

# Psychology and the armed forces

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## Summary

The present paper aims to examine the history of Psychotecnics applied to the military context of Air Forces since the First World War. In Italy, in order to select pilots thanks to A. Gemelli and his first Psycho-physiological Office the human capacity for physical effort had led to assess fatigue, visual and auditory perception with the support of many devices, such as reaction times apparatus, chronoscope, etc. The second part introduces the psycho-physical dimension of the human machine into personnel selection, in which personality was considered in relation to various flight difficulties. The years of Italian fascist period saw the setting up of a Permanent Committee for the Applications of Psychology headed by Gemelli.

*Keywords:* military psychology, history of psychotechnics, personnel selection.

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## Abstract

Personnel selection as an applied domain of work and organizational psychology has a scientific history of over a century. This paper presents a historical account of one of the most active trends in this field during the two World Wars, namely psychology in a military context. Principles and methodological applications of psychology used by the various armed forces are examined in order to provide an exhaustive background to a period in which realities of war called for realistic attitudes and led to the need for practical psychological services and personnel.

This paper starts from an analysis of the first attempts by psychologists during the first World War to solve certain technological problems of military importance in the areas of fatigue, visual and auditory perception, military instruction, morale, etc. Selection and training procedures for military personnel were introduced or improved.

In 1915 A. Gemelli, who at that time was head of the Laboratory at Udine, used psychological tests in the selection of pilots for the Italian Air Forces. The same initiatives were taken in others countries in Europe as well as in the Us America's entry into World War I created an opportunity for psychology to demonstrate its potential value: psychologists were involved in war service in laboratories, in training camps, and in the field. The main aim in April 1917 was to devise efficient and objective techniques by which civilian recruits could be select for military assignments. To meet this challenge, the A.P.A. appointed a committee of five psychologists who specialised in mental testing, under the chairmanship of

R.M. Yerkes: the result was the Army Alpha and the Army Beta tests for recruits. In addition, the analysis of various jobs was carried out so as to establish exactly what they involved and which qualifications were appropriate to them. The wartime service gained support for applied psychology. The concept of personnel specifications aroused particular attention: the paper-pencil tests set the pattern for new group tests of intelligence, aptitudes, and personality creating a post-war market for personnel selection and testing procedures in education and in industry.

This trend increased during World War II. Just as in World War I, psychologists selected military personnel at induction and reception centres through tests such as the Army General Classification Test, the Army Air Force Test, etc. Main objectives were the development of a personality assessment program to select intelligence personnel for special assignments, the establishment and training of resistance groups, the disruption of morale in enemy forces, and the procurement of information behind enemy lines. In Italy, a selection of the Permanent Committee for the Applications of Psychology, set up in 1939 and headed by Gemelli, was dedicated to the Army. In the following year the Committee became an Experimental Centre of Applied Psychology as a of the army. These events are examined in the second part of this paper.

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The starting point for the history of applied psychology in a military context is the early part of the Twentieth Century, when developments in the Italian Air Force during the First World War led to the need to examine new approaches to the emerging problem of personnel selection. The objective was to find newer and better guidelines than those which were proving inadequate for the difficult tasks that the new Army was setting itself.

It was also a period dominated by a Tayloristic approach to working life and by a consequent psychological model of man at work without any interpersonal dimensions. In fact, the dominant ideas were man's subordination to machines and the improvement of working efficiency. Moreover, it was also a time when psychological devices were being constructed in order to test human abilities and to select personnel.

As the Neapolitan University lecturer U. Durante pointed out in 1959 (Durante, 1959, p. 756), the recruitment criteria introduced for the first time into the Italian Air Force had already been in use for some time in industry personnel selection elsewhere in Europe, where, on account of the changing nature and demands of work, there was an increasing necessity to find workers with specific abilities for specific jobs. As a consequence, the task of vocational guidance and personnel selection was entrusted to psychotechnics, at that time still in its infancy.

Air Force personnel comprised not only pilots, but also specialists, flight engineers, assemblers, radio operators, etc., all of whom shared flight risk, even though they were not responsible for actually flying the planes. Air Force personnel selection therefore involved two types of psychological testing. The first consisted of general, non-specialist tests to assess mental abilities in calculus, recognition and completion of shapes, dictation, memory, problem-solving, visual acuity, reading, acoustic orientation, reaction times, etc. Each job and specialization required quickness of perception, sense of direction, and prompt reaction to external stimuli. The second type of testing dealt with manual abilities and vocational guidance, and involved the use, for example, of devices to evaluate visual-motor coordination (chronoscope, etc.).

The pioneer of Italian military psychology was Agostino Gemelli, who in 1915, at the beginning of World War I, following on the heels of other countries, founded and managed the first Laboratory of Psychology, in Udine. The Laboratory's work included the devising of psychophysics tests for pilot selection and active involvement in assistance and organization.

In 1916 in Milan a Psycho-physiological Office was created by Gemelli and his school in order to select pilots and to deal with the recruitment of Air Force specialists by using purely aptitudinal methods. The high rate of airplane accidents meant that personal courage and physical fitness alone were no guarantee of a candidate's suitability and competence as an Air Force pilot and specialist. Realising this, Gemelli insisted on the importance of *the right man in the right place*, «right» being defined as an individual's aptitudes and productivity in terms of his physiological reactions.

Gemelli's fundamental educational experience provide significant insight into his scientific contribution to psychology: from 1907 to 1911 he studied biology, physiology, and philosophy in Germany and Belgium; in Bonn he attended Verworn's Laboratory of physiology and Nussbaun's Laboratory of general biology, where he carried out investigations into the formation of anterior roots of the spinal marrow; in Munich he became acquainted with Kraepelin while attending his clinic of neuropsychiatry; in Frankfurt he worked in Edinger's neurological clinic. During this period he was persuaded of the need for more thorough experimental studies of the behaviour and reactions of living organism.

In the USA, as F. Samelson noted, (Samelson, 1977, p. 274), the dramatic change in the role of psychologists in the eyes of the natural scientists and the public at large was a result of America's entry into World War I. The wartime activities of the psychologists, especially the intelligence testing in the U. S. Army, had made it possible to connect scientific psychology to life, or in other words to bring «psychology down from the clouds and [make] it useful to men» (Terman, 1924, pp. 105-106).

The first mental tests designed for mass use were in fact developed by psychologists for the U.S. Army in 1917-1918. When America entered the War in 1917, the governing body of the American Psychological Association met to decide how the nation's psychologists could best come to the aid of their country. Yerkes succeeded in promoting the use and status of mental testing, and the American military gave him permission to carry out mental tests on over 1.75 million army recruits. In the meantime, the A.P.A. appointed a committee of five psychologists, under the chairmanship of R.M. Yerkes, who specialised in mental testing modelled on intelligence tests designed for one-to-one assessment. In developing the mental tests, the psychologists subscribed to the position that an individual could be intelligent even if illiterate or lacking proficiency in the English language.

As S. J. Gould pointed out (Gould, 1982, p. 349), in 1917 Yerkes devised three types of mental tests, based on the theoretical position that intelligence was an inherited trait: Army Alpha, a written test for literate recruits and made up of eight tasks, such as analogies, filling in the missing number, and unscrambling a sentence; Army Beta, a pictorial test for individuals who were illiterate or failed the Alpha, divided into seven parts, including running through a maze, number work and a picture completion task; the Individual Examination, a spoken test for the subjects who failed Beta. (Yerkes, 1921).

It is important to underline –as J. Carson affirmed (Carson, 1993, p. 282)– that psychology was only just emerging as an autonomous professional endeavour at the start of the First World War, and American psychology's interest in intelligence had not really borne fruit, in any practical sense, until new methods for the measurement of intelligence –devised by the French psychologist Alfred Binet in the period from 1905 to 1911– were adapted for American use by Henry H. Goddard and especially by Lewis M. Terman, who in 1916 produced his Stanford Revision of the Binet-Simon Intelligence Scale.

As in Europe, the war brought a huge influx of new soldiers who needed to be trained quickly, assigned to tasks where their skills could best be taken advantage of, and given leaders. As Secretary of War Newton D. Baker noted in an address to personnel adjutants in the summer of 1918,

we have no time for men to grow up into those groups evolved by association, but we have to have a selective process by which we will get the round men for the round places, the strong men for the strong tasks and the delicate men for the delicate task. [...] Some system of selection of talents which is not affected by immaterial principles or virtues, no matter how splendid, something more scientific than the haphazard choice of men, something more systematic than preference or first impression, is necessary to be devised (Baker, 1918, pp. 1-4).

It is also possible to affirm, as M. Sokal did, that psychological testing enjoyed a boom and that the first heavy users of the group tests developed for the army were the schools and colleges, which found them more efficient than the individual tests (Sokal, 1984, p. 277).

As a result of the need to train large numbers of pilots, many devices were invented to aid in the assessment of the aptitudes of candidates. In Italy, in 1915 a visual stimulation machine was proposed by A. Gemelli for the measurement of reaction times in correcting disturbances such as unexpected noises, hits, etc, and to examine inhibited control. Thus, an individual's ability to pick up light signals at moments of emotional stress could be monitored. Assessment was to take account of the subject's responses to the stress of environmental factors, of his emotional make-up and of his capacity for recovery.

During the early years of the Committee on Selection and Training of Aircraft Pilots, the major emphasis was on the development of improved methods for the selection and classification of pilots and on associated criterion problems. As the selection situation became stabilized, the emphasis shifted from research in selection to research in training.

Furthermore, the next step in the evolution of military psychology regarded the construction of mechanical or electrical actuators linked to the trainer controls. The aim of the new automatic devices was to rotate the trainee pilot's fuselage into an attitude corresponding to that of the real aircraft in response to his control inputs.

The years between the First and the Second World Wars were characterized by innovation in personnel selection and vocational guidance. In fact, the first attempt was introduced by Gemelli, who in vocational selection took account not only of a pilot's technical aptitudes, but also of his personality in relation to various flight difficulties. He observed that certain subjects who were apparently in possession of all the abilities necessary to piloting, were unable to overcome difficulties arising during flight; a particular type of temperament was also necessary (Durante, 1959, p. 758)

As the Italian professor G. C. Ferrari, the founder of *Rivista di Psicologia*, wrote in 1915, in assessing the effect of a soldier's military experience, that «the mind ceases to function and he becomes simply a machine» (Ferrari, 1916, p. 86), as well as Gemelli noted in 1918, «the soldier thinks very little, because he sees too little! His mental life is really limited and nothing nourishes it» (Gemelli, 1918, p. 92). Thus, pilot selection had to be based on new guidelines connected with behaviour, which was the only key to understanding personality.

This example was followed immediately by German military psychologists, who identified occupational fatigue and affirmed that the personnel was not up to the difficult tasks required (Ansbacher, 1948, pp. 9-10). Meanwhile the U. S. Army continued to assess recruits with mass testing.

This trend increased during World War II. Just as in World War I, psychologists selected military personnel at induction and reception centres through tests such as the Army General Classification Test, the Army Air Force Test, etc. Main objectives were the development of a personality assessment programme to select intelligence personnel for special assignments, the establishment and training of resistance groups, the disruption of morale in enemy forces, and the procurement of information behind enemy lines. In Italy, a section of the Permanent Committee for the Applications of Psychology, set up in 1939 and headed by Gemelli, was dedicated to the Army. In the following year the Committee became an Experimental Centre of Applied Psychology.

The years of the fascist period were characterized by the concept of human being as the mechanical expression of the totalitarian apparatus and by the setting up of various institutes of physiological research in Catania (muscular work), in Genoa (sponge fishermen), or the institute for the study of high altitude respiration headed by Rodolfo Margaria at the aeronautical medicine centre in Guidonia (Margaria, 1941).

In 1928 Gemelli, as a member of the Biology Committee, insisted on the need for research into psycho-physiology work and psychotechnics as a basis for personnel selection and to improve work efficiency. In fact, he was of the opinion that psychotechnics was a fundamental factor in the corporative conception of society (Gemelli, 1937, pp. 833-845). The Second World War gave a significant impetus to the in-depth development of knowledge of the psycho-physical dimension of the *human machine*, knowledge which would subsequently be used effectively in the armed forces and the production cycle. As he himself said,

we are used to attributing no importance to the human factor and only recently thanks to preventive medicine has organic human activity become an object of study – for example, the human capacity for physical effort has led to research into fatigue. Up to now there has been a reluctance to consider human mental activity (Gemelli, 1939, pp. 383-384).

The 18<sup>th</sup> January 1939 saw the setting up of a Permanent Committee for the Applications of Psychology, headed by Gemelli and divided into four sections: armed forces, transport, production and school.

The armed forces concentrated their activities on attitudinal selection with a mixed committee made up of leaders of the CNR and the Army. This led to the foundation of an Experimental Centre in Rome headed by Ferruccio Banissoni, and similar centres in Milan, Naples, Turin, Florence and Trieste (Commissione permanente per le applicazioni della psicologia, 1941, p. 669),

This trend was shared by German military psychology: research was carried out into problems not only of fatigue, auditory activity, noise and the like, leading to the development of a variety of tests to measure intelligence, mechanical comprehension, manual ability, aptitudes, attention, and memory, but also of the personality as a whole. The following procedure was adopted: candidates were asked for a written account of their personal history and were given a detailed exploratory interview which embodied many of the principles stressed by the *non-directive* American psychologists of today (Mierke, 1943, p. 68).

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