A Semantic Model for Generic Terms and Place Nouns

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Abstract. This paper offers a model of the semantic content of spatial nouns as generic terms in place names (e.g. *Square* in *Trafalgar Square*) and as descriptors for places ("place nouns", e.g. *street* in *the second street*). The model is based on a variant of Frame Semantics in which different context- and community-based uses (e.g. general, daily uses; specialised uses; legal, normative uses) are modelled as as sets/matrices of attribute-value pairs, or *frames*. The attributes forming these frames are based on data extraction from corpora (general uses), Wikipedia articles (specialised uses), and professional geographical dictionary (legal uses) as contexts. It is shown that uses associated to each context define frames varying considerably in content; however, a semantic overlap relation connects these frames. Consequences for a general theory of the semantics of place and geonames are discussed.

Keywords: generic terms · place names · place nouns · frame semantics · geosemantics

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1 Introduction

Studies on the semantics of place names within Geographic Information Science (GIS) often focus on their descriptive content [15, 24]. Such content is mediated via classifying or *generic terms* that involve heterogeneous uses across communities and contexts. For instance, [11] observes that Swiss mountain names may include the term *horn* (e.g., *Matter-horn*) to describe horn-like, elongated mountainous reliefs. Professional geographic dictionaries in German-speaking countries propose refined definitions for generic terms (cf. [9, 10]). However, the speakers who coined these names often bestowed them without assuming that these terms precisely described these places, e.g. *Matterhorn* having a horn-like but bulky shape. Nevertheless, GIS connects professional, normative uses of generic terms with speakers' daily, informal uses [23, 9, 24].

Linguistic studies on place names offer a convergent view. Toponomasticians assume that generic terms mostly have a descriptive content (e.g., *Square* in *Trafalgar Square*; [1, 2]). Generic terms combine with *specific terms*, names referring to places often dedicated to individuals or events (e.g. *Trafalgar*). Place names including both terms involve descriptive and culturally-rooted content. Crucially, pinpointing the descriptive content of generic terms requires multi-dimensional, etymologically-driven analyses. For instance, terms across languages may be borrowed from local languages/dialects (e.g., *glen* from Gaelic in Scotland; [47]). Local speakers of these languages may display more accurate uses than other speakers of the borrowing language, due to this cultural background (e.g., Scottish vs. other British speakers; [41, 38]). Thus, toponomastic studies suggest that the analysis of generic terms and their semantic content must include dimensions of geographic, sociological, and temporal variation.

Linguistic terminology has uncovered a similar picture. Terminology studies distinguish among *general* vocabulary, *specialised* vocabulary, and *term* uses of words [33]. General vocabulary uses do not require domain-specific knowledge (e.g., *cat* in daily conversation). Specialised uses involve domain-specific knowledge (e.g., *carnivore* in zoology). Terms uses involve words requiring explicit definitions based on necessary and sufficient identity conditions, usually in normative contexts (e.g., legal texts: [18, 17]). Recent literature has observed that uses of geographic vocabulary varies considerably across domains (e.g., [16]). Professional geographers outline detailed definitions for spatial/place nouns as lists of necessary and sufficient conditions for place classification in formal ontologies (e.g., [48]). However, speakers mostly resort to general uses, especially in multi-modal contexts (e.g., uses of *street* in social media; [25]). Thus, terminology suggests that uses hinge on contextual and genre norms of employment.

The goal of this paper is to offer a semantic analysis of the content of generic terms (e.g., *Square* in *Trafalgar Square*) that can model how these uses vary across linguistic communities. We show that generic terms can have technical uses from which specialised and general uses can be distinguished, though uses partially overlap. We also show that place nouns can be associated to layered uses (e.g. *this is the second street*). We model these uses via attribute-value matrices or *frames* in Frame Semantics [30, 31], and show that semantic relations may emerge among uses and contexts. We thus merge these theoretical views in one model for the content of spatial nouns. To reach this goal, we present a three-part study on *street*, *square* and *alley* as generic terms (Section 2). We then propose our Frame Semantics analysis (Sections 3–4), before concluding (Section 5).

2 Methods and Materials

Our methodology and the flowchart of the three-part study are presented in Fig. 1, with the rest of this section explaining the details of each part:

First, we selected *street*, *square* and *alley* for analysis. We investigated the three most frequent generic terms occurring in place names (see also [46]), to have a small but manageable data set. We explored the BNCweb platform [22],

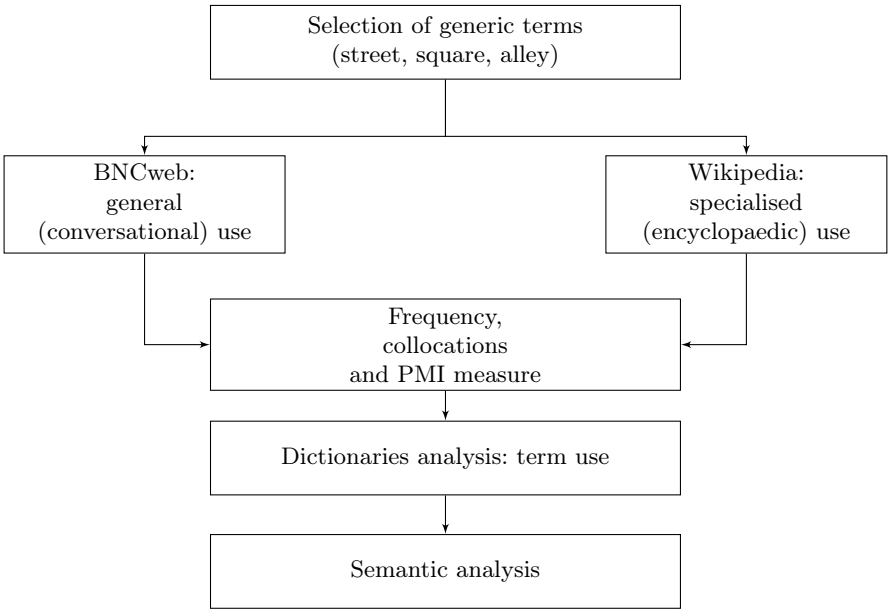

Fig. 1. The three-part study involved three experimental set-ups used to individuate common terms of comparison and extract semantic definitions on which we built the formal model. The dictionaries phase did not undergo a frequency and collocations analysis, and occurred after this step was performed on the other two parts. Once we gathered the results from all the three parts, we performed a semantic analysis. The bottom part of the flowchart thus also represents the temporal/inferential flow of the different parts in the study.

adopted to retrieve textual data from the British National Corpus (BNC, [7]). The BNC contains fiction genre documents (e.g., "prose"), adding a welcome descriptive dimension. However, we chose this corpus for size (100+ million words), and accessibility of data extraction tools in a user-friendly interface. We downloaded a text file containing the naturally occurring sentences including these generic terms/nouns to carry out a semantic analysis. We then ran a Python script to automatically find collocations, using the Pointwise Mutual Information [6] to map semantic relations [4, 34] and standard collocation frequencies, using the software KWIC [42]. We manually individuated semantic features, and removed unrelated uses due to polysemy (e.g., *square* as a geometrical figure).

Second, we retrieved 5000 sentences containing *street*, *square* and *alley* from the Wikipedia database hosted by the Spike platform[4] [37]. We ran the same Python script to mark asymmetries between the two data-sets and we retrieved collocation frequencies using KWIC. We again individuated the semantic features associated to these words, and then created a semantic model of specialised vocabulary uses. The authors independently investigated and cross-validated

[4] https://spike.apps.allenai.org, last access 19.05.2023

each list of collocations from KWIC and the output of the Python scripts. Third, we analysed the definitions offered in the dictionary of U.S. professional land surveyors[5] and in the International Dictionary of Landscape and Urban planning [27]. These definitions outline uses of *street*, *square* and *alley* as technical terms in the professional geographers' field (cf. also [21]), hence our choice.

3 Results

The results were as follows. First, we found 18885 tokens for *street* (1.89^{-2}% frequency/million words), 6836 for *square* (6.84^{-5}% frequency/million words), 604 for *alley* (6.04^{-6}% frequency/million words). Semantic features' extraction lead to the feature sets in (1):

(1) a. *Street* = {*residential, commercial, with_ shops, deserted, crowded, suburban*}
b. *Square* = {*pedestrian, with_ signs, open_ space, parking_ space, with_ lamps, with_ artists*}
c. *Alley* = {*narrow, bright, cobbled*}

As the sets show, general uses of these words involve some semantic features that may be more prototypical properties. For instance, the features *narrow* for *alley*, *open_ space* for *square* and *residential*, *suburban* for *street* describe the geometrical features and urban location within cities of these places. The other features may describe more contingent properties of these place types, e.g. *crowded/deserted* for *street*, *cobbled* for *alley*. This result suggests that speakers may use these words in a flexible manner, i.e. without describing core properties of these places. Hence, conversational data offer evidence for the general vocabulary use of these words. Second, we identified subtly different sets of features associated to each item, as the feature sets in (2) show:

(2) a. *Street* = {*residential, commercial, with_ shops, suburban, for_ community, next_ to_ park*}
b. *Square* = {*pedestrian, market, commercial, monument, central*}
c. *Alley* = {*narrow, unpaved, old, network, historic, related_ to_ culture*}

Wikipedia entries contain some more descriptive content for *street* and *alley*, and offer perhaps more information about core properties for *square* (e.g. that squares have commercial uses). Crucially, Wikipedia entries often mention several features in a single text, accompanying multi-sentential descriptions to images of streets, squares, and alleys. A degree of overlap with generic uses exists: for instance, both definitions for *street* contain the *residential* feature. Overall, Wikipedia mostly confirms the specialised vocabulary use of these three words. Third, we found other feature sets associated to these words, cf. (3):

[5] https://landsurveyorsunited.com/dictionary, last access 13.05.2023

(3) a. *Street* = {*thoroughfare, extended_ space, 20_ feet_ or_ wider, residential public_ use, public_ property*}
b. *Square* = {*open_ space, four-sided, gathering_ area, intersection_ of_ streets, with_ trees,with_ grass, pedestrian, park_ use, next_ to_ buidings*}
c. *Alley* = {*passageway, narrow, vehicular_ traffic, rear_ access_ building, rear_ access_ lot*}

Professional dictionaries, due to their legal standing, offer definitions that act as official terms in a given discipline. However, these definitions mostly focus on perhaps more prototypical properties of these places than those found in general and specialised uses. All three definitions, for instance, include features attesting the function of a given place (e.g. *thoroughfare* for *street*, *gathering_ area* for *square*, *passageway* for *alley*). Overall, these results outline two emerging properties of these three uses. First, the semantic features forming these uses are closely related and form broadly defined semantic fields [44, 45, 19, 20]: they describe properties of places. Second, uses of a same word may vary considerably in their content and the "size" of their feature sets (cf. *alley*), but they share some features (e.g. *narrow* for *alley* uses). Thus, uses are semantically related; we model these results next.

4 Analysis

We begin with some linguistic assumptions. We treat place names as a sub-type of proper names, and thus as phrasal coordinated compounds [35, 36]. From *Trafalagar* (specific term) and *Square* (generic term), we obtain the compound name *Trafalgar Square*. As compounds, their content corresponds to the combination of the content of generic and specific items, and the naming/etymological relation connecting these items [8, 46, 43, 1, 2]. The semantic content of *Trafalgar Square* is the combination of the content of *square* (a place type), *Trafalgar* (a famous battle), and their etymological relation (i.e. a square commemorating this battle). The content of *square* as a place noun is the content associated to its generic term distribution, minus the contribution of specific terms (i.e. reference to the battle and its commemoration). This content can be defined as feature lists/sets (cf. the previous section, [16, 24]). We can thus model the content of generic items as nouns for place types, and as elements forming place names. A concern becomes how form and content can have a unitary representation.

We address this concern by using a frame semantics approach. We model content as attribute-value matrices, and associate these to morpho-syntactic templates [12, 14, 13, 30, 31]. Each attribute/value pair represents one of the features associated to the different words' uses: general, specialised, term use. For instance, [*use:pedestrian*] and [*function:market*] are pairs representing that square have pedestrian uses and market functions (i.e. we treat features as values of general attributes). An attribute representing context- and case-sensitive uses, *C*, can be used as an "open slot" for emergent content in context [26]. We make

precise these notions by introducing explicit representations of the content for *Square*, and use *Trafalgar Square* as a template for the analysis in Table 1. We offer the frames for *street* and *alley* in Tables 2-3, respectively, using *Carnaby Street* and *Magpie Alley* as (arbitrary) place names for the templates.

The frames read as follows. The symbol "$\sqcup$" represents a disjunctive interpretation ([28]: Ch. 2; [39]: Ch. 1). *Square* as a general term/word and place nouns refers to a place where people can gather or spend time. *Trafalgar Square* is a square dedicated to a famous battle, though speakers may not be aware of this etymology [8, 1, 2]. *Square* as a specialised vocabulary word may involve a description of a place that Wikipedia readers may be curious about. Authors may then explain the origins of the name in an article, thus providing more content for this use. In both uses, the disjunctive representation represents this fact as a possibility. Speakers may associate at least one or possibly more features to these uses, as alternative interpretations based on a given context.

Instead, *square* as a geographical term involves a list of attribute/value pairs taken as necessary and sufficient conditions for identification in legal contexts ([33]: Ch. 4). The term describes a square as a place if and only if attribute a and attribute b... and so on apply. We represent these stricter conditions via a conjunctive interpretation and the symbol "$\sqcap$" (again [28, 39]). For instance, *Trafalgar Square* is the official name of a place qualifying as a square, and commemorating the famous battle. Documents pertaining to this square certainly report this etymology, and possibly document its genesis. Term uses of this place name and the place noun *square* should thus make reference to its proximity to buildings, and the other features defining the content of this technical use.

The three frames introduced in Fig. 2 define related senses. General uses for *square* contain some but not all of the pairs attested in specialised uses, which are in turn some of those attested in technical term uses. We can model these facts by using an *overlap* relation holding between frames as complex linguistic structures ([29]; cf. also [28, 39]). An overlap relation $a \circ b$ holds if (and only if) $a \sqcup b = c$ and $a \sqcap b = d$, with c, d being distinct objects from a and b. In our cases, two frames and the content they represent overlap if (and only if) they share a set c of attribute/value pairs (i.e. part of their senses). Their union may correspond to a fourth frame d not associated to specific uses, but corresponding to e.g. a dictionary list of possible senses associated to a word (cf. [19, 20]).

For *street*, for instance, general and specialised uses are in an overlap relation (i.e. $street_{general} \circ street_{specialised}$ holds), and so are specialised and term uses (i.e. $street_{specialised} \circ street_{term}$). General/daily uses of *street* cover part of their specialised uses; pairs such as [*locational:residential*] form part of the content of both frames. However, term uses include only this latter pair. The corresponding frame includes other pairs, confirming that professional uses differ considerably from layperson uses (cf. again [9, 10, 16]). Pre-theoretically, speakers in daily conversation may offer more contingent and flexible uses of these three words, as they can focus on how they can describe places such as *Trafalgar Square*. Term uses, instead, represent prototypical/whole uses to describe ideal squares in the views of professionals. Thus, they only include those pairs that may describe any

Square (general vocabulary use)
[[Trafalgar]$_{\text{specific term}}$ [square]$_{\text{generic term}}$]$_{\text{Place Name}}$

ATTRIBUTES=	[*parts:signs*]⊔
	[*use:pedestrian*]⊔
	[*access:open*]⊔
	[*service:parking*]⊔
	[*parts:lamps*]⊔
	[*users:artists*]⊔
	[*etymology:commemoration*]⊔
	[*commemorated_ entity:battle*]⊔
	[*C*(ontext attributes)]⊔
	...

Square (specialised vocabulary use)
[[Trafalgar]$_{\text{specific term}}$ [square]$_{\text{generic term}}$]$_{\text{Place Name}}$

ATTRIBUTES=	[*use:pedestrian*]⊔
	[*function:market*]⊔
	[*function:commercial*]⊔
	[*type:monumental*]⊔
	[*location:central*]⊔
	[*etymology:commemoration*]⊔
	[*commemorated_ entity:battle*]⊔
	[*C*(ontext attributes)]⊔
	...

Square (term use)
[[Trafalgar]$_{\text{specific term}}$ [square]$_{\text{generic term}}$]$_{\text{Place Name}}$

ATTRIBUTES=	[*place_ type:intersection_ of_ streets*]⊓
	[*parts:trees*]⊓
	[*parts:grass*]⊓
	[*use:pedestrian*]⊓
	[*function:park*]⊓
	[*location:next_ to_ buildings*]⊓
	[*etymology:commemoration*]⊓
	[*commemorated_ entity:battle*]⊓
	[*C*(ontext attributes): x (e.g., legal context)]⊓
	...

Table 1. Frames representing different senses for *square* in place names, according to our multiple-context analysis. We could use variables for "open" pairs to represent only the content of generic terms/place nouns (e.g. [*etymology:X*]). We focus on actual examples to offer a more concrete analysis of content representation via frames. The content associated to *square* corresponds to the list of pairs in the frame, minus the attribute/value pairs [*etymology:commemoration*], [*commemorated_ entity:battle*].

Street (general vocabulary use)
[[Carnaby]$_{\text{specific term}}$ [Street]$_{\text{generic term}}$]$_{\text{Place Name}}$

	[*use:commercial*]⊔
	[*use:residential*]⊔
	[*parts:shops*]⊔
ATTRIBUTES=	[*status:desert/crowded*]⊔
	[*type:suburban*]⊔
	[C(ontext attributes)]⊔
	...

Street (specialised vocabulary use)
[[Carnaby]$_{\text{specific term}}$ [Street]$_{\text{generic term}}$]$_{\text{Place Name}}$

	[*parts:shops*]⊔
	[*location:suburban*]⊔
ATTRIBUTES=	[*location:community*]⊔
	[*location:next_to_park*]⊔
	[C(ontext attributes)]⊔
	...

Street (term use)
[[Carnaby]$_{\text{specific term}}$ [Street]$_{\text{generic term}}$]$_{\text{Place Name}}$

	[*function:thoroughfare*]⊓
	[*location:residential*]⊓
	[*width:20$_f$eet-wider*]⊓
ATTRIBUTES=	[*use:public*]⊓
	[*property:public*]⊓
	[C(ontext attributes): x (e.g., legal context)]⊓
	...

Table 2. Frames representing different senses for *street*.

Alley (general vocabulary use)
[[Magpie]$_{\text{specific term}}$ [alley]$_{\text{generic term}}$]$_{\text{Place Name}}$

ATTRIBUTES=	[*width:narrow*]⊔ [*conditions:bright*]⊔ [*surface:cobbled*]⊔ [C(ontext attributes)]⊔ ...

Alley (specialised vocabulary use)
[[Magpie]$_{\text{specific term}}$ [alley]$_{\text{generic term}}$]$_{\text{Place Name}}$

ATTRIBUTES=	[*width:narrow*]⊔ [*surface:unpaved*]⊔ [*conditions:old*]⊔ [*shape:network*]⊔ [*status:historic*]⊔ [*status:cultural*]⊔ [C(ontext attributes)]⊔ ...

Alley (term use)
[[Magpie]$_{\text{specific term}}$ [alley]$_{\text{generic term}}$]$_{\text{Place Name}}$

ATTRIBUTES=	[*type:passageway*]⊓ [*width:narrow*]⊓ [*function:rear_ access_ building*]⊓ [*function:rear_ access_ lot*]⊓ [C(ontext attributes): x (e.g., legal context)]⊓ ...

Table 3. Frames representing different senses for *alley*.

street, square and alley; more contingent properties are left aside (e.g. streets being potentially residential). Nevertheless, core pairs/features connect each use; communities do share views on what counts as streets, squares and alleys.

5 Discussion and Conclusions

We have reached our goal as follows. Our data-driven analysis shows how the content of general, specialised and term uses of words occurring as either generic items in place names or as place nouns (e.g. *Street)* can be modelled via a frame semantics approach. Generic term uses can include several necessary and sufficient conditions to describe places in professional contexts, via core/prototypical features. For instance, *Trafalgar Square* as an officially sanctioned name for a square corresponds to a corpus-defined frame as an attribute-value matrix. Specialised uses in Wikipedia may be more detailed but also more flexible. Authors may use various attributes to describe *Trafalgar Square*, but not necessarily all of them in a single article (e.g., its etymology). General uses found in examples from the BNC corpus offer a vaguer picture. Speakers may use *square* and *Trafalagar Square* to refer to some salient squares and places in thousands of conversations. Usually, however, they do not mention but one or two possibly contingent properties of these places. Therefore, these spatial words may convey different but related content about places in different contexts.

One observation about our results is that the size of feature sets may be correlated to the size of the selected corpora, at least for general and specialised uses. Our current conjecture is that the use of larger corpora could lead to the individuation of more features that one can associate to each word and use. Pre-theoretically, the more data we have on how speakers define place types in discourse, the more detailed their formal (i.e. frame-based) representations can be. For this reason, we propose that the context variable C in the frames can also represent features that may emerge once one analyses larger corpora as "novel" contexts. Under this view, frames must only report attested features to be empirically adequate, in a sense acting as more formal counterparts of dictionary definitions. If researchers obtain access to more data justifying more thorough or "bigger" features sets, then the formalism introduced in this work can be used to perform such updates seamlessly. Empirical accuracy rather than frame "size" is the goal of our type of analysis (cf. also [20]).

Semantic relations are thus an emergent property of generic terms/spatial nouns' content that we can also model. All uses/frames include features related to place type, function and other attributes defining these places: these uses form a minimal semantic field (cf. also [16, 44]).These uses, however, are only partially overlapping. Communities of use may have similar but not identical views on what counts as a square, street and other place types, especialy across countries and cultures. Such differences and similarities are reflected in our treatment involving overlap relations among the frames representing these uses. Uses are related because they share of the features that different communities associate to place types, and thus to the names/nouns for these places (e.g. streets being

in residential locations). Further studies should investigate additional types of datasets, such as TripAdvisor, which offers journey and point of interest reviews as a multi-modal genre [3, 40, 32, 5]. We leave the study of these and other types of data, however, for such future endeavours.

References

1. Blair, D., Tent, J.: Feature terms for Australian toponymy. ANPS Technical Paper (3) (2015)
2. Blair, D., Tent, J.: A revised typology of Place Names. Names **69**(4), 1–15 (2021)
3. Bouabdallaoui, I., Guerouate, F., Bouhaddour, S., Saadi, C., Sbihi, M.: Advanced exploratory data analysis for moroccan shopping places in tripadvisor. In: Advanced Research in Technologies, Information, Innovation and Sustainability: Second International Conference, ARTIIS 2022, Santiago de Compostela, Spain, September 12–15, 2022, Revised Selected Papers, Part I. pp. 257–271. Springer (2022)
4. Bullinaria, J.A., Levy, J.P.: Extracting semantic representations from word co-occurrence statistics: A computational study. Behavior research methods **39**, 510–526 (2007)
5. Cassar, M., Konietzny, J., Caruana, A.: Customer encounter satisfaction and narrative force: an investigation of user-generated content on tripadvisor. Scandinavian Journal of Hospitality and Tourism **23**(1), 51–72 (2023). https://doi.org/10.1080/15022250.2023.2194272
6. Church, K., Hanks, P.: Word association norms, mutual information, and lexicography. Computational linguistics **16**(1), 22–29 (1990)
7. Consortium, B., et al.: British national corpus. Oxford Text Archive Core Collection (2007)
8. David, J.: Commemorative place names—their specificity and problems. Names **59**(4), 214–228 (2011)
9. Derungs, C.: From text to landscape: extraction of landscape concepts through the resolution of ambiguity and vagueness present in descriptions of natural landscapes. Manuscript, University of Zurich, Faculty of Science (2014)
10. Derungs, C., Purves, R.: From text to landscape: Locating, identifying and mapping the use of landscape features in a swiss alpine corpus. International Journal of Geographical Information Science **28(6)**, 1272–1293 (2014)
11. Derungs, C., Wartmann, F.M., Purves, R.S., Mark, D.M.: The meanings of the generic parts of toponyms: use and limitations of gazetteers in studies of landscape terms. pp. 261–278. Springer, Cham (2013)
12. Fillmore, C.J.: Frame semantics. pp. 111–137. Hanshin Publishing, Seoul (1982)
13. Fillmore, C.J., Baker, C.: A frames approach to semantic analysis. pp. 313–340. Oxford University Press, Oxford (2010). https://doi.org/10.1093/oxfordhb/9780199544004.013.0013
14. Fillmore, C.J., R, J.C., Petruck, M.R.: Background to framenet. International Journal of Lexicography **16**
15. Fonseca, F.: Geospatial semantic web. Springer, Berlin. https://doi.org/https://doi.org/10.1007/978-0-387-35973-1_513
16. ten Hacken, P.: Terms and specialized vocabulary: Taming the prototypes. pp. 3–13. John Benjamins, Amsterdam & Philadelphia (2015)

17. ten Hacken, P.: Terms between standardization and the lexicon. Roczniki Humanisticyzne **66**(11), 100–118 (2018). https://doi.org/https://doi.org/10.18290/rh.2018.66.11-4
18. ten Hacken, P., Kwiatek, E.: Nominal compounds as naming devices: A comparison of english and polish land surveying terminology. pp. 83–101. Edinburgh University Press, Edinburgh (2013)
19. Hanks, P.: Do word meanings exist? Computers and the Humanities **34**(1), 205–215 (2000)
20. Hanks, P.: Lexical analysis: Norms and exploitations. MIT Press, Cambridge, MA (2013)
21. Hill, L.: The geographic associations of information. MIT Press, Cambridge, MA (2006)
22. Hoffmann, S., Evert, S.: Bncweb (cqp-edition): The marriage of two corpus tools. vol. 3, pp. 177–195. Peter Lang, Frankfurt am Main (2006)
23. Hollenstein, L., Purves, R.: Exploring place through user-generated content: Using flickr tags to describe city cores. Journal of Spatial Information Science (1), 21–48 (2010). https://doi.org/doi:10.5311/JOSIS.2010.1.3
24. Hu, Y.: Geospatial semantics. pp. 80–94. Elsevier, Oxford. https://doi.org/http://dx.doi.org/10.1016/B978-0-12-409548-9.09597-X
25. Hu, Y., Deng, C., Zhou, Z.: A semantic and sentiment analysis on online neighbourhood reviews for understanding the perceptions of people toward their living environments. Annals of the American Association of Geographers **109**(4), 1052–1073 (2019). https://doi.org/10.1080/24694452.2018.1535886
26. Kamp, H., Partee, B.: Prototype theory and compositionality. Cognition **57**(2), 129–191 (1995)
27. Klaus-Jürgen, E., Ballard, E., Elswo, D.E. (eds.): Encyclopedic Dictionary of Landscape and Urban Planning Multilingual Reference Book in English, Spanish, French, and German. Springer, Berlin (2010)
28. Link, G.: Algebraic semantics in language and philosophy. CSLI Publications, Stanford, CA (1998)
29. Löbner, S.: Concept types and determination. Journal of Semantics **28**(3), 279–333 (2011). https://doi.org/https://doi.org/10.1093/jos/ffq022
30. Löbner, S.: Evidence for frames from natural language. pp. 23–68. Springer, Heidelberg (2014). https://doi.org/https://doi.org/10.1007/978-3-319-01541-5_2
31. Löbner, S.: Frames at the interface of language and cognition. Annual Review of Linguistics **7**(1), 261–284 (2021). https://doi.org/10.1146/annurev-linguistics-042920-030620
32. Olorunsola, V.O., Saydam, M.B., Lasisi, T.T., Ozturen, A.: Exploring tourists' experiences when visiting petra archaeological heritage site: voices from tripadvisor. Consumer Behavior in Tourism and Hospitality **18** (2023). https://doi.org/10.1108/CBTH-05-2021-0118.
33. Pearson, J.: Terms in context. John Benjamins, Amsterdam / Philadephia (1998)
34. Recchia, G., Jones, M.N.: More data trumps smarter algorithms: Comparing pointwise mutual information with latent semantic analysis. Behavior research methods **41**, 647–656 (2009)
35. Scalise, S., Bisetto, A.: The classification of compounds. pp. 34–53. Oxford University Press, New York / Oxford (2009)
36. Schlücker, B., Ackermann, T.: The morphosyntax of proper names: An overview. Folia linguistica **51**(2), 309–339 (2017). https://doi.org/https://doi.org/10.1515/flin-2017-0011

37. Shlain, M., Taub-Tabib, H., Sadde, S., Goldberg, Y.: Syntactic search by example. In: Proceedings of the 58th Annual Meeting of the Association for Computational Linguistics: System Demonstrations. pp. 17–23. Association for Computational Linguistics, Online (Jul 2020). https://doi.org/10.18653/v1/2020.acl-demos.3, https://aclanthology.org/2020.acl-demos.3
38. Stolz, T., Warnke, I.: Comparative colonial toponomastics: Evidence from german and dutch colonial place-names. pp. 65–90. De Gruyter, Berlin (2018)
39. Szabolcsi, A.: Quantification. Cambridge University Press, Cambridge (2010)
40. Tekiner, K.: Efficiency and effectiveness of the hotels in the covid-19 period: Evidence from cappadocia in türkiye. Ekonomi Politika ve Finans Araştırmaları Dergisi **8**(1), 130–140 (2023)
41. Tent, J.: Approaches to research in toponymy. Names **63**(2), 65–74 (2015). https://doi.org/10.1179/0027773814Z.000000000103
42. Tsukamoto, S.: KWIC Concordance for Windows: Easy Access to Corpora. Brill, Leiden, The Netherlands (2002). https://doi.org/https://doi.org/10.1163/9789004334205_020
43. Ursini, F.A.: On the structure of toponyms. In: Kortellessy, L., Stekauer, P., Valera, S. (eds.) Word-formation across Languages, pp. 375–393. Cambridge Scholars Publishing, Cambridge (2016)
44. Ursini, F.A.: Semantic field. In: Damico, J., Ball, M.S. (eds.) The SAGE Encyclopedia of Human Communication Sciences and Disorders, vol. 2. Sage Publication, Thousand Oak, California (2019)
45. Ursini, F.A., Huang, A.: Sense. In: Damico, J., Ball, M.S. (eds.) The SAGE Encyclopedia of Human Communication Sciences and Disorders, vol. 2. Sage Publication, Thousand Oak, California (2019)
46. Ursini, F.A., Samo, G.: Names for urban places and conceptual taxonomies: the view from Italian. Spatial Cognition & Computation **22**(3-4), 264–292 (2022). https://doi.org/10.1080/13875868.2021.1954186
47. Watts, V.: The Cambridge Dictionary of English Place-Names: Based on the Collections of the English Place-Name Society. Cambridge University Press, Cambridge
48. Yue, P.: Geospatial semantic web. p. 17–02. Springer, New York (2013). https://doi.org/https://doi.org/10.1007/978-1-4614-6809-7_3