

## Scholarly Impact of New Zealand Psychology (1970-1977)

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The frequency with which research publications have been cited has been used to index the scholarly impact and visibility of psychology journals and departments in Britain, Canada, and the United States. The present study looks at citations to research authored by individuals holding appointments in New Zealand psychology departments between 1970 and 1977. Among the principal findings: While as a group New Zealand psychologists have had lower citation rates per person per year than overseas psychologists, some New Zealand departments, individuals, and their research publications have achieved a notable degree of international visibility. These and other pertinent findings are discussed, comparisons made and conclusions drawn.

The research profiles of academic departments and individuals can be indexed from a number of measures; to name a few, quantity of research output, peer-ranking of postgraduate courses and facilities, and receipt of research grants. Recently there has been a surge of interest in the sociology of knowledge the concerns of which are, inter alia, the development of research profiles, how knowledge is disseminated via publication networks, and the impact which individuals, institutions, and publications have on science. The present paper is a contribution to this problem-area. Its specific purposes are to examine the *scholarly impact* of New Zealand psychology departments and the individuals employed in these departments between 1970 and 1977, to make comparisons with overseas findings and to identify the sources of publication outlets. The logic of the exercise hinges on the proposition that scholarly impact can be meaningfully indexed by the frequency with which a researcher and his or her publications are cited.

To date, citation analyses have produced a number of interesting and often discomfiting findings. Citations have been seen to correlate highly with other criteria for scientific eminence such as awards and honours and subjective peer ranking (hence the face validity for the notion that citations

reflect scholarly impact. Cf. Cole & Cole, 1971; Myers, 1970; Wade, 1975). A disproportionately small number of individuals, and publications, seems to account for a disproportionately large number of citations; for both individuals and publications the modal citation rate is nil (Endler, Rushton, & Roediger, 1978; White & White, 1978). Again, the correlation between publications (productivity) and citations per publication (impact) at the individual level has been found to be quite low (White & White, 1978). Within the particular field of psychology, citation analysis has been used to assess the impact of journals (White & White, 1977), British departments of psychology (Rushton & Endler, 1977), Canadian departments (Buss, 1976; Endler, 1977), and North American departments (Endler et al, 1978).

As might be expected, the very idea of checking institutions and people along a citation dimension has generated a good deal of debate and not a little hot air; each of the studies referred to in the preceding paragraph has attracted a number of critical comments (e.g., Bavelas, 1976; *Bulletin of the British Psychological Society*, 1978; MacDonald, 1976; Over, 1978). Somewhat curiously though, these criticisms have been mainly concerned with the validity of the data bases and counting procedures employed; most have not questioned the philosophy underlying the indexing of scholarly impact although some have been

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concerned with disputing the validity of citations as a measure of impact and visibility.

The reasons why publications and their authors are cited in a positive way are manifold but collectively they add-up to something which can be likened to the impact or the influence they (the publications and authors) have had on other researchers, on the development of theory, on methodological and instrumentation refinements, on the shaping of research areas, and on science in general. The reasons why any particular publication is cited are varied and numerous. A theoretical-review paper can be cited by virtue of its having been cited by previous writers as the standard summary work; an experimental paper might be cited because of its direct relevance to a study being reported; a text on experimental design might be cited because of its contribution to the development of one experiment's methodology.

There are "negative" reasons why individuals cite one another. Someone's work might be cited because the citer considers it the politically and strategically wise thing to do. Publications can also be cited as models of bad designs, of opaque theorizing, and the like. Whatever the frequency of these "bad" citations however, they cannot readily be equated with zero impact. In many instances, a cited work which has been vigorously condemned by a researcher is the very one which has provided a direct impetus for an improved study.

The favoured data bases for citation analyses are the *Social Science Citation Index (SSCI)* and the *Science Citation Index (SCI)*. By checking these volumes for any recent year it can be found out how often a publication has been cited, in what journals the citations appeared, and who the citing authors were. Together, the indexes cover the majority of scientific publications of all languages including (in 1975), at least 180 psychology-type journals in the *SSCI* and 90 in the *SCI*. The *SSCI*, which has been the preferred data base in most psychology citation studies, lists citations appearing in journal articles to books, conference papers, book reviews, and journal papers.

One objection raised against the *SSCI* as a data base for the measurement of scholarly

impact in psychology, is that a psychologist who researches in other than mainstream areas can be credited with an artificially low citation count. While the *SSCI* covers all the mainstream psychology journals (including the *New Zealand Psychologist*) and selectively abstracts citations from others (e.g., *Brain* and the *Journal of Comparative Neurology*), it has not always covered a number of physiology, biology, and neurology journals which some psychologists regularly publish in. Citations appearing in the *SCI* have not always appeared in the *SSCI*.

As a preliminary check on the relevance of this question to the present study, listings of the citations in the 1975 *SSCI* to publications authored by psychologists who held New Zealand appointments in that year, were compared with listings in the 1975 *SCI*. The *SSCI* search revealed a total of 283 citations distributed over 33 persons (29 New Zealand academic psychologists were credited with nil citation returns in 1975). Ten persons had exactly the same *SSCI* and *SCI* citation entries and 21 had a total of 56 or more *SSCI* than *SCI* citations. One person had a single additional *SCI* citation and one other had 11 more *SCI* than *SSCI* citations. It can be noted that for all but two psychologists, the *SSCI* provided the same or the more generous measure of citations, vis-a-vis the *SCI*. It must also be noted that from 1976 on, citations appearing in journals and books not covered by the *SSCI* but by the *SCI*, have been enumerated under the appropriate publication in the *SSCI*. These additional citations have been incorporated in the present counts for 1976 and 1977.

A more general objection against using either the *SSCI* or the *SCI* as a data base for an estimate of scholarly impact has to do with the business of self citations. These are citations to one's own work made by oneself in successive publications. Some citation studies (e.g., Endler et al., 1978) have included self citations in their counts and while it is quite proper to reason that one's work can have an effect upon oneself as well as upon others, the assessment of scholarly impact upon *others* would seem to demand the exclusion of self citations. Accordingly, these have not been included in the present counts and are nowhere included in the

summary results tables. For comparative purposes, some textual discussion will refer to overseas and New Zealand rates which do include self citations but these occasions will be clearly identified.

Yet another potential problem with the *SSCI* data base is that it shows citations to only the senior author; second-author and third-author citations are not listed. In the present study only first-author citations have been counted and for two reasons: First, at the individual level a high correlation has been observed between first-author citations and citations accruing at other authorship levels (Cole & Cole, 1971). Second, at the level of departments the inclusion of second-author and third-author citations can result in inflated citation rates for departments in which multiple-authored publications are the rule.

To recapitulate the main purpose of the study: It is proposed to measure the frequency with which research authored by psychologists in new Zealand university departments has been cited over an eight-year period and to use these data as an index of the scholarly impact and visibility of New Zealand psychology and psychologists. The principal subsidiary purposes are these: (a) To check citation fluctuations at the levels of individuals and departments by comparing rates for the years 1970-73 with the rates for the years 1974-77. (b) To identify the publication outlets for research authored by New Zealand psychologists. (c) To make relevant comparisons with data which have been reported for academic psychologists in Britain, Canada, and the United States.

#### Method

All six New Zealand universities had functioning psychology departments in the eight-year period, 1970 to 1977. The names of all full-time personnel in psychology departments who held the status of lecturer and above were found for each university and each of these eight years by referring to the appropriate Calendars. In a few cases Calendar data were discounted in favour of more accurate data available from other sources. Three groups of people were not included in the survey: Optometrists in the Auckland department, nursing studies staff attached to the Massey department, and sociologists in the Canterbury Department of Psychology and Sociology (as it was known before 1978).

Volumes of the *SSCI* for the years 1970 to 1977 were searched for citations to publications authored by individuals holding appointments in New Zealand universities. Excluded were self citations, citations to

papers in-press and unpublished reports, and citations for years in which an individual was not on the staff of a New Zealand university. For each year a person held a New Zealand appointment, a list was developed for that person showing his or her cited publications, the dates, names, and sources of the publications, and the frequencies with which the publications were cited. No attempt was made to monitor number of publications output during 1970-77 either from Calendar data or from *SSCI* data. A careful check was however kept on the publications cited during this period and on the dates of the cited publications.

In the results which follow, an individual's mean citation rates (for 1970-73, 1974-77, and 1970-77) have been calculated by dividing the number of citations credited during a period by the appropriate number of years in the period and a department's mean citation rates have been calculated from its individuals' rates. Number of cited publications for an individual is the number of his or her publications (whatever their dates) cited by others.

#### Results

The total *N* (number of individuals) was 79. Thirty-seven of these held full-time, permanent appointments in New Zealand university departments for the entire eight-year period; 33 were either appointed from outside or promoted from an internal junior lectureship between 1971 and 1977; six retired or resigned and three both took-up appointments and subsequently resigned in this period. Only ten individuals either moved from one New Zealand department to another or resigned to take up a position elsewhere in these eight years. The mean period of service across all 79 persons was 5.9 years (out of a maximum of eight years) and the median period seven years. It would appear that psychologists in New Zealand universities constitute a fairly static group of individuals.

A total of 1524 citations was recorded for the period under review and these were unevenly distributed over a total of 372 publications. The number of citations to works published in the same years in which their authors held New Zealand appointments was 1133 or 74% of the total, and the number of cited publications published in the same years in which their authors held New Zealand appointments was 269 or 72% of the total. The data at hand thus provide a reasonable reflection of the visibility of work actually researched in New Zealand psychology departments in the past 30 years or so.

Table 1

*Number of Citations and Number of Publications Cited between 1970-73 and 1974-77 related to Period in which Cited Publication appeared*

Publication period	Citations		Cited Publications	
	70-73	74-77	70-73	74-77
75-77	—	47	—	23
70-74	102	463	47	118
65-69	327	351	97	87
60-64	84	67	41	41
55-59	30	41	12	10
50-54	9	1	4	1
-49	2	0	1	0
Totals	554	970	202	280

Note: The cited publication figures for 1970-73 and for 1974-77 are not independent.

It can be seen from Table 1 that for each of the four-year periods, 1970-73 and 1974-77, three-quarters of the citations were credited to works published later than 1964 with only 15% of all citations being to works published before 1965. Similarly, for each of the four-year periods fewer than 30% of the total number of cited publications had been published before 1965. The frequency with which a work was cited diminished, the more aged (chronologically) the work was, a finding consistent with others that have been made overseas (e.g. Garfield, 1972). Incidentally, the most-cited pre-1965 publication was Peter McKellar's *Imagination and Thinking* (1957).

Citation frequencies were related to level of academic status. For the entire period, 1970-77, the mean and median citation rates per person per year were: professors ( $N = 11$ ) 6.38 and 4.75, associate professors and readers ( $N = 9$ ) 5.22 and 3.12, senior lecturers ( $N = 36$ ) 2.50 and 0.90, and lecturers ( $N = 23$ ) 1.28 and 0.00. Part of the explanation for this association between academic rank and citation rate lies in the fact that senior academics have generally been around longer and have had relatively more time in which to accumulate a corpus of potentially citable papers. There was in fact a perfect rank-order correlation between mean years of service in New Zealand

departments, mean citation rates, and academic grades. But there was also a marked variability in citation rates across individuals both within and between grades, some lecturers having mean citation rates well in excess of the professorial average.

Fifty per cent of the lecturers and senior lecturers were credited with fewer than one citation per year over the period, and 50% of associate professors, readers, and professors were credited with fewer than five citations per year. In considering these rates it has to be borne in mind that the  $N$ s for each academic rank referred to above include new appointments and promotions made up to 1977. The citation rates therefore include citations received say, by a professor when he was a senior lecturer, by a senior lecturer when she was a lecturer, and so on. One might therefore conclude that while appointment to a lectureship should be based more on potential than on realised research ability, many appointments have been made at all *senior* levels without regard to whether or not an individual has had any visible impact on the international community of researching psychologists.

The results in Table 2 show a breakdown of mean citations per year and total number of cited publications for 1970-77 for all 79 individuals. Thirty-nine persons (49%) were credited with a mean citation rate per year of one or under and 41 persons (52% — not necessarily the same ones) were credited with

Table 2

*Mean Citations per Year and Total Number of Publications Cited over the whole Period 1970-77*

Citations/Cited publications	Number of individuals	
	Citations	Cited publications
20.01-	2	2
10.01-20.00	2	9
5.01-10.00	8	16
4.01- 5.00	10	2
3.01- 4.00	5	4
2.01- 3.00	5	5
1.01- 2.00	8	9
0.01- 1.00	18	11
0.00	21	21
Total individuals	79	79

Table 3

*Mean and Total Citations and Total Cited Publication Rates  
for each of the Six Psychology Departments*

Period	University					
	Auckland	Canterbury	Massey	Otago	Waikato	Wellington
(a) Mean citations						
70-73	3.91	1.98	0.83	1.53	1.73	4.23
74-77	5.23	3.17	1.70	3.68	1.57	5.48
70-77	4.48	2.75	1.19	2.75	1.41	4.87
(b) Total citations						
70-73	206	91	20	48	52	137
74-77	314	147	68	158	73	210
70-77	520	238	88	206	125	347
(c) Total cited publications						
70-73	60	44	7	19	27	45
74-77	68	63	18	35	39	57
70-77	85	85	22	45	56	79

Note: The publication rates for 1970-73 and for 1974-77 are not independent.

having had a maximum of two different publications cited during the eight years. At the other end, four persons were cited ten or more times per year and 11 had had 11 or more separate publications cited.

In order to allow exact comparisons to be made, the mean and median citation rates for 1975 were adjusted to include self citations. Endler (1977) has found a mean individual citation rate of 8.02 (NZ = 4.56) for a 1975 survey of 35 Canadian psychology departments; the median rate was less than two (NZ = 1.50). Rushton and Endler (1977) have found a mean individual rate of 7.2 (NZ = 4.56) for a 1975 survey of 51 British departments of psychology and Endler et al. (1978) have observed a mean rate of 13.6 (NZ = 4.56) for a 1975 survey of 180 North American and British departments. The mean New Zealand rates are in all cases considerably lower than overseas figures.

Table 3 shows the mean citation rates, the total citation rates, and the total cited publication rates for each of the six New Zealand departments. Separate mean

citation rates, once again including self citations, were computed for comparison with overseas figures. Wellington ( $M = 7.25$ ) was seen to rank 96th among the top 100 North American and British departments surveyed by Endler et al. (1978). It also occupied the 11th position and Auckland the 16th ( $M = 5.81$ ) among 51 British departments covered by Rushton and Endler (1977). Finally here, it must again be emphasized that the New Zealand rates quoted above have been adjusted to make them comparable with overseas rates and have therefore taken account of self citations and the period of coverage. The rates shown in Table 3 do not include self citations.

Table 4 shows the product-moment intercorrelations between the various measures reported in Table 3, for the two four-year periods. With the exception of two coefficients, all were significant at the .05 level. For New Zealand departments then, there seems to have been a high degree of stability in the relative amount of output indexed by cited publications.

Table 5 presents citation and cited

Table 4  
*Intercorrelations between Mean Citation, Total Citation, and Total Cited Publication Rates for Departments*

	(a)	(b)	(c)	(d)	(e)	(f)
(a) M citations 70-73	—	.90*	.89*	.86*	.79*	.78*
(b) M citations 74-77		—	.89*	.75*	.72	.68
(c) Total citations 70-77			—	.90*	.83*	.77*
(d) Publications 70-73				—	.98*	.96*
(e) Publications 74-77					—	.99*
(f) Total publications 70-77						—

\* $p < .05$

publication figures for the six departments in terms of the number of individuals who contributed to each department's total rates. (Because two persons shifted from one New Zealand department to another between 1970 and 1977 the total  $N$  in Table 5 is 81 rather than 79.) This table shows, for example, that during the eight-year period one person was credited with between 31 and 40% of the total number of citations for all persons in the Auckland department; similarly, three persons were credited with between 61 and 70% of all cited publications authored by persons in the Canterbury department. These results indicate that in all departments, relatively few people pick up the bulk of citations and account for the bulk of cited publications.

The mean citation rates, the total citation rates, and the total cited publication rates for the 12 individuals who had the highest mean citation rates during 1970-77 are shown in Table 6. These 12 individuals (15% of the total  $N$ ) were responsible for something like 62% of the total number of

Table 5

*Cumulative Numbers of Individuals credited with Percentages of each Department's Total Citations and Total Cited Publications 1970-77*

% of Dept's Total	University					
	Auckland	Canterbury	Massey	Otago	Waikato	Wellington
(a) Citations						
91-100	17	15	11	12	14	12
81- 90	7	5	2	3	5	3
71- 80	6	3	2	3	4	2
61- 70	4	2	2	2	3	1
51- 60	3	1	1	2	2	
41- 50	2			1	1	
31- 40	1					
21- 30						
11- 20						
1- 10						
(b) Cited publications						
91-100	17	15	11	12	14	12
81- 90	7	6	3	4	7	6
71- 80	6	4	2	3	5	4
61- 70	4	3	2	3	4	3
51- 60	4	2	1	2	3	2
41- 50	3	1		1	2	2
31- 40	2				1	1
21- 30	1					
11- 20						
1- 10						

Table 6  
*Individuals with Highest Mean Citation Rates  
 1970-77*

	Grade (at 1977)	Mean citations	Total citations*	Total cited publications
A	SL	28.12	225	15
B	P	22.50	111	11
C	AP	16.38	131	17
D	R	11.88	95	21
E	P	9.40	47	18
F	L	8.40	42	10
G	P	7.88	63	27
H	P	7.88	63	13
I	SL	7.62	61	12
J	SL	7.12	57	8
K	SL	7.00	14	9
L	P	5.25	42	8

\*For years in which individual held a New Zealand appointment.

Note: Three of these individuals were no longer in New Zealand in 1977 and their 1977 oversea ranks have therefore been shown.

citations recorded and for 45% of the total number of cited publications. (One person's mean citation rate increased to 16.75 with a consequential jump in rank of one place when SCI citations were included.) None of the individuals making-up Table 6 would appear in Endler et al's (1978) listing of the 100 most-cited international psychologists. One (A) would rank 21st in Rushton and Endler's (1977) listing of the 25 most-cited British psychologists for 1975.

For the 11 most-cited psychologists who had served at least one year in the period 1970-73 and one year in the period 1974-77 in a New Zealand university, the correlation between citations for 1970-73 and citations for 1974-7 was .68. However, the correlation for cited publications between these periods was only .27 and for citation and cited publication measures (cf. Table 4) the correlations ranged from .02 to .50. While the highly-cited New Zealand psychologist thus seems to have maintained his or her visibility over a considerable period of time, this visibility has not been determined by number of publications cited.

Table 7 identifies the principal journal outlets for both citations and cited publications. These 16 journals represent 19% of the total number of journals and 11% of all

publication sources (including books, conference papers, etc.) in which cited publications by New Zealand psychologists appeared. The journals named in Table 7 accounted for 50% of all cited publications and in turn, these publications were credited with 59% of all citations recorded.

There is a very much greater number of psychology journals published in North America than there is in Australia, Britain, and New Zealand combined. The observation that nine of the journals identified in Table 7 are from the former source and seven are from the latter might therefore reflect a certain academic chauvinism on the part of New Zealand psychologists; to be sure, many of the more mature New Zealand academics have had strong ties with British and Australian institutions — British ones especially. Thus, 42% of the cited publications which had appeared in the seven non-American journals listed in Table 7 had been published before 1966 but only 9% of those which had appeared in the nine American journals had been published before 1966.

Table 7  
*Number of Citations 1970-77 to Publications  
 authored by Psychologists in New Zealand  
 Universities and Number of Cited Publications  
 appearing between 1949-77 for 16 Journals*

Journal	Total citations	Total publications
Aust. J. Psychol.	33	20
Brit. J. Psychol.	84	20
Brit. J. Soc. Clin. Psychol.	48	14
J. Exp. Anal. Behav.	130	19
J. Exp. Psychol.	51	15
J. Genetic Psychol.	16	6
J. Social Psychol.	7	5
Nature	26	5
N.Z. Medical J.	11	6
Occup. Psychol.	9	6
Percept. Psychophysics	56	14
Perceptual Mot. Skills	69	17
Psychol. Bull.	207	2
Psychol. Rep.	54	12
Psychon. Sci.	36	10
Quart. J. Exp. Psychol.	67	16
Totals:	904	118

Note: All these journals had had five or more cited publications and/or publications which together had been cited more than 40 times.

### Discussion

The validity of citation rates as a measure of scholarly impact is determined by the validity of the data bases and counting procedures used. In the present study, the relatively small size of the total  $N$  permitted a much closer check to be kept on vagaries which have partially undermined the usefulness of larger-scale, overseas studies. The *SSCI* data summarized here arguably provide an excellent indication of the relative visibility of New Zealand psychology departments, the individuals employed therein, and their research publications.

Previous relevant studies have tended to focus on a more limited time base, one year in the studies of Endler (1977), Endler et al. (1978), and Rushton and Endler (1977); two and one-half years in the study of Buss (1976). The present study appears to have been the first to have examined citation patterns over an eight-year period and it is of interest to note that the mean rates for 1970-73 correlated .90 and .68 with the rate for 1974-77 at levels of departments and most-cited individuals respectively. The stability of these citations can be seen to reflect the fairly low staff mobility in New Zealand among academics. As well, of course, they reflect a static pattern of visibility.

Some of the principal features of the present study agree closely with those which have been reported by overseas researchers. The majority of citations here were credited within three to five years following a publication's appearance and relatively few individuals were responsible for the majority of citations and cited publications. The two most obvious differences between the New Zealand results and overseas results lay in the relationships between academic grades and citation rates for the most-cited individuals, and in the relatively low citation rates per person per year.

For British and Canadian psychologists, the most-cited individuals have tended to be those holding the most senior academic posts. In Rushton and Endler's (1977) British study, the most-cited 25 individuals included 14 professors and five Oxford lecturers. And in Endler's (1977) study, the 26 Canadian psychologists credited with the most citations comprised 24 full professors and two associate professors. The results of

the above surveys reflected the position for 1975. As a comparison, in that year the six most-cited New Zealand psychologists consisted of one professor, three associate professors-cum-readers, and two senior lecturers. Unlike their overseas colleagues, those New Zealanders who have had the biggest visible impact on their discipline have not always been the ones holding the most senior academic ranks (cf. Table 6).

Across all individuals, the mean citation rate per person per year was well below comparable rates observed for British, Canadian, and U.S. psychologists. At least four reasons might account for this feature. First, New Zealanders might publish at a lower rate thus giving themselves less opportunity for being cited. Earlier studies have shown that the mean publication rate per person per year is about .6 for New Zealand psychologists, .8 for British psychologists, and .9 for Australian psychologists (Rushton & Endler, 1977; White & White, 1978) and as White and White noted, there is a fairly strong relationship between *total* citations and total number of publications. Second, the research published by New Zealanders may simply attract less attention, have less impact, and be less visible than work published by overseas researchers. However intuitively plausible this notion is, it requires substantiation through a comparison of New Zealand and overseas *citation per cited publication* rates; at present these are available only for Australia and New Zealand (White & White, 1978). Third, there could be proportionately more highly-cited individuals overseas, with these tending to inflate the overseas rates. Some support for this notion is gained from a comparison of the median individual citation rates for Canada and New Zealand; both are about the 1.0 mark (cf. above under Results).

A fourth possible reason is that New Zealanders might publish in areas which are not part of the current popular *Zeitgeist* and which therefore command low citation base rates.

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