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THE PSYCHOMETRIC SOCIETY—ROOTS AND POWERS*

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A classical function familiar to all psychologists is the expression $S \rightarrow R$, commonly called the $S-R$ bond, or stimulus-response. This function might well be the motto of this Society since one of the primary concerns of the Society's members is that of prediction and control; that is, given a particular stimulus or set of stimuli, what is the most likely expectation as to the response or result. These symbols are particularly significant when one examines them in connection with the Society, for it leads one to a consideration of the causes that led to its organization and to its probable effect on psychology in the future.

The Gestaltist might interpret the formation of the Society as an illustration of the principle of closure, but, while this is a perfectly reasonable rationalization of the *fait accompli*, it seems to have a tone of finality and completeness which is not at all in keeping with the possibilities of the future for the Psychometric Society. For this reason, I have chosen the Thorndikian rather than the Gestalt principle to exemplify our Society.

Psychology as a formal study is young as disciplines go, and, as a science is barely through its birth pains. In considering this science one cannot but remember James' famous remark about the new-born child being in a state of "blooming, buzzing confusion" and realizing that psychology is just beginning to attain some order in its domain. This state of confusion is not peculiar to psychology or to psychologists but is natural in any new field of human endeavor. The original approaches in any science are based on common experiences, philosophical speculations, and inherited superstitions, and only with exasperating slowness can a body of quantitative data based on controlled observations be secured from which it is possible to develop rational hypotheses.

The task confronting the early workers in the field of psychology was tremendous, and there is no obvious and easy way for us to evaluate the contributions to quantitative rational psychology of such men

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as Bacon and Galton in experimental design, of Weber and Fechner in psychophysics, of Lashley and Rashevsky in physiological psychology, of Binet, Terman, and Thorndike in mental measurements, of Spearman and Thomson in quantifying theories of intelligence, of Allport in social psychology, of Warden in formulating the dynamics of animal behavior, and of Fisher, Kelley, Pearson, and Thurstone in the analysis of data, to mention only a few. The efforts of these men are not only widely spread over the field of psychology, but they have been even more widely scattered in terms of time and geography. This long and widespread attempt at quantification is indicative of the need for such work. The importance of such attempts is further evidenced by the steadily increasing volume of technical literature appearing in various periodicals during the first four decades of the current century.

There can be no question that the stimuli were present, and only a catalyst was needed in the form of some individual to implement the uniting of widely separated scholars into an articulate and functional organization. In 1931 such an individual appeared: Dr. A. P. Horst. Horst had a firm conviction that there was a strong and growing interest in the quantification of our science and that what was needed was a medium of publication devoted to this purpose. He believed that the quantity and quality of the articles then appearing in widely scattered sources furnished a sound basis for establishing a journal devoted to the development of psychology on a quantitative rational basis.

In 1931 Horst was attempting to develop or locate a journal that would be devoted to quantitative methods as applied to education and psychology. The journals that most nearly met this condition were the *Journal of Educational Psychology* and the *Journal of the American Statistical Association*. Both of these, however, had other and more general purposes to serve than that proposed by Horst. During the following years Horst discussed the matter at great length with A. K. Kurtz and in 1933 carefully examined the possibilities of such a journal with L. L. Thurstone and M. W. Richardson. The idea of such a journal appealed strongly to Thurstone, since he was just beginning to publish his results on factor analysis. Richardson's interest in the theoretical problems of test construction guaranteed his support of the projected publication. During the latter part of 1933 the matter was brought to the attention of the speaker, because of his connection with the *Journal of Educational Psychology* and his consequent knowledge of the quantity of technical material available for the support of such a journal. In the spring of 1934 Thurstone went over the details of establishing such a journal, and at this time vari-

ous methods of financing the journal were considered. Several attempts were made to interest one of the Foundations in supporting the proposed periodical, but all to no avail. Throughout the spring and summer of 1934 Horst, Kurtz, Richardson, and Stalnaker were working on details as to costs, publishers, policies, and the methodology of editorial management.

Thus, at the time of the fall meeting of the American Psychological Association at Columbia University, "Psychometrika" was only a nebula in a mist of words and wishes. A series of conferences of those interested in the project during the week of the meetings crystallized the plans, brought the group together as a unit, with the result that *Psychometrika* began to assume form and substance. As a result of these conferences the material gathered by different individuals as to publishers, costs, sales, style, policy, and editorial management were collated, and specific tasks were assigned to particular individuals. It was at this time that Kurtz began to emphasize the fact that, if there were readers for such a journal, they would be interested, in all likelihood, in forming a society in which their common interest would be the keynote.

The formation of such a society would have many advantages—the identifying of individuals with common interests, focusing attention on the need and importance of developing a quantitative rational psychology, providing a physical meeting where technical papers could be read (and perhaps, appreciated), of locating possible contributors to the journal, and last but not least, if the journal was to be the official organ of the society, providing financial support for its publication. The only fly in the ointment was that there was no idea of how many individuals were interested in such an organization. There seemed to be a number of cogent arguments to the effect that such an organization would have a greater chance of success if the journal, *Psychometrika,* were to appear, like Minerva from Jove's forehead, full blown before the public immediately after the organization of the society. But here a paradoxical situation arose—to have the journal it was first necessary to have the society, but to have the society it was claimed that one must first have the journal. So the matter stood through the fall of 1934 and the spring of 1935.

The next problem was to determine whether other biometricians, educators, psychologists, and statisticians were interested in forming such a Society. Thurstone made this possible by the liberal contribution of not only his own time and effort but also that of his staff. Through the facilities at his command, letters of inquiry were sent to a large number of individuals who, it was thought, might be interested. As a result of this canvass, invitations were extended to all

who replied to attend the formation of the Society on September 4, 1935, at Ann Arbor, Michigan, during the session of the American Psychological Association. Temporary officers were appointed for the Society, and later in the fall a mail ballot for election of officers was held. Dr. L. L. Thurstone was the first president, Dr. Paul Horst, the secretary, and the speaker, the treasurer.

During the following year the constitution committee, composed of Horst, Kurtz, and Richardson, prepared the present constitution of the Society, which was officially adopted at the second annual meeting held at Dartmouth. This was amended in 1937 to include a "student membership," and at present such memberships constitute approximately one-sixth of the total membership.

The growth of the organization has been slow, but, on the other hand, the membership has had relatively few withdrawals. The paid membership for 1936 included 133 individuals and with the succeeding years included 185, 189, 214, and in 1940 dropped to 200 paid members. That the membership takes an interest in the affairs of the Society is indicated by the fact that approximately forty per cent of the eligible members voted in the recent elections.

In dealing with the historical development of the Society it is impossible to disentangle its history from that of the Psychometric Corporation. As pointed out above, one fundamental question was how to publish the Journal immediately upon the organization of the Society. At the Ann Arbor meeting it was voted to have dues of one dollar a year until the Journal appeared, and thereafter of five dollars a year. Thus, there was still no capital for starting the journal.

Suddenly shortly after the beginning of 1936, Horst became impatient, and with a confidence equalling his foresight, he cut the Gordian knot by offering to underwrite the losses of the journal for the first year up to one-fourth of its cost. A simple but practical solution, and an example which was immediately followed to a lesser extent by Kurtz, Thurstone, Richardson, and, so as not to appear too niggardly, by Dunlap. Somehow the word got about as to the plans for the journal and how it was to be financed initially. It was only a short time until pledges of support had been received from Guilford, Gulliksen, Kuder, Lorge, Stalnaker, and Thorndike. Suddenly, it was realized that sufficient money had been guaranteed to publish the journal for at least a year and a half, but offers still came in to help underwrite the venture. This spontaneous reaction seemed to more than justify the attempt to organize the Psychometric Society and to proceed with the publication of *Psychometrika.*

If the journal were to appear immediately, it was necessary that some legal unit be responsible for the financial arrangements. This

was the basic reason for the formation of the Psychometric Corporation, independent of the Psychometric Society. Another cogent reason was that the original sponsors felt that during the early years the policy of the journal should conform closely with the basic ideas of its founders and not degenerate into another periodical devoted to publishing only the results of psychological and educational measurements. It was believed that if an editorial policy was firmly established, the journal would then go on regardless of changes in the composition of the editorial board. If, as time went on, the journal was a success, the Corporation would gradually turn over the control of *Psychometrika* to the members of the Society. It was for these reasons that on August 24, 1936, the Psychometric Corporation was incorporated in the State of Illinois.

That there was a real need for such a journal is shown by the list of library subscriptions, which has grown to include 78 libraries at present, exclusive of those in foreign countries that have dropped their subscriptions for the duration of the war. Within the short space of two years after its first appearance *Psychometrika* could be found in libraries in Canada, China, England, Austria, France, Germany, Scotland, South Africa, and a number of countries which now are only memories. This growth occurred in spite of the fact that the cost to a library was twice that for a private subscription. An unusual innovation was sending to libraries a fresh volume of the journal at the end of each year for binding purposes.

Originally the journal assessed contributors a dollar a page for text and tables and for the cost of cuts, but at the Columbus meeting in 1938, this charge was reduced to fifty cents a page with no charge for cuts. However, at the annual meeting held at Penn State College in 1940 this charge also was completely eliminated. The contributor has always been furnished *gratis* with two hundred copies of his article.

Another interesting fact about the journal is that each manuscript is first examined by the Managing Editor who removes all references to the name of the author. The manuscript is then evaluated by three members of the Editorial Board. The Managing Editor collates the comments on the manuscript and then accepts the article; rejects the article; or accepts it, conditional upon revisions suggested by the readers. This practice has contributed in no small way to the quality and uniform grade of material appearing in the Journal. The untiring efforts of the Editor, Dr. M. W. Richardson and of Dr. Dorothy Adkins, Assistant Editor, have been no small factor in the production of the Journal.

Publication of a journal is not all that the Corporation has done.

In 1938 there appeared the first of a series of *Psychometric Monographs*. This first monograph, entitled "Primary Mental Abilities," illustrates with emphasis the type of quantitative rational psychology that the Society has tried to develop. In 1939 the Psychometric Corporation made possible the publication of another journal, the *Bulletin of Mathematical Biophysics*. The Corporation acted as publishing and financial agent for the *Bulletin* and in 1940 turned this publication over to the University of Chicago Press.

Today we are a society on a firm professional and financial basis, and we have a journal that has attained a high rank among scientific periodicals. It is with no little pleasure that, as a former treasurer of both the Society and the Corporation, I announce that the loans of the original sponsors have been repaid and that both the Society and Corporation have no debts but rather a small but comfortable reserve with which to face the contingencies of the future.

But enough of the past. Let us consider the present and the future of our Society. At each annual meeting the Society has sponsored a program of papers. Last year barely enough papers were submitted to form a program, and this year the number of papers submitted was so small that it was impossible to arrange a program. What does this mean? Is it that our members are not engaged in productive scientific work? Is interest in the development of the principles of the organization waning? Is the type of program not satisfactory? Are our members so busy with affairs of national defense that they cannot participate in scientific programs?

I do not know, but I suspect that not one but all of these reasons have contributed to a greater or lesser extent to this unfortunate state of affairs. This is an important juncture in the development of the Psychometric Society. Shall we abandon our program of papers? Shall we have a program consisting of two or three invited papers? Or shall we attempt to design an entirely new type of program? This is not a task for the President or for that matter, for your officers, but this is a task for the total membership. Surely the time has not arrived when we can comfortably recline on our advances and say, "Psychology is now a quantitative rational science; let us maintain the status quo." That there is work to be done, almost an unlimited amount, seems to be apparent. What must be done is to induce each member to take a more active part in the affairs of the Society and to contribute of his time, energy, and ideas. Your officers will welcome any suggestions and be glad to receive your assistance in implementing these suggestions into concrete action.

Perhaps part of the fault lies with our Journal, which has a preponderance of material so highly technical that only the specialist can

read and understand it. But we, as members, must remember that the editors cannot publish material that is not submitted to them. Personally, I would like to see more material such as the highly practical article of Richardson and Kuder on the "Theory of Estimating Test Reliability." If the members want articles other than those on factor analysis or the determination of the order of a matrix, they must submit technical manuscripts on other topics.

The future should see a great many papers of theoretical and practical importance in all fields of psychology. That problems abound that demand formulation in quantitative and mathematical terms you know even better than I. The entire field of quotients needs to be examined and stated in more precise and rigorous terms. We have allowed ourselves to be shackled by the I.Q. with the resulting controversies about the stability of this function. Millions of words have been written on the subject, and thousands of hours have been expended in computing and recomputing this function. Curiously, little has been done on the basic rationale underlying the function. Thurstone and Thorndike have attempted to develop more satisfactory units of measurement, and Heinis has developed a function which has received far too little consideration in the discussions of this problem. Here indeed, is a field worthy of investigation and restatement.

The field of item analysis and test construction is just beginning to emerge from the labored gropings as to methodology. Recently it was my good fortune to examine a manuscript by Horst *et al,* in which a systematic attempt had been made to develop item analysis on a rational basis. This work, however, was far from conclusive, and I am sure the authors would be the first to disclaim that all the problems were solved.

The general field of prediction, which is being emphasized so strongly in this time of national emergency, when it is vital to our country and to each of us that each man be placed where he will be most effective, is filled with problems demanding our attention. What are criteria? How can their validity be established? What is the most predictable criterion? What is the minimum number of variables from a given matrix which will give valid, reliable, and effective estimation of either a single or a multiple criterion?

The rationale of rating scales has advanced little since the last world war, and there is no question but that the pressure of time and numbers will again bring such scales to the fore. Here, indeed, is a field that should challenge the membership, not only for its theoretical implications but also for its practical applications.

The current personality scales represent a cut-and-try methodology, and only recently has there been any attempt to apply modern

methods of analysis to such scales. It is necessary in this field not only to apply more rigorous statistical techniques but also to attempt to delimit the problems more precisely and to formulate hypotheses susceptible to experimental study.

Whichever way one turns he is confronted with problems in social psychology, animal psychology, and in the psychology of personality, to mention a few, where solutions await the development of a rationale that can be subjected to quantitative formulation. I could go on with these citations, but why should I mention other fields when you are even more familiar with their problems than I?

The Psychometric Society emerged as a result of a felt need and so far has served its purpose admirably. That its services to psychology will be more substantial in the future is not merely a possibility, but is a probability of a very high order. The roots of the Society are firmly fixed, and its powers, though latent, are just beginning to emerge and will, I am confident, be a major force in the psychology of tomorrow.