

An Ego-Centered Citation Analysis on the Top Five Iranian Chemists

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Introduction

The focus here is on ego-centered citation analysis—a method in which data gathering starts with an individual author's name. Ego-centered analysis reveals, in H. D. White's terminology, an author's collaborators, citation identity, citation image-makers, and citation image. Here, citation identities, including recitation patterns, will be extracted from DIALOG SciSearch (file 34), and studied for the top five Iranian chemists, as identified in previous research. A citation identity is the set of authors that an author cites over multiple publications.

In ego-centered citation analysis, all that is needed to start the mapping process is an author's name as seed. The advantage of starting with a single name is that it minimizes cognitive load for whoever wants the map made. This would seem particularly important if the aim is to create document-retrieval interfaces from citation data for naïve users. The method can reveal a seed author's *collaborators* (co-authors), *citation identity* (those cited by the seed), *citation image-makers* (those who cite the seed), and *citation image* (those co-cited with the seed). For this article we will examine the citation identities of the top 5 Iranian chemists from Osareh & McCain (2008) study: H. Firouzabadi, M. R. Ganjali, M. M. Heravi, M. Shamsipur, and M. A. Zolfigol.

Methodology

Techniques for the four modes of ego-centered analysis are given in White (2000, 2001), as follows:

	1: Select command s	2: Rank comm nds	3: Ranking shows	4: Basis of ranking (high to low)
Author's collaborator s	? S AU=Lee HX	? Rank AU CONT	Lee's co- authors	Counts of Lee's works with each co- author
Author's citation identity	? S AU=Lee HX	? Rank CA CONT	Authors cited by Lee	Counts of Lee's works citing each of his citees
Author's citation image- makers	? S CA=Lee HX	? Rank AU CONT	Authors citing Lee	Counts of each author's works citing Lee
Author's citation image	? S CA=Lee HX	? Rank CA CONT	Authors co-cited with Lee	Counts of works co- citing each other author with Lee

Table 1 displays the top five Iranian chemists and the authors they recited most often in their journal publications. The data are transferred directly from DIALOG retrievals. Only the top 25 or so citees are listed for each citer. At the bottom of each column are counts of the unlisted authors cited in at least one publication. Findings that emerge for the five Iranian chemists in Table 1 are:

1. Quoting White (2001: 92-93), all five Iranian selected authors" take the familiar form of Bradfrodian core-and-scatter distributions. None is 'all scatter' in the sense of being a long list of authors cited only once. None is 'all core' in the sense of being only self-citations or only recitations of a small, select group."

2. All five Iranian chemists are intellectual leaders in one of two fields: analytical chemistry or organic chemistry. Therefore, much the same citees turn up in their lists, differing only in their rankings. Shamsipur and Ganjali from analytical chemistry have the greatest overlap, with 11 chemists. Of those, three are Iranian (Fakhari, Rouhollahi, and Amini) and the rest are international (Umezawa, Bakker, Kamata, Rosatzin, Ammann, Buhlmann, Izatt, and Yang). Firouzabadi, Heravi and Zolfigol are from organic chemistry. Firouzabadi and Zolfigol have the second greatest overlap with five chemists. Of those one is Iranian (Iranpoor), and others are international (Olah, Greene, Cornelis, and Varma). Firouzabadi and Heravi have in their citee lists only Corey, Greene, Varma and Mckillop, who all are international chemists. The three Iranian organic chemists jointly overlap in citing only with two international chemists (Varma and Greene). This result differed somewhat from one of the White's (2001) results—that the eight information scientists he studied all had highly individualized identities.

3. None of the Iranian chemists in either group cited outside his own field. That is, none of the analytical chemists cited the organic chemists or vice versa. This result also differed from White's (2001) finding that some of his eight information scientists cited authors in other specialties in a way that broke stereotypes.

4. All five Iranian chemists cited themselves most frequently. The counts for second-ranked authors are usually considerably lower. Self-citation, according to White (2001: 93) is the largest single part of the identity; it is "the core of the core." This finding agrees with one of the White's (2001) findings: all eight of his information scientists cited themselves most frequently.

Table 1. Top names in citation identities of five Iranian chemists

Firouzabadi		Ganjali		Heravi		Shamsipur		Zolfigol	
138	FIROUZABADI	156	GANJALI MR	230	HERAVI MM	277	SHAMSIPUR	142	ZOLFIGOL MA
61	IRANPOOR N	145	SHAMSIPUR	54	VARMA RS	171	IZATT RM	94	FIROUZABADI
51	OLAH GA	112	UMEZAWA Y	42	MCKILLOP A	106	GANJALI MR	56	SHIRINI F
38	COREY EJ	95	BAKKER E	40	CADDICK S	89	BAKKER E	49	IRANPOOR N
38	GREENE TW	80	KAMATA S	33	GREENE TW	85	UMEZAWA Y	47	SALEHI P
20	CORNELIS A	73	ROSATZIN T	33	TAJBAKHS M	83	FAKHARI AR	42	MALLAKPOUR
20	OAE S	71	AMMANN D	28	BALOGH M	82	KAMATA S	42	OLAH GA
19	TANI H	55	BUHLMANN P	22	SHELDRIK GM	76	ROUHOLLAHI	27	RIEGO JM
17	SEEBACH D	47	FAKHARI AR	21	AGHAPOOR K	74	AMINI MK	23	MIRJALILI BF
17	TAMAMI B	46	EUGSTER R	21	GREEN TW	74	PEDERSEN CJ	21	CORNELIS A
15	LALONDE M	42	JAVANBAKHT M	20	BAMOHRAM FF	64	BUHLMANN P	21	WILLIAMS DLH
15	RANU BC	38	ROUHOLLAHI	20	GHASSEMZADEH	61	GUTMANN V	20	KEEFER LK
14	EVANS DA	37	IZATT RM	20	MIZUTANI M	58	AMMANN D	20	TURRO NJ
14	KAMITORI Y	37	YANG XH	19	CLARK JH	57	YANG XH	19	ITOH T
14	MUZART J	35	IUPAC AN CHEM DIV	19	MINGOS DMP	56	DADFARNIA S	19	KARIMI B
14	PAGE PCB	32	GUPTA VK	19	SPEK AL	54	NICELY VA	18	GREENE TW
14	TODA F	31	AMINI MK	18	BARTON DHR	53	TAVAKKOLI	18	STICKLER JC
14	VARMA RS	29	GEHRIG P	18	FATIADI AJ	52	ALIZADEH N	18	VARMA RS
13	GROBEL BT	29	MOODY GJ	17	ABRAMOVITCH	51	SHANNON RD	17	BANDGAR BP
13	HUDLICKY M	29	POURSABERI	17	BALLINI R	49	SEMNANI A	17	COOKSON RC
13	IZUMI Y	28	SCHALLER U	17	COREY EJ	46	KASHANIAN S	17	KLINDERT T
13	KIM YH	23	AMMAN D	17	DORNOW A	46	PARHAM H	17	LAI YC
13	KOZHEVNIKOV	22	LI ZQ	16	BRAM G	46	ROSATZIN T	17	YADAV JS
13	MCKILLOP A	21	JANATA J	16	HERAVI M	41	1 other	16	2 others
13	1 others	21	TAVAKKOLI	16	2 others	38	1 other	15	5 others
12 to 2	2714 others	18 to 2	2431 others	15 to 2	2198 others	37 to 2	6852 others	14 to 2	548 others
1	1220 others	1	979 others	1	1706 others	1	2766 others	1	929 others
Totals	4571		4744		4713		11626		3980

5. The five chemists have certain other authors whom they cite repeatedly. Excluding self-citations, Shamsipur has the most authors cited at least twice: 8583, Ganjali has 3609, Firouzabadi has 3213, Zolfigol has 2909, and Heravi has 2777. All five also have long lists of authors cited once only (see Table 1).

6. While all five chemists have cited more international chemists than Iranian ones, they have also cited some of their students. Shamsipur, for example, has cited at least four of his former PhD students (Fakhari, Rouhollahi, Alizadeh, and Semnani). It seems that the five chemists are affected by invisible colleges (defined as researchers with similar interests who communicate and collaborate, although their institutional bases are far apart). This result confirms White's (2001) finding that the authors he studied were affected by social networks.

Concluding remarks

All five Iranian chemists: form of Bradfordian core-and-scatter distributions, are intellectual leaders in one of two fields: analytical chemistry or organic chemistry, none of the Iranian chemists in either group cited outside his own field, all chemists cited

themselves most frequently, and While all five chemists have cited more international chemists than Iranian ones, they have also cited some of their students.

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