

To understand a Psychiatry Journal via Four Facets: an example of Ann Gen Psychiatry



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Abstract

Background: Identifying journal features is important and meaningful, but no journal uses Medline library to extract journal publication information or to report evidence-based journal characteristics using Social Network Analysis (SNA).

Objective: Our aims were to investigate journal features by collecting data from Medline and to visualize the journal characteristics for Ann Gen Psychiatry (AGP) and presenting resulting findings using SNA.

Methods: Selecting 416 abstracts and their corresponding coauthor names as well as keywords on September 1, 2017 from the US National Library of Medicine National Institutes of Health (Medline), we analyzed author names and keywords to report following features:

- Nation distribution and coauthor collaboration.
- Journal features represented by paper keywords;
- The most productive authors and their authorship clusters;

d. The top 10 journals most similar to AGP. We programmed Microsoft Excel VBA routines to extract data from Medline. Rasch model's Winseps and SNA Pajek software were performed to display visualized representations for AGP features.

Results: We found that (a) the most number of papers are from nations of Greece (18%), Japan(13%), and USA(11%), The strongest authorship collaboration are come from USA and Greece; (b) The most linked Keywords are depression and anxiety; (c) the most productive author is Konstantinos NFountoulakis; (d) The top ranked journals most similar to AGP are those J Affect Disord, Encephale, Cochrane Database Syst Rev.

Conclusion: Social network analysis provides wide and deep insight into the relationships among nations, coauthor collaborations, abstract keywords, and journals most similar to AGP. The results can be offered to strategy and decision making for the target journal.

Keywords: Abstract keywords, Authorship collaboration; Rasch analysis; Social network analysis; Medline

Abbreviations: AGP: Ann Gen Psychiatry; CTT: Classic Test Theory; SE: Standard Error; SCI: Science Citation Index; SNA: Social Network Analysis; VBA: Visual Basic for Applications

Introduction

Comorbid is defined in medicine as existing simultaneously with and usually independently of another medical condition. As for psychiatric disorders, depressions are often comorbid with and can usually complicate the treatment of patients with migraine headache [1]. Chronic pain problems also commonly co-occur with other anxiety problems [2]. In many situations, it is very hard to observe the association of two or more symptoms at one moment.

An apocryphal story often told to illustrate the concept of co-occurrence is about beer and diaper sales. It usually goes along with both beer and diaper sales which were strongly correlated [3-5] in a market place. As such, all possible pairs of our observed phenomena can be combined and analyzed using computer techniques. However, we have not seen any computer algorithms that help us selecting the most possible pairs co-occurred with each other.

Social network analysis (SNA)

Social Network Analysis (SNA) [6-8] has applied to authorship collaboration in recent years. It is because co-authorship among researchers that forms a type of social network, called co-author network [7]. We are thus interested in using SMA to explore the most pair relations (e.g., beer and diaper in marking sales) for a journal through what we observed and collected from data, such as abstract keywords, coauthor collaborations, and other journals similar to the target journal.

Authors are usually required to provide three to ten key words that represent the main content of the article for an article [9-13]. Keywords or short phrases published with an abstract can assist indexers in cross-indexing the article. However, few study investigated whether keywords are substantially associated with the abstract and what keywords that can represent the researched journal in academics.

Author collaborations and international relations

Many papers have been collected and saved at the US National Library of Medicine National Institutes of Health (Pubmed.com). Meanwhile, we have seen some computer scientists placing high hope on those machine-learning algorithms, data mining or artificial intelligence to quantify research information and even to create a structured database [14,15] for use in academics. Accordingly, extracting the Pub med (or say Medline) published papers may be possible for us to apply those data to understand the features and characteristics of a specific journal. For instance, we are interested in investigate what are the nation distribution and what are the top 10 journals similar to a specific journal.

For the reason that using internet information is increasing the yield of knowledge from data generated in the course of inquiry [16-18]. How to further display and develop new knowledge for a target journal is required to explore and further study.

Aims of the study

Our aims are to investigate journal features by collecting data from Medline and to visualize the journal characteristics for Ann Gen Psychiatry (AGP) in following representations:

- i. Nation distribution and coauthor collaborations;
- ii. Journal features represented by a couple of keywords;
- iii. The most productive authors and their authorship clusters;
- iv. The top 10 journals most similar to AGP.

Methods

Data sources

We programmed Microsoft Excel VBA (Visual Basic for Applications) modules for extracting abstracts and their

corresponding coauthor names as well as keywords on September 1, 2017 from the US National Library of Medicine National Institutes of Health (Medline), see Additional file 1. Only those abstracts published by Ann Gen Psychiatry (AGP) and labeled with Journal Article were included. Others like those labeled with Published Erratum, Editorial or without author name(s) were excluded from this study. A total of 416 abstracts were retrieved from Medline since 2005.

Data arrangement to fit SNA requirement

Prior to visualize representations of research findings using SNA, we should organize data in compliance with the SNA format and guidelines using Pajek software [19]. Microsoft Excel VBA was used to arrange data fitting the SNA requirement. For more information about the data extraction and the data arrangement, see Additional 1.

Graphical representations to report

Author nations and their relations: A cross table (i.e., columns for publication years and rows for the 1st author nations) was prepared for presenting the distribution of nations and their corresponding collaborations by separating isolated and clustered nodes (eg, nations). The bigger bubble means the more number of authors (including their coauthors) in papers. The wider line indicates the stronger relations between two nodes. Community clusters are filled with different colors in bubbles.

Keywords to present the journal research domain: If keywords represent the research domain for AGP, the stronger relations between two keywords can be highlighted through the SNA, like the concept of co-occurrence about beer and diaper sales. The presentation for the bubble and line is interpreted similar to the previous section.

The most productive authors and their authorships: Coauthor collaborations for AGP can be also drawn using SNA and interpreted by their bubbles and connected lines. Through which, we selected the most productive authors who published the most number of papers in AGP with their colleagues. With this in mind, only those with many contributions to AGP are illustrated in the diagram for focusing and narrowing the prestigious ones in the diagram.

Journals similar to AGP: Each paper in Medline can be linked to those similar articles by the algorithm of PubmedMeSH (Medical Subject Headings) terms. Through which, all those 416 AGP papers can be identified with similar journals by their papers including AGP himself. A total of 1416 journal were retrieved and 6480 counts were recorded across years since 2005. Rasch rating scale model [20,21] using Win steps software [22] were applied to analyze the dataset (i.e., 1415 journal rows and 13 year columns).

Rasch analysis overcomes the inherent weakness of conventional analytical techniques based on Classic Test Theory

(CTT), such as factor analysis, requiring linear, interval scale data input [23]. Raw data collected through Likert-type scales are always ordinal since their categories indicate its ordering without any proportional levels of meaning [24,25]. Therefore, it is highly possible misleading conclusions if applying CTT to raw scores which are ordinal data (i.e., response from 1 to 5 ordered category for instance) in nature. We selected Table 23.6 in Win steps to compare the journals most similar to AGP.

The interval measures for each journal on two opposite clusters from different items (i.e., years) were reported on two axes. If the clusters are different dimensions, then we expect the person measures to be considerably different for the different clusters [26].

The journal similarity measures are cross-plotted with 95% confidence bands based on the S.E.s of the measures. The confidence bands are averaged across the journals. The diagonal line on the plot is the identity line. All the points in the plot would fall on this line if the journal measures on both clusters were the same. If almost all the points are within the confidence bands, then the two clusters of items are not

measuring the journals in a statistically different way.

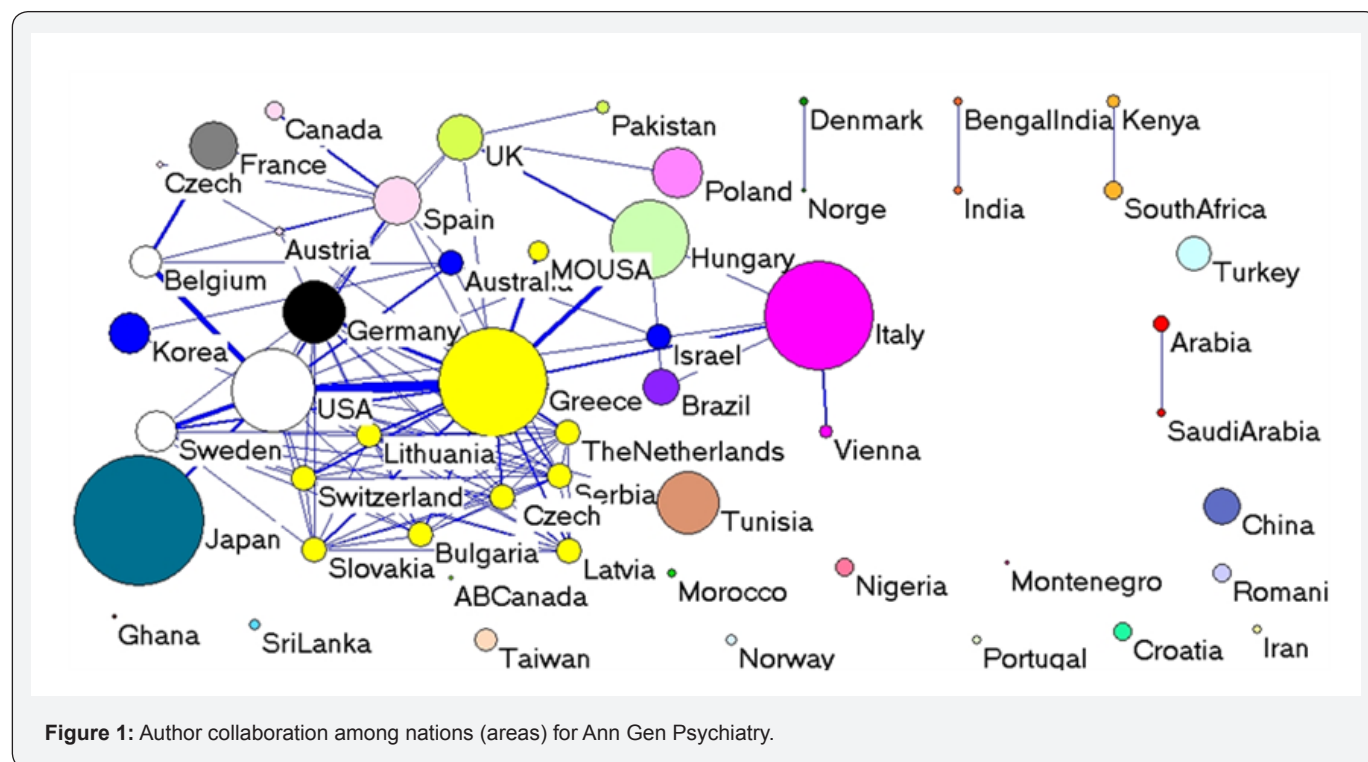
Statistical tools and data analyses

Rasch model's Winseps [22] and SNA Pajek software [19] were used to display visualized representations for AGP features. Author-made Excel VBA modules were applied to organize data, see Additional File 1.

Results

Author nations and their relations

All 416 AGP papers limited in journal article since 2005 are shown in Table 1. We can see the top 3 nations are Greece, Japan, and USA. The diagram shown by SNA in Figure 1 presents author collaboration among nations based on AGP publication. The strongest association is located on Greece and USA. The Greece in yellow cluster has many connections and collaborations with other countries. Some isolated nodes located on the bottom are those without any international collaboration. The bigger bubble represents the more number of papers and coauthors in the past 13 years.



Keywords to present the journal research domain

The top 10 keywords (weighted connection counts in parentheses) are listed as below: schizophrenia (89), depression (67), anxiety (50), mental health (25), cocaine

(19), heroin (19), alcohol (18), bipolar disorder (18), and brain-derived neurotrophic factor (18). We can see that the two bigger bubbles with a wider connection line in the yellow cluster are depression and anxiety in Figure 2, indicating these two are commonly co-occurred and discussed in AGP papers.

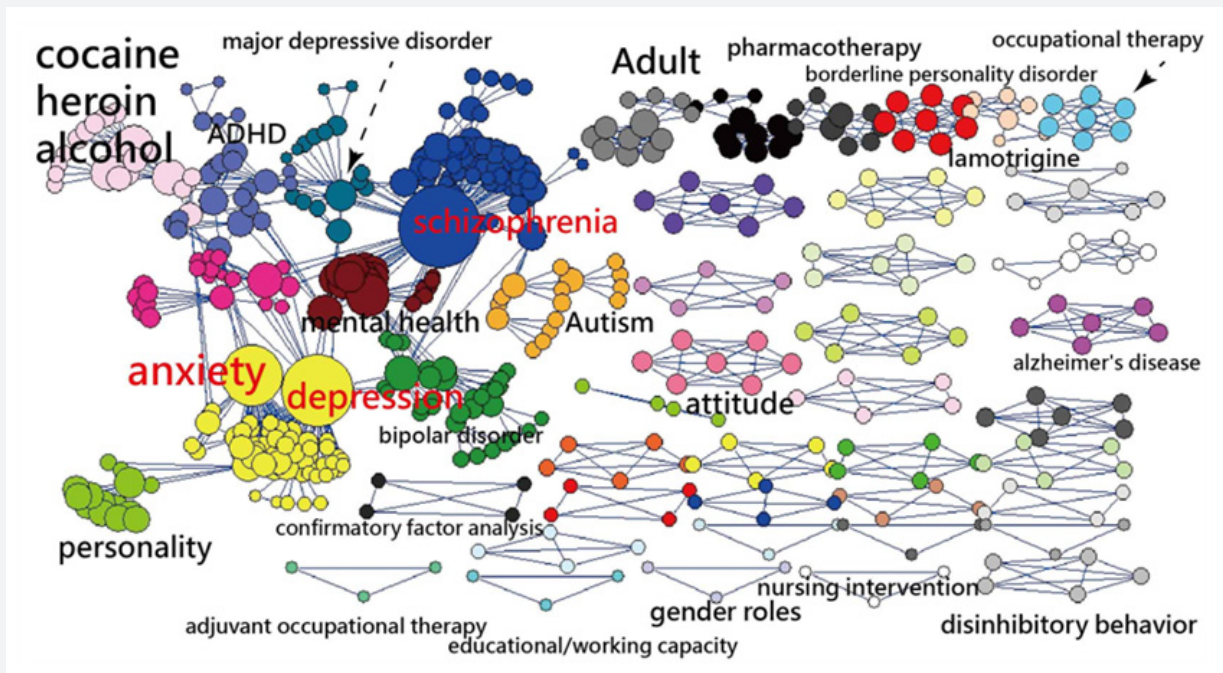


Figure 2: The most linked Keywords are depression and anxiety.

The most productive authors and their authorships

The top 10 productive authors (including coauthors in papers) are listed as below: Konstantinos NFountoulakis (143), XeniaGonda (92), IcroMaremmani (84), NorioSugawara (64), NorioYasui-Furukori (64), MelinaSiamouli (63), GeorgJuckel (61), Pier PaoloPani (60), Masaomilyo (56), and

ChristosChristodoulou (54). Five big clusters shown within the circle of Figure 3 are represented by Konstantinos N Funtoulakis, IcroMaremmani, Georg Juckel, Xenia Gonda, and Christos Christodoulou respectively. Other two isolated bubbles are denoted by Masaomilyo (at left bottom side), the dual equal bubble size contributed by Norio Sugawara and Norio Yasui-Furukori at the bottom.

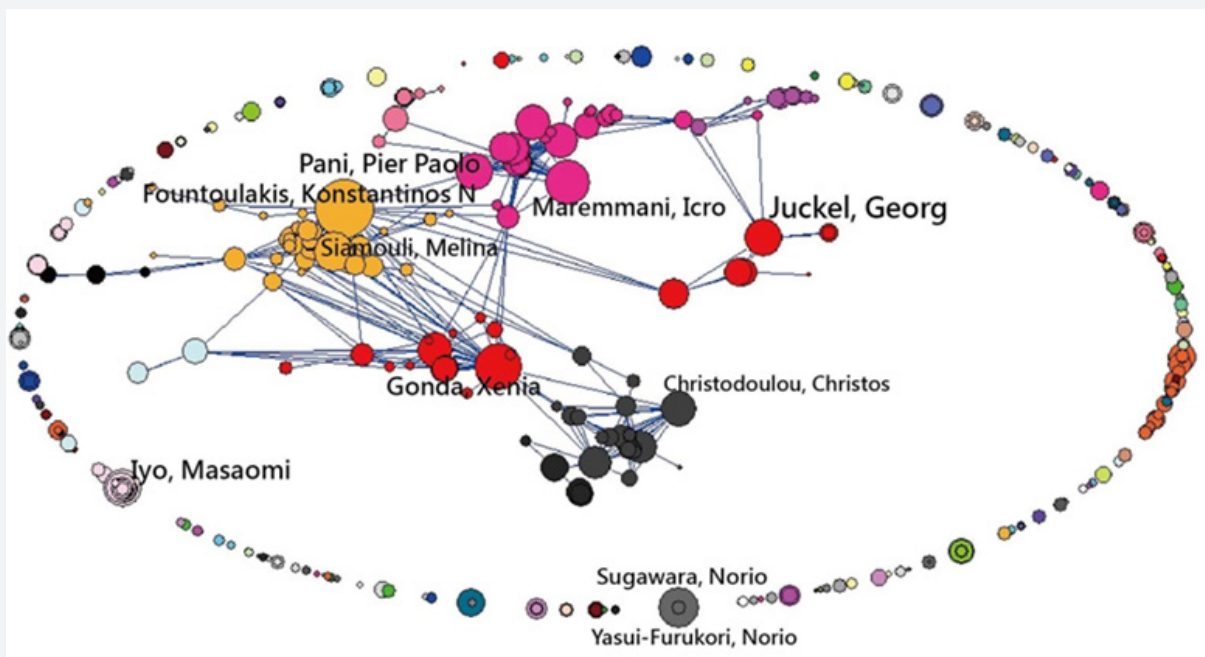


Figure 3: The most linked cluster for authors is related to Funtoulakis, Konstantinos N.

Journals similar to AGP

Two contrast clusters with different item sets (ie, years with opposite standardized item loading scores) are shown in Figure 4. This reports the difficulty in 2017(=0.36 logits) is the highest in years, indicating that the number of similar papers

(=28 in Table 1) is less than others due to papers in 2017 are not including all months in a whole year. We also found that the number of similar papers is monotonously increasing by years when we refer to the difficulties shown at the left bottom side in Figure 4, implying that AGP is a promising and developing journal.

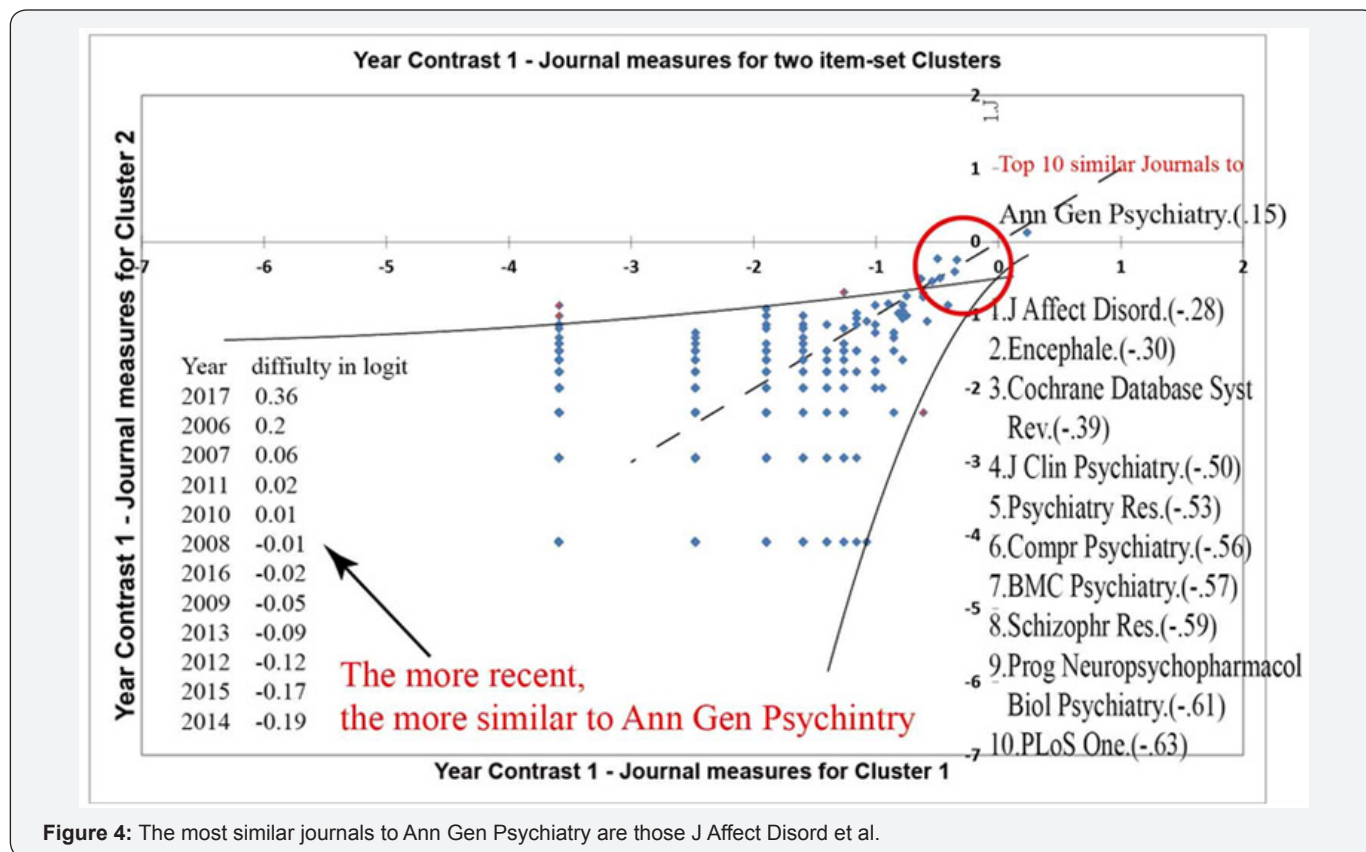


Figure 4: The most similar journals to Ann Gen Psychiatry are those J Affect Disord et al.

The top 10 similar journals (difficulties in parentheses) are listed as below: J Affect Disord (-0.28 logits), Encephale (-0.3), Cochrane Database Syst Rev.(-0.39), J Clin Psychiatry (-0.5), Psychiatry Res.(-0.53), Compr Psychiatry (-0.56), BMC Psychiatry (-0.57), Schizophr Res. (-0.59), Prog Neuro psycho pharmacol Biol Psychiatry (-0.61), and PLoS One (-0.63). It implies that the similar journals compared with AGP can be measured by Rasch analysis.

The journal similarity measures are cross-plotted with 95% confidence bands based on the S.E.s of the measures in Figure 4. Almost all the journal points are within the confidence bands, indicating the two clusters of items (i.e., years) are measuring the journals in a statistically invariance way and can be constructed a unidimensional measurement [26].

Discussion

This study used SNA techniques to demonstrate that

- i. The top 3 nations are Greece, Japan, and USA;
- ii. The mostly frequent keyword for AGP is schizophrenia, and the strongest couple of keywords is depression and

anxiety;

iii. The most productive author is Konstantinos NFountoulakis;

iv. The journals mostly similar to AGP is J Affect Disord.

What This Adds to What Was Known

Many previous researches [6-8] have investigated coauthor collaboration using SNA. An apocryphal story often told to discover the co-occurrence about beer and diaper sales [3-5]. However, we have not seen any demonstrating a concrete way to show how to conduct this exploration (or, say, how to dance on data) and to present informative messages to readership. We add a MP4 video in Additional File 1 showing how easy the SNA can display all possible pairs of our observed phenomena at a short time using the free-charged Pajek software.

Again, Rasch analysis can transform ordered category scores into interval logit scores and overcome the inherent weakness of Classic Test Theory (CTT) that requires linear, interval scale data input [16-23] for data analysis. We selected Table 23.6 in Winsteps [22] to compare the journals most

similar to AGP showing in Figure 4.

Journal authorship collaboration can be compared with each other, see Figure 3. We can see that five or more author-pattern was the prevailing pattern which is similar to the previous study [6]. Hence the AGP researchers have good collaboration in the subject category of psychiatry which is consistent with the previous studies that investigated scientific collaboration of Iranian Psychology and Psychiatry Researchers [27,28].

There are 416 papers with the keyword terms in title abstract when searching Pubmed database in 2017 September 1 [29]. Two papers [30,31] incorporated MeSH into social network analysis to explore interesting journal knowledge, but failed to demonstrated it with MP4 video, like we did in this study. The way we illustrated the strongest relation in all possible couples of interest is novel and promising in future, especially in the field of bibliometrics and medicine researches.

What It Implies and What Should Be Changed?

Scientific publication is one of the objective measurements to evaluate the achievements of a medical specialty or discipline [29]. Many journals are included in the Thomson Reuters

Science Citation Index (SCI). Since the advent of bibliometrics, citation analysis has been widely used in many disciplines to evaluate the influence of academic articles [30-38]. It is worth using SNA to report journal features in future.

Several algorithms and measures have been developed and used with SNA to graphically explore data. If we investigate whether any author or paper most fits the research domain of a journal and its scope within the journal's keyword network, the centrality measures using SNA can be applied [6]. It means that the core subject can be analyzed using the centrality measure [7,8] yielded in SNA.

Strengths of This study

We applied Rasch model to detect data unidimensional by the two contrast clusters cross-plotted in a diagram. If the clusters are different dimensions, then we expect the person measures to be considerably different for the different clusters [26]. Otherwise, we accept the measurement is good to examine or compare their examinees' latent construct. Table 1 in Winsteps is a newly developed report showing in Winsteps (Version 4.0.1).

Table 1: Papers in Ann Gen Psychiatry summarized by nation and year.

Nation	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
Greece	4	4	6	7	8	7	8	5	8	5	9	2	2	75
Japan				1	2	8	5	8	4	7	8	7	2	52
USA	3	6	5	2	4	3	4	1	4	3	4	4	1	44
Italy	1		5	2	4	6	5	4	2	2	2	5	1	39
UK	3	7	4	2		4	1			1	1		1	24
Canada	1	1	2	3				3	1		1		2	14
Germany	1					1	1		3	1	4		2	13
Korea									1	2	1	4	2	10
Norway	1		1			2	1	1	3				1	10
Spain						1	3	2	1	1	3			11
Taiwan			1			1		1	1	1	1		2	8
France									1	1	3	1	1	7
Hungary			1			1			1	1	1	2		7
Australia	1	1		1			1		1	1				6
Iran			1	1			1				2	1		6
Kenya					2	1			2		1			6
Tunisia						1						2	3	6
Nigeria	1			1	2						1			5
Poland											2	3		5
Turkey		1							2			2		5
Brazil						1			1	1			1	4
Israel			1				1	1				1		4
Pakistan			1	1	2									4
Portugal			1				1	1					1	4
Switzerland		1	1				1		1					4

Trends in Technical & Scientific Research

China						1					1	1		3
Denmark				1		1		1						3
Netherlands	1	1			1									3
SouthAfrica	1								1	1				3
SriLanka						1			1	1				3
Arabia									1				1	2
Bulgaria												2		2
Morocco			1										1	2
Romania											2			2
Serbia				1					1					2
India					1						1			2
Belgium										1				1
Croatia			1											1
Cuba				1										1
Egypt						1								1
Ethiopia													1	1
Ghana													1	1
Latvia										1				1
Estonia									1					1
Malawi				1										1
Malaysia	1													1
Mexico				1										1
Montenegro													1	1
Norge			1											1
Russia									1					1
Sweden													1	1
Zambia				1										1
Total	19	22	33	27	26	41	33	29	42	31	48	37	28	416

Another strength and feature for this study is the MP4 video added to the manuscript for interested readers who can quickly understand the author's research approaches and processes. The nation distribution in Figure 1 is merit in easily understanding the feature of international collaborations for the journal. Most authors of AGP come from Europe, particularly from Greece, see the yellow cluster. Authors from Japan are less collaborated with others, like USA with authors in Europe. One picture is worth ten thousand words. We hope following studies can report more such kinds of information using SNA to readers in future.

Limitations and Future study

The interpretation and generalization of the conclusions of this study should be carried out with caution. First, the data of this study were collected from Medline for a single journal. It is worth noting that any attempt to generalize the findings of this study should be made in the similar journal domain with similar topic and scope contexts. Second, although the data were extracted from Medline and carefully dealt with every linkage as correct as possible, the original downloaded text file

including some errors in symbols such as period and comma in author address that might lead to some bias in the resulting nation distribution. Third, there are many algorithms used for SNA. We merely applied separation components showing in Figures. Any changes made along with algorithm used will present different pattern and judgment. Fourth, the social network analysis is not subject to the Pajec software we used in this study, others such as Ucinet [38] and Gephi [39] are suggested to readers for use in future.

Conclusion

Social network analysis provides wide and deep insight into the relationships among nations, coauthor collaborations, abstract keywords, and journals most similar to AGP. The results can be offered to strategy and decision making for the target journal.

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