

Journal of the Minnesota Academy of Science

Volume 14 | Number 1

Article 2

4-1946

Abstract Papers

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Recommended Citation

(1946). Abstract Papers. *Journal of the Minnesota Academy of Science*, Vol. 14 No.1, 78-79.

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General

A WORD OF WELCOME

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ATOMIC ENERGY AND RELATED RESEARCH

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THE WAR-TIME DEVELOPMENT AND POST-WAR APPLICATION OF DDT AND INSECT REPELLENTS

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WAR PSYCHOLOGICAL RESEARCH AND ITS IMPLICATIONS

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So great were war demands for psychological research and practice that virtually all the younger American psychologists were drawn into service or civilian projects. Because many are still restricted, many results will not be available to the scientific public for some years. Results may be grouped under several headings.

Classification and assignment of personnel. In World War I new areas of research and practice were created by the use of intelligence, special aptitude and trade tests. In subsequent years great advances were made in test construction theory. In World War II a careful sorting process was necessary in order to utilize the human resources in the 14,000,000 men and women who came into the Army and Navy in a short time. Not only were previously standardized instruments used, but many new and special tests were also developed.

The mere tabulation of the tests devised, standardized and used, and of the researches based upon them, would fill many pages. Even

more significant for the future is the number of men who have been trained in the use of modern classification techniques. The war made available for observation, study and measurement, persons in great numbers and whole sections of the population that in ordinary times are almost inaccessible. Just as the normative data of World War I was of inestimable value for many years, so that of World War II will be with us for years to come.

Some results are of particular interest to educators, since it was possible to follow persons from testing, through training to the actual job. In some experiments all persons regardless of performance were permitted to go through all stages in order to obtain a complete scientific check. The results show that good testing may compensate for poor training. Both testing and training may, however, have little validity in terms of the job because staff ideas about training may differ greatly from actual job requirements.

In many complex skills predictive instruments for both motor and intellectual activities must be developed in a different conceptual framework than that of the verbal tests so commonly used in academic circles. The movement is away from all-inclusive instruments toward highly differentiated instruments.

A central problem, that of a reliable criterion in terms of actual job performance, emerges. For instance, if a clearly defined criterion of what is a good scientist, and what is good scientific work could be obtained, effective instruments for predicting scientific ability could be developed. The experimental and statistical procedures for producing good instruments, once a criterion is obtained, are now well known.

Research in aviation. The training of an aviator is expensive and lengthy, because he is a highly skilled specialist. Any device that can improve aviator selection preserves lives and pays its own savings in the cost of training. Both the Army and Navy Air Forces attacked this problem. The procedures illustrate modern techniques for developing good instruments; these consist of applying many potential measuring devices to candidates on whom performance records are kept during training and combat. The separate measures, one by one, are evaluated against criterion groups of good and poor aviators. For instance, if, on any item 85 per cent of the good and 25 per cent of the poor aviators pass, the item is good. If 50 per cent of the good and 50 per cent of the poor group pass, it does not discriminate.

In Army aviation, measures showing very high predictive value for success as aviator, were developed. For example, in the top ninth of the combined test results only 4 out of 100 failed to make good, while in the bottom ninth 79 out of 100 or 4 out of every 5 failed. Similar measures (with different basic content but equal discrimination power) were developed for bombardiers and navigators.

Specific studies in perception, learning, adjustment, etc. Many

specific studies were undertaken of which only a few can be mentioned as examples. The design and use of range finders involves problems of the perception of the third dimension—a traditional field of research for a century. During the war, not only was the scientific literature completely summarized, but also basic concepts were reworked, new techniques of observation were developed and new insight into underlying factors gained. When automatic sighting mechanisms were developed for guns, gunners needed no longer to correct for the movement of the target. With these instruments the bead is drawn directly—not by leading the target. In previous selection of gunners, much emphasis was placed on prior experience in hunting and skeet-shooting. With the new instruments, the correlation between previous experience and accuracy in hitting targets was negative. Greater progress in learning to operate the guns was made by persons without previous experience, because the habits of leading a target are so well established that it takes a long time to unlearn them.

Design and use of equipment in terms of the human factor. In the early design of military equipment, little account was taken of the human being supposed to operate it. Some equipment adequate from an engineering standpoint was beyond the range of human performance. In one instance, gun controls were so designed that a person seven feet tall was necessary to operate them; in another instance, a complicated aiming mechanism involved seven different manual operations, some opposing each other, which were to be done simultaneously. Even athletes with good coordinations and much practice could not operate this apparatus with more than chance success. When the motor reactions and their timing were studied, the controls were redesigned and unmanageable equipment became useable and valuable.

Often complex equipment was sent out without instructions. Because of the inexperience of those receiving it, often it could not be used, or a trial and error resulted in damage. Psychologists studied such equipment; recorded the steps involved in its use, observed soldiers learning to use it, and wrote standard operating procedures to be attached to equipment or manuals that made the use clear.

The detection of neurotic symptoms and potential difficulties. In any population some persons break or show behavior difficulties under stress. Others meet their obligations and responsibilities. In war-time the problem of adjustment becomes of great moment because of the increase in stress. Each potentially inadequate person on the battle line has cost much in time, money and effort. If such persons can be selected in advance and are eliminated or given duties with less stress military proficiency is increased. While difficulties arose in getting criteria and good measures, substantial advances were made.

At war's end a similar problem arises in reverse, because it is necessary to rehabilitate and reeducate many persons who have broken down. There is need both of remedial procedures and of methods of distinguishing between episodic or temporary effects and permanent and lasting effects. One measuring instrument developed at the University of Minnesota by Hathaway and McKinley, the Minnesota Multiphasic Inventory, had wide war-time use and is of future promise. Prior to the war many interesting developments occurred in the so-called projective techniques for studying personality. Many of these were used and checked under war conditions in a way that would have taken at least twenty years in civilian life. Out of this clinical research there will come many devices of promise in peace time.

Attitudes, polling and opinion sampling. Before the war great advances were made in measuring attitudes and opinions. The public opinion polls which attract so much attention in political campaigns are familiar to most of us. Not so familiar are similar instruments for more specific practical problems. When many civilians are brought together difficulties arise: some from the inertia of the military or naval organization; some from the new manner of living; some from inexperience or inadequacy in officers.

In the past, the attack on such problems has followed the word of the person who speaks most loudly rather than by determining feelings of the men involved. For example, some newspaper men were invited to visit camps and report on conditions. Because they were trained to select dramatic and emotional incidents in terms of reader interest, they presented a picture of conditions that in many respects was far from reality. Sometimes the newspapermen met optimists and reported only the favorable side; in other instances, they met the grumblers and reported the opposite picture. What was needed was an actual survey of the wishes and opinions of adequate samples of men taken without regard to their rank and position. Adequate survey methods using techniques of public opinion polling were developed to answer questions on thousands of specific problems. While the results are still not available, nevertheless substantial modifications were made in practices and procedures as well as in the training of able young men in their use.

Psychological warfare. Behavior is affected by what is seen and heard. Rumors, inaccurate information, propaganda may change peoples' actions in desirable or undesirable directions. The scientist is interested in determining how propaganda devices modify or change attitudes. What are the effects of bombing upon a population? What are the effects of particular forms of government or of administrative procedures? Although here there is some opportunity for direct observation, the use of modified opinion or attitude polling techniques is of value.

Conclusion. In this paper I have surveyed only a few of the

developments within the field of psychological research in wartime. Although much war research dealt with technical and practical problems, some fundamental advances occurred. However much we may deplore war, nevertheless war may further some aspects of science. Psychology made many contributions to the war effort; it can make many to peace.