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Measuring Individual Potential and Nature-Nurture Interactions to Support and Select Personnel for Professions with Very High Physical and Mental Load

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Abstract

The ability of a selection process to identify and evaluate relevant competencies and skills, combined with an individualized support for further development is crucial for successful role placement and long-term individual health. This is especially important in professions with very high physical and mental load, such as police and military special operation forces (SOF), firefighters or paramedics.

Keywords: Genetic Predispositions; Genetic Traits; Environmental Influences; Power Phenotypes; Post-Traumatic Stress Disorder

Abbreviations: SOF: Special Operation Forces; KPI: Key Performance Indicators; SNP: Single Nucleotide Polymorphisms; PTSD: Post-Traumatic Stress Disorder

Opinion

The design and implementation of selection processes require a careful approach aligned with specific requirements defined by Key Performance Indicators (KPI). These KPI ensure that selection tests and assessment procedures cover the requirements of the respective position or task as comprehensively as possible. However, assessment of KPI only provides a snapshot of a person, ignoring the amount of time the individuum invested to reach the performance level and the potential to develop.

A central goal of the selection process is to provide a well-founded recommendation for individual development. These recommendations are designed to help individuals address and overcome deficits while also offering opportunities to enhance existing strengths [1].

It is insufficient to measure only the current level of performance at a given time. Instead, the selection process should aim to identify and foster future development potential. This requires a holistic consideration of the interaction between genetic predispositions (genotypes), phenotype, and environmental conditions (nature-nurture interaction) [2,3].

The nature-nurture interaction, which describes the interplay between genetic traits and environmental influences, is a complex field that must be given special attention in the context of selection and developmental processes. While genetic predispositions set certain potentials, how these potentials actually unfold depends greatly on the environmental conditions under which a person lives and works [4,5]. Studies have shown that genetic influences explained 44%, 72%, and 10% of the response variance in aerobic, strength, and power phenotypes, respectively [4]. Single nucleotide polymorphisms (SNP) also account for variations in behaviour, stress management, or post-traumatic stress disorder (PTSD) [6]. This underscores the importance of considering genetic data alongside phenotypic traits and environmental factors to obtain a comprehensive assessment of developmental potential [7,8].

A well-designed and implemented selection process can significantly contribute to optimal individual development. It also plays a crucial role in health maintenance [9], e.g., by providing protection against overstrain during intensive training phases and offering valuable insights for future physical training measures and resilience training techniques. These aspects are particularly important in professions with extremely high physical demands, such as police and military SOF, firefighters, or paramedics. Employers in these fields have a special responsibility for the healthcare of their employees. A sound selection process that considers both physical and psychological aspects can help reduce the risk of injuries and overstrain, thereby protecting the long-term health of employees. By identifying overstrain risks early and adapting training plans, long-term health problems could eventually be avoided. This includes both physical and psychological/personality aspects, as both are of great importance in the context of intensive training and performance.

Moreover, these processes can provide valuable information for designing future training and development programs. By continuously collecting and analyzing data from selection and training processes, organizations can develop robust and effective long-term development strategies based on the specific needs and potentials of individuals, thus foster talents [10] and reducing drop-outs.

Overall, this analysis illustrates that selection processes are far more than mere evaluation of some performance. They are essential for the long-term development, health, and performance of individuals and organizations and should therefore be designed and implemented with the utmost care and consideration of scientific insights. Such an approach contributes to a comprehensive understanding of a person's abilities and potential, extending beyond a mere snapshot of current performance.

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