Laying the foundations: A bibliometric analysis of L2 vocabulary research in 1982-1986

Paul Meara
Swansea University, the United Kingdom

Abstract

This paper uses a co-citation analysis to examine the research on L2 vocabulary acquisition that was published in 1986. This year seems to mark a serious consolidation of L2 vocabulary research, with the main themes of future research appearing. The paper also reports a larger analysis of all the work that appeared in a five-year window from 1982-1986. This analysis clearly shows the beginnings of a recognisable research focus on L2 vocabulary acquisition, though this work is influenced by some surprising sources, who do not figure in more recent work in the field.

Keywords: L2 vocabulary acquisition, vocabulary research, bibliometric analysis

1. Introduction

This paper is the sixth in a series of studies which attempt to plot the way research in L2 vocabulary acquisition has progressed over the last fifty years. Earlier papers in this series have analysed the research outputs published in 1982, 1983, 1984, 1985 and 2006. (Meara 2012, 2014, 2015, 2016, and 2017). This paper follows on directly from my analyses of the 1983, 1984 and 1985 data, published in earlier issues of *LingBaW* in that it covers the 1986 research output. However, the earlier analyses now provide us with a large amount of data from a five year window, and we can combine the five single-year analyses into a much larger – and more reliable – data set covering the whole of the period 1982-86.

This paper, then, falls into two parts. Part 1 reviews the research published in 1986 in its own terms, while Part 2 analyses the entire research output for the period for 1982-86. Both sections use the co-citation methodology which will by now be familiar to readers of *LingBaW*. The methodology is summarised in Appendix 1 for readers who are not yet familiar with this approach.

2. Part 1. The 1986 data

The main feature to note from our earlier analyses is that 1985 seems to mark some kind of a watershed in L2 vocabulary research. This is the first year in which we find a coherent L2 vocabulary research initiative in the data – a clear contrast with earlier years, where the L2 research seems to rely on a wide range of disparate influences. The 1985 research draws heavily on the work of an active group of European researchers, and is particularly influenced by the work of Scandinavian researchers (notably Håkan Ringbom) and an emerging group of researchers active in the Netherlands. We also noted a continuing rift between research that is informed by psycholinguistics, and research that is more allied with research that comes from an Applied Linguistics tradition, particularly the Edinburgh School with its interest in Error Analysis. Researchers from these two traditions are only rarely cited along-side each other. We also noted the appearance of French and German sources alongside the better known English language research, and the growth of an influential group of sources based in Israel.

The question we need to ask of the 1986 data is whether these trends consolidate: Is the "new beginning" that we identified in 1985 really the start of modern research in L2 vocabulary acquisition, or is it no more than a brief flash in the pan?

2.1. The data sources

A total of 98 research outputs were identified in the VARGA database for 1986 (Meara n.d.) – slightly more than the number of outputs identified in 1985. These outputs include four Masters' theses, one PhD thesis (Quigley), three book length treatments that are principally concerned with teaching materials (Crow, Gairns and Redman, Morgan and Rinvolucri), one monograph that deals with L2 learners' use of words (Linnarud), and a second monograph that deals with the vocabulary of L2_German speakers in primary schools (Neuner and Schade). We also have a small number of conference papers and one unpublished (but influential) report by Black. Conventionally, theses and other book length treatments are excluded from bibliometric analyses on the grounds that the way they cite previous research is very different from the way this work is normally cited in research papers. This practice is followed here. Additionally, a small number of sources turned out to be unobtainable. This left a total of 81 eligible outputs to be used in the analysis, a slight fall from the 1985 figure. These outputs are listed in Table 1. The excluded items are listed in Appendix 2.

Table 1: The outputs used in the analysis.

Allwood, J and E Ahlsén
Lexical convergence and language acquisition. In: Ö Dahl (ed.) *Papers from the Ninth Scandinavian Conference of Linguistics Stockholm*: University of Stockholm, Dept of Linguistics. 1986.
Amer, A
Semantic field theory and vocabulary teaching. *English Teaching Forum*, 24,1(1986), 30-33.
Arnedt, CS and JR Gentile
A test of dual coding theory for bilingual memory. *Canadian Journal of Psychology* 40,3(1986), 290-299.
Balcke, D
Wortschatzsystematisierung im Englischunterricht. *Fremdsprachenunterricht* 30,1(1986), 34-35.

Barnett, M

Syntactic and lexical/semantic skill in foreign language reading: importance and interaction. *Modern Language Journal* 70,(1986), 343-349.

Baumgarten, H

Anregungen zum Einsatz der Lautschrift als Hilfe zur schriftlichen Bewaeltigung des Wortschatzes. *Englisch* 21,2(1986), 55-56.

Beheydt, L

Optimalisering van de woordenschatverwerving. [Optimising vocabulary acquisition.] Levende Talen, 416(1986), 630-637.

Bogaards P

Op zoek naar nuttige woorden. Een geschiedenis van de vocabulaireselectie voor het vreemde-talenonderwijs. [In search of useful words.] *Levende Talen* 416(1986), 626-629.

Bogaards, P

Hoe nuttig zijn frequente woorden? [How useful are frequent words?] *Levende Talen* 416(1986), 626-629.

Broeder, P, J Coenen, G Extra, R van Hout and R Zerrouk

Ontwikkelingen in het nederlandstalig lexicon bij anderstlige volwassen: Een mcro- en micro-perspectif. In: **J Creten, G Geerts and K Japaert** (eds.) *Werk-in-uitvoering. Moment-opname van de sociolinguistiek in Belgie en Nederland.* Leuven-Amersfoort: Acco. 1986. 39-60.

Broeder, P, G Extra and R van Hout

Acquiring the linguistic devices for pronominal reference to persons: a cross-linguistic perspective on complex tasks with small words. In: **F Beukema and A Hulk** (Eds). *Linguistics in the Netherlands* Dordrecht: Foris. 1986.

Broeder, P and K Voionmaa

Establishing word class distinctions in the vocabulary of adult language learners; a cross linguistic perspective. In: **O Dahl** (Ed). *Papers from the ninth Scandinavian conference of linguistics.* Stockholm: Dept. of Linguistics. 1986.

Cammarota, M and J Giacobbe

L'acquisition du lexique en français par des adultes hispanophones. [How adult Spanish-speakers acquire vocabulary in French.] *Langages* 84(1986), 65-78.

Chen, HC and C Ho

Development of Stroop interference in Chinese-English bilinguals. *Journal of Experimental Psychology: Learning, Memory and Cognition* 12(1986), 397-401.

Clarke, D

Vocabulary acquisition and the computer database. *UEA Papers in Linguistics*, Special Issue (1986), 21-42.

Cohen, A

Forgetting foreign language vocabulary. In: B Weltens, K de Bot and T van Els (Eds.) *Language Attrition in Progress.* Dordrecht: Foris. 1986.

Cohen, A

Verbal report as a source of information on reading strategies. *ESPecialist* 15,1(1986), 1-12.

Cristoffanini, P, K Kirsner and D Milech

Bilingual lexical representation: the status of Spanish-English cognates. *Quarterly Journal of Experimental Psychology* 38A (1986), 367-393.

Crow, J

Receptive vocabulary acquisition for reading comprehension. *Modern Language Journal* 70,3(1986), 242-250.

Daams-Moussault, A

Woordverwerving en lesmateriaal. *Levende Talen* 416(1986), 644-649.

de Bot, K

Fonologische processen in woordherkenning door twee-talige kinderen. [Phonological processes and word recognition in bilingual children.] *Interdisciplinaire Tijdschrift voor Taal- en Tekstwetenschap* 6(1986), 339-354.

Dorriots, B

How to succeed with only fifty words: an analysis of role-play in the frame of adult language acquisition. *Gothenburg Papers in Theoretical Linguistics*, 52. 1986.

Fichez-Vallez, E

Le vocabulaire a-t-il sa place dans la formation des adultes a l'expression? *Langue et Institutions* 1986. 181-213.

Fox, J

Past, present and future in computer assisted vocabulary learning. *Zielsprache Englisch* 16,3(1986), 25-30.

Gebhard, I

Behaltensfoerderndes Einpraegen und Einueben der Lexik nach Empfang des Fernsehkurses. *Fremdsprachenunterricht* 30,6(1986), 268-270.

Giacobbe, J and M Cammarota

Learners' hypotheses for the acquisition of lexis. *Studies in Second Language Acquisition* 8(1986), 327-342.

Giacobbe, J and M Cammarota

Un modèle de rapport langue source/langue cible dans la construction du lexique. [How the relationship between L1 and L2 affects the development of a lexicon.] In: **A Giacomi and D Véronique** (Eds.) A*cquisition d'une langue étrangère*. PUP. 1986. 192-209.

Giacobbe, and P Ostyn

Apprendre … communiquer en langues étrangères. [Learning to communicate in foreign languages.] *IRAL* 24,4(1986) 329-336.

Graham, C and R Kirk Belnap

The acquisition of lexical boundaries in English by native speakers of English. *IRAL* 24,4(1986), 275-286.

Green, D

Control, activation and resource: a framework for the control of speech in bilinguals. *Brain and Language* 27(1986), 210-223.

Greidanus, T, P de Beyl and J Schouwerwou

Het opmaken van de betekenis van onbekende woorden uit de context. [Guessing the meaning of unknown words in context.] *Levende Talen* 416(1986), 638-644.

Hakansson, G

Quantitative aspects of teacher talk. In: **G Kasper** (ed.) *Learning, teaching and comunication in the foreign language classroom*. Aarhus: Aarhus University Press. 1986. 83-98.

Havola, S and S Takala

Review of some recent soviet research on vocabulary learning and teaching. *Papers in Linguistics* 19(1986), 495-510.

Heid, U

Wortschatzlernen mit dem Computer. Was taugen die kommerzialisierten Vokabeltrainingsprogramme? [Learning words with the computer.] *Zeitschrift für Sprache un Literatur in Wissenschaft und Unterricht* 58(1986), 68-84.

Höhmann, HO

Lexikalische Lernarbeit mit dem Lehrbuch. *Der fremdsprachliche Unterricht* 20,79(1986), 171-180.

Holmes, JL

Snarks, quarks and cognates: an elusive fundamental particle in reading comprehension. *ESPecialist* 15(1986), 13-40.

Huckin, T

The use of discourse patterning in foreign language reading and vocabulary acquisition. *Documentos de Estudos em Linguística Teórica e Aplicada* 2,1(1986), 57-75. Sao Paulo.

Huckin, T and Zhendong Jin

Inferring word-meaning from context: a study in second language acquisition. In: ESCOL '86. *Proceedings of the 3rd Eastern States Conference on Linguistics*. 1986. 271-280.

Ijaz, H

Linguistic and cognitive determinants of lexical acquisition in a second language. *Language Learning* 36,4(1986), 401-451.

Johns, T

Micro-concord: a language learners' research tool. *System* 14,2(1986) 151-162.

Kellerman, E

An eye for an eye: Crosslinguistic constraints on the development of the L2 lexicon. In: **E Kellerman and M Sharwood Smith** (eds.) *Crosslinguistic Influence in Second Language Acquisition*. Oxford: Pergamon Press. 1986. 35-48.

Kelly, P

Solving the vocabulary retention problem. *ITL Review of Applied Linguistics* 74(1986), 1-16.

Kirsner, K

Lexical function: is a bilingual account necessary? In: **J Vaid** (Ed.) *Language processing in bilinguals*. Hillsdale, NJ.: Lawrence Erlbaum Associates. 1986.

Kohlert, I

Arbeit mit individuell-differenzierter Lexik im Franzoesischunterricht. *Fremdsprachenunterricht*, 30,6(1986), 283-284.

Laufer, B

A case for vocabulary in EAP reading comprehension. In: **A-M Cornu, J Vanparijs, N N Delahaye and L Baten** (Eds.) *Beads or Bracelet? How do we approach LSP?* Oxford: Oxford University Press. 1986.

Laufer, B

Possible changes in attitude towards vocabulary acquisition research. *IRAL* 24,1(1986), 69-75.

Lessard, G

The presentation of vocabulary in computer-aided instruction. *Canadian Modern Language Review* 43(1986), 94-107.

Lübke, D

Vokabellernen mit Computer? *Praxis des deustchsprachlichen Unterrichts* 4(1986), 387-394.

Mack, M

A study of semantic and syntactic processing in monolinguals and fluent early bilinguals. *Journal of Psycholinguistic Research* 16,6(1986), 463-488.

Mahnert, D

Worte, Worte – nichts als Worte! Vokabeln einführen, üben und lernen in der Sekundarstufe I. *Der fremdsprachliche Unterricht* 20, 1986, 79, 191-202.

Meara, PM

The DIGAME project. In: **VJ Cook** (Ed.) *Experimental approaches to second language learning*. Oxford: Pergamon Press. 1986. 101-110.

Meara, PM

Psycholinguistic relativity – is Spanish different? In: **VJ Cook** (Ed.) *Experimental approaches to second language learning*. Oxford: Pergamon Press. 1986.

Meara, PM and S Ingle

The formal representation of words in an L2 speaker's lexicon. *Second Language Research* 2(1986), 160-171.

Murray, DJ

Characteristics of words determining how early they will be translated into a second language. *Applied Psycholinguistics* 7,4(1986), 353-372.

Nakamura, LK

Students' identification of English/Portuguese cognates. *ESPecialist* 13(1986), 11-18.

Nakamura, LK

A practical procedure to develop student's awareness of English imports into the language. *ESPecialist* 13(1986), 19-24.

Nattinger, J

Lexical phrases, functions and vocabulary acquisition. *The ORTESOL Journal* 7(1986) 1-14.

Noyau, C and M-T Vasseur

L'acquisition des moyens de la référence temporelle en français langue étrangère chez des adults hispanophones. [Acquisition of terms for time in French by native speakers of Spanish.] *Langages* 84(1986), 105-117.

Ostyn, P, M Vandecasteele, G Deville and P Kelly

Towards an optimal programme of FL vocabulary acquisition. In: **A-M Cornu, J Vanparijs, M Delahaye & L Baten** (Eds). *Beads or bracelet? How do we approach LSP?* Leuven: Instituut voor Levende Talen. 1986.

Palmberg, R

Vocabulary teaching in the foreign language classroom. *English Teaching Forum* 24, 3(1986), 15-24.

Pattison, P

'Je leert je rot aan woorden.' [School-children's attitude towards vocabulary learning.] *Levende Talen* 416(1986), 649-653.

Pons-Ridler, S

Les champs semantiques de l'action a travers le vocabulaire fondamental [Semantic Fields and Verbs in the Dictionary of Basic Vocabulary]. *French Review* 59,4(1986), 515-531.

Pye, C

One lexicon or two? an alternative interpretation of early bilingual speech. *Journal of Child Language* 13(1986), 591-193.

Ramirez, SZ

The effects of suggestopedia in teaching English vocabulary to Spanish-dominant Chicano third graders. *The Elementary School Journal* 86,3(1986), 324-333.

Reiner, E

Dubletten und Faux Amis: Berührungspunkte zwischen Sprachunterricht und Sprachwissenschaft. *Moderne Sprachen* 30,3-4(1986), 30-48.

Rudzka-Ostyn, B

Vocabulary teaching: a cognitive approach. In: **A-M Cornu, J Vanparijs, N Delahaye and L Baten** (Eds.) *Beads or Bracelet? How do we approach LSP?* Oxford: Oxford University Press. 1986.

Schouten-van Parreren, C

Nieuwe perspectieven op de didactiek van de woordenschatverwerving. [New perspectives on the teaching of vocabulary]. *Levende Talen* 416(1986), 618-625.

Schouten-van Parreren, C

Verslag van de werkbijeenkomst woordenschatuitbreiding. *Verslag* (1986) 143-148.

Schumans, J and W Hermans

Woordkennis Duits in HAVO3. [Knowledge of German vocabulary in Dutch Secondary Schools]. *Toegepaste Taalwetenschap in Artikelen* 26(1986), 95-102.

Segalowitz, N

Skilled reading in the second language. In: **J Vaid** (ed.) *Language processing in bilinguals: Neuropsychological perspectives*. Hillsdale, NJ.: Lawrence Erlbaum Associates. 1986. 3-19.

Slagter, PJ

Woorden, woorden, woorden. [Words, words, words.] *Levende Talen* 416(1986), 616-617.

Smit-Kreuzen, M

Woordenschatverwerving – kan de computer helpen? [Vocabulary acquisition: can the computer help?] *Levende Talen* 416(1986), 648-651.

Speight, S

Choosing the right words. *Der fremdsprachliche Unterricht* 20, 1986, 79, 182-190.

Stip, P and J Hulstijn

Hoe geef je het goede voorbeeld? Woordenschatuitbreiding met behulp van voorbeeld zinnen. [Explaining word meanings with target language example sentences.] *Toegepaste Taalwetenschap in Artikelen* 25(1986), 118-128.

van Kooten, WA

Vocabulariumverwerving en vocabulariumbeheersing op universitair niveau: Focus on the learner. *Toegepaste Taalwetenschap in Artikelen* 25,1(1986), 110-117.

Véronique, D and R Porquier

Acquisition des moyens de la référence spatiale en français par des adultes arabophones et hispanophones. [How native Arabic and Spanish speakers acquire terms for spatial reference in French.] *Langages* 84(1986) 79-103.

Vihman, M

More on language differentiation. *Journal of Child Language* 13(1986), 595-597.

Weis, D

Untersuchungen zur langfristigen Verfugbarkeit von Wortschatz im Leistungsfach Englisch. *Neusprachliche Mitteilungen* 3(1986), 174-180.

Wolf-Franz, J

Was ich mit meinem Koerper alles kann – Wortschatzerweiterung und Wortschatzsicherung. *Grundschulmagazin* 1,12(1986), 11-12.

Zimmerman, R

Semantics and lexical error analysis. *Englisch, Amerikanische Studien* 2(1986), 294-505.

Zimmerman, R

Classification and distribution of lexical errors in the written work of German learners of English. *Papers and Studies in Contrastive Linguistics* 21(1986), 21-41.

The most notable feature of the included items is that many of them are to be found in two special issues of the Dutch language journals *Levende Talen* and *Toegepaste Taalwetenschap in Artikelen* – a clear confirmation of the importance of the Dutch research that we noted in the 1985 analysis.

The usual superficial analysis of the number of contributions made by each author in the data set identifies 92 unique contributors (again, slightly down from the 1985 figure).

As in previous years, the number of authors who contribute to a single paper is large (83% of the total). However, the number of authors contributing to more than one output in the 1986 data set has increased to 16: **Giacobbe** contributed to 4 papers; **Broeder, Cammarota** and **Meara** each contributed to 3 papers; **Bogaards, Cohen, Extra, Huckin, Kelly, Kirsner, Laufer, Nakamura, Ostyn, Schouten-van Parreren, van Hout** and **Zimmerman** all contributed to two papers (see Table 2). The biggest contributor to the 1986 data set was Giacobbe who contributed to 4 outputs in 1986 – the highest figure that we have found so far in this series of reports. As in previous years, the data suggests that there are fewer authors of multiple outputs than we would expect in a mature discipline. Work by Lotka (1926), conventionally known as Lotka's law suggests that we can expect the number of authors contributing N papers to a field will be approximately $1/N^2$ times the number of authors making a single contribution to the field. Table 2 shows that the number of authors contributing 2, 3 and 4 papers in 1986 falls well short of the figures predicted by Lotka's Law: the field as a whole continues to over-rely on one-off contributions.

Table 2: Authors contributing to N publications in 1986

No. of contributions	4	3	2	1
No. of Authors making N contributions in 1986	1	3	12	76
Expectation from Lotka's Law when N_1=76	2	8	19	

Of the 16 authors who contributed more than a single paper to the 1986 dataset several had also made multiple contributions in 1985 (**Broeder, Extra, van Hout, Laufer** and **Meara)**. **Cohen** and **Schouten-van Parreren** were both identified as significant influences in the 1984 and 1985 data, though they did not make multiple contributions in those years. Two authors had published relevant papers in earlier years, but this work was not cited often enough for them to

reach the inclusion threshold for this study (Bogaards 1980 and Kirsner et al. 1980, 1982 and Smith and Kirsner 1984). Six authors are genuinely new members of the list, who have not appeared in our earlier analyses: **Giacobbe, Cammarota, Huckin, Kelly, Kirsner, Nakamura** and **Zimmerman.**

2.2. The analysis

The citation data from each of the 81 eligible papers was extracted in the usual way (see Appendix 1). This analysis identified 1278 unique sources. The number of times each of these sources is cited in the data set is summarised in Table 3.

Table 3: The number of times sources are cited in the 1986 data set

frequency	13	12	11	10	9	8	7	6	5	4	3	2	1
cases	1		1	2		1	1	4	17	26	72	179	974

The ten most cited sources in this data set are: **Krashen(13), Meara (11), Levenston** and **Schouten-van Parreren (10)**, **JC Richards (8)** and **Lambert, Corder, Gougenheim, Hatch** and **Rosch** with four citations each. Compared with the 1985 data, the raw number of sources has increased slightly, and so has the number of sources cited only once in the data set. The main change between 1985 and 1986 is the number of sources who are cited a lot. Krashen, for example, is cited in 16% of the papers in the data set.

This distribution is actually quite difficult to work with. In 1985, 88 sources were cited at least three times in the dataset. In 1986, the equivalent figure is 125 sources, an increase of 42%. 125 sources is quite a lot larger than the conventional figure of 100 often used in bibliometric maps. We might consider using a higher inclusion threshold for the 1986 data, but only 53 sources were cited at least four times, and this figure is very much lower than we would like for a co-citation analysis. In the analysis that follows, then, we will work with the 125 sources that are cited at least three times in the 1986 data. Included authors are therefore cited in about 4% of the total outputs in 1986, and the inclusion criteria for 1986 are identical to the inclusion criteria for 1985.

These data were analysed using the Gephi software (Bastian, Heymann and Jacomy 2009). The 125 sources are linked by 2031 edges, and Gephi identifies four main clusters in the data. The analysis is shown in Figure 1. For the sake of simplicity the weakest links have been eliminated from this graph. The nodes are sized according to their **betweenness centrality**. (Nodes have a high score on this measure if they are likely to be included in the shortest path between two randomly selected nodes. The measure tends to highlight authors who act as bridges between clusters.)

The paragraphs that follow identify the main features of these clusters. We will follow this discussion with a consideration of the sources that survive from 1985-1986, and the new sources that appear in the 1986 map.

Cluster I, at the Western edge of the graph is the by now familiar psycholinguistics group of influences. As usual, the members of this cluster are very frequently cited alongside each other, but they have very limited co-citations with members of the other clusters. Most of these

between cluster co-citations link to Kucera and Francis, the standard word frequency count that both psychologists and applied linguists were using at this time.
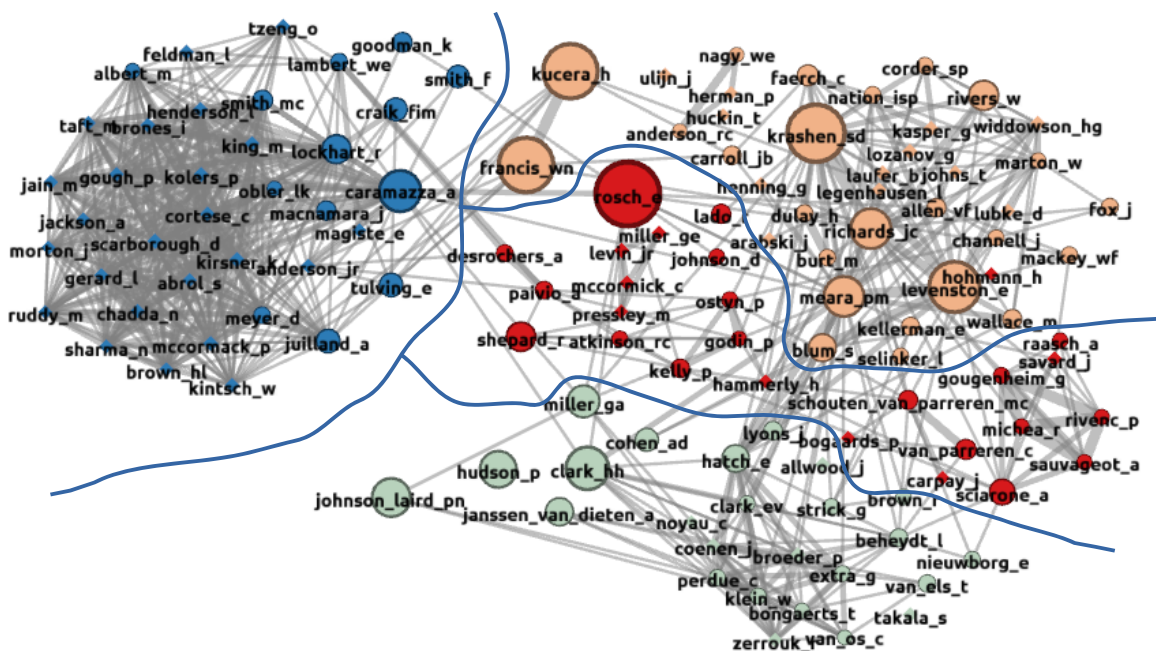

Figure 1: Co-citation analysis of the 1986 data. Each source is cited at least three times in the data set.

Cluster II, at the bottom of the map is slightly more difficult to characterise. This cluster too contains some influences who are psycholinguists (notably Johnson-Laird and George Miller), and it also contains a group of influences who are mainly concerned with L1 acquisition (Eve Clark, Herbert Clark and Roger Brown). The main feature of this cluster is the relatively dense part of the map which includes Broeder, Extra, Bongaerts, van Els, Zerrouk, Perdue and Klein. These influences are all members of a large international project team funded by the European Science Foundation, and hosted by the Max Planck Institute in Nijmegen. This project was a very large scale comparative study of the way migrants acquire typologically different languages in naturalistic settings. The project used an interesting methodology which relied heavily on in depth observations of a small number of Subjects across a large number of language pairs – five target languages and six source languages in total. Klein was the overall director of the project. Broeder, Extra and van Hout were part of the Dutch team which looked at acquisition of Dutch by L1 Arabic speakers and by L1 Turkish speakers. Giacobbe and Camarotta, who were identified earlier as authors of multiple papers in the 1986 data set, were part of the French team working on this project, which looked at acquisition of French by L1 Spanish speakers and L1 Arabic speakers. Both teams had a special interest in the lexical development demonstrated by their Subjects, but unlike the reports of the Dutch team, Giacobbe and Camarotta's reports did not appear early enough to influence the other work in the 1986 data set.

Cluster III, at the North East section of the map is easily recognisable as a cluster that deals with mainstream L2 vocabulary research. Interestingly, this cluster is much more tightly interconnected in this map than it was in our earlier maps, and this suggests that there is a growing consensus among L2 vocabulary researchers over who the main influences are. It is

also worth noting that most of the sources co-cited in this cluster are themselves L2 vocabulary researchers, and a very high proportion of them appeared as significant influences in our 1985 map. Perhaps these are the early signs of a self-reflexive orthodoxy emerging in the field?

Cluster IV, in the centre of the map, is the most difficult cluster to characterise. Two main sub-groups stand out among these influences. At the left of this cluster is a group of researchers whose main interests focus on imagery and the role of imagery in memory. Particularly striking here is a group of psychologists who had earlier published a lot of research into the use of mnemonics in vocabulary acquisition (Levin, McCormick, Pressley and Atkinson, whose main work appeared in the late 1970s). The other end of this cluster comprises the *Français fondamental* group (Gougenheim, Michea, Rivenc, Sauvageot and Savard), and three Dutch researchers (van Parreren, Schouten-van Parreren and Sciarone) who are mainly interested in the way learners can infer the meanings of words from context. The single idea that seems to link these separate groups appears to be the specific conditions under which learning words can take place. In this respect, cluster IV looks to be concerned with small-scale vocabulary learning, whereas cluster III might be more concerned with large scale vocabulary learning, with a particular interest in vocabulary use.

Overall, this map differs from the 1985 map in that its structure is much less influenced by geography, and much more influenced by topic. This feels like a significant change.

Several of the sub-clusters that we identified in the 1985 map no longer make an appearance in 1986, confirming our view that the clusters are very volatile at this period.The dictionaries and semantics group no longer stands alone as an identifiable cluster; what remains of this group seems to have been subsumed by Cluster IV. The 1985 dyslexia sub-cluster seems to have disappeared completely. So too has the small cluster comprising Davoust and Bouscaren, which we identified as a specifically French set of influences. The large cluster of influences focussed on word frequency issues seems to have disintegrated in 1986. Most of the members of this cluster still appear in the 1986 map, but here they seem to be distributed among the other clusters, rather than forming a cluster of their own. About half of the members of this cluster have been absorbed by cluster III in the 1986 map, while the French language sources have mostly been absorbed by Cluster IV.

As usual, we can identify a small group of **survivors** – sources who were influential in both the 1985 and the 1986 data – summarised in Figure 2. Because the 1986 network is much larger than the 1985 network, we might expect that the 1986 survivors list would also be larger. Surprisingly, this is not the case. We had 32 survivors in 1985, and 36 in 1986. These sources are shown in Figure 2. In fact, most of the 1986 survivors had appeared as survivors in the 1985 map, yet another indication that the field is beginning to crystallize. A third of the 36 survivors are genuinely new additions to the survivors list: **Bongaerts, Carroll, Hammerly, Hatch, Ostyn, Sciarone,** and the *Français Fondamental* group: **Gougenheim, Michéa, Rivenc, Savard** and **Sauvageot.** It is also worth noting that some of the 1985 survivors, including some sources who would have been considered very influential, no longer appear in the survivors list: **Oller, Ringbom, Clarke, Bialystok, Arnaud, West, Fillmore, Krauthamer** and **Paradis** all seem to have drifted off the radar in 1986. Given that the inclusion criteria for both maps are identical, it seems safe to conclude that some serious consolidation is taking place in 1986, but that some long-standing influences are becoming less significant.

Gephi identifies three clusters in the survivor group. The familiar psycholinguistic survivors appear in the west of the map, but much reduced in number from their dominating role in earlier maps. Apart from Kucera and Francis – the two most important influences in this cluster – only Caramazza is co-cited with influences from the other groups. I think that Caramazza is a ignificant influence in this map because his 1979 paper deals with English and Spanish bilinguals, an interest shared with Meara in the central Cluster.
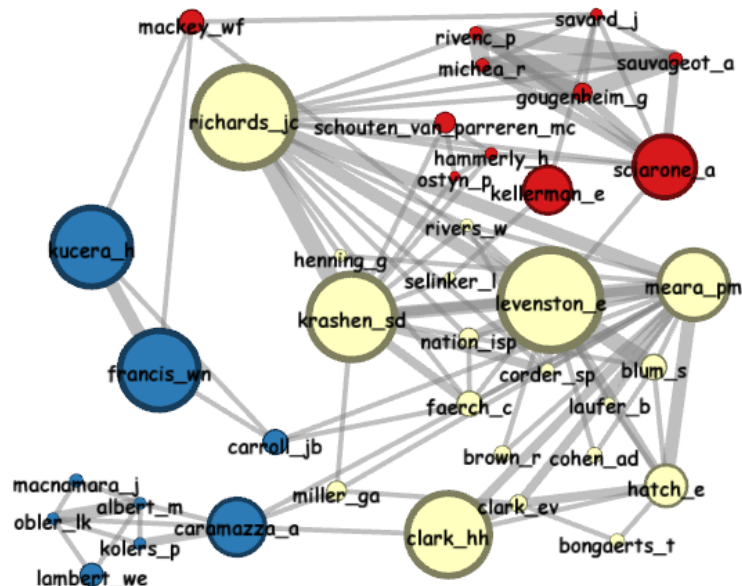

Figure 2: *The 1986 survivors: influences who appear in both the 1985 and the 1986 map. The weakest links have been removed for the sake of simplicity. Nodes are sized according to their betweenness centrality.*

The cluster at the Northeast corner of the survivor map consists of two subgroups, the strongly inter-connected *Français Fondamental* group, and some important influences based in the Netherlands and Belgium. A surprising feature of this cluster is the importance of **Sciarone,** strongly co-cited alongside the *Français Fondamental* group. Sciarone's work is mostly in Dutch, so not well known in the English speaking research world, though his 1979 book is very frequently cited by Dutch researchers.

The centre of the map is occupied mainly by English language researchers, and contains over half of the most significant influences in this map. This central cluster is dominated by Levenston (who together with Laufer, Blum and Cohen make up the Israeli cohort here.) Richards and Krashen make up the other two wings of this influential triumvirate. Herbert Clark, Eve Clark and Roger Brown speak to the continuing influence of L1 acquisition research on L2 vocabulary thinking. The surprising survivors here are Corder and Selinker, not vocabulary researchers themselves, but clearly influencing the thinking of many of the papers in the 1986 data set.

Figure 3 shows a map of the new influences who appear in the 1986 data. As usual, the weakest links are omitted in the interests of simplicity and the the nodes are sized according to their betweenness centrality.

This map needs to be treated with rather more caution than the maps in our earlier papers that identified sources surviving from one year to the next. type. At first glance, this map seems

to imply that we have an unusually large number of new influences in 1986. In part, however, this increase is due simply to the fact that the 1986 map contains many more nodes than the 1985 map, and this inevitably leaves room for a lot of new entrants. Nevertheless, the criteria for inclusion in the 1985 map and the 1986 map are identical, so this large increase in new entrants does seem to be a genuine phenomenon, and not just an artefact. And there are some striking features in the 1986 data which require comment.

Gephi identifies four clusters in this data. These clusters broadly reflect the cluster structure of the whole 1986 data set – this is not really surprising given that new entries make up a very large proportion of the bigger map. The new clusters are rather more interconnected than we have come to expect from our earlier maps where the new entrants formed sizeable but loosely connected clusters. Here, each cluster is fairly self-contained, but there are few strong ties running across the cluster boundaries.

The most striking feature of this map is the very dense cluster that appears at the Western edge of the map, a cluster that is largely made up of psychologists and psycholinguists. A feature of this sort has appeared in most of the maps in this series of papers. What is surprising here, however, is the sheer number of new sources appearing in this cluster. It implies that the psycholinguistics cluster which appears in our earlier maps is not nearly as stable as it appears at first sight: the 1985 map contained a very large psycholinguistics cluster, but by 1986 most of its members have been replaced by new influences. The new theme in 1986 seems specifically to be word recognition in an L2, a theme which has not been strongly represented in the earlier maps. Several of the papers included in the 1986 data set come from a single volume of papers edited by Vaid, and this may have influenced the emergence of a new and unusually coherent theme in the 1986 map.
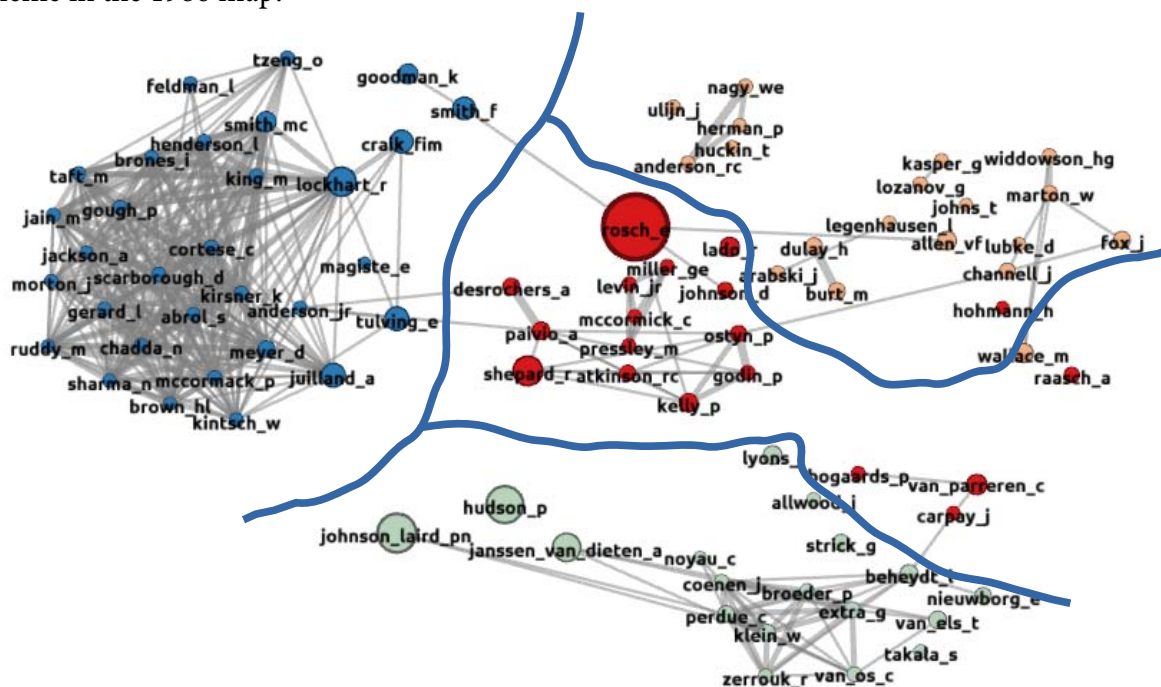

Figure 3: The new influences in the 1986 map.

The cluster at the Southern edge of the map is largely made up of the members of the ESF project, and a couple of influences in the area of semantics. Lyons and Beheydt were not

significant sources in the 1985 map, but did play a role in earlier maps, suggesting that they are returners, rather than genuinely new sources. This cluster, despite its strong internal structure, is largely isolated from the rest of the map: it has no co-citation links with two of the other clusters, and only a weak geographical link with the remaining cluster.

The cluster at the Northeast sector of the map contains two sub-clusters. The Nagy-Huckin-Anderson-Herman-Ulijn sub-cluster represents a set of influences who are mainly concerned with L2 reading skills. (We might have expected them to be closely linked with Goodman and Smith in the psycholinguistics cluster – both eminent figures in L1 reading studies.) The remaining members of this cluster seem to represent a set of eclectic approaches towards vocabulary acquisition. Lozanov (of Suggestopedia fame) is a notable figure in this group, Johns and Fox represent the beginnings of a computer-based approach to vocabulary acquisition. Dulay and Burt reflect the increasing dominance of Krashen in the US research. Allen and Wallace both authored text books on vocabulary teaching.

Cluster IV, the group at the centre of this map, is also difficult to characterise succinctly. Rosch has appeared as a significant influence in our earlier maps, but in spite of her central role in the overall graph, she seems to be somewhat disconnected from the other influences in this cluster. Two sub-groups can be identified. The van-Parreren-Carpay-Bogaards subgroup is a nucleus of Dutch vocabulary researchers. The remaining members of this cluster are very specifically interested in imagery and mnemonics as they apply to L2 vocabulary acquisition.

Apart from the striking turn-over in Cluster 1, the new entrants seem to reinforce the general patterns which have appeared in our earlier maps. By 1986, we still do not have anything like a consensus about the main lines of vocabulary research, and the clusters of influences which inform vocabulary research are very fluid and unsettled. Nonetheless, a small core of influences, whose names will be familiar to modern researchers, is beginning to appear consistently in these maps. None of these figures has yet emerged as a dominant influence on the way people are thinking about vocabulary at the time, however. That role is reserved for figures like Krashen and Rosch, neither of whom would be regarded as major L2 vocabulary researchers today. Kucera and Francis are the other major influences in 1986: they play a role which would probably surprise them as much as it is likely to surprise modern readers. Their influence is more methodological than conceptual, with their word frequency list playing an important reference role in discussions of word frequency.

In short, the map which emerges from the 1986 literature continues to look very different from the kind of maps which we find in the more recent research (Meara 2012). The real change here is the fact that more systematic research is being carried out into L2 vocabulary work, and that the multiple papers generated by a couple of coherent research groups are beginning to form a body of work that L2 vocabulary research can start to build on. Perhaps 1986 is best seen not so much as a great leap forwards, but as a substantial amount of preparatory work on the foundations of future research.

3. Part 2. A wider perspective: 1982-1986

Several reviewers of my previous papers have commented that it is rather unusual to carry out bibliometric analyses on a single year's work, and that it might make more sense to work with

a wider window, say, five or ten years' worth of research outputs. This is a very valid comment, which needs to be taken seriously. As we have seen, the annual maps that we looked at so far show quite radical changes from one year to the next, suggesting that the field was peculiarly volatile at this time. However, it is possible that the volatility is an artefact caused by the relatively slow rate of publication at the time. And maybe a more stable picture, one less influenced by short-term publication patterns, would emerge if we stood back from the data and analysed a larger set of papers produced over a longer time period.

Obviously, now that we have data sets from 1982-1986, we are in a position to merge the annual data sets into a much larger comprehensive data set covering the entire period. A bibliometric analysis that does this is presented in this section.

3.1. The data sources

The combined data set for 1982-1986 consists of 317 papers. For reasons of space. I have not listed these papers here, but interested readers can find the included papers in the VARGA database: (www.lognostics.co.uk/varga). Items included in this analysis are listed with two hash marks (##), and the list of included items can be retrieved by using the VARGA query page to limit the search period (1982-1986) and entering ## as the search term. Note that this figure of 317 items is somewhat larger than the combined total of the individual 1982-1986 analyses reported earlier. This is because a few unobtainable items came to light after publication of the earlier analyses. These additional sources are fairly obscure sources which do not materially change the earlier analyses.

The data set identifies a total of 309 unique authors, distributed as shown in Table 4.

Table 4: *Authors contributing N papers to the combined data set, and the number of contributors we would expect taking Lotka's Law into account.*

# contributions	11	10	9	8	7	6	5	4	3	2	1
authors	1					4	1	7	12	42	242
Lotka's Model	2	2	4	4	5	7	10	15	27	60	

The most prolific authors in this period are Meara (11 items), Laufer, Mägiste, Nation and Ringbom (6 items each), Broeder (5 items), Binon, AD Cohen, Cornu, Extra, Kirsner, Palmberg and van Hout (4 items each).

In my earlier analyses, I pointed out that the field as a whole is characterised by a relatively large number of authors who contribute to only a single paper in the data set. This feature is even more apparent in the combined data set than it is in the data for individual years. The bottom line of Table 4 shows how many people we would expect to be publishing N papers in this period, given that we have 242 authors contributing to just one paper (Lotka 1926). Lotka's model suggests that the number of people contributing to N papers is about half of what we would expect, and considerably worse than this in the 7-10 range.

3.2. The analysis

Table 5 shows our initial analysis of the citation patterns in this data. The 15 most cited sources are Lambert (40), Meara (34), Richards(30), Krashen (29), Albert, Corder and Levenston (25 each), Obler(24), EV Clark, AD Cohen and Kolers(23 each), Macnamara(22) and H Clark, Kucera and Francis (21 each). A raw frequency count of the citation data suggested that the threshold for inclusion in the co-citation analysis that follows should be set at 9 citations. This threshold gives a total of 92 sources – very close to the traditional figure of 100 that is conventionally used for co-citation analyses. Figure 4 shows a more detailed analysis of the citation patterns in the data set; the analysis is based on the 370 co-citation links between nodes that occur at least 4 times in the data set. At this level of delicacy, Gephi's analysis identifies 5 clusters and one unattached singleton. These clusters are identified below in order of their size.

Table 5: *The number of authors cited in N papers in the combined 1982-86 data set.*

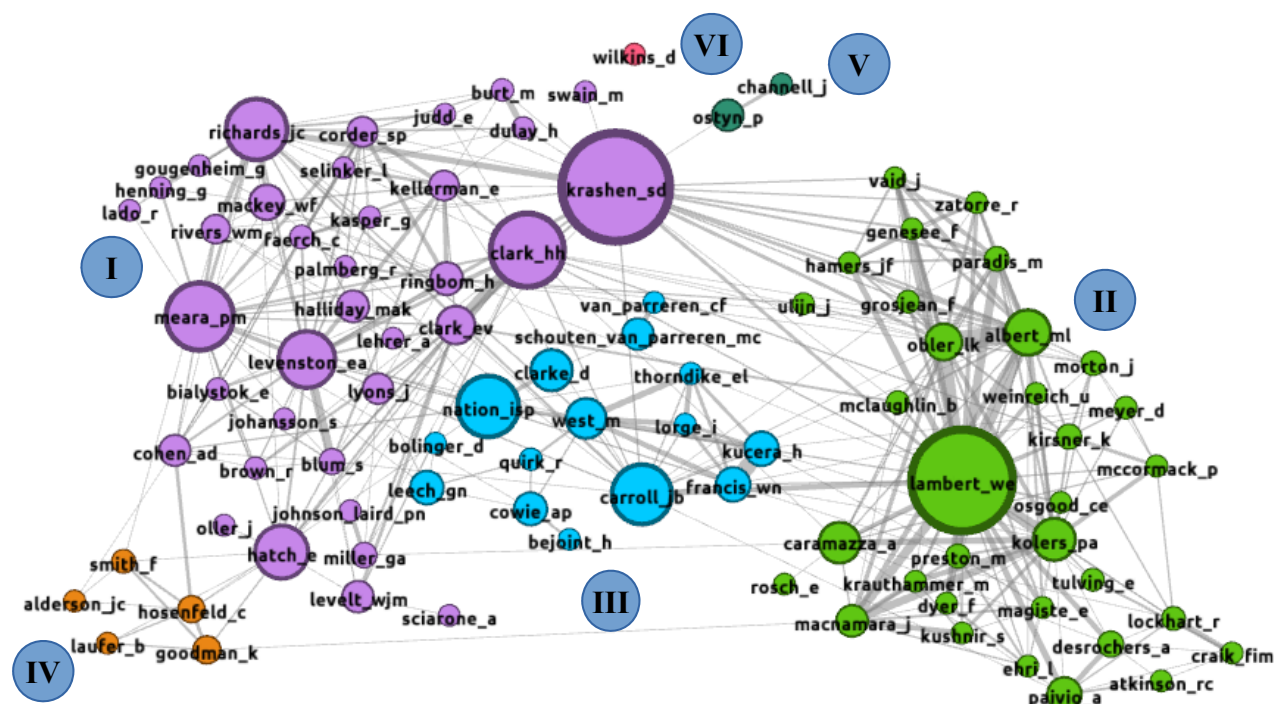| N cites	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31
sources						1						1			
N cites	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
sources	1	1				3	1	3	1	3	1	1		3	3
N cites	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
sources	5	5	9	6	4	21	18	31	30	56	86	122	234	530	2201

Figure 4: *Patterns of co-citation among the 92 most frequently cited sources in the 1982-86 data set. Threshold for inclusion is 9 citations in the data set, with a minimum co-citation strength of 4. Nodes are sized according to their betweenness centrality.*

Cluster I, the principal cluster with 35 members, can clearly be identified as an L2 vocabulary cluster. The most important influence here is Krashen, but six of the top ten sources (in terms of betweenness centrality) belong to this cluster – Krashen, Clark, Meara, Richards, Levenston

and Hatch. Several subclusters can be identified in this group: *français fondamental* (Gougenheim, Richards, Mackey); semantics and meaning (Lyons, Lehrer, Halliday and Hatch); L1 acquisition (Clark and Clark and Brown); transfer and lexical errors (Ringbom, Corder, Selinker, Kellerman, Palmberg); a psycholinguistics influence (Miller, Johnson-Laird, Levelt); and the Krashen, Dulay and Burt subcluster, mainly identified with Krashen's Monitor Model, and the difference between acquisition and learning. Krashen's surprising appearance here as the Most Significant Influence will be discussed in more detail below.

Cluster I, the principal cluster with 35 members, can clearly be identified as an L2 vocabulary cluster. It consists of 35 influences. The most important influence here is Krashen, but six of the top ten sources (in terms of betweenness centrality) belong to this cluster – Krashen, Clark, Meara, Richards, Levenston and Hatch. Several subclusters can be identified in this group: *français fondamental* (Gougenheim, Richards, Mackey); semantics and meaning (Lyons, Lehrer, Halliday and Hatch); L1 acquisition (Clark and Clark and Brown); transfer and lexical errors (Ringbom, Corder, Selinker, Kellerman, Palmberg); a psycholinguistics influence (Miller, Johnson-Laird, Levelt); and the Krashen, Dulay and Burt subcluster, mainly identified with Krashen's Monitor Model, and the difference between acquisition and learning. Krashen's surprising appearance here as the Most Significant Influence will be discussed in more detail below.

Cluster II is the familiar set of psychological influences, which we have noted in our earlier analyses. The influences in this cluster are mainly psychologists interested in experimental studies of bilingual behaviour. Two of our top ten influences fall into this cluster: Lambert and Albert. Again, we can distinguish a several sub-clusters here, principally a number of people interested in neurolinguistics (Albert, Obler, Paradis), a group interested in the linguistic performance of bilinguals (Lambert, Macnamara, Kolers), and a group of influences that are specifically interested in word recognition effects in bilingualism. The distinguishing features of this cluster of influences are a focus on experimental research methods (as opposed to the less rigorous, descriptive methods employed by the researchers in cluster I), and a Montreal connection – several of the influences in this cluster are based in that city. The cluster has relatively few co-citation links with Cluster 1, and almost all of these links involve a co-citation with Krashen. Co-citation links within the cluster are very strong.

Cluster III, with 15 members, is predominantly made up of the main frequency counts available at this time. Thorndike and Lorge, Kucera and Francis, Carroll and West all authored important word counts. Quirk and Leech are important in corpus linguistics. Bejoint and Cowie work on L2 learners and dictionaries. The most interesting influence in this cluster is Nation, forming with Clarke, Schouten-van Parreren and van Parreren, a subcluster that deals with guessing and inferencing behaviour in L2 learners. This cluster has a lot of weak co-citation links with Cluster I, but only one stronger co-citiation link with Cluster II (Carroll~Lambert).

Cluster IV, a small cluster with only five members, is clearly an L2 reading cluster. The main figure of interest here is Laufer, who will become a very significant influence in later maps. Goodman and Smith are both major figures in L1 reading research. This cluster is weakly connected to cluster I, and has one direct co-citation link with Cluster II (Goodman~Macnamara), but no direct co-citation links with Cluster III.

Cluster V contains only two members, Ostyn and Channell, who were working at this time on a semantic approach to vocabulary acquisition. We might have expected to find this cluster closely aligned with the semantics group in cluster I (Lyons, Lehrer, Halliday), but this appears not to be the case.

Finally, Wilkins appears as an unconnected singleton in this map (**Cluster VI**). He is cited nine times in the data set, but none of the co-citation links are strong enough to reach the threshold for inclusion for this map. Wilkins is mostly cited in connection with a comment in his 1972 book:

> 'There is not much value in being able to produce grammatical sentences if one has not got the vocabulary that is needed to convey what one wishes to say ... While without grammar very little can be conveyed, without vocabulary nothing can be conveyed'
>
> (Wilkins 1972:110-111).

4. Discussion

A number of features in the 1982-1986 map deserve some comment. Firstly, our analysis of the five year data set broadly supports our earlier analyses based on the outputs in a series of single years. However, the patterns in the data are much more clearly discernible here, and it does look as though a five year window gives a more reliable and more stable picture, which is less susceptible to the accidental fluctuations that we find in the smaller, single year data sets. We will work with data sets from a rolling five year window in future analyses.

Secondly, the five year data shows a much more coherent picture of the applied linguistics research on L2 vocabulary than we found in the single year analyses. In the earlier analyses, the applied linguistics influences were relatively insignificant compared with the psychological influences in the research. Here, they emerge as considerably more numerous than the psychological influences, more clearly delineated into identifiable research themes. Whereas the L2 vocabulary researchers were relatively insignificant in the single year analyses, here they appear as a large group (Cluster I), and if we add in Cluster 3, Cluster 4, Cluster 5 and Cluster 6 to Cluster 1, then the linguistic influences significantly outnumber the psychological ones. Cluster 1, the main L2 vocabulary acquisition cluster, has not yet crystallised around a single theme, and references sources from a range of research traditions. This is probably what we would expect to find in a relatively young field of research, and it suggests that we might expect a hardening of this group in the years to come, with some of the more tangential influences forming a focus for new clusters. For instance, it would not be surprising to find in future a young bilinguals cluster, heavily influenced by L1 vocabulary research, that focussed on vocabulary acquisition in young bilinguals.

Thirdly, the five year window strongly reinforces our view that the psycholinguistic influences and the applied linguistics influences form two very separate clusters that do not really interact with each other. Cluster II exhibits the strongest co-citation links of all the clusters in this map, but few of these links extend into other clusters. Again, this feature was one that we noted in connection with our single year maps, but the longer term view provided in Figure 4 clearly shows that the majority of the influences in Cluster II have no co-citation links

at all with the other clusters. The gulf between experimental and observational approaches to L2 vocabulary appears to be deeply engrained in this map.

Fourthly, a number of the smaller research clusters that appeared in our earlier maps no longer make a showing in the five year map. Two examples of this are the dyslexia group that appeared in our 1985 map, and the attrition group that appeared in our 1984 map. Neither group has a presence in the 1982-86 overview map. In the case of the dyslexia group, my feeling is that this idea was not being seriously pursued by 1986. Attrition research is active in the 1982-86 period, but it has not yet developed into a significant research theme. Likewise, the *Français Fondamental* group that has appeared in some of our single year maps appears here only as a minor influence (Gougenheim) in Cluster 1,and the inlfuence of this kind of research appears to be on the wane. On the other hand, Reading in an L2 and Dictionaries and Guessing Behaviour have consolidated by 1986, and are sufficiently coherent to appear as co-citation clusters that are characteristically different from other strands of L2 vocabulary research. A notable omission from the 1982-1986 map is any sign of the ESF work that we identified as a major new growth area in 1986. This highlights a particular problem with larger window analyses in that they tend to favour research that was active at the start of the window, and are not good at picking up newer research themes.

The most surprising feature of the 1982-1986 overview map is the emergence of Krashen as by far the Most Significant Influence in this data set, and unusually strongly co-cited alongside both the applied linguists and the psychologists. My first reaction to this feature is that it was basically an artefact due to the fact that some of Krashen's earlier publications which dealt with neurolinguistics, and the implications of brain structure, were being cited by psychologists, while his more recent work, which dealt specifically with L2 acquisition, the effects of age on language learning and so on were being cited by applied linguists. In fact, this analysis is very superficial, and does not capture the complexity of Krashen's citations in this data set. Alongside the specific citations of his work, Krashen seems to be the go-to person for anyone who wants to cite a general source on second language acquisition at this time. Significantly, perhaps, the number of papers citing Krashen goes up markedly over the 1982-86 period – two in 1982, three in 1983, four in 1984, eight in 1985 and 13 in 1986. These citations mostly refer to the six(!) books that appeared in this period (*Principles and Practice in Second Language Acquisition* and *Second Language Acquisition and Second Language Learning* both published in 1982, *The natural approach: Language Acquisition in the Classroom* co-authored with Terrell in 1985, the two edited volumes co-authored with Robin Scarcella and *Language Two* co-authored with Dulay and Burt. Ironically, very little of this work deals explicitly with vocabulary acquisition – indeed, Laufer (1986) notes that *Research in Second Language Acquisition* (1980) "includes papers on communicative competence, prosodic development and syntactic development. But no vocabulary development" (p69), while "Language Two … one of the most comprehensive texts on second language acquisition does not deal with vocabulary, as if vocabulary was not part of second language acquisition"(p69).

Krashen's seminal paper *We acquire vocabulary and spelling by reading: additional evidence for the input hypothesis,* and the much cited *Clockwork Orange* paper co-authored with Pitts and White, both published in 1989, still lie in the future. However, given the sheer volume of

Krashen's publications, we can expect him to remain a dominating influence in vocabulary research for many years to come.

5. Conclusions

This paper has provided an overview of the L2 vocabulary research that was published in a five-year window between 1982 and 1986. The bibliometric maps that we have analysed present a picture which will be recognisable to most people who were around at the time, but will perhaps be unfamiliar to younger researchers. Indeed, the maps discussed in this paper are strikingly different from maps that emerge from the more modern research. Few of the very significant modern vocabulary researchers figure in the 1982-86 map, and most of the themes which characterise current L2 vocabulary research have yet to emerge as coherent research clusters. Clearly, there is a lot of change to come, and we will be able to map these changes in future studies. In the meantime, what we have established here is a baseline against which we can evaluate new developments and paradigm shifts within L2 vocabulary research.

References

Bogaards, P. (1980). Geheugen en woordverwerving in een vreemde taal. [Memory and the acquisition of words in a foreign language.] *Levende Talen*351, 272-83.

Bastian, M., Heymann, S., & Jacomy, M. (2009). Gephi: an open source software for exploring and manipulating networks. International AAAI Conference on Weblogs and Social Media.

Dulay, H., M. Burt and S. D. Krashen. (1982). *Language Two.* Oxford: Oxford University Press.

Kirsner, K., H. Brown, S. Abrol, N. Chadha and N. Sharma (1980). Bilingualism and lexical representation. *Quarterly Journal of Experimental Psychology,* 32, 585-594.

Kirsner, K., M. Smith, R. S. Lockhart, H. L. King and M. Jain. (1984). The bilingual lexicon: language-specific units in an integrated network. *Journal of Verbal Learning and Verbal Behaviour,* 23, 519-529.

Krashen, S. D. (1981). *Second Language Acquisition and Second Language Learning.* Prentice-Hall International.

Krashen, S. D. (1982). *Principles and Practice in Second Language Acquisition.* Prentice-Hall International.

Krashen, S. D. (1985). *The Input Hypothesis.* Harlow: Longman.

Krashen, S. D. (1989). We acquire vocabulary and spelling by reading: additional evidence for the Input hypothesis. *Modern Language Journal, 73, 440-464.*

Krashen, S. D. and R. Scarcella. (1982). *Child-adult differences in Second Language Acquisition.* Rowley, Mass.: Newbury House.

Krashen, S. D. and T Terrell. (1983) *The natural approach: Language Acquisition in the Classroom.* San Francisco: The Alemany Press.

Laufer, B. (1986) Possible changes in attitude towards vocabulary acquisition research. *IRAL,* 24,1, 69-75.

Lotka, A. J. (1926). The frequency distribution of scientific productivity. *Journal of the Washington Academy of Sciences,* 16(12), 317–324.

Meara, P. M. (2012). The bibliometrics of vocabulary acquisition: An exploratory study. *RELC Journal*, 43(1), 7-22.

Meara, P. M. (2014). Life before Nation: Bibliometrics and L2 vocabulary studies in 1982. In: M. Gómez González, F. J. Ruiz de Mendoza Ibañez, F Gonzálvez García & A. Downing (Eds.), *The Functional Perspective on Language and Discourse: Applications and implications.* (pp. 111-129). Amsterdam: John Benjamins.

Meara, P. M. (2015). Vocabulary research in 1983: A bibliometric analysis. *Linguistics Beyond and Within,* 1, 187-198.

Meara, P. M. (2016). Two steps backwards: A bibliometric analysis of L2 vocabulary research in 1984. *Linguistics Beyond and Within*, 2, 139-152.

Meara, P. M. (2017). A new beginning? A bibliometric analysis of L2 vocabulary research in 1985. *Linguistics Beyond and Within*, 3, 136-154.

Meara, P. M. *VARGA: the Vocabulary Acquisition Research Group Archive.* Available at: *http://www.lognostics.co.uk/varga/* (accessed 27th November 2018).

Pitts, M., H. White and S. D. Krashen. (1989). Acquiring second language vocabulary through reading: a replication of the Clockwork Orange study using second language acquirers. *Reading in a Second Language,* 5,2, 271-275.

Price, D. (1965). Networks of scientific papers. *Science*, 149(3683), 510-515.

Scarcella, R and SD Krashen (eds.) (1980). *Research in Second Language Acquisition.* Rowley, Mass: Newbury House.

Sciarone, A. G. (1979). *Woordjes leren in het vreemdetalenonderwijs.* Muiderberg: Coutinho b. v.

Small, H. (1973). Co-citation in the scientific literature: A new measure of the relationship between two documents. *Journal of the American Society for Information Science*, 24, 265-269.

Smith, M. and K. Kirsner. (1982). Language and orthography as irrelevant features in colour-word and picture-word Stroop interference. *Quarterly Journal of Experimental Psychology,* 34A, 153-170.

White, H. D., & Griffith, B. C. (1981). Author cocitation: A literature measure of intellectual structure. *Journal of the American Society for Information Science,* 32, 163-171.

Wilkins, D.A. (1972). Linguistics in Language Teaching. London: Edward Arnold.

Appendix 1: Co-citation analysis: The methodology

The co-citation method was developed by Small in a number of papers published in the 1970s (e.g. Small, 1973). This approach, which was actually built on earlier bibliometric work by Price (1965), has been extensively used to analyse research in the natural sciences (e.g. White & Griffith, 1981) but does not seem to have been adopted as a standard tool by researchers in the Humanities.

The raw data for a co-citation analysis consists of a list of all the authors cited in the set of papers to be analysed. For each paper in the data set, we make a list of every author that the paper cites; for each paper, each cited author counts only once, regardless of how many times they are cited in the paper; and for a cited paper with multiple authors, each of the contributors is added to the author list.

This raw data is then used to construct a large matrix showing which authors are cited together in each of the papers in the data set. The matrix can then be analysed using a program such as **Gephi** (Bastian, Heymann, & Jacomy, 2009). Gephi performs a cluster analysis on the data, groups together authors who tend to be cited alongside each other in a number of papers, and outputs a map which shows the composition of the clusters and the relationship between them. The clusters are generally taken to represent "invisible colleges" in the data – i.e. groups of researchers who share similar reference points and a common research focus.

Appendix 2 omitted items (theses, books, unpublished items and unobtainable items)

Theses

Bahat, E
The acquisition of word formation devices in a second language. Unpublished master's thesis, Tel Aviv University. 1986.

Kruse, H

A computer word-association test as a test of second language proficiency. Unpublished master's thesis, University of Utrecht. 1986.

Quigley, JR

A semantic field approach to passive vocabulary acquisition for advanced second language learners. PhD. North Texas State University. 1986.

Verkaik, P and P van der Wijst

Taal verlies en woordherkenning in het Frans als vreemde taal. [Language loss and word recognition in French as a foreign language.] Masters Thesis. Katholieke Universiteit, Nijmegen. 1986.

Books

Crow, J

The Keyword approach: vocabulary for advanced reading comprehension. Englewood Cliffs, NJ.: Prentice Hall Regents. 1986.

Gairns, R and S Redman

Working with words: a guide to teaching and learning vocabulary. Cambridge: Cambridge University Press. 1986.

Linnarud, M

Lexis in composition: a performance analysis of Swedish learners' written English. Malmö: Liber Förlag. 1986.

Morgan, J and M Rinvolucri

Vocabulary. Oxford: Oxford University Press. 1986.

Neuner, G and E Schade

Lernschwierigkeiten ausländischer Schüler mit dem Wortschatz der Grundschule. Kassel: Kasseler Werkstattberichte zur Didaktik. 1986.

Unobtainable items

Berwald, JP

Au courant: Teaching French vocabulary and culture using the mass media. Language in Education: Theory and Practice 65. ERIC ED267644. 1986.

Cheung, YS and PLM Lee

A study of the English vocabulary in junior secondary textbooks in Hong Kong. Educational Research Establishment, Education Department, 1986.

Hatakka, JJM

We all make mistakes. *Kielikeskusuuntisia Language Centre News* (Jyväskylä) 4(1986), 25-30.

Hubbard, P, J Coady, J Graney, K Mokhtari and J Magoto

Report on a pilot study of the relationship of high frequency vocabulary knowledge and reading proficiency in ESL readers. *Ohio University Working Papers in Linguistics and Language Teaching* 8(1986), 48-57.

Löschmann, M

Die Arbeit an lexikalischen Kenntnissen. In: **G Desselmann and H Hellmich** (eds.) *Didaktik des Fremdsprachenunterrichts (Deutsch als Fremdsprache)*. Leipzig. 1986. 141–166.

Maul, S

Falsaj amikoj. *Esperanto aktuell: Organ des Deutschen Esperanto-Bundes* 5,8(1986), 5-6.

van Weeren, J

Falsche Freunde. *Grazer linguistische Studien* 25(1986), 341-342.

Unpublished items

Black, A

The effects on comprehension and memory of providing different types of defining information for new vocabulary. Cambridge: MRC Applied Psychology Unit. 1986.