This question was included to get some idea of what kinds of articles readers enjoy and profit from, and the answers are tabulated so that readers can discover articles that other readers have singled out as especially interesting or valuable. However, the question apparently had an unintended competitive implication, and 14 people wrote negative comments about the question for this reason, feeling that such competition serves no useful function or is in questionable taste. The use of the word "best" in the question was probably unfortunate; it would have been better simply to ask what articles readers found especially valuable. Bibb Latané

Assessing Impact (Quality?) in Psychology: The Use of Citation Counts

In an earlier *PSψBlication* Note, Zick Rubin (1978) raised very serious questions about measuring quality by the sheer counting of publications, fearing it would lead to a deluge of poor to mediocre papers clogging up the journals. He also conjectured that the correlation between quantity and quality would be close to zero--given that we could get a good measure of quality.

Crandall (1978), in a reply to Rubin, argued that *citations* as indexed by the Science Citation Index (SCI) and the Social Science Citation Index (SSCI), could be used as a measure of quality and cited several studies, of both physicists and sociologists, that provided validity to his point of view. He also cited studies showing that high correlations were found between number of citations, on the one hand, and number of publications on the other, thus suggesting that Rubin's conjecture about the relationship between quality and quantity was wrong. We would like to provide some additional validity data for citations generally, and within psychology, specifically.

To begin with, let us consider some additional validity data. Garfield (1977) listed the 250 most cited individuals in all disciplines for the period 1961-1975. These individuals had a yearly SCI citation average over this period of 266, compared to the yearly average of all authors cited in the SCI of 7. Seventeen percent of them (42) had received the Nobel Prize. Forty-four percent (110) had been elected to the U.S.A. National Academy of Science and twenty-two percent (55) belonged to the Royal Society of London. In all, over 60% (151) had been members of at least one national academy. Thus high citations for individuals are validated against clear recognition of scientific eminence.

Data on both the reliability and validity of citation counts for *psychology* have been provided by Myers (1970). With regard to validity, for example, the total number of citations an individual earns has been found to predict such different measures of scientific eminence as, peer ratings, Distinguished Scientific Contribution Awards, and Presidency of the American Psychological Association. When we turn to aggregates of individuals, as measured at the *psychology department level,* we again get clear evidence for convergent validity against highly meaningful criteria. In 1969, the American Council on Education published a study evaluating the "quality" of a number of graduate programs in American Universities. These evaluations consisted of average ratings given by departmental chairpersons in other universities. Endler, Rushton & Roediger (1979) ranked 100 psychology departments from the United States, Britain, and Canada in terms of the total number of 1975 SSCI citations accruing to the individual faculty members of those departments. The total number of SSCI citations that the American departments in the sample had accumulated in 1975 correlated .68 with the ratings of "quality" that chairpersons had assigned some *six years earlier!* It did not matter whether the correlations were calculated using a department's total citations, mean citations, or

median citations. In all cases the Pearson product moments were greater than .60. The figures for *publications*, on the other hand, particularly *mean* publications per department, were lower than this (*r*s = .51 and .39). It would seem that citation counts are valid for both individuals and aggregates of individuals, as at the departmental level.

Rubin (1978) hypothesized that the correlation between productivity and quality would be low. In the above this was *not* the case. Those departments which were the most productive in terms of publishing journal articles (as also indexed by the 1975 SSCI) were also the ones which had the most impact in terms of citations. For a Canadian sample, the Pearson correlations between mean citations of a department and mean publications (thus controlling for faculty size) was $r = 0.68$ (Endler, 1977). For a British sample it was $r = 0.57$ (Rushton & Endler, 1977). For the top 100 American, British, and Canadian schools combined, it was $r = 0.56$. These correlations were calculated on *departments*. When Endler (1977) calculated the correlations on 1,005 *individual* Canadian psychologists, it reduced to .41. The comparable figures for the 250 full professors, 388 associate professors, and 296 assistant professors (there were 71 unranked faculty) were .50, .58, and .58. Essentially then, there does seem to be a strong positive correlation between productivity and impact. It has often been observed for disciplines as wide ranging as musical composition to nuclear physics, that one of the most prominent characteristics of the greatly impactful worker (often called a "creative genius") is his or her immense productivity. Perhaps this is also true for psychology.

The use of citations as a dependent variable is likely to increase in the future. For example it might be considered a measure of "creativity". Research in this area has been bedevilled by the lack of a good objective criterion. A potentially useful one might well be citations. This metric starts at a true zero and goes on up into the several hundreds. It is highly reliable, and predicts such valid criteria as the Nobel Prize, as well as the more prosaic peer-rating. A start on this problem was recently made in this journal by Helmreich, Beane, Lucker & Spence (1978) who reported on achievement motivation and scientific attainment (SCI citations). Hopefully more such studies will follow.

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