

Development of the Swiss Army Interest Inventory

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1. Situational background: The reorganisation of the recruitment process

The Swiss Army is currently undergoing a process of reorganisation. One focus of the reorganisation is the recruitment process. The personnel situation of the Swiss Army has changed dramatically over the last few years. Almost one third of the recruits does not finish basic training. With the aim to reduce this high drop-out-rate, the Swiss Army commissioned the Department of Applied Psychology at the University of Zurich to develop professional recruiting instruments, including an interest inventory based on military interests.

A basic assumption of vocational psychology is that people prefer to work in occupations that are congruent to their personal interests. Therefore, assignment to military functions according to recruits' interests should be an improvement over the former unstructured assignment method. As vocational interest inventories cover aspects of activities that are not relevant to the military environment and do not cover specific military activities, a new inventory had to be developed. The goal of the Swiss Army Interest Inventory is to match recruits' personal interests to the pool of existing military functions. Based on a recruit's responses on the interest questionnaire, a list of several congruent military functions will be drawn up. The recruitment officer will use this resulting list in combination with other information, such as the recruit's intellectual and physical achievement, occupation, and specific assignment preferences. An optimal combination of interests (represented by the list of congruent functions) and skills should lead to better assignment upon recruitment and a long-term reduction of dissatisfaction of military personnel.

2. Theoretical background: Holland's Interest Theory

The development of the Swiss Army Interest Inventory is modelled on John Holland's operational definition of interests. Holland uses six interest types to describe persons as well as work environments. This person-environment fit model, first published in 1959, consists of the following six types that describe both work-related interests and work environments: Realistic (R), Investigative (I), Artistic (A), Social (S), Enterprising (E), and Conventional (C). These RIASEC dimensions represent a person's interests as manifested in activities and competencies and cumulate in a disposition to act in certain predictable ways. The description of the six types of work environments has changed over years. Initially, work environments were defined by the number of individuals of a certain interest type found in that environment. Today, environments can now also be defined by an analysis of work activities. It is thus possible to describe types of work environments in terms of the kind of physiological and intellectual demands they make on workers. There is solid empirical support for the six interest dimensions. They have been verified by innumerable studies, and most interest inventories today use correlation with the six Holland types to validate their interest dimensions.

The basic message of Holland's theory is that people search for work environments that allow them to exercise their skills and abilities and to express their attitudes and values. The congruence hypothesis says that people show greater satisfaction, achievement, and job persistence the better the fit between themselves and their work environments.

Holland's theory is applied practically through a number of vocational counselling instruments to describe either persons or environments. On the basis of homogenous scales, these instruments determine the so-called Holland Code for either persons or work environments. The Holland Code reflects the three dimensions on which an individual or environment shows the highest raw summary scores on the scales. Utilising Holland's environmental assessment instruments for all existing occupations results in an occupational classification system that complements measurement of people's interests. Vocational counsellors advise people to make the most attractive career choice from those occupations whose three-letter codes match their own personal codes. Holland's counselling system is the most widely used organising principle for vocational interest assessment in the world today.

3. The development of the interest inventory

The development of the Swiss Army Interest Inventory is modelled on Holland's practical applications for vocational counselling. The basis of the inventory is a number of comprehensive interest dimensions that can be used to characterise personal military interests as well as military environments. This is the very first attempt ever to investigate interests as satisfied by work areas in the Swiss Army.

A recruit's primary military interests are assessed by means of a questionnaire with homogeneous scales. These preferences comprise the recruit's personal interest code. The code is then compared to codes for the various military functions, as rated by experts. The final result of the Interest Inventory is a list of several military functions that best fit a person's interest code.

3.1 The interest dimensions

Vocational interest inventories mostly measure interests by establishing people's preferences for certain activities. However, existing inventories do not cover specific military activities, and many of the activities are not relevant to the military environment. For this reason, a new inventory has to be developed. In order to find out what interest dimensions are relevant to the military environment, clarification was needed of the *activities* that characterise the 139 military functions to which recruits must be assigned.

It is assumed that the 25 military functions that differ most with regard to work activities would allow to derive the military interest dimensions. Recruitment officers, who are familiar with all 139 military functions, were asked to determine the selection of the 25 functions that show the greatest differences in work activities. Finally, in telephone interviews, professional officers in each of the 25 work areas described in detail the activities required of soldiers by typical military operations within their areas.

In a step-wise procedure, qualitative content analysis was used to generate the interest dimensions. The telephone interviews were recorded and transcribed. The result was an initial list of 635 military work activities.

In the first reduction phase, similar activities within a function and activities that are not specific to a function but rather performed by every soldier in the army were eliminated (selection). The second reduction grouped activities that have the same content over all functions. This reduction process was repeated until, at the highest level of abstraction, the result was a system of categories that represent the desired interest dimensions. As a final control, the ex-

tracted dimensions were checked to ensure that they still represent the original content. In order to do this, all initial activities had to be assigned by different raters to one of the elicited dimensions. The inter-rater reliability of this assignment shows a Kappa value of .76. That means 76% of the activities were assigned to the same interest category by different raters.

Finally, to ascertain content validity, recruitment officers were asked, as experts, to evaluate the list of interest dimensions with respect to completeness and accuracy. According to their expert evaluation, no corrections or additional categories were required.

In the following there are detailed definitions of the seven main dimensions and two additional interest dimensions.

Main interest dimensions:

- **Fight:** This dimension encompasses fighting activities such as attacking, defending, firing, destroying, offensive operations, or reconnoitring as well as activities that demand athletic endurance, such as marching or running.
- **Security:** Guarding, protecting or patrolling activities make up this dimension. These activities ensure the safety of civilians, soldiers, equipment, and institutions.
- **Handcraft:** This field of activities includes using tools for building, removing, or fixing. It also contains activities such as heaving or tugging objects and people, or in other words, activities that require muscular strength.
- **Technical:** This dimension encompasses fine-motor activities that are rather more complex than the activities in the handcraft dimension. Installing, setting up, handling or repairing technical instruments as well as measuring, analysing, and calculating data belong to this dimension.
- **Administration:** Orderly, well structured administrative activities such as tabulating and collecting stocking material numbers or data belong here. This dimension includes book-keeping activities, clerical work with forms, or materials managing.
- **Social:** Activities in this dimension serve people's well being by helping, rescuing, nursing, supporting, or serving. Also included here are activities such as cooking or cleaning.
- **Information & Organisation:** This dimension encompasses information processing activities, such as reading, learning, or interpreting, and information adapting activities such as producing, preparing, creating, designing, or summarising information. Oral or verbal communication activities also come under the transmission and presentation of information. The scope of organisation covers the three activity areas of planning, leadership, and organisation.

Two additional interest dimensions:

- **Driving:** All military driving activities belong to this dimension. Only one distinction is made: driving heavy versus lightweight vehicles.

- **Music:** Playing either a wind or percussion instrument in the military band is contained in this dimension.

3.2 The questionnaire

All interest dimensions are represented by numerous items on homogeneous scales. Each item characterises an activity that is typical for one of the nine interest fields. The questionnaire is made up of three parts, respectively three kinds of items: items taken from the civilian environment, items using military terms, and statements about occupations. The respondent has only to indicate whether he likes or dislikes the activity described in the item.

The first version of the questionnaire contains a very large number of items that reflect a first guess about the items that may eventually prove useful. For the first data collection, 300 male inductees being recruited into the Swiss Army filled out the questionnaire. The sample is representative as to literacy and rural or urban origin.

Item analysis identified items with an insufficient discriminating power ($rit < .3$), which were then deleted from the questionnaire. The final form of the inventory contains seven scales of 20 items each with alpha reliability ranging from .88 to .94 and two scales of three items (driving and music) with alpha reliability from .75 to .85.

An orthogonal factor analysis verified that the interest dimensions are almost perfect. Only three out of 146 items do not load highest on the factor they belong to. The nine interest dimensions together explain 48% of the variance. Besides the two factors *music* and *driving*, which are only represented by three items, all main factors have similar importance as assessed by the proportion of variance or covariance accounted for by the factor after rotation.

3.3 The personal interest code

The questionnaire yields a personal interest code for each recruit. The respondent marks off the activities described by the items that he likes and dislikes. The respondent's raw summary scores on the scales form his personal interest code. The highest summary score accounts for the first position in the three-position code, the second highest summary score for the second position, etc. This personal code characterises the recruit's military interests, or in other words, the kind of military activities he prefers during military training.

Let's look at the distribution frequencies in the first and second rank of the personal interest code. *Fight* and *technique*, with frequencies of 25% and 20%, are the most popular interest fields, while *social* and *administrative* activities, with 13% and 8%, are preferred the least. But more important is the fact that the popularity of all seven main interest dimensions, which are assessed by 20 items, is nearly balanced.

The two additional dimensions *driving* and *music* are treated specially. They are assessed like single items. Almost every function in the Swiss Army can also be combined with driving, so it makes sense to find out from every recruit if he or she has an interest in driving. The second special case is the field of music. Only three of the 139 military functions are characterised by musical activities, so it doesn't make sense to treat music as a main interest field. It is sufficient to find out whether a person would like to play in the military band or not.

3.4 Military function code

Whereas the personal military interest code is assessed by the questionnaire, the military function interest code for all recruitment functions is assigned by experts who rate the func-

tions. To aid coding, high-ranking officers of all the different army corps are provided with standardised instructions and definitions of the codes. The information the officers received explains the development of the inventory, the distinction between interests and demands, and the consequences of their judgements. They used a detailed description of all military interest dimensions as the basis for their ratings. The officers were asked to rate the typical activities in a military function with respect to the main interest dimensions. They had to assign at least a three-position interest code to the functions about which they have expert knowledge. If questions arose during rating, at least one of the authors of the inventory provided help and guided the decision making process. All these steps were taken to maximise the validity of the expert ratings.

It is one possible weakness of the Swiss Army Interest Inventory that the military function codes were not assessed empirically. With expert ratings there is always the danger of subjectivity. An improvement of the procedure would be to take the average of the personal military interest codes of people working in a particular military function. About 20 to 30 satisfied soldiers per military function would be needed to fill out the questionnaire to produce valid results. At this initial stage of development, such a procedure would demand too much effort. There is justification for carrying out the procedure at a future date, however.

3.5 Matching

The final step of the Swiss Army Interest Inventory is to match a person's interest code to the military function codes. The ideal match would be absolute congruence between personal interest code and military function code. Probably this aim (identical three-position codes for interest and work area) won't be achieved very often. The matches resulting from the Inventory are meant to serve as suggestions, not as determinants. Keeping in mind that a future recruit must also meet certain requirements, such as intellectual and physical achievement or occupational training, it is not reasonable to propose less than ten military functions for each inductee. Another restriction is that some military functions need more manpower than others. All of these considerations dictate that the rules for matching shouldn't be too strict.

The matching procedure also requires technical solutions. Fortunately, all the data is being recorded via computer. A mathematical algorithm must be defined that lets the list of congruent military functions start with the highest degree of congruence to interests and then successively shortens this optimal match. Thus it will be possible to compute an individual match for every single recruit.

4. Outlook

This new instrument will be utilised for the first time for the recruitment process in 2003. As the size of the database increases and experience with the inventory is gathered, several modifications and improvements will probably be made. Particularly important will be to assess the military function codes empirically.

The Swiss Army Interest Inventory will be a support to both recruitment officers and future recruits. The Inventory provides recruitment officers with additional information about the recruits that will facilitate decision-making on work area assignments. Recruits who aren't informed about the various military functions or who haven't reflected upon their personal interests gain a better chance to be assigned to a military function that really interests them.