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Swedish Officer Selection

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Abstract

The use of psychological methods as an aid to officer selection in the Swedish armed forces dates back to the early 1940's. The psychological examinations at that time were heavily influenced by German methods developed in the 1930's with an emphasis on personality variables. In 1996, a new system was introduced, which is based on the theories of Jaques and Stamp and on the philosophy that the first stage of selection must be directed at deselecting applicants not at all suited for the officer profession, rather than trying to find those best suited. The new system has three main components: A cognitive test battery, a personality inventory and an interview. The test battery, comprising three inductive, four spatial and five verbal tests, was constructed with the aid of confirmatory factor analysis. It is evaluated in independent (orthogonal) factor scores over the three latent intelligence factors G (general), Gv (visualization) and Gc (crystallized), as well as in co-varying (oblique) factor scores over the factors inductive, spatial, and verbal intelligence. The personality inventory was also constructed using confirmatory factor analysis. It has 155 statements that yield five independent factors labeled Subjective Leadership Potential, Inflexibility, Adventurousness, Opportunism and Unreliability. The interview is semi-structured and lasts for about 90 minutes. It results in ratings of the six variables Social ability, Motivation for the profession, Emotional stability, Intellectual ability, Energy and Maturity. Construction of criterion instruments is under way, but so far it has not been possible to assess the predictive validity of the instruments due to the fact that criteria have as yet not been available.

Historical background

In Sweden, the use of psychological methods in officer selection was introduced in 1944. The ongoing war prevented exchange with psychologists involved in military selection in the belligerent powers, and so most of the methods had to be developed with the domestic resources available. The formalized psychological examination was strongly inspired by German methods used in the 1930's. The most important part was an interview, carried out by specially trained psychologists. As a basis for the interview there was a biographical self-description, a questionnaire concerning interests and personality, a so-called "work curve", situational tests (of social intelligence), an intelligence test, an essay, and tests of technical comprehension.

In 1955 the Institute of Military Psychology (MPI) was established and given the responsibility of guaranteeing the professionalism of the methods used for officer selection. In the aftermath of the 1968 student revolution, however, public opinion against selection procedures grew strong and in 1981 formalized psychological selection was abandoned when a new officer structure was introduced which placed all officers, commissioned as well as non-commissioned, in the same category. In 1991, work started on a new system for

officer selection, which was introduced in 1996. At this time, MPI had been reorganized to become a part of the National Defence College (NDC).

Each single Army unit at the division level and each Navy squadron is responsible for its officer selection, having a selection board of its own. The Air Force has a central selection board that provides service to the different wings of the force, both as regards selection of commissioned officers and of pilots. In the last few years, a total of about 1500 applicants have been screened each year, which is approximately double the number required. The testing and interview procedures take place at the military units involved.

NDC is responsible for the development and validation of the test instruments through its Department of Leadership. The actual testing, scoring, and the interviews are carried out by a central Defence agency, responsible for recruitment and selection to all three defence branches.

Apart from the test and interview results, which are delivered to the selection board by the psychologists, the selection boards also collect information on the applicant from his or her training unit. This information concerns his or her service grades, as well as the opinions of peers and subordinates, which are collected by a conscript representative body at the unit in question.

Selection philosophy

The problem in the initial selection of officers differs from that in selection situations where one wants to find the right person for a certain, well-specified job. Officers apply for their profession at a young age, and then train and develop within the same organization, often for the rest of their professional lives. The first selection step should aim at identifying and deselecting individuals that are assessed as not having any qualifications whatsoever to become a good officer, rather than trying to find those best suited. The reason for this is the fact that there are hundreds of different officer professions at different levels of the military hierarchy, a fact that makes it necessary to keep a large enough variation among those admitted to the military academies in order to permit successive further selection for higher levels. Later steps in the selection procedure should be aimed at finding the most suitable persons for the next consecutive hierarchical level. In the armed forces there is thus a need for continuous evaluation of the interplay between individual qualifications and organizational demands as a basis for development and promotion.

A method of principal interest for the selection problem in the armed forces has been designed by Stamp (1988). It is based on an organization theory formulated by Jaques (1976), which states that different levels in hierarchical organizations demand different qualities from the employees. From the lower to the higher levels, job tasks change systematically from simple to complex ones, from short-term to long-term, and from concrete to abstract. Freedom of action, responsibility and power grow with each level. To five such hierarchical levels Jaques attaches five qualitatively different cognitive levels of abstraction, defined in terms of "time-span" or planning horizon that seem to possess some degree of generality, and that have been described in areas as different as mathematics (Gibson, 1975), pedagogics (Bloom, 1956), and moral standards (Kohlberg, 1971). Selection instruments for the first selection step must be designed to permit testing of large groups of applicants in a relatively limited time. The selection instruments described in the following are aimed at assessing the candidates' cognitive and personality qualifications for functioning at an academic education level and as an officer on at least the lowest levels in the hierarchy.

Population

Those eligible as officer candidates form a very qualified population. The formal requirement, equal for male and female applicants, is having been trained as a non-commissioned officer for 10 to 15 months during the compulsory military service. Non-commissioned conscript officers are trained for one of three levels: the company, platoon or section level. They are selected to these levels according to information obtained at the enlistment regarding their intelligence, their leadership potential and their emotional stability. Each year, the best 4 % of the total population of conscripts in these combined qualities are selected for the company level, the following 4 % for the platoon and the next 20 % for the section level. Most of the applicants for the profession as a commissioned officer come from the company and platoon levels. To be allowed to apply, the applicants must also have obtained average or higher military grades during their service. It is therefore safe to say that they belong to the 30 % most intelligent and stable people in the Swedish population.

The test battery

The test battery was designed at NDC and standardized to differentiate in this highly qualified population of candidates and to measure three intelligence factors: General cognitive ability, general visualization, and general crystallized intelligence. The general ability factor (G), at the highest level of a hierarchy, was shown by Gustafsson (1984) to be equivalent to the fluid intelligence factor described by Horn & Cattell (1966). On a second level in a hierarchical intelligence model Gustafsson (1984) defined two broad factors: General visualization (Gv) is supposed to be involved in tasks that demand mental manipulation of figural information, and General crystallization (Gc) in tasks that demand acquired knowledge, particularly of a verbal nature.

In a military context, the G and Gc factors were supposed to be basic factors for problem-solving and for understanding and giving military orders. The Gv factor, hopefully, would predict the ability to imagine different situations, to understand military tactics, to have control over units in the field, to move units around on the battlefield, and to keep control of a moving enemy unit when your own unit is moving as well.

The tests are presented on a wall screen by means of a computer and a video projector, and the examinees respond by checking alternatives in an

answering sheet. As many as 40 individuals may be tested simultaneously. The test results are sent to the psychologist who will interview the applicant, and are also stored in a data base at NDC for technical follow-up and validation studies.

Introduction of the computer in the testing procedure has many advantages, as compared to conventional paper-and-pencil testing. The test instructions are highly standardized, each item can be given a time limit and all examinees are given a chance to solve all items. It is also possible to separate the presentation of the response alternatives from the presentation of the problem, which

for instance opens new possibilities in the testing of spatial ability (Lohman, 1998). The test battery consists of three inductive, four spatial and three verbal tests. Cronbach's alpha for the tests varies from .62 to .86. For a closer description of the tests, see Carlstedt and Widén (1997).

A nested-factor two-group (males-females) model (Gustafsson & Balke, 1993) was tested under the assumption of one general intelligence factor (G) and two broad orthogonal factors, called Gv (visualization factor) and Gc (crystallized intelligence). The results appear in Table 1.

Table 1. The factor structure of the test battery in a hierarchical intelligence two-group model for Males (n=945) and Females (n=122). Factor loadings in bold type are significant (p < .05)

Test\ factors	Males			Females		
	G	Gv	Gc	G	Gv	Gc
Bongard (ind)	.63			.67		
Rules (ind)	.64			.73		
Series (ind)	.65			.77		
Forms (vis)	.63	.44		.66	.53	
Dots (vis)	.60	.33		.63	.33	
Patterns (vis)	.47	.24		.57	.17	
Rotation (vis)	.45	.40		.44	.40	
Literature (crys)	.31		.71	.34		.74
Sciences (crys)	.39		.65	.42		.65
Technology (crys)	.29		.36	.27		.66
Debate (crys)	.25		.71	.28		.73
Associations (crys)	.40	-.21	.37	.51	-.20	.30

ind = inductive, vis = visualisation, crys = crystallized.

The analysis confirms the three orthogonal factors G, Gv and Gc in both groups. The model's fit to data is: $\chi^2 = 157.85$, df = 99, Root Mean Square of Approximation (RMSEA) = 0.024.

Individual results are expressed as factor scores that are transformed to stanine scales. In addition to the orthogonal factor solution, the test battery is also evaluated with an oblique solution, where the factors are allowed to co-vary. The reason for this two-fold evaluation is that in the orthogonal case direct comparison between individuals is possible only with respect to G, whereas the values in the Gv and Gc factors can be directly compared only for individuals sharing the same G level. In the oblique solution, however, all individuals can be directly compared with all others in all three factors.

For practical selection purposes, it is recommended to use a combination of factor scores from the two solutions. From the orthogonal solution G and Gv should be used, while the measure of verbal ability should be drawn from the oblique solution. Individuals can then be ranked on general and verbal

ability in order to predict the overall ability to profit from academic studies. Depending on the visualization demands in a specific profession, individuals with a certain factor score on G can then be ranked according to Gv.

CTI - The Personality Inventory

Personality is of great interest in most selection contexts. Management style as described by Stamp (1988) is closely related to *cognitive style*, a concept on the border between intelligence and personality. It can be looked upon as an individual's characteristic way of perceiving reality, acquiring knowledge and thinking, evaluating and making decisions (Harré & Lamb, 1983; Messick, 1987).

The first six of the eleven scales forming the Commander Trait Inventory (CTI) (see Table 2 below) are intended to assess cognitive style, having Jung's (1971) theory of psychological types as a source of inspiration.

The remaining five scales assess personality aspects presumed essential to the officer profession. *Empathy* and *Leadership Motivation* should be reg-

arded as necessary but not sufficient qualities in leadership, while *Egocentrism*, *Impulsiveness* and *Ethnocentrism* should be sufficient signs of unsuitability for the officer profession, mainly for ethical and moral reasons. Table 3 shows the results of a confirmatory factor analysis of the instrument, yielding five factors. For a closer description of CTI, see its English manual (Carlstedt & Widén, 1998).

Table 2. Description of the CTI scales: Number of statements, reliability (alpha), and a representative statement.

Scales	Number of statements	Alpha	Representative statement
Sensation Orientation	15	.88	I seldom miss an opportunity that provides a challenge
Intuitive Decision-making	12	.86	I often see possibilities where others see difficulties
Concrete Thinking	12	.81	Concrete facts are the only things that matter
Abstract Thinking	16	.82	I spend quite a lot of time thinking and reflecting over different things
Superficial Value Orientation	14	.77	I keep up with all new trends
Ideological Value Orientation	11	.85	It is important to formulate your own ideals and to live by them
Empathy	15	.90	I often comfort colleagues who have problems
Leader Motivation	15	.89	I am suited for leading positions
Egocentrism	14	.86	My main purpose in life is to get as many goodies as I can
Impulsiveness	14	.84	I quickly lose interest in tasks that I initiate
Ethnocentrism (ETC)	9	.83	There will be problems if immigrants to a greater extent come to command Swedes

All scales possess a satisfactory homogeneity.

Table 3. Confirmatory factor analysis of the CTI scales (n=1176). Factor loadings in bold type are significant ($p < .05$)

Scale/Factor	Subjective Leader Potential	Inflexibility	Adventurousness	Opportunism	Unreliability
Sensation Orientation	.50		.49		.23
Intuitive Decision-making	.83				
Concrete Thinking	.48	.43	-.30	.16	
Abstract Thinking	.35	.64			
Superficial Value Orient.	.31			.89	
Ideological Value Orient.	.58	.36			
Empathy	.59			.19	-.27
Leader Motivation	.83				
Impulsiveness	-.22		.51		.52
Egocentrism	.07			.25	.89
Ethnocentrism	-.09			.20	.52

$\chi^2 = 313.7$, $df = 31$, RMSEA = .09. Factor intercorrelations vary between .00 and -.09.

It is possible to find models with slightly better goodness-of-fit values than the one presented above. The present solution, however, was chosen because of its simplicity and because it was judged to have a higher psychological credibility than the alternative solutions available. Individual results are expressed as factor scores, transformed to stanine scales.

The interview

Interviewing the conscripts in the enlistment procedure has a long tradition in Sweden, going back to the late fifties. This interview lasts for about 20 minutes; it is semi-structured and results in a rating of leadership potential and an assessment of psychological functioning. The majority of the psychologists performing the interviews have long experience of their work.

In general, interviews aimed at penetrating the personality seem to have low validity. However, semi-structured interviews of the type used in the Swedish enlistment procedure seem to have a relatively good validity (Muthén, Hsu, Carlstedt & Mårdberg, 1994).

The psychologists working in the officer selection system were recruited from the enlistment centers. The interview lasts for about 90 minutes and results in ratings, on 5-grade scales, of the variables *Social ability*, *Motivation for the profession*, *Stability*, *Intellectual ability*, *Energy*, and *Maturity*. The interview manual defines these variables in detail, providing anchors for both extremes of the continuum. A comprehensive rating of *General eligibility* is made, based on the six sub-variables. This final rating is presented to the selection board, accompanied by a short psychological characteristic of the applicant and a rank order of all the applicants.

The psychologists meet regularly to perform rating exercises in order to insure the reliability of their instrument, and to exchange experiences from their work on the different selection boards. The NDC is represented at these meetings to receive feedback on the selection system as a whole and to provide expertise in psychometrics and other theoretical issues.

The psychologists are regarded as a valuable component of the selection system, since they have the opportunity to consider all available psychological information about the applicant and present a synthesis to the selection board.

Criterion measures

In order to validate the instruments described in this paper, it is necessary to have access to reliable information about the performance of the admitted

candidates, to begin with at the military academies, and later on in their subsequent roles as commissioned officers. Unfortunately, the military academies give only two grades: Approved or Not approved. Also, the report system used for evaluating and promoting officers, although quite elaborated, tends to be inadequate for validation purposes.

In an effort to circumvent these difficulties, an instrument was developed for assessing the competence of military leaders. It was first created in order to assist in selecting officers for promotion to the colonel level, but has later been adapted to be useful at lower levels of command as well. The latest version is being tried out for use at the first stage of officer training, the military academies.

The "colonel" version consists of 38 statements concerning overt leadership behavior. In order to get a so-called 360° assessment, it is filled out by the candidate himself and by one officer at each of his superior, peer and subordinate levels.

A confirmatory factor analysis of the instrument yielded six orthogonal factors labeled *General leadership qualifications*, *Emotional control*, *Relations competence*, *Mental capacity*, and *Intellectual scope*. Factor reliability ranged from .91 to .97.

A first validation of the selection procedure will be made at the three military academies in the Fall of the year 2000.

References

- Carlstedt, L., & Widén, H. (1997). Officer selection in the Swedish Armed Forces. *Försvarshögskolan, LI Serie R:2*
- Carlstedt, L., & Widén, H. (1998). CTI. Commander Trait Inventory. English Manual. *Försvarshögskolan, LI Serie R:3*
- Bloom, B.S. (Ed.). *Value judgments and dualism in geometry and arithmetic*. Michigan: Mathesis Press, Ann Arbor.
- Gibson, R.O. (1975). *Value judgments and dualism in geometry and arithmetic*. Michigan: Mathesis Press, Ann Arbor.
- Gustafsson, J.E. (1984). A unifying model for the structure of intellectual abilities. *Intelligence*, 8, 179-203.
- Gustafsson, J.E., & Balke, G. (1993). General and specific abilities as predictors of school achievement. *Multivariate Behavioral Research*, 28 (4), 407-434.
- Harré, R. & Lamb, R. (Eds.). (1983). *The encyclopedic dictionary of psychology*. Oxford, England: Blackwell.
- Horn, J.L., & Cattell, R.B. (1966). Refinement and test of the theory of fluid and crystallized general

- intelligence. *Journal of Educational Psychology*, 57, 253-270.
- Jaques, E. (1976). *A general theory of bureaucracy*. London: Heineman.
- Jung, C. (1971). Psychological Types. In Campbell, J. (Ed.), *The portable Jung* (pp. 178-269). Tennessee: Kingsport Press, Inc.
- Kohlberg, L. (1971). In Mischel, T. (Ed.). *Cognitive development and epistemology*. London: Academic Press.
- Lohman, D.F. (1988). Spatial abilities as traits, processes, and knowledge. In R.J. Sternberg (Ed.), *Advances in the psychology of human intelligence, Vol. 4*, (pp 181-248). Hillsdale, N.J.: Lawrence Erlbaum.
- Muthén, B.O., Hsu, J.Y., Carlstedt, B. & Mårdberg, B. (1994). *Predictive validity assessment of the Swedish military enlistment testing procedure using missing data and latent variable methods*. Technical Report, UCLA.
- Messick, S. (1987). Structural relationships across cognition, personality and style. In R.E. Snow & M.J. Farr (Eds.). *Aptitude, learning and instruction. Vol.3: Cognitive and affective process analysis*. Hillsdale, N.J.: LEA.
- Stamp, G. (1988). *Longitudinal research into methods of assessing managerial potential*. U.S. Army Research Institute for the behavioral and social sciences. Technical Report 819, October 1988.