

QUANTIFYING HISTORY OF PSYCHOLOGY: BIBLIOMETRY ALLA VALENCIANA

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RESUMEN

En el presente artículo se ofrece una revisión del trabajo realizado por el grupo de investigación en Historia de la Psicología liderado por Carpintero en la Facultad de Psicología de la Universidad de Valencia. Un grupo caracterizado por la utilización de un modelo historiográfico socio-organizacional apoyado en una metodología bibliométrica, si bien abierto a otras aproximaciones. Las fuentes utilizadas recogen una amplia muestra de la producción del grupo: artículos publicados en la R.H.P., monografías y libros de actas. En él, se analiza sus orígenes, la metodología utilizada, los principales ámbitos y tópicos temáticos en los que han trabajado con aquélla, para acabar con una discusión crítica respecto de este enfoque dentro de las orientaciones dominantes actualmente.

SUMMARY

In the present article its offer a review of the work realizar for a investigation group the history of psychology who leadership, H. Carpintero, from University of Valencia. A group characterized for a utilization of a historygraphyc, socio-organizational model to rest on bibliometric methodology, but open a others approximations. The sources used collected a big trade of group's productions: public articles in R.H.P., monographyc article, and books of minutes. In this, its analyzed their sources, the methodology used, the first thematics and topics fields where worked that one to focused whit a critical discussion about the utility of this focusing into the dominant position at present.

I.- INTRODUCTION

It was a memorable experience to meet, not altogether accidentally, two kindred souls at the Annual Convention of the American Psychological Association, Held in the City of New York in 1979: Helio Carpintero, then Chairman of the Department of General Psychology at the University of Valencia, and his younger colleague, José María Peiró. The outcome of this encounter was a lasting personal and professional friendship, based on two shared convictions, one general, the other one methodological and specific: 1) That the study of the history of psychology would benefit from a closer cooperation between Spain and the USA, and 2) That historiometry in general and "bibliometry" (a term favored by the Valencians) in particular constitute a viable approach to the study of psychology's past and present.

I first spelled out the latter conviction in a paper (Brozek, 1969a) entitled "History of Psychology: Diversity of Approaches and Uses" There I referred to quantification as a "New Look" in studies on the history of psychology, making at the same time clear that this approach supplements but does not replace the traditional methods of description and analysis.

The "Valencian school" put the bibliometric methodology to a good use in many studies, as we shall document in the body of this account. However, not all of their work was quantitative in nature. Carpintero (1978a) wrote an innovative textbook on the history of psychology in order to meet the special needs of the National Extension University of Education and returned to the subject, though not the style, at a later date (Carpintero, 1986, 1987). In cooperation with M^a Vicenta Mestre he published, in 1984, a volume on "Freud in Spain", an exploration in the history of ideas.

A substantial number of journal articles written by the Valencian historians of psychology is discursive, no-quantitative in nature. They deal with such topics as "science of science" (Carpintero, 1987), various aspects of Spanish psychology (Carpintero, 1982, Mestre & Carpintero, 1983a & 1983b, Peiró & Carpintero, 1988), and the theory of the history of psychology (Cerezo, 1987).

The term "bibliometry" refers to a quantitative analysis of publications (Garfield, Malin & Small, 1978). The "Valencian school" is concerned, specifically, with publications in the area of scientific psychology.

Two roots of their interest in the subject may be identified one more specific, the other more general. Carpintero, Peiró & Tortosa (1988, p. 15) tell us for their early interest in the problem of eminence, both of publications and of authors. In searching for dependable, objective criteria they stumbled according to their own account upon the bibliometric methodology. The broader concern with the "science of science" was the second root (Carpintero, 1977)

The theoretical background of their thinking on the subject is defined, in an important way, by the writings of such authors as Price (1963), Ziman (1968), Merton (1973), Zuckerman (1977), and Elkana et al. (1978), cited in an early methodological paper by Carpintero & Peiró (1983).

II.- SOURCES OF INFORMATION USED IN THE PRESENT ACCOUNT

The principal depository of journal articles relevant to our topic is the *Revista de Historia de la Psicología*, initiated in 1980 by Helio Carpintero as Editor and J. M. Peiró as Associate Editor.

A volume edited by Carpintero & Peiró (1981a) contains 4 papers previously published in the *Revista de Historia de la Psicología*, 6 papers reprinted from the journal *Análisis y Modificación de Conducta*, and a paper that had appeared in the *Revista de Psicología General y Aplicada*. In addition, there are 3 original articles.

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Thirteen contributions of the Valencian historians of psychology, presented at the International Conference on Scientific Psychology, held in Alicante in 1981, are contained in a volume edited by Carpintero (1983).

A special issue of the *Revista de Historia de la Psicología* (Nº. 1-2. Vol. 5, pp. 396, 1984) put together by Carpintero & Peiró and available also in the form of a monograph (Carpintero & Peiró 1984), represents a *festschrift* prepared in connection with the 70th birthday of the present author. It contains 41 contributions, from many parts of the world, including papers on the impact of the Spanish Civil War on Spain's scientific psychology and on the history of industrial and organizational psychology in Spain (Peiró, 1984). Very "valencian" is the closing paper on "Visibility", examined *modo bibliométrico*.

Of particular importance in the present context are the numbers 1 and 2 of Volume 8, 1987, of the *Revista de Historia de la Psicología*. This double issue of the journal consists of 202 pages and contains systematic accounts of four major American journals studied from their beginnings to the year 1945, the British journal *Mind* and the *British journal of Psychology*, the French *L'Année Psychologique*, and synthesizing paper based on all the 7 journals noted above.

Eight *valenciana* form of the proceedings of the First National Symposium on the History of Psychology, held on 8 and 9 January 1988 at the Faculty of Psychology, Autonomous University of Madrid (Rosa, Quintana y Lafuente, 1988).

In English, Carpintero, Peiró & Tortosa (1988) prepared for publication a collaborative monograph on the influence of European thought on the early development of American psychology. It contains the following chapters:

- 1) Introduction, with a section entitled "The Varieties of Europeans".
- 2) Theoretical background, including a section on "Bibliometric Methodology in the History of Psychology".
- 3) Early history (to 1945) of four American Journals: American Journal of Psychology, Psychological Review, Psychological Bulletin, and the Journal of Experimental Psychology.
- 4) European members of the editorial boards.
- 5) Significant contributions of European psychologist to the four journals.
- 6) Working groups of European psychologists.
- 7) Study of citations.

8) Languages of the works cited in the journals. A synthesis of the information on over 110,000 citations, referring to the period 1887-1945, was reported by Brozek & Tortosa (1989).

These are the principal sources of information on which the present review will be based. However, it may be useful to note that *Revista de Historia de la Psicología* is attracting contributors beyond the "valencian school" proper. We shall limit illustrations to the bibliometrically oriented papers. In Valencia, Alfaro, of the Department of Systematic Pedagogy, in collaboration with Helio Carpintero examined in 1983 the papers on educational psychology published in the *Revista de Pedagogía*. Serra & González (1988) explored the history of developmental psychology in Spain on the basis of the textbooks published in the 1920s.

Beyond Valencia, a bibliometric study of the Rorschach test was undertaken by Marques (1986) at the Autonomous University of Madrid. Mendez & Colotla (1983), associated with the National Autonomous University of Mexico, provided a bibliometric analysis of the influence of Ch.B. Ferster, a co-worker of B.F. Skinner (Schedules of Reinforcement, 1957) and the author of a "manifiesto" on psychiatry from the standpoint of a behaviorist (cf. Schindler & Algarabel, 1982).

Among the U.S. historians of psychology, Brozek (1981) carried out a bibliometric study on "Wundt in America" and, in collaboration with J. Hoskovec (1986, esp. p. 42), associated with Charles University, Prague, tabulated the works written in English, German, French, Russian, and Italian that were cited in the 1920s and 1930s in major Czech publications on applied psychology (psychotechnology). Zusne (1984) gave thought to quantitative investigations on the history of psychology and "Zeitgeist", and described an innovative approach to the study of eminence in psychology (Zusne & Dailey, 1982; Zusne, 1986).

III.- METHODOLOGY

A comprehensive account, recent in vintage, of bibliometric methodology applied in Valencia to studies on the history of psychology is given in a subsection (pp. 15-26) of chapter 2, "Theoretical background" of collaborative volume (Carpintero, Peiró & Tortosa, 1988). The bibliography contains a large number of references to the publications of the "valencian school" of the history of psychology, embedded into a more general list (pp. 245-167). Unfortunately, the distribution of the volume, published by an academic institution -not a commercial publisher- is apt to be limited.

Consequently, we shall refer at a greater length to the writings that are likely to be available more readily, beginning with a chapter by Carpintero & Peiró (1983a), presented at the XXII International Congress of Psychology in 1980 and included in a volume of selected, revised contributions (Eckardt & Sprung, 1983). Having presented the model of science as an "organization", with qualitative (conceptual and theoretical) and quantitative (material and social) dimensions, the authors focus on a "bibliometric" approach to the study of scientific literature, past and present (cf. Carpintero & Peiró, 1983b).

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In characterizing authors of scientific publications we may consider such *features* as gender, age, academic degrees, and the institutions with which they are associated. One of the indicators of individual as well as institutional contribution to science is productivity. Productivity figures correlate only moderately with other criteria of eminence; such as citation rates. Productivity is affected by many factors, including the availability of the media of publication, editorial policies, presence of censorship, or motivation to publish ("Publish or perish" of the North American academe). Productivity may be studied also with reference to countries and fields.

Scientific collaboration involves joint research and writing, the master-pupil relationships, and the formation of research teams. The exchange of information, reflected in the mutual citation of publications, attests to the existence of "visible colleges". The visibility of specific authors or works and of their impact on the scientific community is assessed on the basis of the relative frequency of their citation by others. In a similar way one may examine the centrality-peripherality of journals. Information about the frequency of publications dealing with specific topics enables us to construct conceptual "maps" of different fields of science at a given time and follow the changes in time.

In Spanish there are two shorter methodological accounts of historical research approached in a "bibliometric perspective". The first one (Carpintero, 1980) gives further thought to the concept of science as "organization", with Table 1 listing 9 organizational features (aim, specialization, systems of communication and execution, kinds of information that are being communicated, authority and leadership, membership, training, motivation, and the psychological characteristics of the group). For each of these aspects their scientific "correlates", "representative elements", and "indicators" are given. To illustrate, for the category "Information being communicated" the following items are noted; publications; the authors being cited and the concepts that are being utilized; references to the literature that is cited; and the analysis of the content.

The second Spanish paper (Carpintero & Peiró, 1981b) goes more or less over the same ground but considers also the problems encountered in the classification of the content of scientific communication. The issue is examined in reference to the changes in the classificatory systems used in the *Psychological Abstracts* (cf. Tortosa, 1980).

Pastor (1986) dealt with the use of textbooks as sources of information on the history of psychology. The textbooks are viewed as depositories of knowledge on which the scientific community, at a given time and place, agrees. A systematic study of textbooks in a given field serves to document the changes taking place over time. The author's doctoral thesis (Pastor, 1982) involved biometrical analysis of four French textbooks of psychology. She collaborated in a study of the journal *Revista de Psicología General y Aplicada* (Pastor & Carpintero, 1980), examined with reference to the years 1946-1977, and of the *Quadernos de Psicología 3*, published during a period 1975-1977 (Barberá & Pastor, 1981).

The range of topics that are typically considered in the studies of journals may be usefully illustrated with reference to the study of the *Journal of the History of the Behavioral Sciences* (Tur, Peiró & Carpintero, 1983). The following features were examined: Origins of the journal, its aims, the history of the editorial board, the material and the economic infrastructure, the authors and their productivity, collaboration between authors, including the "invisible colleges", productivity of specific institutions, institutionalization of the history of psychology in the USA, and the topics treated in the journal.

An early, innovative methodological paper was devoted to content analysis (Carpintero & Peiró, 1978), using a statistical approach aiming at a more effective characterization of the contents and utilizing abstracts of scientific communications as the "raw material". More concretely, the effort was made to identify the descriptive terms occurring in abstracts of papers dealing with the concept of "generations". The concept received substantial attention in Spain at that time Carpintero (1978) himself contributed to a volume edited by the great Spanish thinker and teacher, Julián Marias. The volume dealt with the theme of "social change and generations"

In the *Psychological Abstracts*, published between 1968 and February of 1978, 117 entries had term "generations" either in the title or in the body of the abstract. On the basis of statistical analysis, 6 "descriptors (college students, parent-child relations, parental attitudes, age differences, adolescence, and generation gap) were found that appeared with significantly high frequencies in the abstracts.

More rewarding were the results of the analysis of the materials contained in the *Sociological Abstracts* for the period 1963 to May 1977. To begin with, the number of relevant abstracts proved to be substantially greater (N=199). Thirteen descriptors occurred with significantly high frequencies (analysis, value, attitude, culture, mobility, politics, family, youth, and conflict, social change, students, politics, and USA). Table 9 (p.112) provides an interesting comparison of the two disciplines: In the psychological material, the term "attitudes" occurs with a significantly higher frequency than in the sociological abstracts, while the terms "social phenomena", "social groups", "methodology", "countries", and "politics" occurs significantly less frequently.

The principal aim of the communication was to illustrate the analytical procedures. The authors hoped that the methodology would be used as a "heuristic tool", importantly supplementing citation analysis.

IV.- APPLICATIONS

In this bibliographic summary of the output of the Valencian labors on the vinyard of bibliometric analysis of the history and the present status of scientific psychology, the major categories and the subtopics within the categories will be presented in alphabetical order.

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Table 1.- Topics and References

*CONGRESSES and SYMPOSIA**International Congresses of Psychology*

Motivation and Emotions (Mayor, Montoro, Tortosa 1988)

Origins (Montoro, Carpintero, Tortosa 1983)

Spanish psychology (Montoro, Tortosa, González 1988)

Topical analysis, congresses I-XVI, 1880-1960 (Montoro, Carpintero, Quintanilla 1982)

SPANISH SOCIETY OF PSYCHOLOGY

Congresses 1-7, 1963-1982 (Puente et al. 1988)--presidents, fields of psychology, productive and frequently cited authors

NEBRASKA SYMPOSIA ON MOTIVATION

Channels of communication (Mayor, Montoro 1985)

Overview (Mayor et al. 1988)

CONTEMPORARY PSYCHOLOGY

Developments, 1927-1978 (Tortosa, 1981)--number of abstracts as yearly totals and by field

Motivation (Mayor, Tortosa, Carpintero 1987)

Social Psychology (Miranda, Miralles, Tortosa 1984)

EMINENT AUTHORS

Characteristics (Pérez-Delgado, Peiró, Carpintero 1981)-births and deaths, training, positions

Citations as criteria of eminence (Tortosa et al. 1988)

Data based on the analysis of 7 journals (Carpintero, Pérez-Delgado, Tortosa 1987)

FACTORS, POLITICAL

Wars, Effects on Psychology: Second World War (García-Merita, Peiró, Carpintero 1983)

Wars, Effects on Psychology: Spanish Civil War (Carpintero, 1984)

FIELDS OF PSYCHOLOGY

Abnormal and clinical (Belloch, Ibañez, Tortosa, 1983)
 Applied Behavioral Analysis (Sos-Peña, Carpintero, Tortosa, 1987)
 Applied Psychology, USA, prior to 1914 (Moya, Peiró, Carpintero, 1983)
 Behavior Modification (Carpintero, Peiró 1980; Peiró, Carpintero, 1981)
 Behavioral Teratology (Redolat, Salvador, Simón, 1987)
 Developmental Psychology (Serra 1983)
 Experimental Psychology (Pascual, Peiró, Moll 1983)
 History of Psychology (Tur, Peiró, Carpintero 1983)
 Industrial and Organizational Psychology (Peiró, 1984)
 Learning (Catalá, Carpintero, Peiró, 1983)
 Mental Tests (Alfaro, Peiró y Carpintero, 1983; Balaguer, Peiró y Carpintero, 1983)
 Pharmacology of Behavior (Pérez-Gomis, Garcia-Merita, Simón, 1985)
 Physiological Psychology (Salvador, Tortosa, Calatayud 1984)
 Psychometrics (Rivas, Peiró 1979)
 Social psychology (Miralles, Tortosa 1983)

INVISIBLE COLLEGES

In experimental Psychology (Pascual, 1983)
 In Psychology (Peiró, 1980)--various areas
 In Psychometrics (Peiró, Rivas 1981)

JOURNALS

Content, collaboration, productivity (Gotor 1982)
 Structure, formal (Tortosa et al. 1983)
 Type of journals (Carpintero, Gotor, Miralles 1983)--effects on collaboration and productivity

*NATIONAL PSYCHOLOGIES**British*

British Jour. of Psych., 1904-1945 (Balaguer, Tortosa, Carpintero, 1987)
 Mind, 1876-1945 (Moya et al. 1987)

French

Année Psychologique, 1894-1945 (Moltó, Carpintero, 1987)

*Quantifying History of Psychology ...**Spanish*

- Dictionaries (Pérez-Delgado, Mestre 1988)
 Cuadernos de Psicología 3, 1975-1977 (Barberá, Pastor, 1981)
 Revista de Psicología General y Aplicada, 1946-1970 (Pastor, Carpintero, 1980; Tortosa et al. 1988)
 Textbook (Tortosa, Carpintero, 1980)
 University of Louvain, influence on Spanish psychology (Pérez-Delgado, Mestre, Carpintero 1987)

USA Journals

- American Journal of Psychology, 1887-1945 (Tortosa, Carpintero, Peiró, 1981, 1987)
 Journal of Experimental Psychology (Carbonell et al. 1987)
 Psychological Bulletin, 1904-1945 (García-Merita, Peiró, Carpintero, 1987)
 Psychological Review, 1894-1945 (Calatayud, Carpintero, Peiró, Tortosa, 1985; Calatayud et al. 1987)

PERSONS

- Barbado, Manuel (Zanón, Carpintero, 1981)
 Fechner, G.T. (Carpintero, Tortosa, 1987)
 Freud, Sigmund (Mestre, Carpintero, 1983 a & b; Pérez-Delgado et al., 1984)
 Hebb, D.O. (Grau et al., 1984)
 Kohlberg, Lawrence (Pérez-Delgado, Frías, Pons, 1988)
 Lafora, G.R. (Carpintero, Mestre, del Barrio, 1988)
 Luria, A.R. (Peiró, Mateu, Carpintero, 1980 a & b)
 Maslow, Abraham (Zalbidea, 1988)
 Mira i López, Emilio (Miralles, 1985)
 Olds, James (García-Merita, Carpintero, 1980)
 Viqueira L., Juan V. (Mestre, Carpintero, 1982)

PRODUCTIVITY

- On the international level (Pascual, 1980)
 On the Spanish scene (Miralles, 1980)

SYSTEMS

- Behaviorism at 75 (Prieto, Tortosa, Carpintero, 1986)
 Cognitive approach in clinical psychology (Carbonell et al., 1986)
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V.- COMMENT

Historiography, qualitative and quantitative

Our Valencian colleagues would be the first to insist that the study of the history of psychology (and of the history of science in general) must accommodate both the discursive and the metric approach. In analogy to Lakatos's (1974) statement about the relationship of the philosophy of science to the history of science --philosophy of science without a history of science is empty while history of science without the philosophy of science is blind-- cited by Caparrós (1980, p.405), we could argue that a narrowly metric approach is shortsighted while the traditional verbal (conceptual) approach is significantly enriched by quantitative information, statistical analysis of the data, and graphic modes of presentation.

We can quote specific statements to document the open-mindedness of the Valencians on this issue. Speaking of an "integrative model" and a coherent view of historiography, Carpintero & Peiró (1983 a, p.197), they call for due consideration to the qualitative (theoretical and conceptual) and quantitative (material and social) dimensions of scientific psychology and of science in general. The necessity to integrate bibliometric methodology into a more comprehensive approach to the understanding of the historical evolution of scientific psychology was reiterated 15 years later (Carpintero, Peiró, Tortosa, 1988, p. 15).

The present overview is purposefully focused on the publications of the "Valencian school" that approach the subject more bibliometric, since this is a Valencian speciality. But the presentation does not pretend to provide an exhaustive coverage of the literature, even when the Valencian contributions are viewed in this restricted perspective.

In the context of institutional and organizational developments in the historiography of psychology around the world (Brozek 1983, esp. pp. 319-320), the Valencian research group is unique.

Origins

The publications we had the opportunity to consult tell us next to nothing about the conceptual and social (organizational) origins of the "Valencian school". The group was formed and operated in the framework of the Department of General Psychology, University of Valencia, subsequently enlarged and diversified into the Department of Basic Psychology, Methodology, Psychobiology, and Social Psychology, operating within the University's Faculty of Psychology. Throughout, the *spiritus movens* of the enterprise was Helio Carpintero, Chairman of the Department, ably assisted by his younger colleague, Jose María Peiró.

Important financial support was provided at an early stage of the operations by the U.S.-Spanish Committee for Educational and Cultural Affairs (Comité Conjunto Hispano Norteamericano para Asuntos Educativos y Culturales). It facilitated

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systematic, detailed, quantitative analyses of the principal early North American journals of psychology.

But how about ideas? We come closest to learning something about it in the recent volume (Carpintero, Peiró & Tortosa, 1988, p.15). As noted earlier, bibliometric methodology appeared to offer a promising approach for research on scientific eminence. It is not clear at what time these developments took place. Our estimate is that Carpintero became interested in these matters in mid-1970s. The estimate is based on two facts: 1) His interests in the "science of science" and its relevance to psychology is documented by his paper published in 1977. 2) The methodological papers written in the late 1970s (cf. Carpintero & Peiró, 1980) attest the familiarity of the Valencians with the existing relevant, primarily North American literature.

There is one point that does not cease to puzzle me: The neglect, in methodologically-oriented papers, of an important, "home-grown", Valencian publication on quantitative analysis of scientific literature. I refer to the volume written by J.M. López-Piñero (1972), professor of the history of medicine and the Director of the Center for Medical Documentation and Information ("Informática"), associated with the Medical faculty of the University of Valencia.

López-Piñero begins his introduction by noting that quantitative analysis of scientific literature -he speaks of statistical and sociometric analysis- constitutes a watershed in bibliographic research, emerging in the 1960s. The volume consists of four chapters dealing, respectively, with the growth and aging of scientific literature, the scattering of scientific information as well as the productivity and "visibility" of scientists, and collaboration among scientists, including the phenomenon of "invisible colleges".

I came across two papers, written by the members of the "Valencian School", in which the 1972 publication is cited, but almost incidentally. Garcia-Merita & Carpintero (1980, p. 223) refer to it in the section of the paper in which it is noted that collaborative research is on the increase. Pastor (1986, p.20) notes the publication of López-Piñero in connection with the discussion of conceptual analysis.

Approaches

There is a distinct merit to using standardized methodology in the analysis of psychological journals since it makes possible cross-journal comparisons and the pooling of the data (cf. Carpintero, Peiró & Tortosa, 1987).

We shall turn to the matter of further development of the methodology in the closing section of this paper, dealing with the "perspectives".

Accomplishments

We closed our earlier account of the developments at the University of Valencia (Brozek, 1983, pp. 319-320) by stating that "Taken together, these studies provide not only a unique portrait of modern scientific psychology, viewed through its representative

journals, but also a body of primary data for additional historiographic (and historiometric) analysis". And we added: "It is highly desirable that a synopsis of this work be made available, in English". Both statements still apply, seven years later.

VI.- PERSPECTIVES

In terms of the volume, novelty of information, and the importance of the contributions of the "Valencian school" are impressive. The enterprise as a whole is quite unique in the annals of research on the history of psychology. Nevertheless, a few additional comments appear appropriate. They are intended to be constructive and to serve as a stimulus for thought, for further development of the methodology, and for expansion of the topics to be covered. The approaching tenth anniversary of the foundation of the *Revista de la Historia de la Psicología*, and the departure of Helio Carpintero for the Universidad Complutense de Madrid appear to be an appropriate occasion for a critical overview of the work accomplished and for the clarification of the perspective for the near future. This can be done only to a limited extent in this communication.

First, then, let us give some further thought to the matters of methodology.

As we pointed out earlier, there is a distinct merit in using a fairly standardized, but not rigid, approach to the analysis of psychological journals, most systematically presented in N.1-2, Vol. 8, 1987, pp. 3-202, of the *Revista de Historia de la Psicología*. It may be useful to list the subtopics, even though there will be some overlap with the presentation of the structure of the bibliometric analysis of the *Journal of the History of the Behavioral Sciences* in the section III. METHODOLOGY.

The analyses of the journals consider the following topics: The history of a given journal, with focus on the journal's editors; the productivity of the contributors; collaboration among the authors; the topics of the papers and their relative frequency; references that are being cited, their authors and writings, but also the dates and languages. Of particular interest are the authors and the words that have had major impact.

In the closing paper in the series (Carpintero, Pérez-Delgado, Tortosa, 1987) the authors cited most frequently in each of the seven journals are tabulated. The changes of "visibility" over time of select, frequently cited authors (W. Wundt, W. James, E.L. Thorndike but also of Binet and Piéron) are presented graphically.

It is pointed out that this approach provides the historians of psychology with unique opportunities for tracing the development of psychology in terms of theories, authors and specific words. At the same time it is emphasized that the interpretation of the trends must be based on a thorough knowledge of the authors and of their words (and of the social and cultural developments—we might add).

The emphasis on the historiometric analysis of journals is fully justified: journals are the principal channels for the communication of information on scientific research.

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However the methodological armamentarium and the scope of investigations may be broadened. I shall illustrate, on the basis of some of my past studies.

The spectrum of interests of Soviet Psychologists was characterized using the extensive (3 volumes) proceedings of the third (1968) meeting of the Soviet Psychological Society (Brozek 1969b). It turned out that most of the presentations (29.2% of the total) dealt with educational and child psychology, followed by "general experimental" (20.7%), medical (15.2%), and technological (12.8%) psychology. Surprisingly, 7.3% of the papers fell into the category "physical education and sports".

The "longevity" of F.C. Donders' paper on "The Rapidity of Thought Processes" was studied over a period of 100 years, in terms of reference made to the paper. We chose the 1868, German version of the paper for the purposes of this follow-up study. Resurgence of the interest in the paper in the 20th century was due to its significance for the emerging information-processing theory. Measures of "longevity and visibility" would have been very disappointing if an attempt had been made to trace the impact of either the preliminary Dutch version of 1865 or its English translation, published in an out-of-the-way medical journal.

The numerical growth and the relative frequency of contributions to different fields of Psychology in Yugoslavia was followed in the years 1960-1971 with reference to the first four congresses. In 1971, of the 158 papers, 29% fell into the area of industrial, 25% to general experimental, 19% to clinical, 6% to child and development, and 5% to social psychology (Brozek, 1972a).

But how to attempt to quantify the changes in the general political and cultural "climate" in which the Yugoslav psychologists operated? We found that the translations of books dealing with psychological topics would provide a valuable, quantifiable criterion (Brozek, 1972b). Initially following the Second World War, all the translations were made from Russian. After Yugoslavia had broken relations with the Soviet Union, in 1948 and the Russian translations had come off the press, for a period of time no translations appeared at all. The first books reflecting the close cultural relations with France before the war, beginning in 1954, were translated from French. The translations from German began to appear in 1958. The first American book, R.S. Woodworth's "Experimental Psychology" appeared in translation in 1959 and the translations of American publications came to dominate the scene in the 1960s.

In the context of an autobiography, a graphic record of the appearance of publications dealing with specific topics (performance and fatigue, psychological methods, nutrition and behavior, aging, illumination and visual performance, Soviet psychology, History of psychology) documents the *changes in interests and research activities* (Brozek, 1974, p. 68). A table (*ibid.*, p.72) provides information on the frequency of citations, by others, of the author's publications concerned with specific topics, in and out of psychology.

The differentiation of scientific and professional interest of psychologists in the United States was documented on the basis of the number of men and women, registered separately, who belonged to the 40 divisions of the American Psychological

Association (Brozek, Hoskovec, 1985). Elsewhere we followed the changes in the number of members belonging to the Association's divisions from 1975 to 1983.

In order to assess the awareness of international psychology in Czechoslovakia during the 1920s and the 1930s, references to publications in English, German, French, Russian, and Italian cited in three major publications in the area of applied psychology were tabulated (Brozek, Hoskovec, 1986).

Finally, *changes in categories* under which books were being reviewed between 1949/1950 to 1982 in the journal *Psychologische Rundschau* were registered, were presented graphically (Brozek, Rust 1987). A major change, taking place in 1973, involved the disappearance of the categories "Charakterologie- Typologie" and "Kultur- und Völkerpsychologie", viewed as left-overs from the Nazi times. The first category was eventually transformed into "Sozialpsychologie". "Medizinische Psychologie" was replaced after 1972 by "Klinische Psychologie". Complex was the history of the category "Angewandte Psychologie, Psychagogik & Psychotherapie". These complex patterns can be followed much more readily when they are presented graphically.

The paper by Brauns & Schmitz (1989) demonstrates the merit of combining competences, an approach that became wide-spread during the Second World War (Brozek, Keys, 1944, 1945): Brauns is a "conceptual" historian of psychology while Schmitz (1987, 1989) is a specialist in the statistical analysis of time series. Their 1989 paper illustrates novel uses to which statistical methods can be put in research on the history of psychology. The basic data refer to yearly outputs of publications in psychology between 1894 and 1933.

The paper brought sharply into mind the fact that the history of German psychology in general and of the German psychological journals in particular -as well as the history of psychology in many other parts of the globe- still remain to be analyzed *alla valenciana*.

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