cognitive Linguistics, as a usage-based theory (Langacker 2008), follows an inductive methodology (Schmid & Handl 2010). This bottom-up way of proceeding in the analysis tries to avoid the circularity following a self-confirmatory intuition. By this assumption, hypothesis testing must follow generalisations over real and large-scale data. This theoretical approach naturally links linguistic inquiry with corpus-based studies. The connection between linguistic theorising and data has long been assumed possibly as the only way for linguistics to proceed as a science. Fillmore (1985), Talmy (1985) and Lakoff (1987) are some examples of this turn towards empiricism and usage-based analysis (Langacker 1987, 1988). Nevertheless, data analysis kept being based on introspection long after cognitive linguistics has been characterised as data-driven (Glynn 2010a, 2014a, 2014b). In this context, the present work tries to draw a connection between more intuitively implemented methods of analysis such as radial polysemic sets (cf. Lakoff 1987) and conceptual integration networks (Fauconnier and Turner 2002, 2003), on the one hand, and inductive statistical methodology applied on large-scale data (cf. Glynn, op. cit.), on the other. It does so on the basis of visualisation of multiple correspondence analysis for an Ancient Greek term, *plēróō*, for successive periods of the term's development.

Some aspect of linguistic inquiry that links to the concern of relating theory and method is a reliable representation of meaning itself. A central point of debate here is the deconstruction of the intuitively grasped notion of lexical sense as an atomic unit. This deconstruction has two facets that along the history of the field took place as a series of subsequent and consequential phases. The first facet concerns the relevance of the phrasal context of a lexical unit, captured in the long-standing aphorism that "you shall know a word by the company it keeps" (Firth 1957; also Mackin 1978; Gries 2013). The second facet is the extension of Firth's idea that

collocations are a reliable indicator of a word's meaning, towards a more radical notion of *co-occurrence*. The latter has evolved so that it encompasses – beyond the more familiar idea of phrasal "context" at the level of words- the set of features constituting the matrix of a sense as well as the features constituting the item´s environment. This move extends the usage-based analysis into a usage-feature analysis (Geeraerts et. al. 1994; Gries 2003; Glynn 2009, 2010b), otherwise known as "behavioural-profile approach" (Gries 2010).

It is crucial to note though that a feature-based analysis goes much beyond what would be understood either as a structuralist or, within a semantic structuralist framework, as a componential analysis (Geeraerts 2010, chpt.2). The reason is that the latter would see featural composition as based on binary oppositions, such as in Hjelmslev´s analysis of meaning (1953, 1958) or Pottier's (1964, 1965) and Coseriu´s (1962, 1964, 1966, 1967) semantic field analysis. The turning point in semantic theory is precisely the abandonment of the idea that semantic categories are rigidly defined in binary terms of necessary and sufficient conditions (Geeraerts 1987, 1993), susceptible to the notion of 'truth' (Davidson 1967). Work on prototype-based categorisation (see Rosch 1973, 1975; Rosch & Mervis 1975; Rosch et al. 1976) seems to have once and for all resolved theoretically the paradoxes stemmed from considerations of "necessity". The notion of "prototype", a more general notion concerning categorisation, has its linguistic semantic equivalent (Taylor 2003; Geeraerts 1997). Prototypicality in linguistic categorisation holds that meaning is not a matter of clear-cut segmentation of realities into linguistic denotations. In contrast, it is to be understood as a dynamic and extensible configuration of features, either the latter are semantic, formal/constructional or pragmatic/encyclopaedic.

Nevertheless, the decomposition of senses into clusters of prototypical features raises a representational problem (Geeraerts 1995). How is the intuitively grasped notion of sense to be represented in the theory? The question actually specifies the more general problem of the contrast between inductive usage-based methodology and top-down intuitive analysis. On the one hand, under the strong version of the thesis on prototypical organisation of meaning, senses are not but an illusion, and for that matter potentially dispensable as objects of analysis. On the other hand, people do speak with words understood as psychological realities, which renders words a natural boundary between sub-sense and supra-sense level of conceptualisation. Additionally, the demolition of the notion of sense seems to be at odds with a core assumption within cognitive semantics. This assumption holds that meaning is greatly organised through gestaltist units, such as image-schemas, semantic frames and ICMs (Fillmore 1985; Lakoff 1987). Denying the psychological reality of senses would also put in question the representational value of those gestalts in the theory.

Older analyses used to represent prototypical organisation of meaning either through the architecture of a radial network or that of overlapping sets (Brugman & Lakoff 1988; Lakoff 1987; Geeraerts 1995). The overlapping-set representation is based on set membership, with category members presenting commonness of shared features. These sets may or may not overlap, to a greater or lesser extent. The representation is given schematically in Figure 1, for the concept BIRD (Geeraerts 1995: 25; also Cuyckens 1991; Schmid 1993):
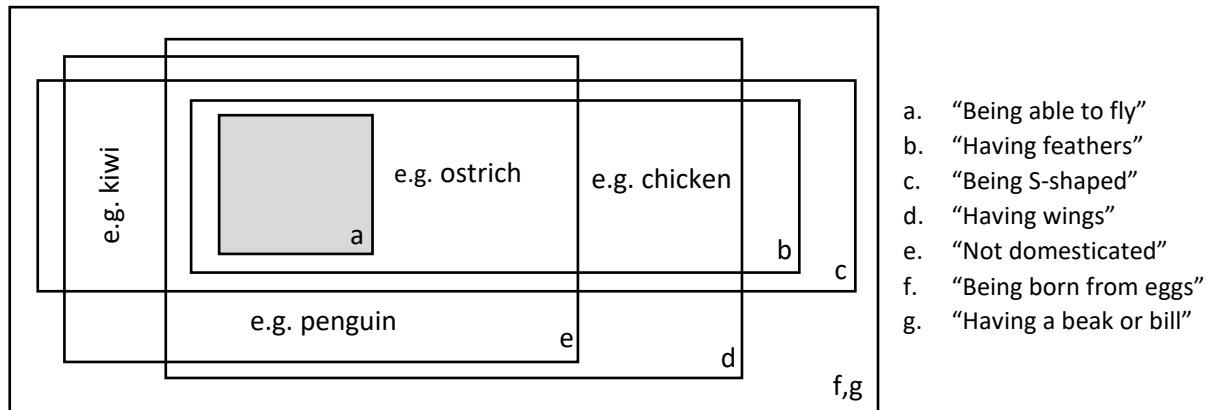
Figure 1. *overlapping-set representation of meaning for the concept* BIRD

In a representation such as that in Figure 1, prototypicality corresponds to the area with the maximal overlapping among sets (Lewandowska-Tomaszczyk 2010, chpt. 6).

The radial set model, introduced in Lakoff (1987; see also Brugman 1981; Janda 1990; Nikiforidou 1991; Goldberg 1992), has as its basic element the meanings of the senses of a category, themselves. Among these senses there are links that represent extensions from one sense to another. Taking again the example of the category of BIRD and its representation through a radial model in Figure 2, we see that all peripheral senses stem from a so-to-say central one that corresponds to the chronologically prior biological reading. The peripheral senses in this case are motivated through metaphorical similarity:
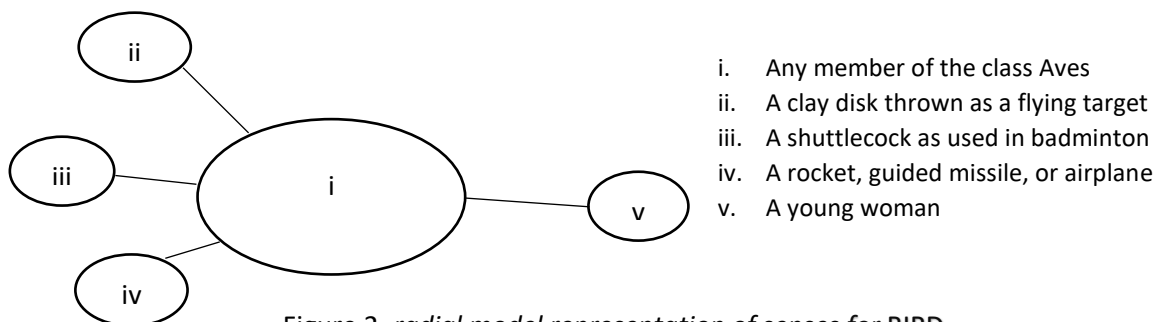

Figure 2. *radial model representation of senses for* BIRD

The two representations are not incompatible but rather focus on different structural aspects of the semantic network. The former, for example, can be understood as an elaboration of category (i) in Figure 2. The peripheral elements in Figure 2, on the other hand, are extensions of (i). The difference between elaboration and extension as understood by Langacker (2008) lies in the degree at which a category sanctions its elaboration. In Figure 1, at a level of schematicity represented by (i) in Figure 2, all categories are sanctioned holistically. In Figure 2, though, senses (ii-v) are only partially sanctioned by (i). This makes them extensions of the latter rather than elaborations of it.

The problem of representational compatibility between the two models lies precisely in integrating these two aspects: elaboration and extension as related to two different theoretical conceptions of the notion of prototypicality. The first represents a vertical dimension and the second a horizontal one, as depicted in works such as Langacker (2008) and Tuggy (2010):
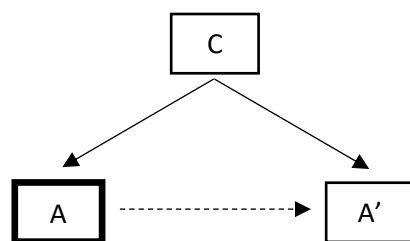
Figure 3. *integrated model of sense representation*

The network in Figure 3 combines the overlapping-sets representation and the radial network representation. If [A] is a category such as RING understood as a CIRCULAR PIECE OF JEWELERY, then its conceptual link to an extension [A'] such as CIRCULAR ARENA must pass through the re-categorisation of both under a single schematisation, such as CIRCULAR OBJECT (Langacker 2008: 37). The figure accommodates both models, encompassing the extension from a category central within a network on the one hand, and the categorisation of both through a more schematic entity that as a gestalt underlies both.

At the same time, Figure 3 captures in a single representation two types of prototypicality. The one is prototypicality based on centrality, whereas the second prototypicality based on schematicity. [A] as PIECE OF JEWELERY has a central and prior correspondence to the use of the term, in other words it is prototypical in terms of being central in a context of use. On the other hand, [A'] as an extension of [A] forces [C] to categorise both at a more schematic level. Although more encompassing a category now, [C] is less specific and for this reason less associated with a concrete instantiation. The dashed and continuous lines in Figure 3 between the categories are links of extension and links of schematisation, respectively. The latter represents the relationship between a subordinate category and a superordinate one in a hierarchical taxonomy. Extension [A'], on the other hand, represents partial capacity of the extended category to be schematised by the prototype of [A] (Lewandowska-Tomaszczyk 2010, op. cit.).

Nevertheless, if [A] is [A]'s extension and not a distinct category altogether, then the relation between the two is one of partial overlapping, much similar to that of Figure 2. This assumption, beyond being a matter of representation, has ramifications regarding the very ontology of the category [C]. Is the schematicity-based prototypicality real or just a theoretical artefact? The two problems can be labelled as follows: the non-discreteness of lexical senses and the non-independent existence of prototypes, respectively. Hence, two empirical questions that beg for an answer are the following: First, can the [C]-type schematic prototypes be empirically traced, perhaps as independent instances of emerging lexical senses? Second, in the context of a behavioural-profile approach to determining meaning, how can a schematic prototype be represented, not as an introspectively traced intuitive reality but as an inductively emerging entity?

The remainder of the paper is organised as follows: Section 2 shows how an onomasiological perspective on semantic extension gives rise to the possibility of representing a schematic prototype as a generic space in a process of sense-blending. Section 3 shows how this assumption can be methodologically and representationally translated into a multiple correspondence analysis, in the context of a feature-based behavioural-profile approach. Section 4 looks at the data, taken from the development of the ancient Greek verb *plēróō*, originally meaning FILL, for a period of 4 centuries, between 6th and 3rd c. BCE. Section 5 summarises and presents the conclusions and some perspectives for future research.

2. Semantic extension as ad hoc integration in an onomasiological framework.

2.1 *Polysemy vs. blending*

Last section hinted at the desirability of an identification between mental processes and meaning representation. This identification seems to have more chances if it follows an inductive route, thus avoiding the a priori postulation of entities. Categorisation is principally a bottom-up process, as must be the emergence of prototypes. In the light of this assumption, the present section will try to see how the status of the schematic prototype in polysemy can be theoretically accommodated, so that it is eventually mapped into an appropriate operationalisation.

Semantic extension, either metonymically, metaphorically or otherwise driven, is inextricably linked to the notion of polysemy (Riemer 2005; Langacker 2008; Evans 2015). Nonetheless, although metonymy and metaphor have been formalised in terms of blending (Fauconnier & Turner 2003; Coulson & Oakley 2003) it is a generally held view that polysemy and synonymy research are rather irrelevant to it (Glynn 2014a). The basic reason is that conceptual integration has been widely formulated as a discourse-driven process of ad hoc extension which, although it makes use of entrenched gestaltist units of knowledge, serves purposes of ongoing discourse (Fauconnier & Turner 2002). The implication is twofold: first, there is a purposeful discursive/pragmatic intention escaping the gradual and greatly unconscious nature of the constitution of polysemic networks. Second, it does not get entrenched but dissolves upon the integration being externalised and processed.

Nevertheless, I want to argue that in polysemy there is always an ad hoc component, which in turn may get lexically entrenched. As we will see immediately below, this assumption implies that a further dissociation of the notion of ad hoc construal from conceptual integration as a *deliberate speech act* must be drawn.

As has been early noted in literature (Sweetser 1990), no historical semantic shift can take place if a polysemic state does not first intervene. The context of this state has been characterised as *bridging context* (Evans and Wilkins 2000; Geeraerts 2017). Bridging context between two polysemically related meanings [A] and [A'] (see Figure 1) leads to a contextually enriched and inferentially identified [A], before this gets independently identified and lexicalised as [B]. For example, this is the case of the term *emotion*. The latter, with the initial literal meaning of MOVEMENT, the [A] meaning in our formulation, passed through a usage context where the understanding of moving fluids in the body were metonymically related to the generation of feelings such as sadness, melancholia, happiness, rage, etc:

(1) *The king…in this <u>emotion or rage</u> of iealousie hardly contained he himselfe from killing his wife* (*T. Lodge tr. Josephus Wks. xv. iv. 388, 1602 AD*).

This contextual interpretation, [A'] in our case, finally got entrenched to what today *emotion* means. Figure 4 depicts this intermediate state between *emotion* meaning MOVEMENT and *emotion* meaning FEELING, which is the interpretation of feeling as the result of a specialisation of actual motion, that of fluids in the human body, as shown in Geeraerts (2017):
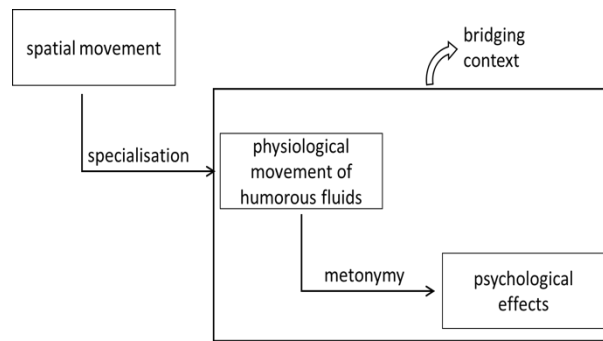
Figure 4. *bridging context for FEELING is MOTION*

Here, what constitutes the bridging context is a situation where fluid motion as a physiological event and feelings as psychological effect co-exist. Interestingly though, even for such examples where a bridging context seems to be concrete and physically detectable, a comprehensive "theory" on emotions as fluids *precedes*, does not follow (Geeraerts 2017). In a relevant sense, the bridging context would not have arisen in the absence of the theory. In other words, the bridging context emerges only as a secondary "theory" that gets situated, as the result of the perspectivisation of emotions as motion of fluids. In this light, it is not deterministically present in principle.

The point can be made clear through a great number of examples. I will choose the term whose analysis follows, namely *plēróō* in Ancient Greek. The term, originally meaning FILL in 6th c. BCE, evolved into that of SATISFY, entrenched to meaning PAY around 2nd c. CE (see Ioannou 2017, 2018). In the last stage of its evolution towards a sense meaning PAY, *plēróō* was used to depict situations of paying as the fulfilment of a duty. The term gradually substituted for the periphrastic term *apodídōmi timḗn*, which literally means GIVE OFF THE DUE PRICE. Compare the two expressions in (2) and (3):

(2)　　*Kàn*　　　　*chrḗmata*　　　*dômen*　　　　　　*toîs*　*deoménois,*
　　　　And if　　　money.ACC　　give.1PRS.SUBJ　　det　　need.PART.DAT
　　　　ofeilḕn　　　*plēroûmen*　　　(John. Chris. *Scr. Ecc. In epist. ad Rom. hom 1-32*)
　　　　debt.ACC　　pay.1PRS
　　　　'Even if we give money to the needy ones, it is a debt we pay'

(3)　　*tês*　　*timês*　　　　*te*　　　　*apodidótō*
　　　　det　　price.GEN　　　PTC　　　give.3PRS.IMP
　　　　tôi　　*priaménōi*　　　*triplásion* (Plato, *Leges 916d1*).
　　　　det　　buy.PART.DAT　　triple.ACC
　　　　'…and give the buyer the triple of the price'

Nevertheless, the term's sense of SATISFY does not pre-determine the context of commercial transaction as the bridging context between the senses of SATISFY and that of PAY. It is rather the conceptualisation of a given situation that *inserts* the concept of SATISFACTION in the context of transaction as relevant to the latter. This is also evident by the fact that *plēróō*, until its entrenchment into the sense of PAY, the sense that has eventually retained in Modern Greek (MG), selected a rather wide range of possible direct objects, such as DESIRE, HONOR, OBLIGATION, etc.:

(4) Pôs   oûn   kaì   tèn   epithumían   eplérōse
     how   then   CONN   det   desire.ACC   satisfy.3PRS.AOR
                                                 (John. Chr. *Scr. Eccl. In fac. ei rest.*)

     How then did he satisfy his desire?

(5) I   Shakira   plírose   20.000.000   evró
     det   Shakira.NOM   pay.3PRS.AOR   20.000.000   euro.ACC
                                                        (*Google Search, 2018*)

     Shakira paid 20.000.000 euro.

2.2 *Conceptual onomasiology and polysemy as blending*

Given that bridging context does not drive polysemy but actually is generated through the insertion of a term appropriate to construe linguistically a situation, I argue that the use of a term in a new context is primarily a matter of "concept designation" (Baldinger 1980). This is important because it has a plausible consequence: polysemy understood as semasiological extension (Glynn 2014a) may actually always involve an ad hoc choice of a term among a range of possible candidates, a matter of onomasiology. This in turn opens the possibility for treating diachronic polysemy as conceptual integration.

Here, it would be useful to make a more concrete reference to the notion of *onomasiology* in diachronic semantic research, which is usually contrasted to that of *semasiology* within the broader field of inquiry into the relation between words and their meanings. The two terms signal mostly a difference of perspective within the study of semantic change. Baldinger (op. cit) has early defined semasiology as the study of the meanings through which a given term is manifested. On the other hand, he defines onomasiology as the considerations of the 'designations' of a particular concept, in other words, the cluster of potential expressions to label a given meaning. This distinction would automatically identify the study of polysemy as a semasiological concern, whereas synonymy as an onomasiological one.

Geeraerts (1993, 1999, 2002, 2006, 2017) has drawn a similar distinction between the domain of semasiology and onomasiology, identifying them roughly as being about *meaning* and *naming*, respectively. Nevertheless, Geeraerts carefully differentiates that early conception of onomasiology from its cognitive linguistic equivalent. Earlier onomasiology was directly linked to the traditional, structuralist conception of formal semantic relations such as hyponymical, antonymical, synonymous, etc. Additionally, concerns of "designations of a particular concept" is more relevant to the investigation of the pragmatic factors that push towards an actual choice of a term as a designation of a particular concept or referent (Geeraerts 1999).

This conception of onomasiology leads to binary distinctions as that between *langue* and *parole*. The resolution of the binary contrast comes from a qualification of onomasiology into *formal* and *conceptual*. The former refers to the competition between equivalent terms on the basis of sociolinguistic and more generally external/contextual factors such as register, education, gender, etc. An example would be the relative preference of groups of speakers for a certain taxonomical level (Grondelaers & Geeraerts 2003). Concretely, an expert in a field is more likely to use subordinate and very specific terms such as detailed technical terms pertaining to their field of expertise than a layman. Conceptual onomasiology, on the other hand, extrapolates semasiological notions into the workings of onomasiology. The choice of a name has a conceptual weight that gives an import into a situation where it is used. Conceptual onomasiology in this light is a kind of "cognitive preference" on the part of a speaker for one term over the other as a designating name for a given referent. In this sense, there is no real

synonymy and the difference between terms such as *emotion* and *feeling* have an impact on the way the referents are conceived. Subsequent entrenchment through frequent use of this preference may convert a name to the only choice for a referent.

In the light of the above, it can be argued that, from an onomasiological perspective, polysemy has a relevant onomasiological facet that consists in "choosing" a given name in the context of a competition among alternatives that impose a distinct construal over a situation. For any given context, where the necessity of denoting aspects of the latter arise, the relevant choice is done on the basis of the conceptualisation symbolically linked to a chosen term.

For instance, in the example of *plēróō* mentioned above and in the context of commercial transaction, an onomasiological choice is made over what term is most suitable to designate the action of PAY. This competition and subsequent choice is not supposed to be conscious, but possibly part of the processes that have been called "backstage cognition" (Turner 2003). It pertains to the more general human capacity of linguistic construal (cf. Langacker 2008), where profiling "selects" specific aspects of a given conceptual base to bring into fore and onto stage.

Thus, in any communicative event, designation of some entity brought in focus within a given context, say C_1, typically takes place. This context may be a CULINARY context, a COMMERCIAL TRANSACTION context, or a context containing more evaluative or affective nuances such as MOTHERHOOD. We may want to call C_1 a *situational ontology*, typically expressed through its frame-semantic linguistic coding (cf. Fillmore 1977, 1982, 1985). These designated entities constitute the range of possibilities for profiling parts of this ontology. Some of the linguistic choices may come from terms entrenched within the frame-like conceptualisation of C_1. Thus, for a COMMERCIAL TRANSACTION FRAME terms such as *buy*, *sell*, *cost*, etc. are used. Nevertheless, others may not have been used before for the specific context. This was, for instance, the use of the term PAY when it was first used in the context of commercial transaction. In this case, C_1 picks up a term whose sense S_1, in our example PACIFY, entrenched for C_2, brings along the conceptualisation of the ontology of C_2. This way, S_1, still not entrenched as extension of S_1, annotated here as S_{1e}, is able to perspectivise aspects of the context under conceptual negotiation, namely $C1$ – the COMMERCIAL TRANSACTION context - in our case. The process is shown schematically in Figure 5:
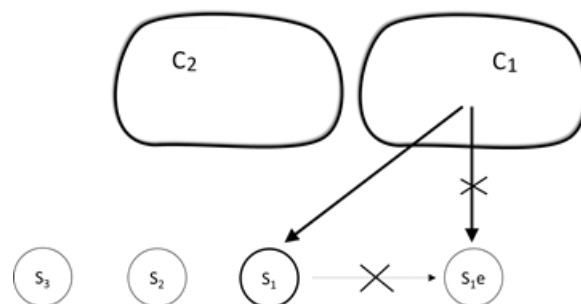

Figure 5. *perspectivisation of* C_1 through use of S_1

Hence, the usage of a given sense into a new context of use is a perspectivisation of its situational ontology in terms of that sense, a matter of conceptual onomasiology. Nonetheless, how is the notion of 'bridging context' to be understood under a conceptual onomasiological perspective? Earlier on, we saw that the main obstacle for polysemy to be inserted in a framework of conceptual integration is the fact that the latter concerns ad hoc conceptualisations, with S_1 in Figure 5 being ad hoc for C_1. Polysemy, understood from a semasiological perspective, concerns the semantic potential of a single term. Hence, meaning extension in this sense can be accounted for mostly as a matter of lexical-internal processes

that occur, if only because a bridging context favoured the extension. Nevertheless, understanding bridging context as a consequence of an onomasiological choice renders the preference for a term – and through this for the sense that the term represents- a cognitive process of construal.

3. Blending representations within a multivariate analysis

3.1 *Operationalising blending spaces*

We turn now to the question how the onomasiological perspective on polysemy as an ad hoc – albeit unconscious - process of designation opens the possibility for re-formulating polysemy in terms of conceptual integration, and how this formulation can be operationalised and visualised within a behavioural-profile approach to semantic extension.

If a sense from one frame, say PASSIFY/APPEASE from STIMULATE EMOTION frame (see FrameNet 2020) is chosen in order to profile the COMMERCIAL TRANSACTION frame, it is not PAY inserted in C1 but actually APPEASE, taking a conceptual perspective over the frame. In this light, this insertion is actually an instance of integration between COMMERCIAL TRANSACTION and STIMULATE EMOTION frames, as shown in Figure 6:
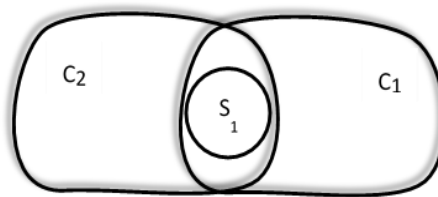

Figure 6. ad hoc *choice of S_1 in C_2 by C_1 as C_1-C_2 blending*

The ad hoc onomasiological choice of a sense that has been entrenched as a lexical unit to a different context or semantic frame, for that matter, generates an area of overlapping between the two contexts C_2 and C_1, understood as conceptualisation of the latter through elements of the former, namely COMMERCIAL TRANSACTION through STIMULATE EMOTION.

Conceiving polysemy as a process of blending raises specific theoretical, methodological and representational questions. First, conceptual integration presents two dimensions of overlapping structures: *generic space* and *emergent structure* (Fauconnier & Turner 2002). As said above, generic space consists of the elements that make up the "commonness" of the two inputs. It is a more abstract, schematic type of structure that serves as the common ground for blending to take place. It is a categorising entity, reminiscent in its role of schematising on the basis of similarities the notion of 'family resemblances' in Wittgenstein (1953; Kövecses 2010). Theoretically speaking then, there arises the question what kind of space the overlapping between C_1 and C_2 represents, question linked to the more general problem of the distinction between schematic and central prototypes. The question is also relevant to the concerns expressed above (see introduction) on the representability and real character of the generic space at large as a gestaltist object. Methodologically, a similar problem arises. This concerns the operationalisation of generic space and emergent structure as real objects, on the basis of the observable featural configurations comprising the various senses´ behavioural profiles. As said above, behavioural-profile approach to semantic research holds the idea that senses must be defined on the basis of a non-discrete probabilistic categorisation. A sense thus is defined in terms of clustered usage-based featural configurations

(Gries 2003, 2006; Glynn 2009, 2010; etc.). In this light, the following question arises: Are also generic space and emergent structure to be operationalised as featural configurations? Representationally, the question translates into the actual detectability of the configurations on a map of visualisation of the correlations holding among the features instantiating all observations.

Much has been already written in the direction of refuting the cognitive faithfulness of Lakoff´s radial networks and the employment of representational nodes serving to depict distinct senses (Geeraerts 1993, 1995; Kilgarriff 1997; Zlatev 2003; Glynn 2010, 2014a, 2014b). If the polysemic state of a sense and its prototypical commonness were to be represented, this would more naturally bear a resemblance to Figure 8 than to Figure 7, where some partial overlapping of the featural configuration (Geeraerts 1993, Geeraerts et al. 1994, Lehrer & Lehrer 1994) comprising the prototypicality of a sense, appears to be common in two configurations:
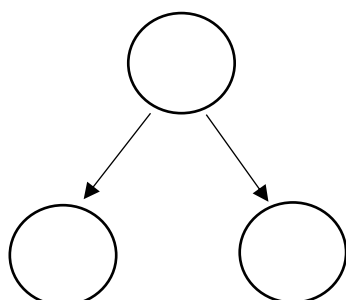

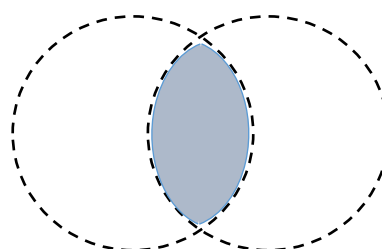Fig.7 *radial network-based polysemy*   Fig.8 *feature overlapping-based polysemy*

Nevertheless, if the problem related to Figure 7 is the autonomy of senses taken for granted, the problem with Figure 8 is related to the notion of *immanence* (Langacker 2008: 56). Immanence is defined as the "lying within" schematicity of a categorised conceptual instance (op. cit. 174). It is not enough for a categorising schema to be a fragment of the categorised entity. It has to be, in other words, 100% present within the instance it categorises. The problem is related to the aforementioned distinction between the two types of prototypicality, namely one based on centrality, and another based on schematicity. Does a featural overlapping between two related senses represent one of the two types of prototypicality? And if yes, which one? Finally, can this overlapping coherently give us a glimpse of the emergence of a generic space as a categorising process over two or more related senses? Intuitively speaking, if the generic space is to be identified with one of the two types of prototypicality, this has more chances to be conceptual prominence. The question is if it can be detected on a visualisation map of some sort or not, especially because of its gestaltist immanence to the structures it prototypises.

To this end, the present analysis argues that the visualisation of implementation of a series of multiple correspondence analyses (MCA) for diachronic data may be able to grasp the reformulation of polysemy as conceptual blending, at the same time unifying the two representations of semantic extension given above: as a map of overlapping featural sets along a continuum of senses on the one hand, and as a radial network whose constitution is driven by processes of extension such as metaphor and metonymy.

MCA is an exploratory statistical method for analysing categorical data. The course of its implementation is the following: first, for a set of data that comprises a more or less long list of attested occurrences of the term that is under analysis, a given number of variables/factors are characterised for their instantiations into specific levels. These variables may concern either grammatical/formal or semantic/conceptual features, the former being for

example PAST, INDICATIVE, PERFECTIVE, etc., and the latter ranging from very schematic characterisations such as AGENT or INSTRUMENT to more concrete such as ANIMATE OBJECT or MACHINE, VEHICLE, etc. In turn, the frequency of co-occurring features is converted into a distance matrix among these features, representing the overall correlation among the totality of (co-occurrence of) features coded for. This distance/proximity matrix can be subsequently plotted so that proximity between points reflects similarity, both among features as well as clusters of these. Such a plot may take as reference point either the features, the variables that these features code for or the observations themselves. The bi-dimensionality[1] of an MCA plane that visualises the overall attraction between factors/levels collapses the multi-dimensional correspondences into a single biplot. Hence, an MCA map is a reduction from a multi-dimensional space of interactions to a lower-dimensional representation. If the MCA map is chosen to visualise the senses that act as labels for the featural configurations that are associated to them and constitute their behavioural profiles, then we expect the following: the senses that appear closer will be "more similar" regarding their constitutive featural configurations, as they display similarities in the distribution of the features across their contexts (for an analysis of the technique see e.g. Baayen 2008, Levshina 2015, Glynn 2014b; also Ioannou 2017).

3.2 *Confidence ellipses around the centroids of senses and prototypicality*

How may an MCA visualisation of senses be a useful method towards a felicitous representation of polysemy as conceptual integration? The labelling of senses across an MCA map actually depict relative distances among their featural configurations. The positioning of the senses is not a mere point, but actually has a "prototypical range" of expansion towards other configurations, roughly defined as senses. It is an ellipsis-shaped expansion of a given "centroid", itself understood as the grand average across the average distances among the features comprising a cluster, towards the rest of the clusters. Hence, the visualisation of this structure around each centroid identified with the sense-labels, formed as ellipses around them, gives a good representation of the prototypical structure for each sense.

The technique has been implemented for synchronic research, such as the correlation of registers with grammatical features or classifications of objects on the basis of their functional features, and the degree to which there is overlapping among the former in regard with the latter (e.g. Levshina 2015), the former understood as 'exemplar' categories (op. cit). This analysis will implement an MCA and its concomitant visualisation for a series of period-slots in a diachronic research context, for the ancient Greek term *plēróō*, originally meaning FILL, for the period 6th c. BCE to 3rd c. BCE, for a totality of 883 coded instances. It uses the same data as Ioannou (2017) and is based on the same MCA analyses conducted there, extended here through the visualisation of the ellipses around the centroids of the senses. The reason for choosing the specific term is twofold: first, in its original meaning it sanctions an image-schema of central interest in Cognitive linguistic literature, namely the image schema of CONTAINER. Second, the evolution of the verb led to its meaning of today, namely PAY, a sense that profiles possibly the most thoroughly analysed semantic frame in linguistic literature (Fillmore & Baker 2010). The Greek term already shows the first usage as PAY in the 2nd c. CE. It got entrenched with this sense in Medieval Greek and got lexicalised under the form *pliróno*. This form contrasts with the more archaic form *pliró*, still in use in MG, that has retained the older meaning SATISFY. The totality of the extant data has been extracted from Thesaurus Linguae Greacae, a platform including all Greek literary texts.[2] The distribution of texts with the term

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varies greatly, from epic to poetry and historiography, to medical texts and philosophy, a fact that shows that the term has a generalised use that is not constrained dialectically or on the basis of register. The present analysis stops before the rise of Atticism (Kim 2017, De Jonge 2008) with the end of 2nd c. BCE, where a standardised rhetoric mannerism signals a retrogression not only in terms of language forms but possibly in terms of textual themes too.

The representation of centroids is labelled through the observations themselves, namely the senses coded for, with an expansion of the visualisation of the centroid as ellipses around the latter, at a 95% level of confidence. Thus, a comparison among the various MCA maps for the subsequent periods will take place, with a parallel comparison of the expansion and relative positioning of the ellipses for the centroids of the various senses. The aim of the comparison is the following: detect any coherent patterning among (a) the expansion of a sense, (b) its relative positioning and overlapping with the rest of the senses, as well as (c) the schematicity of the sense under observation. The ultimate goal is to detect distributions that make sense as representing the entities of generic space and emergent structure.

As already said, the MCA analysis will yield a global clustering of the various senses for the four-century period under investigation for the ancient Greek term *plēróō*, thus evaluating the conclusions drawn for the diachronic evolution of the term. The analysis will mainly confine itself to the visualisation of the MCA, drawn on an analysis whose quantitative data can be found in Ioannou (2017, 2019). Nevertheless, the contribution of the relevant features for each century, on which the visualisation is based, are given in the appendix of the present paper. The data comes from the manual collection of the sum of the instances of the verb *plēróō*, for the period under examination. The term has been annotated for the following formal features: VOICE (e.g. ACTIVE, PASSIVE, etc.), TENSE (e.g. PRESENT, PRETERITE, etc.), CONJUGATION (INDICATIVE, IMPERATIVE, etc.) and CONSTRUCTIONAL PATTERN: SO represents a subject and an object, in an expression such as *Diomedes filled the theatre*; SOG, represents the prototypical construction of a subject filling an object with something, met in an expression such as *Diomedes filled the cup with wine*; SG represents the construction where a subject is filled with something, as in the expression *the theatre was filled with people*; Finally, S represents a construction including just a subject, as in the expression *the theatre got full.*). The semantic features include the type of the following participants: AGENT, PATIENT and the entity that assumes the role of the filling element, tagged as FILLER. The coding is held at a rather fine-grained level, with instantiations such as PERSON, ANIMAL, VEHICLE, PLANT, LIQUID, etc. For the characterisation of the observations into senses, the Ancient Greek dictionary of Liddle-Scott has been used. The data has been divided by century, with the exception of 6th and 5th centuries BCE, which have been merged, a choice due to the relative scarcity of data for 6th century. For the correlational analysis and visualisation of data has been used the *R*-platform.

4. Visualisation and analysis

4.1 *COMPLETION between FILLING and CULMINATION*

Let us start with the visualisation of the distance matrix for 6th-5th c. BCE, represented in the form of confidence ellipses around the centroids of the senses on an MCA plot. This is given in Figure 9:
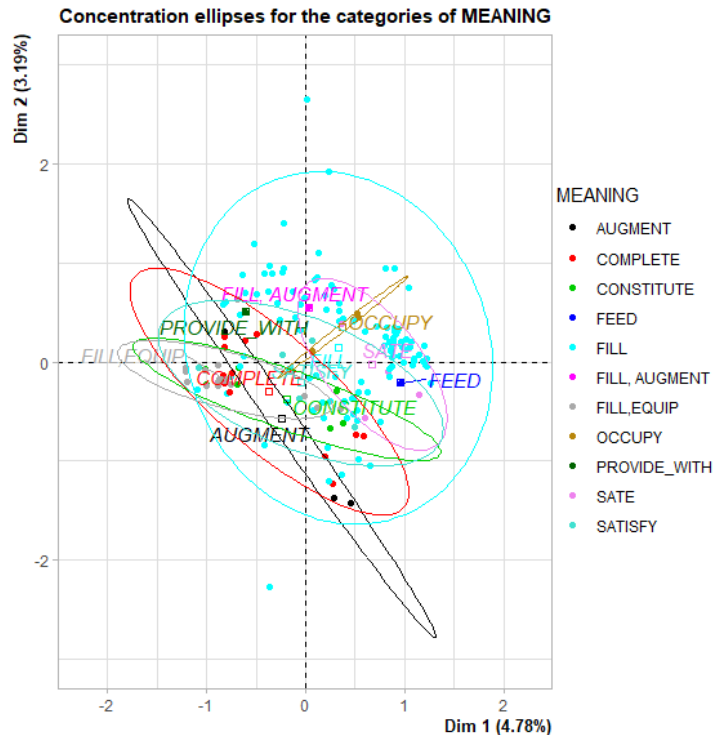
Figure 9. *MCA confidence ellipses for senses, 6th-5th c. BCE*

The interpretation of such a map is difficult and to a certain extent tentative. In spite of that, having in mind that that the technique is not as much about hypothesis testing as about data exploration and hypothesis forming (Glynn 2014a), we can extrapolate the following observation relevant to the analysis: this concerns the great degree of overlapping among the ellipses for the different senses. Nevertheless, however disordered and to some extent chaotic as it may seem, the visual distribution of the ellipses points at the centrality that the sense of FILL occupies, which suggests an undifferentiated distribution of contexts within which *plēróō* as FILL is met. In a relevant sense, the prototypicality of FILL as historically prior and diachronically stable meaning, manifests its entrenchment as a lexical sense. Below is a typical use of the term with the aforementioned meaning:

(6)   Diónusos…   oínou   kratêra   plērósas (Dyris, *Hist.Frag.1339*)
       Dionysus.NOM   wine.GEN   glass.ACC   fill.PART.NOM.AOR
       After Dionysus filled up the glass

Beyond this, there are also two big clusters of senses that occupy discernible positions. On the one hand, senses such as OCUPPY, SATE, FEED and SATISFY display an intuitive conceptual affinity, which in terms of featural convergence is translated into constructional identity, that of SOG with an AGENTIVE Subject (S) such as *Diónusos*, a Direct Object as a PATIENT (O) such as *kratêra*, and a Genitive Case FILLER (G) such as *oínou*, in (6) above. The difference basically lies in the semantic type of the arguments, especially that of the PATIENT representing the instantiation of the CONTAINER and FILLER. It is interesting to note here the metonymic relation between senses such as OCUPPY, SATE, FEED and SATISFY on the one hand as well as FILL and EQUIP, FILL and OCCUPPY, and AUGMENT and COMPLETE, on the other, all seem to fit in the metonymic type CAUSE and EFFECT and vice versa: for example, FILL as an effect of OCCUPY, FILL as a cause for SATE, and the latter as a cause for SATISFY. Nevertheless, the sense of

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COMPLETE, whose relevance becomes central in the 4th c. BCE, does not appear having any measurable size of elliptical extension.

Looking in turn at the MCA for 4th c. BCE in Figure 10, something very interesting can be spotted. This concerns the extension of the ellipsis of the sense COMPLETE, which cuts across the map, covering the quadrants that display the greatest variation between each other, namely the second and the forth, lying diagonally on either side of the origin of the plot:[3]
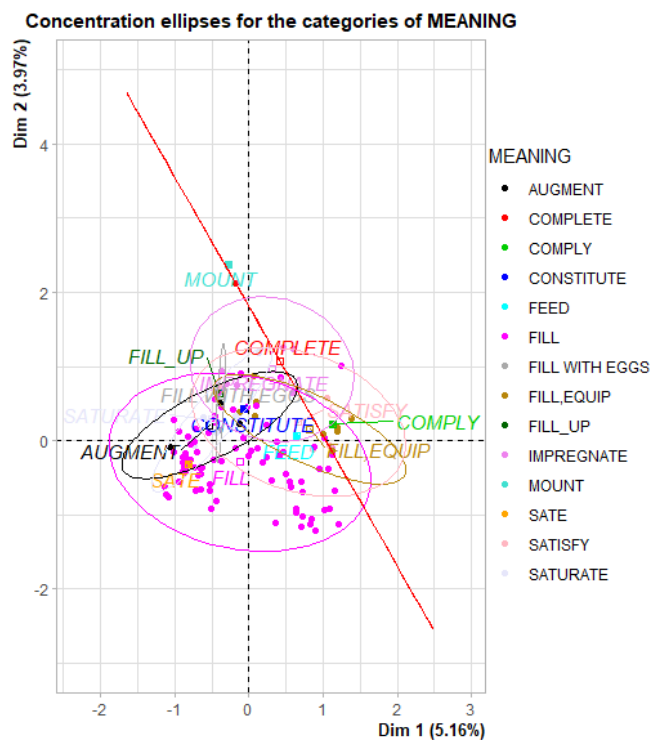
Figure 10. *MCA confidence ellipses for senses, 4th c. BCE*

The comparison between the extent of the sense COMPLETE´s ellipsis and that of the rest of the senses is impressive and worth analysing closer. In featural terms, this arrangement implies that the cluster of COMPLETE stretches its variation across (clusters of) features that for the rest of the senses not only do not co-occur but also repel each other. If, instead of depicting the ellipses around the centroids, we visualise the position of the centroids themselves as well as the features that contribute most to their positioning, then we obtain the following picture:

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[3] This is so because an MCA plot is organised around the two perpendicular axes that represent two dimensions of variation. Thus, the first with the third and the second with fourth quadrants are the most dissimilar.

Figure 11. *MCA for senses, 4th c. BCE*

We observe a more or less undifferentiated cloud of features around the centre of the plot, and the sense of MOUNT at the upper edge linked to the semantic participants of LIQUID and TIME, as well as the grammatical feature of REFLEXIVE VOICE. The pattern is typical of examples such as the following, where a certain quantity of a measurable entity reaches a culmination, driven from some force that lies within the container (Ioannou 2017). In English, a similar construction would be present in the expression *the vase oil spread on the floor*, with the difference that here VOICE is PASSIVE:

(7) *hótan*   *mḕ*   *ekpemfthêi*   *mēdè*   *exélthē*

      when   NEG   push.out.P.AOR.SUBJ.3SG   NEG   come.out.AOR.SUBJ.3SG

      hugrótēs,   *allà*   *plērōthêi (Arist. Hist. Anim.)*

      liquid.NOM.FEM.SG CONJ   mount.P.AOR.SUBJ.3SG

'When the liquid [of the breast] is not pushed out but it mounts up'.

What is especially relevant to the present analysis is the position of the sense COMPLETE. The latter occupies an intermediate position, between the sense of MOUNT and the rest cloud of senses at the centre of the plot. This essentially means that COMPLETE extends its featural configuration from prototypical instances such as those of, say, a voluntary agent completing a task, an active SOG structure with an AGENT, a CONTAINER and a FILLER, to the following: an inanimate object such as the moon reaching a culmination, a *quasi*-reflexive S-structure, with a sole SUBJECT that incorporates the properties and role of the CONTAINER and FILLER at the same time. Even more interestingly, the semantic relation between FILL and MOUNT seems to be one of a gradual transition, reminiscent of metonymy. COMPLETE, on the other hand, appearing in the middle, seems to have stretched its variational pattern so that it encompasses both FILL and MOUNT. In a relevant sense, it can be seen as the intermediary between the other two senses, a *quasi* conceptual link.

Regarding the possibility of formulating polysemy as blending, the present picture is illuminating. If what we see is a conceptual integration process among the senses of FILL and MOUNT, which more concretely would mean perspectivising the END OF A PROCESS as FILLING, even when actual filling does not occur, then COMPLETION seems to schematise both so that the two get integrated. In other words, it is the common ground that facilitates the integration,

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a role that falls precisely in the definition of generic space, being at the same time immanent to both. The process is depicted in Figure 12:
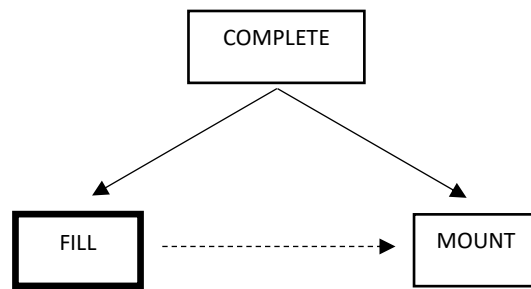

Figure 12. *COMPLETE as generic space categorising* FILL *and* MOUNT

How generalisable are the conclusions of these observations? Let us turn to the 3rd c. BCE, to test further the plausibility of such a formulation.

4.2 *FULFILMENT between SATISFACTION and COMPLETION*

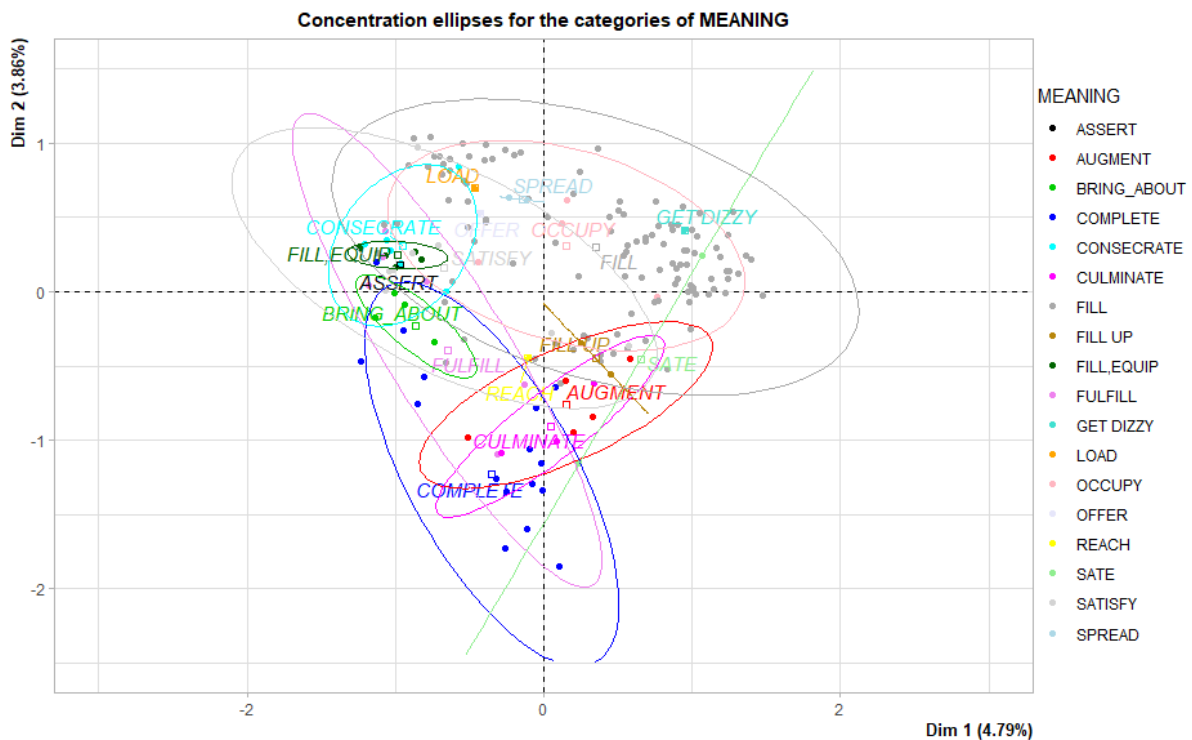Let us first have a look at the confidence ellipses of the senses on the MCA for the 3rd c. BCE:

Figure 13. *MCA confidence ellipses for senses, 3rd c. BCE*

On a par to what holds for the previous maps, for 3rd c. BCE the interpretation is difficult and has an exploratory character. Nevertheless, a closer look reveals a rather interpretable and theoretically coherent distribution of the sense clusters. First of all, the ellipsis representing the prototypical expansion of the sense of FILL has been slightly retrieved from the origin of the diagram towards the first quadrant. In practice, this means that it has been limited regarding the contexts in which it appears, in a relevant sense losing the general and undifferentiated

character of its distribution. Second, it tends to group with senses such as FILL_UP, EQUIP, SPREAD, LOAD, all intuitively forming a natural cluster. SATISFY is in turn partially overlapping with the rest of the group, a situation that was met before for the same sense. As said above, the partial overlapping leads to the possibility of a metonymical relation, that between saturation and satisfaction as a CAUSE-EFFECT relation.

The second cluster of senses concentrated towards the third quadrant forms similarly a coherent grouping. For senses such as AUGMENT, REACH, CULMINATE, underlies an intuitive common conceptual base that profiles the telic state of an incrementing process, either the latter is spatial, temporal or numerical. The constructional and semantic features of these senses are usually sole SUBJECTS that do not take any object, of REFLEXIVE VOICE. The semantic characterisation of these subjects include usually processes and states such as SPEECH, EVENT or TIME (see Ioannou 2017, 2019) and non-animate entities that present the possibility of self-motion, spreading, reaching a limit, etc. Interestingly, COMPLETE, for this century, has lost its schematicity and overarching generality and has been limited to the same contexts that the rest of the senses appear.

What is nonetheless of particular interest on the MCA plot is the appearance and positioning of a new sense, that of FULFILL. As can be seen on the map, repeated in Figure 14 with FULFILL´s ellipsis being highlighted, the extension and substantial overlapping of FULFILL with the COMPLETE -cluster and that of SATISFY is the most striking feature:
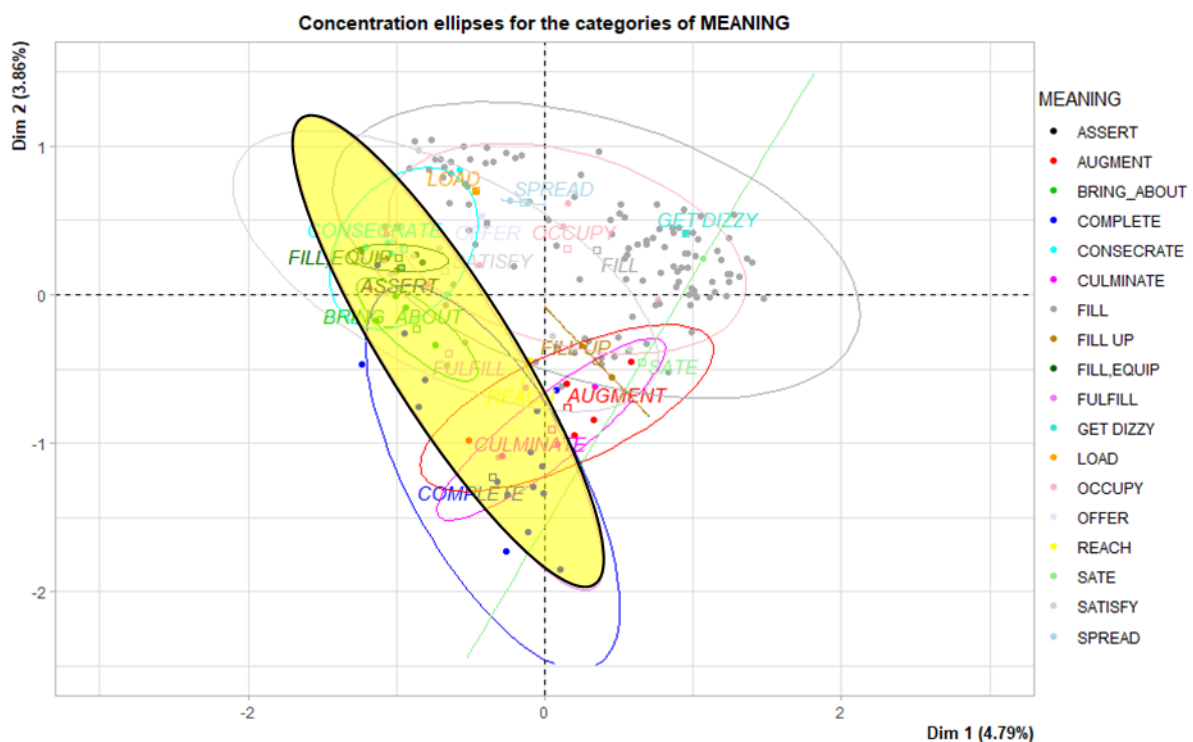

Figure 14. *MCA confidence ellipses for senses, 3rd c. BCE*

It is a case parallel to that met for 4th c. BCE and its underlying workings may very well be described as similar too. Taking into account that by now COMPLETE has got a more entrenched meaning, that of reaching a limit or boundary inherent to the nature of the object, such as the end of a time period, the sense of FULFILL seems to function as a schematisation of both senses of COMPLETE and SATISFY, in much the same way COMPLETE did between FILL and CULMINATE/MOUNT for 4th c. BCE. FULFILL plays here the role of the intermediary between COMPLETE and SATISFY. In later centuries, the sense of SATISFY will take the more specialised

meaning of economic satisfaction. It seems then that what connects the interpretation of SATISFACTION as being perspectivisation of the latter through its integration with a special type of COMPLETION, that of an economic DUE VALUE (Ioannou 2018), is facilitated by a generic space that can encompass both senses, that of FULFILMENT: on the part of COMPLETION that of a DUE_PRICE, whereas on the part of SATISFATION that of the SELLER. Accordingly, the context of a COMMERCIAL TRANSACTION is perspectivised through the notion of COMPLETION, in the name of what the two possess as common ground: the notion of FULFILMENT. The following schema depicts the relation:
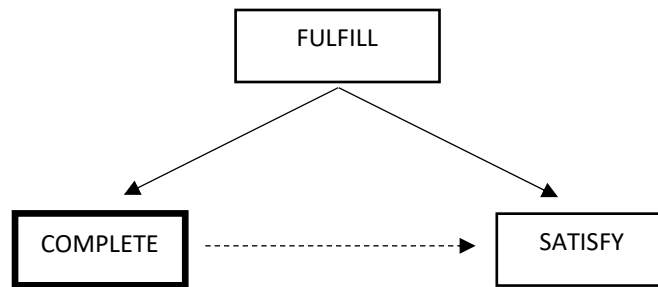

Figure 15. *FULFILL as Generic Space*

What about the emergent structure? This, according to Fauconnier & Turner (2002), must be a selective merge of the inputs, with the presence and elaboration of elements that are not present in those. In a relevant sense, it is also an elaboration of the generic space itself, which is an immanent schematisation of the emergent structure. Thus, I argue that the sense of PAY, eventually entrenched as the Modern Greek sense for the term, is precisely the emergent structure. Completion of a DUE PRICE and the satisfaction of a seller come together, generating the newly sense of GIVE MONEY, which as an emergent structure contains emergent properties not found before in the inputs. At the same time, it can be seen as an elaboration of the sense of FULFILL, the latter being schematically immanent in the act of paying a price as fulfilling both the due value as well as the expectation of the seller. The evolution of the term in a framework that unifies polysemy with conceptual integration for the period under analysis, can be schematically depicted as in Figure 16:
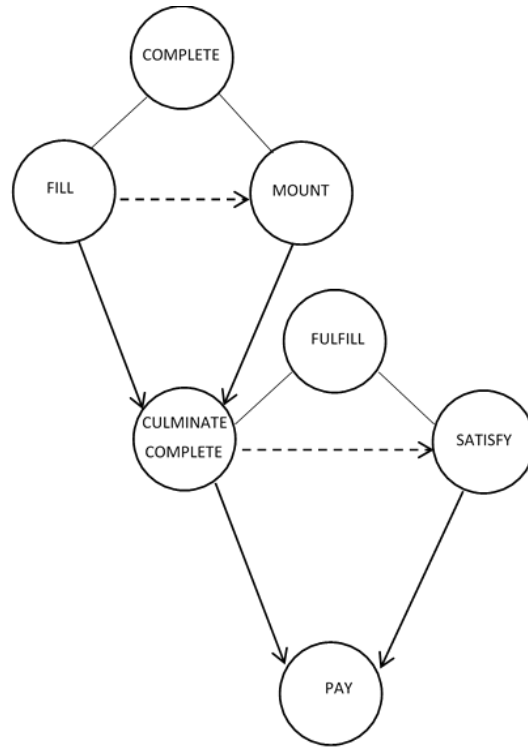
Figure 16. *partial conceptual integration network for* plēróō

5. Conclusions

This work has been a theoretical and methodological exploration into the possibility of a unification between phenomena traditionally treated as ad hoc conceptual integration on the one hand, and sense extension in the context of polysemy, on the other. It was argued that, from an onomasiological perspective, polysemy involves an ad hoc component, whereby the choice of a term whose use is entrenched for some situation, bears a construing import into another situation under onomasiological negotiation. The perspectivisation of the ontology of this second situation, through the conceptualisation conveyed by the chosen term, was seen as resulting to a partial overlapping between the two situations, namely a conceptual integration. In this light, and in the context of a behavioural-profile analysis for the Ancient Greek *plēróō*, the spaces of this integration were put under closer examination so that the possibility of their identification with featural clusters within a multiple correspondence analysis was tested.

To this end, the visualisation of MCA for the diachronic evolution of *plēróō* for three successive states of its evolution from 6th to 3rd c. BCE, was examined. The MCA plots obtained for the term, originally meaning FILL and evolved to mean PAY in Modern Greek, were analysed. It was shown that the use of MCA plots, if accompanied with the depiction of the confidence ellipses around the centroids of the senses mapped, may actually give support to the treatment of polysemy as conceptual integration.

The most interesting aspect of the distribution of the confidence ellipses across the MCA plots lies in the detection of specific senses, lexically attested, that overlap partially with the ellipses of others and manifest two important properties: first, comprising the union of a subset of the semantic and syntactic features that make up the other senses; second, being more schematic in comparison to them. These two characteristics were shown to match two requirements for a categorising generic space: underspecify the senses they categorise and be

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immanent to them. Thus, for the pair of the featural clusters that make up FILL and CULMINATE/MOUNT, the sense of COMPLETE constitutes a gestalt more schematic but at the same time immanent to both. It thus mediates between the two, representing a kind of common ground that possibly facilitates the integration of the aforementioned senses. COMPLETE, in this light, is the generic space that mediates between the two senses, facilitating the integration to take place and situations of CULMINATION to be perspectivised as ones of FILLING, when actually no filling takes place in term of the situation's ontology. A similar case is represented by the evolution of the cluster of COMPLETION/CULMINATION to that of SATISFACTION. The space that lies between is filled by the -partially overlapping with both- sense of FULFILL. Knowing that the new context that the term of *plēróō* eventually enters is that of COMMERCIAL TRANSACTION, we can understand how the immanence of FULFILL to both COMPLETE and SATISFY is instantiated. For COMPLETION, it represents the fulfilment of a DUE_PRICE, whereas for SATISFATION that of the expectation of a SELLER. Insofar as the emergent structure is concerned, this can be identified with the sense of PAY, which is the sense that eventually got entrenched in Modern Greek for the term. This distinction between schematic and more elaborated meaning may also be a fruitful way for dealing with the double facet of prototypicality: the one related mostly to concerns of categorisation and the other related to (arche)typicality, termed also "schematic" prototypicality and prototypicality of "centrality", respectively.

Someone could also speculate further on the dynamics of the system that may necessitate that evolution of a term from one sense to the other take place gradually and not "in jumps". It may be that conceptual under-specification between two senses curves on a conceptual plane the path through which these two senses meet, so that in a new context their common ground is elaborated into a new, specific to the situation and entrenched lexical meaning.

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APPENDIX

What follows are three tables that summarise the results of the MCA performed for each period (see Ioannou 2017, 2019). These have been performed using *R*-code, annotating for all aforementioned formal/constructional and semantic features. On the basis of *R2* indicator for each variable, there have been reported all cases that exceed 0.4, taking the latter to be a plausible cut-off point between moderate and weak association of the variable with the dimension contributing to variation, on a par with *R2* in linear regression models. The same has been applied for the estimation of the features that instantiate the variables. The positive and negative signs represent the polarisation of the features for each variable. Practically, whereas features with the same sign appear attracted in a plot that maps feature associations, polarised features are expected to lie at a lesser or greater distance. The tables gloss the results of these maps:

Table 1. Contribution of variables in dim.1 for 6th/5th c. BCE.					
VARIABLE		**INSTANCE**			
		+		**—**	
CONSTR	0.89	SG	0.88	SO	0.98
PATIENT	0.72|	PERSON BODY_ORGAN BODY_PART BODY	0.77 0.74 0.64 0.60	VEHICLE	0.68
VOICE	0.60	P	0.74	A	0.43
AGENT	0.59	Ø	0.57	PERSON	0.68
FILLER	0.58	PERCEPT ABSTR_OBJ GAS	0.90 0.53 0.51	Ø	0.98

Table 2. Contribution of variables in dim.1 for 4th c. BCE.					
VARIABLE		**INSTANCE**			
		+		**—**	
CONSTR	0.82	SO	0.61	SG SFg	1.1 1.0
PATIENT	0.66	VEHICLE	0.79	B_ORGAN PERSON NAT_LOCATION	0.64 0.54 0.53
VOICE	0.60	M	0.94	P	1.10
FILLER	0.56	Ø		FEELING SUBSTANCE	0.9 0.57

Table 3. *Contribution of variables in dim.1 for 3ʳᵈ c. BCE.*

VARIABLE		INSTANCE			
		+		**—**	
CONSTR	0.85	SFg SG	1.19 1.08	SO	0.86
VOICE	0.73	P	0.65	R A	0.65 0.63
PATIENT	0.64	NAT_LOCATION PERSON BODY_ORGAN	0.64 0.67 0.61	ARTIFACT DUE FEELING VEHICLE BODY_PART SPEECH	1.12 1.08 0.98 0.90 0.76 0.69
AGENT	0.62	Ø	0.84	ANIMAL	0.62
FILLER	0.52	PROPERTY LIQUID GAS	0.78 0.46 0.43	Ø	0.77
TENSE	0.44	PRES_PERFECT PAST_PERFECT	0.53 0.74	PRETERITE PAST	1.37 0.67

The formal features that are coded for are the following: VOICE, TENSE, MOOD and CONSTRUCTION. The levels that code for VOICE are ACTIVE, PASSIVE, MIDDLE and REFLEXIVE. The TENSE has been coded for PRESENT, AORIST (coded as PAST), FUTURE, PRESENT_PERFECT and PAST_PERFECT. MOOD is coded for INDICATIVE, SUBJUNCTIVE, IMPERATIVE, OPTATIVE. INFINITIVE and PARTICIPLE have been also added as special subcases of INDICATIVE realisation, as they are clearly distinguished from the verbal declination by person and they hold a great role in the perspectivisation of a scene. Finally, The CONSTRUCTION type is coded for a series of syntactic construals, explicated in table 4 for the FILL meaning:

Table 4. *CONSTRUCTION TYPES*

SOG	Nom. Subject	Acc. Object	Gen. Filler	*Agentive filling of a container with an explicit filler*
SO	Nom. Subject	Acc. Object		*Agentive filling of a container with implicit or absent filler*
SG	Nom. Subject		Gen. Filler	*Passive pattern of a container filled by a filler*
SgO	Nom. Subject	Acc. Object		*Filling of a container through a non-agentive filler*
S	Nom. Subject			*Non-agentive filling without explicit or implicit filler*
SOFg	Nom. Subject	Acc. Object	Dat./PP Filler	*Agentive filling of a container via a third means or instrument*