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PERSONNEL SELECTION IN TACTICAL INTERVENTION UNITS

Peter G Tedeholm

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Peter G Tedeholm

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Principal Supervisor:
Agneta Larsson, M.D, Ph.D.
Karolinska Institutet
Department of Physiology and Pharmacology

Co-supervisor(s):
Associate Professor Anders Sjöberg, Ph.D.
Stockholm University
Department of Psychology

Irene Lund, Ph.D.
Karolinska Institutet
Department of Physiology and Pharmacology

Professor Elkhonon Goldberg, Ph.D.
New York University
School of Medicine
Department of Neurology

Opponent:
Associate Professor Artur Nilsson, Ph.D.
Linköping University
Department of Psychology

Examination Board:
Professor Ole Boe, Ph.D.
Department of Continuing Professional
Development Programs and Courses
Norwegian Police University College
Oslo, Norway

Professor Erik A.M. Borglund, Ph.D.
Mid Sweden University Department of
Communication, Quality Management, and
Information Systems (KKI)

Associate Professor Lotta Victor Tillberg, Ph.D.
Södertörn University
School of Police Studies

This thesis honors the police officers, especially counterterrorism tactical intervention officers in Western countries, who have bravely defended our society's democratic values at the cost of their lives and enduring injuries.

"It is not the size of the dog in the fight, but the size of the fight in the dog."

Popular science summary

Global terrorism is complex and unpredictable; the role and competence of tactical intervention units is therefore important. The national Swedish Counterterrorism Tactical Intervention Unit (CTIU), Special Weapons and Tactics (SWAT) teams, and the patrolling police, among others, strive to adapt and maintain security for society. This doctoral thesis examines tactical intervention units, focusing on the work-related characteristics of CTIU officers, applicants, and SWAT officers. It includes four studies exploring personality traits and physical and cognitive abilities.

Study 1 investigated the cognitive abilities of applicants to the Swedish CTIU. The study found that CTIU applicants had better results than the general population and regular police officer trainees in cognitive performance tests. When physical and psychological stress were introduced into the testing environment, the CTIU applicants showed a decline in their test results compared to baseline. The results indicate that individuals with the highest initial cognitive capacity declined the most during pressure but still had better results than individuals with lower initial cognitive capacity overall.

Study 2 delved into the personality traits of officers within the Swedish CTIU, using personality inventory. Compared to the inventory's norm of the general Swedish population, CTIU officers demonstrated distinct personality profiles, being more emotionally stable and goal-oriented. The identified CTIU officers' traits indicate a propensity for action and positive engagement, alongside a disciplined and reliable approach to responsibilities, which may be successful in the roles within counterterrorism interventions.

Study 3 examined the Swedish CTIU selection process, focusing on identifying the physical (strength, coordination, running capacity) and psychological (cognitive abilities, personality traits) predictors that influenced whether individuals were admitted. The Counterterrorism Intervention Assessment and Selection (CTIAS) process comprises a 4-day prescreening phase (Phase 1) and a 10-day work sample test (Phase 2). The most prominent variables associated with admission to CTIAS Phase 1 were physical strength, coordination, and running capacity. However, running capacity was the main predictor for the approval of CTIAS Phase 1. This underscores the role of aerobic endurance, which may be associated with the demands of the CTIU selection criteria and work environment.

Study 4 focused on the optimal personality profile for SWAT team members using a personality inventory answered by subject matter experts (SMEs, Swedish SWAT police officers). The findings indicate that an optimal SWAT officer is primarily characterized by high conscientiousness, low neuroticism, low vulnerability, and high levels of

competence, dutifulness, and self-discipline. Moreover, the SWAT personality profile demonstrated strong negative correlations with personality disorders, particularly borderline, schizotypal, dependent, and avoidant personality disorders. This research may contribute to a reliable and valid SWAT profile for future personnel selection programs. Subsequent interventions are needed to establish the criteria-related validity of the proposed personality profile.

This doctoral thesis emphasizes the importance of well-developed cognitive functioning, specific personality traits – notably low neuroticism and high conscientiousness, and a robust physical capacity, particularly aerobic endurance, in tactical intervention units. The most important conclusion is the necessity for ongoing job analysis to ensure that the selection criteria align with job demands. By continuously adapting the selection process, the tactical intervention units improve accuracy in the selection process.

Abstract

Amid the increasing complexities and unpredictability of terrorism, the competence of tactical Intervention units is important. This doctoral thesis examines tactical intervention units, emphasizing the work-related characteristics of applicants and officers. The thesis aims to evaluate whether measurements of cognitive and physical abilities and personality traits can predict which individuals are suitable for tactical intervention units with a particular focus on Swedish CTIU.

This thesis comprises four studies:

Study 1 probed the role of cognitive abilities, specifically Executive Functions (EF), in the CTIU selection process. The investigation was conducted using the Delis–Kaplan Executive Function System (D-KEFS) Design Fluency (DF, Delis et al., 2001) paper-and-pencil performance test, comparing two groups: Swedish CTIU applicants (n = 45, including one woman, age range 27–41 years; M = 31.7 years, SD = 3.33) and police officer trainees (n = 30, including six women, age range 22–39 years; M = 27.7 years, SD = 4.70). Both groups had higher scores than the general population norms for EF, with the CTIU applicants notably performing better than the police officer trainees in DF [F (1, 71) = 18.98, p < 0.001]. Under the 10-day Counter Terrorism Intervention Assessment and Selection course (CTIAS), CTIU applicants displayed a reduction in DF performance. Despite this decline, a substantial correlation remained between the baseline and retest DF scores [r (40) = .49, p = .001]. Those applicants with the highest baseline scores experienced the greatest percentage decrease during retesting [r (40) = -.46, p = .003]; however, the highest baseline performers still had the highest scores in the retest. The study underscored the impact of stress on cognitive functioning.

Study 2 utilized a paper-and-pencil personality inventory, the NEO-PI-3, to investigate the Five-Factor Model (FFM) personality profiles of CTIU officers by comparing them with the Swedish population norm. The CTIU group consisted of 57 male participants, with ages between 28 and 51 years (M = 39.6 years, SD = 5.2) and an average tenure of 7.6 years (SD = 6.0). At the factor level, CTIU officers exhibited lower levels of neuroticism (Cohen's d = .7), extraversion (Cohen's d = .7), and conscientiousness (Cohen's d = .4). At the facet level, CTIU officers displayed less vulnerability (Cohen's d = .8), angry hostility (Cohen's d = .7), and anxiety (Cohen's d = .6) while displaying higher excitement-seeking (Cohen's d = .9), positive emotions (Cohen's d = .6), and activity (Cohen's d = .6). These results show personality distinctions between Swedish CTIU officers and the general population.

Study 3 investigated both physical and psychological predictors that influenced work sample test performance (WST) during the CTIAS process, involving a cohort of 160 applicants. The approved applicants in CTIAS Phase 1 (n = 28) had an age range of 25–42

years (M = 30.64 years, SD = 3.78), while the rejected applicants in CTIAS Phase 1 (n = 132) ranged in age from 25–47 years (M = 30.68 years, SD = 4.11). The CTIAS selection process consists of a 4-day prescreening (Phase 1) that includes an eight-hour WST, followed by a 10-day WST (Phase 2). Biserial correlations were applied to establish the relationships between the selected predictors: age, general mental ability, EF, personality traits, physical strength, coordination, running capacity, and the dependent variable. The dependent variable in the study was the approval of applicants at the end of CTIAS Phase 1. Biserial correlations were observed between approval and strength (r = .217), coordination (r = .223), and running capacity (r = .412). A logistic regression revealed running capacity as the sole significant predictor for approval at the end of CTIAS Phase 1 (B = .336, SE = .085, Wald = 15.783, p < .001). Aerobic capacity emerged as the key success factor in CTIAS Phase 1, but it may not represent the principal criterion for actual job performance in tactical intervention units. Conducting a job analysis to confirm or develop the selection criteria is essential.

Study 4 delved into the domain of personality traits in SWAT units. The objective was to discern the optimal 30 facets of the NEO FFM personality profile for a SWAT officer through the assessment of subject matter experts (N=159, age range 28–55 years, mean = 39.91, SD = 5.29, tenure range 4–23 years, mean = 7.80, SD = 7.16), and compare it with Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR) ten maladaptive personality disorders. The findings demonstrated that the opinion of the experts of an optimal SWAT officer's profile is marked by a high level of conscientiousness and a low level of neuroticism. Facets such as vulnerability (which indicated low levels) and competence, dutifulness, and self-discipline (each indicating high levels) were particularly critical in distinguishing a successful SWAT officer. Notably, the experts SWAT profile displayed consistent negative correlations with personality disorders, specifically showing substantial dissimilarity with borderline, schizotypal, dependent, and avoidant personality disorders. These findings can contribute to developing reliable and valid selection processes for prospective SWAT officers.

List of scientific papers

I. Vestberg*, T., Tedeholm*, P. G., Ingvar, M., Larsson, A. C., and Petrovic, P. (2021). Executive Functions of Swedish Counterterror Intervention Unit Applicants and Police Officer Trainees Evaluated With Design Fluency Test. Frontiers in Psychology, 12, 580463–580463. https://doi.org/10.3389/fpsyg.2021.580463

II. Tedeholm, P. G., Sjöberg, A., and Larsson, A. C. (2021). Personality traits among Swedish counterterrorism intervention unit police officers: A comparison with the general population. Personality and Individual Differences, 168, 110411–. https://doi.org/10.1016/j.paid.2020.110411; Tedeholm, P. G., Sjöberg, A., and Larsson, A. C. (2021). Corrigendum to "Personality traits among Swedish counterterrorism intervention unit police officers: A comparison with the general population." [Pers. Individ. Differ. volume 168, 1 Januar (2021)/110411]. Personality and Individual Differences, 170, 110433–. https://doi.org/10.1016/j.paid.2020.110433

III. Tedeholm, P. G., Larsson, A. C., and Sjöberg, A. (2023). Predictors in the Swedish Counterterrorism Intervention Unit selection Process. Scandinavian Journal of Work and Organizational Psychology, 8(1), 3–3. https://doi.org/10.16993/sjwop.194

IV. Sjöberg, A., Larsson, A. C., and Tedeholm, P. G. Using the Five Factor Model of Personality to Identify an Ideal SWAT Team Member, (submitted and under review 22 June 2023).

*These authors have contributed equally to this work and share first authorship

Contents

List of abbreviations

A	Agreeableness
B	Unstandardized Regression Coefficient
APA	American Psychological Association
BasIQ	Swedish aptitude test
C	Conscientiousness
CTIAS	CounterTerrorism Intervention Assessments and Selection
CTIU	CounterTerrorism Intervention Unit
CTIUs	CounterTerrorism Intervention Units
CWB	Counterproductive Work Behavior
DF	Design Fluency
E	Extraversion
EF	Executive Functions
ES	Emotional stability
FFM	Five–Factor Model
GMA	General Mental Ability
M	Mean
N	Neuroticism
NATO	North Atlantic Treaty Organization
NEO–PI–3	Neuroticism, Extraversion, Openness Personality Inventory 3
O	Openness to experience
OCB	Organizational Citizenship Behavior
r	Correlation coefficient
R	Multiple correlations
R^2	Explained variance
SMEs	Subject Matter Experts
SOF	Special Operation Forces
SWAT	Special Weapons and Tactics
WRCs	Work-Related Characteristics
α (alfa)	Cronbach's alfa
ρ (rho)	The population correlation coefficient in statistics.
ω (omega)/ωH/ωR/ωS	Omega/omega hierarchical/omega restricted/omega subscale

1 Introduction

Personnel selection is important because it affects job performance, and organizational success. Selection inaccuracies lead to increased employee turnover, health issues, decreased productivity, unstable municipalities, and higher societal costs (Sackett et al., 2022; Schmidt & Hunter, 1998). This is relevant in professions such as law enforcement, where incorrect selection can pose substantial risks for the individuals involved and the communities they serve (Aamodt, 2004).

The personnel selection process (Guion & Gibson, 1988; Guion & Gottier, 1965; Ryan & Ployhart, 2014) has been investigated in different professions (Sackett et al., 2022; Schmidt & Hunter, 1998), including the military (Campbell, 1990; Hydren et al., 2017), firefighters (Henderson, 2010; Henderson et al., 2007), and law enforcement (Aamodt, 2004; Annell et al., 2015a; Annell et al., 2014; Lough & Von Treuer, 2013). However, studies explicitly pertaining to personnel selection for police tactical intervention units are sparse. This thesis reviews the key components of personnel selection. Initially, the thesis explores structural considerations of selection programs (Ock & Oswald, 2018), decision-making errors (Highhouse & Brooks, 2023), the validity of selection procedures (Binning & Barrett, 1989), and work performance frameworks (Borman & Motowidlo, 1997). The review also focuses on individual differences (Sackett et al., 2017a), including cognitive and physical abilities and personality traits. It concludes with a review of tactical intervention officers' work-related characteristics (WRCs). It is worth noting that this thesis does not review other important predictors in personnel selection programs, such as interests, motivation (Sackett & Lievens, 2008), biodata (Speer et al., 2022), self-efficacy (Stajkovic & Luthans, 1998) or diversity (Cascio et al., 1995; Van Iddekinge et al., 2023).

Addressing the challenges of personnel selection, the Swedish Police Authority currently utilizes a multiple-hurdle selection model (Annell, 2015b). The multiple hurdle approach neither allows applicants to compensate for potential weaknesses with their strengths nor adequately acknowledges essential attributes such as advanced cognitive and physical abilities or personality traits. The Swedish Police Authority lacks an evidence-based job analysis with identified cutoff levels. This is important because specialized units, such as the tactical intervention units in Sweden and probably in other Western democratic countries, select from a wider pool of existing police officers. Therefore, the initial selection process for basic police education impacts the potential applicant base for specialized units.

There is a scarcity of studies focusing on tactical intervention units. Numerous studies have been conducted on policing, such as the research summary by Aamodt (2004), summarizing police research regarding personnel selection, and the doctoral thesis by Annell (2015b), investigating sustainable police recruitment practices in Sweden.

Aamodt's (2004) research points out that cognitive ability and physical tests are the selection methods that best predict performance among police officers in Western democratic countries. Conscientiousness and emotional stability are key personality traits predicting police performance, alongside physical and cognitive abilities. Annell (2015b) identified cognitive abilities and aerobic capacity as important predictors of future performance in police education and work.

Tactical intervention units such as Special Operation Forces (SOF), Counterterrorism Intervention Units (CTIUs), SWAT units, and police patrol officers represent diverse facets of counterterrorism intervention organizations in Western democratic countries. The SOFs, primarily engaged in military special operations, contribute to counterterrorism abroad. Special Weapons and Tactics teams are police units with a more regional jurisdiction engaged in high-risk incidents. Counterterrorism intervention units are law enforcement units functioning nationally. Specifically, this thesis targets Sweden's Counterterrorism Intervention Unit (Nationella Insatsstyrkan – NI) (Rantatalo, 2013) and regional SWAT teams. In Europe, the ATLAS[1] network forms European cooperation against terrorism consisting of CTIUs known as special intervention units from the European Member States and associated countries.

The objective of this thesis is to contribute to the development and evaluation of assessments for the Swedish CTIU. Hence, the thesis aims to evaluate whether measurements of cognitive and physical abilities and personality traits can predict which individuals are suitable for tactical intervention units with a focus on Swedish CTIU. The gap in personnel selection in tactical intervention units presents an untapped research field. To address this gap, we formed four research questions:

- Is there an association between psychological factors (executive functions [EFs]) and Swedish CTIU basic course admission? (Study 1)
- Are there any differences in personality traits between Swedish CTIU police officers and the Swedish population? (Study 2)
- What factors increase the likelihood of sustaining qualification in the different stages of the Swedish CTIU selection process? (Study 3)
- What is the optimal personality profile for a SWAT team police officer? (Study 4)

By attempting to answer these research issues and integrating the results of Studies 1–4 with a literature review, this thesis may contribute to improvements in personnel selection methods applied in the selection process for tactical intervention units.

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[1] https://www.europol.europa.eu/partners-collaboration/atlas-network

2 Literature review

2.1 Selection Programs

Selection programs can be built around a variety of theoretical frameworks, the most prominent of which are the multiple-hurdles model (Sackett & Roth, 1996), commonly with cutoff[2] scores, and the compensatory model (Industrial and Organizational Psychology, 2018), commonly with a top-down[3] approach. Both models provide a strategy for assessing applicants, influencing predictive validity[4] (Ock & Oswald, 2018), selection efficiency, diversity, and, ultimately, the quality of recruits (Van Iddekinge et al., 2023). While efficient in preserving resources by the early dismissal of unfit applicants, the multiple-hurdle model may run the risk of excluding those who, despite not excelling in every area, might be capable of outstanding performance due to compensatory strengths in other areas. Furthermore, the predefined cut-off criteria of this model may not be adequately validated, potentially causing inaccurate exclusions or inclusions. Conversely, the compensatory model aggregates various scores to provide a balanced view of an applicant's strengths and weaknesses, potentially overlooking key weaknesses that may affect performance (Ock & Oswald, 2018). The principle of efficiency underlines that effective selection programs can lead to higher employee productivity (Schmidt & Hunter, 1998). An efficient selection method can provide an important aspect of the hiring process (Brogden, 1946, 1949; Cronbach & Meehl, 1955; Taylor & Russell, 1939; Tippett, 1925). A selection process may show low utility because of low reliability and validity affected by noise and bias (Freyd, 1925; Highhouse & Brooks, 2023; Kahneman et al., 2021). An effective selection procedure identifies the strongest applicants owing to predictive validity, whereas a process with poor validity struggles to discern performance levels (Van Iddekinge et al., 2023). In the context of selection tests, the savings realized depend on the test's validity, selection ratio, and testing cost, revealing that low-validity tests can be as effective as high-validity ones in scenarios with a low selection ratio (Brogden, 1949). Furthermore, as the validity of the selection process increases, there is probably an improvement in outcomes (Brown & Ghiselli, 1953). The utility and validity of selection methods are linearly related (Schmidt & Hunter, 1998). Schmidt et al. (1984) demonstrated 13 %, 5.9 %, and 2.1 % productivity increases for top-down selection, setting a minimum score at the mean or one standard deviation below the mean. While both selection models contribute to the efficiency of the selection process, their accuracy is a consideration.

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[2] Predetermined thresholds in assessments used to determine pass or fail status.
[3] An approach in selection processes where applicants are ranked based on their total scores and selected based on this ranking.
[4] The extent to which a measure or test can predict future outcomes.

2.2 Enhancing Accuracy and Reducing Bias in Personnel Selection

Clinical judgment refers to decision-making based on individualized assessment and expertise, often incorporating professional intuition and subjectivity. Conversely, mechanical judgment (statistical prediction) utilizes standardized formulas, algorithms, or scoring systems, often based on empirical data, ensuring consistency, and reducing potential bias (Meehl, 1954). Clinical judgment has shown low validity (Grove et al., 2000) in personnel selection (Morris et al., 2015) compared to mechanical judgment (Kuncel et al., 2013). Highhouse and Brooks (2023) review how the prevailing dichotomy between mechanical and clinical data combination methods continues to shape decision-making in employee selection. However, they note that a consistent loss in validity is observed when data are combined clinically, even by experts. Switching to mechanical decision-making could improve prediction by emphasizing structure and consistency to reduce bias and noise while acknowledging the inherent probability of errors in personnel selection. Reducing bias and noise in the selection process is an essential first step in enhancing validity in personnel selection (Highhouse & Brooks, 2023).

2.3 Validity Inferences in Personnel Selection

Construct validity (Clark & Watson, 2019) refers to the degree to which a test or other measure assesses the underlying theoretical construct it is supposed to measure (Industrial and Organizational Psychology, 2018). In 2012, the North Atlantic Treaty Organization (NATO) Research Technical Group endorsed a multifaceted assessment approach to refine personnel selection processes for tactical intervention units such as SOF. The RTGs framework underpins the concept that the validation of personnel selection decisions forms part of a broader construct-validation process, ensuring that each step of the process, from job analysis to performance evaluation, adheres to these inferences (Research and Technology Organization, 2012).

Predictive validity is a form of criterion-related validity that gauges the test's efficacy in estimating an individual's future performance based on their current test scores (Industrial and Organizational Psychology, 2018). Incremental validity is the added value of a new predictor to an existing model. For instance, general intelligence (Spearman, 1904) and physical abilities (Hogan, 1991) will likely provide incremental validity in physically and cognitively demanding jobs owing to minimal empirical overlap. Conversely, the Five-Factor Model (FFM) trait conscientiousness and the construct grit (Duckworth et al., 2007) have empirical ($r= .84$) overlap (Credé et al., 2017), which may result in grit offering limited incremental validity beyond conscientiousness in a selection process. Understanding these different forms of validity can be facilitated through a structured approach (Binning & Barrett, 1989).

Binning and Barrett (1989) conceptual framework for validity in personnel selection processes presents the key inferences that guide the validation process. They describe five different inferences, as illustrated in Figure 1. Inference 1 draws a connection between predictor and criterion. Inference 2 asserts that the predictor is an adequate sample of the constructs. It implies that the selection tools and predictors should be representative of the broader constructs they are meant to assess. Inference 3 underlines the overlap between the construct and work–performance domain. Inference 4 highlights that the criterion measure should adequately sample the performance domains. Inference 5, or operational validity, showcases the relationship between the predictor measure and the performance domain (Binning & Barrett, 1989). Operational validity is critical in personnel selection research as it reveals the degree of correlation between a predictor and actual workplace performance (Sackett & Yang, 2000).
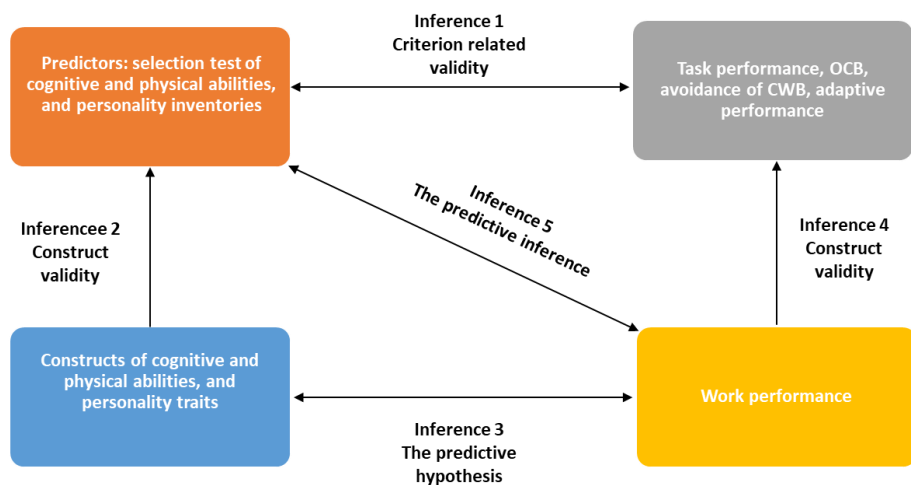

Figure 1. Validity inferences in personnel selection (Binning & Barrett, 1989).
Notes. OCB = Organizational Citizenship Behavior, CWB = Counterproductive Work Behavior.

2.4 Work Performance

Overall work performance is the aggregate measure of an employee's effectiveness in their role, including completing specific tasks, contributions to the organizational environment, willingness to exceed job expectations, adaptive behaviors in response to change, and avoidance of counterproductive behaviors (Choi et al., 2019). Task performance specifically refers to the effectiveness with which job incumbents perform activities that contribute to the organization's technical core, i.e., activities formally recognized as part of the job. It is the main part of a person's job or role – the core technical tasks that need to be performed (Borman & Motowidlo, 1997). Organizational Citizenship Behavior (OCB) refers to voluntary individual actions, which, although not directly or openly acknowledged by the structured incentive system, cumulatively contribute to improving the organization's productivity and effic'acy (Organ, 2014).

Counter Productive Work Behavior (CWB) concerns any intentional behavior on the part of an organization member viewed by the organization as contrary to its legitimate interests (Sackett & DeVore, 2001, pp. 145-164). Work performance in the context of police work includes task performance such as crime investigation and arresting criminals (Aamodt, 2004), OCB such as helping colleagues and voluntary participation in community outreach (Organ et al., 2011), minimization of CWB like misuse of resources or conflicts with colleagues (Marcus et al., 2016; Ones & Dilchert, 2013), and adaptive performance such as effective crisis response and adaptation to new laws or community needs (Baard et al., 2014). An alternative approach for work performance is the Campbell and Wiernik (2015) model that delineates work performance including technical performance; communication; initiative, persistence, and effort; CWB; supervisory, managerial, and executive (i.e., hierarchical) leadership; hierarchical management performance; peer or/team member leadership performance; and peer/team member management performance (Campbell & Wiernik, 2015). A third interesting model includes proficiency, adaptivity, and proactivity (Carpini et al., 2017). The first model encompassing overall work performance, including task performance, OCB, CWB, and adaptive performance, offers a holistic approach in combination with the presented model in Carpini et al. (2017). These two approaches highlight effective crime-solving and law enforcement and emphasize interpersonal skills, adaptability to change, and reducing harmful behaviors. Thus, it provides a more comprehensive measure of effectiveness in the multifaceted and dynamic law enforcement environment. While overall work performance is a multifaceted construct (Koopmans et al., 2011), individual differences among personnel play a crucial role in shaping this performance (Sackett et al., 2017a).

2.5 Individual Differences in Personnel Selection

According to Sackett et al. (2017a), individual differences in personnel selection pertain to the variations among applicants in characteristics—like abilities and personality traits—that influence their potential for job performance. Such differences account for a significant proportion of work performance and are thus valid predictors (Sackett et al., 2022; Schmidt & Hunter, 1998). These differences are shaped by factors including both nature and nurture (Plomin & Deary, 2015) Individual differences in personnel selection encompass overall abilities (Fleishman et al., 1984), more specific cognitive abilities (Spearman, 1927), physical abilities (Fleishman, 1964; Hogan, 1991; Myers et al., 1993), personality characteristics (Allport, 1937), psychomotor abilities ("O*NET Career Exploration Tools," n.d.), interests, and self-evaluations (Sackett & Lievens, 2008) that are generally normal distributed (Herrnstein & Murray, 1994) along a continuum in the population (Kraemer et al., 2004). The impact of individual differences on work performance varies depending on job demands. For instance, cognitive abilities are more potent predictors of performance on complex jobs (Schmidt, 2002; Schmidt &

Hunter, 1998), while cognitive abilities, together with personality traits (Gonzalez-Mulé et al., 2014), likely exert a more substantial influence on performance in teamwork and high-stress situations. Furthermore, physical abilities are important for jobs with demanding physical requirements (Tipton et al., 2013).

2.6 Cognitive Abilities for the Workplace

General mental ability (GMA), or what some call 'g,' is the shared variance across a range of intercorrelating cognitive tasks and is recognized as a determinant of intelligence (Warne & Burningham, 2019). Various studies (Brody, 1999; Gottfredson, 1997; Rushton, 1998; Sternberg, 2000) have emphasized its role in affecting a person's capacity to learn, react swiftly, solve complex problems, reason logically, and think abstractly. Additionally, it plays a significant part in influencing work performance and the acquisition of work-related knowledge (Der & Deary, 2017). General mental ability can be said to be heritable and normally distributed (Herrnstein & Murray, 1994) along a continuum in the population (Colom et al., 2010; Plomin & Deary, 2015; Polderman et al., 2015; Ritchie & Tucker-Drob, 2018; Wraw et al., 2015). It is also seen as a predictor of many life trajectories, including school performance and health, educational attainment, rate of job promotion, ultimate job level, and income (Judge et al., 2010; Strenze, 2007; Wraw et al., 2018). Despite the variability in methodologies, sample restrictions, and performance measurements coming up consistently in different studies, the correlation between GMA and work performance has been consistently demonstrated in research (Sackett et al., 2022). Studies presented in Table 1 give us correlations between GMA and overall work performance, with correlations ranging from $r = .22 - .51$ (Gonzalez-Mulé et al., 2014; Sackett et al., 2017b; Schmidt & Hunter., 1998) and correlations between cognitive abilities and training performance ranging from $r = .74$ (Schmidt et al., 2008), $r = .73$ (Sager et al., 1997), $r = .52$ (Hülsheger et al., 2007), and $r = .64$ (Hirsh et al., 1986). The correlations between GMA and CWB have been estimated to be $r = -.02$; GMA and OCB $r = .23$, GMA and task performance $r = .69$, and GMA and overall work performance $r = .42$ (Gonzalez-Mulé et al., 2014). Individuals with higher cognitive ability exhibit higher work performance success and learning rates as the cognitive complexity of the work increases. Job complexity has been shown to moderate GMA's predictive validity concerning work performance, ranging from $r = .23$ for low-complex jobs to $r = .56$ for high-complex jobs (Hunter & Hunter, 1984). Furthermore, when assessing performance using supervisors' ratings, the correlation with GMA measurements stood at $r = .66$ for medium-complexity jobs. For more complex jobs, the correlations were even higher (Ones et al., 2017a; Ones et al., 2017b). Similarly, a meta-analysis by Scharfen and Memmert (2019) found that, experts and elite athletes exhibited higher cognitive functions than their non-expert and non-elite peers, showing an effect size of $r = .22$. This underlines the importance of cognitive abilities in high-performance roles and the

potential benefits of integrating cognitive tests into talent scouting and development processes (Schmidt & Hunter, 1998).

Cognitive abilities are essential predictors for selection due to their predictive power for future adaptability (r = .25) to new jobs and dynamic tasks (r = .31) (Stasielowicz, 2020). Adaptive performance involves solving problems and addressing uncertainty or unpredictability (Baard et al., 2014). Adaptive work situations include learning new tasks, technologies, and procedures and demonstrating cultural, interpersonal, and physical adaptability (Pulakos et al., 2002; Pulakos et al., 2012). The importance of GMA versus narrower cognitive abilities in relation to work performance has been a point of debate. It contains contradictory results regarding GMA's incremental validity and relative relevance as a general factor and narrow cognitive ability in predicting work performance (Kell & Lang, 2018; Lang et al., 2010; Nye et al., 2022). Nye et al. 's (2022) meta-analysis indicated that narrow cognitive abilities, especially those least correlated with GMA, show incremental validity over GMA for predicting task performance, training performance, and OCB. However, research conducted by McHenry et al. (1990) on professions closely related to tactical intervention units, such as the military, demonstrates a correlation (r = .65) between general soldiering proficiency and GMA, as well as a correlation (r = .63) with specific cognitive abilities like spatial ability (McHenry et al., 1990). These findings parallel those within firefighting professions, where a strong correlation (r = .72) between cognitive abilities and work performance has been established (Henderson, 2010). Studies of tactical intervention units with uncorrected correlations showed positive effects of cognitive abilities on selection (Picano, 2016). Furthermore, cognitive ability was predictive (r = .23) of being selected in CTIU selection (Soccorso et al., 2019). A study (Beal, 2010) investigating the SOF selection process found that cognitive abilities were related (r = .43) to selection in the program. This empirical evidence of the link between cognitive abilities and selection in programs, such as SOF, underpins the importance of cognitive dimensions, and their impact on performance (Beal,2010).

General mental ability is a measure of cognitive ability, while EFs represent cognitive skills primarily associated with planning, problem-solving, and goal-directed behavior (Friedman & Miyake, 2017). Gustavson et al. (2022) suggested that while individuals with high GMA likely possess strong EFs, these two are not synonymous. Despite sharing genetic and environmental influences, their results indicate that EFs and GMA have distinct genetic and environmental structures. Researchers disagree on whether EF could explain capacities other than GMA (Engelhardt et al., 2016; Friedman & Miyake, 2017; Rey-Mermet et al., 2019; Stojanoski et al., 2018). For example, Friedman et al. (2006) found that the correlation between GMA and EF ranged from approximately .3 to .5, showing an association between GMA and EF. However, the results also support discriminant validity between GMA and EF.

Table 1

Variables	*Outcome*	Correlations (r)	References
GMA	Work Performance	.22 - .51	(Gonzalez-Mulé et al., 2014; Sackett et al., 2017b; Schmidt & Hunter, 1998)
GMA	Training Performance	.52 - .74	(Hirsh et al., 1986; Hülsheger et al., 2007; Sager et al., 1997; Schmidt et al., 2008)
GMA	CWB	-.02	(Gonzalez-Mulé et al., 2014)
GMA	OCB	.23	(Gonzalez-Mulé et al., 2014)
GMA	Task Performance	.69	(Gonzalez-Mulé et al., 2014)
GMA	Work Performance (low-complex jobs)	.23	(Hunter & Hunter, 1984)
GMA	Work Performance (high-complex jobs)	.56	(Hunter & Hunter, 1984)
GMA	Work Performance (medium-complex jobs)	.66	(Ones et al., 2017a; Ones et al., 2017b)
GMA	Expert Performance in Athletes	.22	(Scharfen & Memmert, 2019)
GMA	Future adaptability	.25	(Stasielowicz, 2020)
GMA	Dynamic task Performance	.31	(Stasielowicz, 2020)
Cognitive abilities	Fire fighting	.72	(Henderson, 2010)
Cognitive Abilities	General Soldiering Proficiency	.65	(McHenry et al., 1990)
Spatial ability	General soldiering proficiency	.63	(McHenry et al., 1990)
Cognitive Abilities	Selection in CTIU	.23	(Soccorso et al., 2019)
Cognitive Abilities	Selection in SOF	.43	(Beal, 2010)
GMA	Executive Functions	.30 - .50	(Friedman et al., 2006)

Notes. Correlation coefficients should be interpreted as r < .30, indicating a weak correlation; .30 ≤ r < .50, indicating a moderate correlation; and r ≥ .50, indicating a strong correlation (Gignac & Szodorai, 2016). GMA refers to General Mental Ability. OCB = Organizational Citizenship Behavior. CWB = Counterproductive Work Behavior. SOF = Special Operations Forces. CTIU = Counterterrorism intervention units. It is important to remember that these categories of "weak," "moderate," and "strong" are just general guidelines, and the practical or theoretical correlation can vary depending on the context and specific research question.

2.7 Physical Abilities

Diverse taxonomies constructed have been proposed to categorize physical abilities. Fleishman (Fleishman, 1964) proposed strength, flexibility, coordination, equilibrium, and stamina, while Hogan's (Hogan, 1991) model categorized physical abilities into strength, endurance, and movement quality. Tonkonogi sports model (Tonkonogi, 2018) puts forth strength, endurance, speed, coordination, and flexibility as physical abilities. The O*NET model ("O*NET Career Exploration Tools," n.d.), built with Fleishman as an expert,

emphasized endurance, flexibility, balance, coordination, and strength. Myers (Myers et al., 1993) model incorporated static, dynamic, and explosive strength, trunk strength, stamina, cardiovascular endurance, and flexibility as physical abilities. Finally, the NATO (Science and Technology Organization North Atlantic Treaty Organization, 2019) model outlined aerobic endurance, muscular strength, and mobility.

The importance of physical abilities in predicting job performance is well-illustrated in various studies (Campion, 1983). Research exploring physical abilities in professional contexts shows a correlation between .37 and .63 with job performance metrics like supervisor reviews and work simulations (Gebhardt & Baker, 2017). For firefighting roles, physical abilities show a strong correlation ($r = .86$) with work performance (Henderson, 2010). Roles in tactical intervention units, law enforcement, SWAT, and SOF also show significant associations with physical abilities (Beal, 2010; Eisinger, 2006; Eisinger et al., 2009; Farina et al., 2019; Lockie et al., 2020; Marins et al., 2019; Maupin et al., 2018; Orr et al., 2018; Orr et al., 2022; Orr et al., 2020; Strader et al., 2020). These abilities can also hint at possible injury risks (Bahr & Holme, 2003) and potential training failure (Orr et al., 2022). Fitness evaluations, especially those focusing on strength, power, and endurance, are effective predictors of injury risk during training (Tomes et al., 2020). Assessing physical abilities is essential for predicting job performance and maintaining employee health (Gebhardt & Baker, 2023). Thus, it becomes important to evaluate physical abilities for better job performance and health outcomes (Science and Technology Organization North Atlantic Treaty Organization, 2019).

2.8 Personality at Work

Personality traits are persistent patterns of emotions, feelings, thoughts, and behaviors (McCrae & Costa, 1997) and are predictive of life outcomes, such as mental health (Hakulinen et al., 2015; Ka et al., 2021; Kotov et al., 2010), well-being (Steel et al., 2008) and career success (Barrick et al., 2001; Gonzalez-Mulé et al., 2014). Personality traits are influenced by genetic and environmental factors, contributing to their stability and variability across disparate individuals and longitudinally time (Bleidorn et al., 2022; Briley & Tucker-Drob, 2014; Hopwood & Bleidorn, 2018). The combined influences of genetic makeup and environmental circumstances on personality traits pave the way for exploring stability and variability across individuals (Roberts et al., 2007).

There are several taxonomies of personality, i.e., the Pan-hierarchical five-factor model (Stanek & Ones, n.d.), which includes a general personality factor, two higher-order traits, five factors, ten aspects (DeYoung et al., 2007), and 30 facets, or the HEXACO model (Ashton & Lee, 2007). This thesis will focus on the most widely acknowledged taxonomy – the FFM (McCrae et al., 2005). Other models, like the Big Five (Goldberg, 1990), overlap considerably with the FFM. The FFM, as described by McCrae et al. (2005), elucidates

patterns of covariation among personality traits under five broad factors: Neuroticism (N), seen as the opposite of Emotional Stability (ES), Extraversion (E), Conscientiousness (C), Openness to Experience (O), and Agreeableness (A). McCrae et al. (2005) comprise the factors as follows: N denotes feelings of anxiety, hostility, depression, self-consciousness, and vulnerability; E encapsulates characteristics such as warmth, assertiveness, activity, gregariousness, and a propensity for positive emotions; C represents orderliness, dutifulness, a drive for achievement, self-discipline, and deliberate action; O is characterized by curiosity, creativity, resourcefulness, and an inclination towards unconventional ideas Finally, A embodies trust, altruism, compliance, and modesty (McCrae & Costa, 1997; McCrae & John, 1992). There is a body of meta-analytic evidence endorsing the correlation between specific dimensions of the FFM and various work performance outcomes (Gonzalez-Mulé et al., 2014). For more information about the structure of the five-factor model of personality see Kajonius & Johnson (2019).

Several meta-analyses (Gonzalez-Mulé et al., 2014; He et al., 2019; Judge et al., 2013; Mount et al., 1999; Sackett et al., 2022) have empirically established the relationship between C, E, and work performance. Emotional stability (ES) and C consistently emerged as the most potent predictors of work performance. The other three factors also have meaningful correlations with work performance, albeit to a lesser degree (Gonzalez-Mulé et al., 2014; Zell & Lesick, 2022). In a meta-analysis conducted by Zell and Lesick (2022) regarding the five factors and their effects on overall job performance, they found that C had the highest positive correlation (r = .23), while E (r = .13) and A (r = .10) have small positive correlations, O has the smallest positive correlation (r = .05), and N has a small negative correlation (r = −.11). These correlations underscore the influential role of personality traits in work performance (Zell & Lesick, 2022).

Big Five traits correlated with academic performance with corrected correlations (r) of O (r = .16), C (r = .27), E (r = .01), A (r = .09), and N (r = −.02), alongside cognitive abilities (r = .42). Regression identified cognitive abilities and C as predictors, accounting for the explained variance (Mammadov, 2022). The interconnection between personality traits and cognitive abilities is further substantiated, drawing an intricate picture of their joint influence (Stanek & Ones, 2023). They identified a negative r = −.07 correlation between N and GMA, suggesting that high N may be associated with lower cognitive abilities. Positive correlations were identified between A, specifically the compassion facet, and GMA (r = .21). C, specifically the industriousness facet, and GMA (r = .27), and E, specifically the activity facet, and GMA (r = .18). Openness displayed a positive correlation with GMA (r = .21), with the facet of ideas exhibiting a particularly strong correlation (r = .31) (Stanek & Ones, 2023). Luo et al. (2023) provided a meta-analytic reviewing the relationships between the personality factors and stress, revealing that high N correlates positively with stress, while high E, A, C, and O are negatively

associated, implying the role of personality traits in stress response differences in the workforce. High–intelligence groups are known to have a more extreme range of personality traits (Andersson et al., 2022). Anglim et al.'s (2022) comprehensive meta-analysis presented evidence regarding the associations between personality and intelligence, demonstrating correlations between certain personality traits and facets and different types of intelligence. They found that among the factors, O showed a positive correlation ($r = .20$) with intelligence. In contrast, N had a negative correlation ($r = -.09$). The study discovered that intellectual engagement and unconventionality within O correlated more strongly with intelligence than other facets within the same domain. The study elucidates the associations between certain personality traits and facets and different types of intelligence, highlighting the multifaceted nature of these relationships (Anglim et al., 2022).

To examine the implications of these variations of personality characteristics in pathological contexts, the Diagnostic and Statistical Manual of Mental Disorders (DSM) can be used. While the FFM offers a detailed blueprint for normal personality variations, DSM brings a clinical perspective on maladaptive traits (Samuel & Widiger, 2008). This separation, however, has been challenged for oversimplifying complex personality functions and its limited empirical validity (Kotov et al., 2017; Livesley, 2003; Trull & Durrett, 2005; Watson, 2005; Widiger & Samuel, 2005). A tilt toward a more dimensional model, incorporating a wider clinical FFM, seems justified (Ka et al., 2021; Kotov et al., 2017; Livesley, 2003; Widiger & Costa Jr., 2002). Widiger et al. (1994) and Widiger and Costa (2002) offered an alternative to DSM's categorical approach, blending DSM–IV–TR's personality disorders into a 30–facet FFM. For example, within the dimensional approach to psychopathology, antisocial personality disorder might correspond to specific elements of the FFM. This contrasts with the categorical approach traditionally employed in diagnostics, such as the DSM. As psychopathology is shifting towards more dimensional models like the Hierarchical Taxonomy of Psychopathology (HiTOP) introduced by Kotov et al. (2017), the relevance of FFM in clinical settings is underlined. Models like HiTOP give a deeper insight into the relationship between FFM and various mental disorders (Ka et al., 2021). This understanding might be vital for developing screening tools for police personnel.

2.9   Personality in the police and tactical intervention units

Research on police officers' health is interesting considering the risks to society and individual officers (Emsing et al., 2022; Ghazinour et al., 2010). Studies on personality traits have shown that police officers with low Emotional Stability (ES) have an increased risk of depression and exhibit avoidance behaviors in the workplace (Sanders, 2008). Meanwhile, high ES is prevalent among police officers with strong social and coping skills (Jenkins et al., 2019). Elevated E, C, and ES levels characterize law enforcement officers'

personalities (Detrick & Chibnall., 2006, 2013; Young et al., 2018). TenEyck (2023) identifies a typical police personality that, compared to the general population, scores lower in O and is more likely to undergo a divorce, to have served in the armed forces, and to have conservative tendencies.

Personality traits of members in tactical intervention units are also characterized by high ES, E, and C (Garbarino et al., 2012, 2014; Young et al., 2018). These traits are predictors of work performance in general, which provides incremental validity beyond GMA and offers information for selection decisions (Schmidt & Hunter, 1998). Furthermore, Johnson's (2019) study on military SOF found that cognitive abilities and physical fitness were predictors of performance. Additionally, it was observed that personality traits like hardiness, grit, core self-evaluation, and E were associated with enhanced performance even after controlling for physical fitness and cognitive ability. Interestingly, O was negatively correlated with performance, while other personality factors, such as A, N, and C, showed no relationship. Low levels of E, ES, and A were also associated with PTSD symptoms in a sample of Canadian Armed Forces Veterans (Plouffe et al., 2023).

Patterns of personality traits among police officers have been noted. For instance, there are increased levels of A, C, and ES, along with lower levels of O, compared to the general population (Abrahamsen, 2006). Furthermore, studies have found that police officers exhibit higher levels of E, C, and ES (Detrick & Chibnall., 2006, 2013; Young et al., 2018). These studies affirm the personality profiles in the police profession, emphasizing the prevalence of A, C, and ES traits (Abrahamsen, 2006; Abrahamsen et al., 2010; Detrick & Chibnall, 2006, 2013; Young et al., 2018).

2.10 Work-Related Characteristics in Tactical Intervention Units

In the context of tactical Intervention units, work-related characteristics (WRCs) exhibit importance. Job analysis is a process for understanding and defining work performance, identifying WRCs, and developing standardized procedures for their assessment (Brannick et al., 2017). Job analysis establishes the basis for valid selection procedures (Industrial and Organizational Psychology, 2018). Job analysis is essential for identifying job requirements and predicting the demands of jobs (Gebhardt, 2019). The following exploration includes a review of WRCs in tactical intervention units and WRCs that increase the likelihood of success in tactical intervention units' selection processes. Table 2 provides an overview of the WRCs prevalent in tactical intervention units. In contrast, Table 3 presents WRCs that enhance the probability of success in the selection process in diverse tactical intervention units.

The characteristics of tactical intervention units have identified a range of traits and abilities associated with successful performance. High ES and E are commonly observed traits (Braun et al., 1994; Garbarino et al., 2012; Skoglund et al., 2020). Garbarino et al.

(2012) noted that SOF police officers were more agreeable, conscientious, and open to experience than the general population and career soldiers.

Physical abilities are likely a key attribute for tactical intervention units, necessitating high levels of aerobic and anaerobic endurance, strength, reaction speed, and coordinative abilities (Eisinger, 2006; Eisinger et al., 2009; Maupin et al., 2018; Thomas et al., 2019). Motivation and persistence were also noted as important characteristics, with Kilcullen et al. (1999) highlighting attributes such as achievement-oriented, work-motivated, dominant, and fitness motivated. Gayton and Kehoe (2015) underscored the importance of good teamwork ability and characteristics of integrity and persistence. Huijzer et al. (2022) found that SOF officers were less neurotic, more conscientious, and less open to experiences, while Kjærgaard et al. (2013) identified adaptability and emotional stability as important traits for military special unit patrol teams operating in a Polar environment. Physical strength, particularly in the upper body, was also noteworthy, as highlighted by Strader et al. (2020), who noted high shoulder and grip strength in SWAT police.

A high degree of hardiness, comprising commitment, control, and challenge, is associated with increased odds of graduation from Special SOF selection (Bartone et al., 2008). Mental toughness is identified as a psychological predictor of selection into SOF (Gucciardi et al., 2021), with emotionally stable applicants having a greater chance of passing the WST (Hartmann et al., 2003). Moreover, SOF applicants who perceive stress as enhancing show improved performance (Smith et al., 2020). Physical fitness, age, and cognitive ability are recognized as important predictors for passing WST in SOF applicants (Beal, 2010), with physical fitness underscored in multiple studies (Farina et al., 2019). The maximum number of push-ups and performance in long-distance marches emerge as physical predictors of SOF selection (Hunt et al., 2013). High aerobic fitness, upper limb strength, endurance, and agility are important for success in SWAT applications (Robinson et al., 2019). The role of cognitive abilities and commitment is highlighted in successful CTIU applicants (Picano, 2016; Soccorso et al., 2019). Maintaining a healthier diet, achieving high physical performance, and fostering physiological resilience are linked to successful SOF selection completion (Stein et al., 2023).

Few studies have highlighted the combined effects of psychological and physiological/biochemical factors. For instance, the interplay between psychological resilience and a favorable DHEA-to-cortisol ratio accounts for variance in SOF selection (Ledford et al., 2020). In conclusion, successful selection into tactical intervention units is associated with an interplay of psychological, physical, and physiological factors.

Table 2

Work-related characteristics of attributes of tactical intervention units			
Identified successful attributes	**Unit**	**Sample size (n)**	**Reference**
Emotionally stable and extravert	SOF	139	(Braun et al., 1994)
Extraordinarily physically fit, good reaction speed, coordinative abilities, aerobic and anaerobic endurance, and strength endurance	SOF	26	(Eisinger, 2006; Eisinger et al., 2009)
More emotionally stable and moderately more extraverted, agreeable, conscientious, and open to experience than the general population and soldiers	SOF police officers	289	(Garbarino et al., 2012)
Good teamwork ability and characteristics of integrity and persistence	SOF	337	(Gayton & Kehoe, 2015)
Less neurotic, more conscientious, and markedly less open to experiences	SOF	110	(Huijzer et al., 2022)
Core self-evaluations, grit, hardiness, extraversion, agreeableness, conscientiousness, openness, neuroticism	SOF	894	(Johnson, 2019)
Motivational attributes such as achievement-oriented, work-motivated, dominant, fitness motivated	SOF	314	(Kilcullen et al., 1999)
Adaptive and emotionally stable	SOF	12	(Kjærgaard et al., 2013)
High level of fitness	Tactical intervention units	n/a	(Maupin et al., 2018)
Stress control, low neuroticism	SOF	30	(Miyatsu et al., 2023)
Aerobic fitness	SWAT	42	(Robinson et al., 2019)
Emotionally stable	SOF	190	(Skoglund et al., 2020)
Shoulder strength and grip strength	SWAT	18	(Strader et al., 2020)
Aerobic fitness, upper limb strength, endurance, and agility	SWAT	42	(Thomas et al., 2019)
Aerobic fitness	SOF	69	(Vaara et al., 2020)

Notes. SOF = Special Operation Forces. SWAT = Special Weapons and tactics teams

Table 3

Characteristics of applicants who pass the Work Sample Test (WST) within tactical intervention units.							
Identified abilities and characteristics	**Unit**	**Sample size (n)**	**Predictors**	**Analysis**	**Results**	**Fail rate (%)**	**Reference**
High hardiness	SOF	1138	Psychological	Logistic regression	Odds-ratio 1.03 (p < .02)	44	(Bartone et al., 2008)
Physical fitness, age, and cognitive ability	SOF	824	Physical and psychological	Logistic regression	$R^2 = .39$	46	(Beal, 2010)
Higher mental toughness	SOF	122	Psychological	Bayesian structural equation modeling	Odds-ratio 1.68	79	(Gucciardi et al., 2021)
Extraordinarily physically fit	SOF	800	Physical, psychological, physiological	Logistic regression	$R^2 = .32$	69	(Farina et al., 2019)
A lower percentage of body fat and fat mass	SOF	795	Anthropometrics	Cohen's *d* effect size	For selected soldiers, lean mass (*d*	n/a	(Farina et al., 2021)

23

					= .71), body fat (d = -.70)		
Emotional Stability, Extroversion, 3 Rorschach variables (based on the final model in the study)	SOF	71	Psychological	Logistic regression	75% classification accuracy, φ= .46	62	(Hartmann et al., 2003)
Maximum number of push-ups	SOF	104	Physical	Discriminant function analysis	66-68% classification accuracy	63	(Hunt et al., 2013)
Combined effects of psychological resilience and Physiological (DHEA-to-cortisol)	SOF	116	Psychological physiological	linear regression	R^2 = .17	42	(Ledford et al., 2020)
General knowledge, younger	CTIU	71	Psychological, biodata	Logistic regression	Age B= -.19 General knowledge B= .15	40	(Picano, 2016)
High aerobic fitness, upper limb strength, endurance, and agility	SWAT	18	Physical	Hierarchical multiple regression	adjusted R^2 = .70, F (3,14) = 14.373, p = .001)	11	(Robinson et al., 2019)
Applicants with a stress-is-enhancing mindset show improved performance	SOF	174	Psychological	Linear regression	Stress-is-enhancing mindset related to 12% longer training persistence (b = .18, p = .043).	85	(Smith et al., 2020)
General knowledge, higher hardiness, younger	CTIUs	71	Psychological, biodata	Pearson correlation	Age (r = -.33, p < .01). General Knowledge (r = .23, p < .05). Hardiness (r = .23, p < .05)	44	(Soccorso et al., 2019)
Healthier diets, better physical performance	SOF	761	Physiological and physical	Principal component analysis	n/a	≈ 50 %	(Stein et al., 2023)

Notes. CTIUs = Counterterrorism Intervention Units. SOF = Special Operation Forces. SWAT = Special Weapons and Tactics Teams. R^2 represents the proportion of variance in the dependent variable that is predictable from the independent variable(s). Classification accuracy refers to the percentage of correct predictions made by the model. φ (phi) measures the effect size for the association between two binary variables. The odds ratio measures the strength of association between two binary data values. Cohen's d represents the standardized mean difference between the two groups. DHEA stands for Dehydroepiandrosterone, a hormone that plays a role in stress response. 'B' refers to the unstandardized regression coefficient, which indicates the degree of change in the outcome variable for every 1 unit change in the predictor variable.

2.11 Summaries of the literature review

This literature review highlights the need for a job analysis to identify WRCs vital for job performance. The review acknowledges the importance of minimizing bias in personnel selection and scrutinizing the impact of the chosen selection model. Individual differences, such as cognitive and physical abilities and personality traits, emerged as important predictors of job performance. Cognitive abilities are essential for complex roles, while physical abilities are indispensable for physically demanding tasks. Successful applicants display a well-rounded profile in both cognitive and physical areas.

3 Research aims

The objective of this PhD project was to contribute to the development of assessments of cognitive and physical abilities and personality traits to recruit the most suitable individuals for tasks within the CTIUs. The overall purpose of all studies was to evaluate whether measurements of cognitive and physical abilities and personality traits can predict which individuals are suitable for tactical intervention units with a particular focus on Swedish CTIU.

4 Material and methods

We pursued four separate studies, designed to contribute to an improved understanding of the cognitive, physical, and personality traits that influence selection for the Swedish tactical intervention units. A summary of the material and methods included in the thesis can be found in Table 4.

Study 1, titled "Executive Functions of Swedish Counterterror Intervention Unit applicants and Police Officer Trainees evaluated with Design Fluency Test," aimed to identify EF predictors in the Swedish CTIU selection process and determine the impact of extreme pressure on EF. The study followed a predictive cohort, quantitative design with two participant groups. The test group comprised 45 Police CTIU applicants (NIA), including one woman, with an age range of 27–41 years and a mean age of 31.7 years (SD = 3.33). The NIA group was reassessed at four stages, with the numbers reducing from 45 to 40, then 38, and finally 35 participants. The control group included 30 police officer trainees (POT), six women, with an age range of 22–39 years and a mean age of 27.7 years (SD = 4.70). Data was collected using EF inventories, namely the D-KEFS and the CogStateSports (CS, Buckley et al., 2017) computerized concussion test. Various statistical analyses were used: Shapiro-Wilk and Levene's tests checked for normality of distributions and homogeneity of variances between groups, respectively. ANCOVA was used to compare the NIA group and the POT group. The results were adjusted for age and sex. Paired sample T-tests evaluated differences between baseline and re-test scores in the NIA group. Pearson's correlation assessed the relationship between baseline and re-test scores. One-sample T-tests compared the main EF test results of the NIA and POT groups with the D-KEFS norm. Independent T-tests compared the NIA group with the POT group for additional exploratory tests.

Study 2, titled "Personality traits among Swedish Counterterrorism Intervention Unit Police Officers: A Comparison with the General Population," aimed to identify potential differences in personality traits between Swedish CTIU police officers and the general Swedish population. The study used the NEO Personality Inventory (NEO-PI-3). The study followed a cross-sectional, quantitative design. The participant group consisted of 57 CTIU Police officers, all males currently in active service. Their ages range from 28 to 51 years, with a mean age of 39.6 (SD = 5.2). The participants have an average tenure of 7.6 years (SD = 6.0) within the CTIU. For statistical analysis, means, standard deviations, and confidence intervals were used to describe continuous variables. Group comparisons were made using effect size with Cohen's *d*. A p-value threshold of < .05 was considered statistically significant.

Study 3, "Predictors in the Swedish Counterterrorism Intervention Unit Selection Process," aimed to identify psychological and physical predictors in the Swedish CTIU

selection process. This research followed a concurrent cohort, quantitative study design. The participant cohort (N = 160) was exclusively male and included police officers, Swedish customs officers, coast guard officers, and military officers. Participants approved in Phase 1 of the CTIU Selection Process (CTIAS) numbered 28, aged between 25 and 42 years with a mean age of 30.64 (SD = 3.78). Those rejected in the phase numbered 132, aged between 25 and 47 years, with a mean age of 30.68 (SD = 4.11). The study examined numerous variables, including age, strength, running capacity, coordination, GMA, EFs, and the FFM personality traits (N, E, O, A, and C). The imputation expectation maximization method was employed for cases where data was missing to fill the gaps. All scores were transformed into Z-scores to facilitate comparisons across different variables with different scales. For statistical analysis, reliability coefficients were calculated using McDonald's omega (ω) (Taylor, 2021) and Cronbach's alpha (α). The study employed the Pearson correlation coefficient to determine multicollinearity between predictors. The strength of the association was estimated using point-biserial correlation analysis. The study used logistic regression analysis to examine the relationship between predictors and criteria. P-values of < .05 or < .01 were considered to indicate statistical significance.

Study 4, "Using the Five Factor Model of Personality to Identify an Optimal SWAT Team Member," aimed to establish an optimal personality profile for a tactical intervention police team member based on the FFM. In this cross-sectional, quantitative study, 159 SMEs (SWAT police officers), ranging in age from 28 to 55 years with a mean age of 39.91 (SD = 5.29) and tenure in the police force varying from 4 to 23 years (average 7.80 years, SD = 7.16), were asked by the Police Authority to fulfill the Personality Job Profiler inventory in an internal Police investigation. This instrument, which aligns with the FFM of personality, was used to collect data on personality traits. Continuous variables were described using means and standard deviations for statistical analysis. Reliability coefficients were measured using the generalizability coefficient $E\rho2$ and dependability reliability (φ). The degree of similarity/dissimilarity between groups was assessed with the Pearson correlation coefficient, with confidence intervals set at 95 %—a p-value of less than .05 denoted statistical significance.

Table 4

Material and methods: A summarizing of all four studies.				
Variables	**Study 1**	**Study 2**	**Study 3**	**Study 4**
Title	Executive Functions of Swedish Counterterror Intervention Unit Applicants and Police Officer Trainees Evaluated with Design Fluency Test.	Personality traits among Swedish counterterrorism intervention unit police officers: a comparison with the general population.	Predictors in the Swedish Counterterrorism Intervention Unit Selection Process.	Using the Five Factor Model of Personality to Identify an Optimal SWAT Team Member: Evidence on Reliability and Content-Related Validity
Aim	Compare the performance of EF tests between CTIU applicants and police officer trainees and how much extreme pressure impacts EF test results.	Identify possible differences in personality traits between Swedish CTIU police officers and the general Swedish population norm using the NEO-Personality Inventory (PI)-3.	Identify psychological and physical predictors in the Swedish CTIU selection process.	Identify an optimal tactical intervention police team member personality profile in terms of the Five-factor model.
Study design	Predictive cohort study, quantitative study, cross-sectional study	A cross-sectional, quantitative study	Concurrent cohort study, quantitative study	A cross-sectional, quantitative study
Participants	Test group: 45 Police CTIU applicants including one woman (Age range 27–41 years; Mean age = 31.7 years, SD = 3.33; base assessment: 45 individuals; re-test 1: 40 individuals; re-test 2: 38 individuals; re-test 3: 35 individuals). POT group: 30 police officer trainees, including six women (Age range 22–39 years; Mean age = 27.7 years, SD = 4.70)	57 CTIU Police officers (no females) in active service, aged between 28 and 51 years (M = 39.6, SD = 5.2), with an average tenure of 7.6 years (SD = 6.0)	CTIU cohort (N = 160) consists of 160 males and zero females from various professions, including police officers, Swedish customs officers, Coast Guard officers, and military officers. The dependent data (CTIAS Phase 1 approved applicants, n = 28) ranged from 25–42 years (M = 30.64, SD = 3.78). The independent data (CTIAS Phase 1 rejected applicants, n = 132) ranged from 25–47 years (Mean, M = 30.68, Standard deviation, SD = 4.11).	159 SWAT Police officers representing all seven Swedish police regions (Aged 28–55. M = 39.91; SD = 5.29; Tenure 4–23 years M = 7.80; SD = 7.16)
Data and inventories	Delis–Kaplan EF System (D-KEFS) performance tests and the CogStateSports (CS) computerized concussion test	Personality traits. NEO Personality inventory, NEO-PI-3.	Age (n = 160), strength (n = 160), running capacity (n = 160), GMA (n = 159), coordination (n = 158), EFs (n = 147), N (n = 152), E (n = 152), O (n = 152), A (n = 152), and C (n = 152). Missing data were added through the imputation expectation maximization method (Dempster et al., 1977). All scores were transformed into Z-scores to compare	Personality Job Profiler inventory

			different variables with different scales.	
Statistical analysis	Shapiro-Wilk and Levene's tests assessed distributions for normality and homogeneity of variances between groups, respectively. ANCOVA compared the NIA-group and POT-group results, adjusting for age and sex. Paired sample T-tests evaluated differences between baseline and re-test scores in the NIA-group. Pearson's correlation to examine the relationship between baseline and re-test scores. One-sample T-tests compared the main cognitive test results of the NIA-group and POT-group with the D-KEFS norm. Independent T-tests compared the NIA-group with the POT-group for additional exploratory tests, and exploratory-paired sample T-tests examined differences between baseline and re-test sessions in other D-KEFS tests.	Mean, standard deviation (SD), and confidence intervals were utilized to describe continuous variables. Group comparisons were conducted using effect sizes (Cohen's d), with p-values < .05 considered statistically significant.	Reliability coefficients were measured using McDonald's omega (ω) and Cronbach's alpha (α). Pearson correlation coefficient (r) was employed to determine multicollinearity between predictors. Association strength was estimated using the Pearson correlation coefficient and point-biserial correlation analysis. Logistic regression analysis examined the relationship between predictors and criteria, with p-values < .05 or < .01 considered statistically significant.	Continuous variables were described using means and SDs. Generalizability coefficient Eρ2 was used to measure reliability coefficients, while the Pearson correlation coefficient assessed similarity/dissimilarity between groups with 95% confidence intervals. P-values < 0.05 were considered statistically significant. Analyses were performed in R (R Core Team, 2019) using RStudio with package psych (Revelle, 2018) to answer the research questions. The package Gtheory (Moore, 2016) was used to compute reliability.

Notes. EF refers to Executive Functions; CTIU refers to Counterterror Intervention Unit; POT refers to Police Officer Trainees; NEO-PI-3 refers to NEO-Personality Inventory-3; GMA refers to General Mental Ability; N, E, O, A, and C refer to Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness respectively (dimensions of the Five-Factor Model); D-KEFS refers to Delis-Kaplan Executive Function System; CS refers to CogStateSports; ANCOVA refers to Analysis of Covariance; SD refers to Standard Deviation; α refers to Cronbach's Alpha; ω refers to McDonald's Omega; r refers to Pearson's correlation coefficient; CTIAS refers to Counter Terrorism Intervention Unit Selection Process; SWAT refers to Special Weapons and Tactics; ANOVA refers to Analysis of Variance; ANCOVA refers to Analysis of Covariance; M refers to Mean; and R refers to the programming language used for statistical analyses.

4.1   Ethical Considerations

The studies in this research project were evaluated for ethical approval by the ethics committee in Stockholm (Regionala etikprövningsnämnden i Stockholm), Study 1 (Dnr: 2015/528–31/4), Study 2 (Dnr: 2017/2175–32), Study 3 (Dnr: 2017/2175–32), and the Swedish Ethical Review Authority, Study 4 (Dnr 2022–04049–01).

My role as a researcher in Studies 1 and 3 were separated from decisions in the selection process to maintain objectivity and avoid potential conflicts of interest to ensure ethical integrity. This was particularly important considering the potential bias from researching within a police unit. This was an essential aspect of the study design to avoid potential

conflicts of interest and maintain research objectivity. We recognized and addressed the potential coercion of applicants to partake in the studies. The test leaders from the Swedish CTIU, acting on behalf of the police authority, ensured that applicants understood that their decision to participate in the study would not affect their selection process. This aimed to ensure that the applicant's research involvement was voluntary and not influenced by perceived pressure or expectations.

One of the ethical dilemmas in Studies 1 and 3 was ensuring the voluntariness of the applicants' involvement in the research, especially considering their strong desire to get selected. The study recognized that applicants might feel pressure to participate, hoping it would impact their selection positively. Thus, to mitigate this situation, the study took measures such as informing applicants that their participation or non-participation would not influence their selection outcome. This message was communicated via email before testing and reiterated verbally and in writing on the testing day.

The confidentiality and privacy of participants were other critical ethical considerations. The data collected were anonymized, and the identity of the participants was protected using a coding system. Access to this code list was limited to me, ensuring that responses could not be traced back to individuals by any external parties, including unit chiefs, CTIU test leaders, or commanders.

5 Results and discussion

The thesis aimed to establish whether assessments of cognitive and physical abilities and personality traits could predict the appropriateness of individuals for roles within tactical intervention units, with a particular focus on Swedish CTIU. Our findings from Study 1 revealed that CTIU applicants demonstrated high EF compared to police officer trainees and the EF test norm. Notably, the CTIU applicants with the highest baseline scores also had the highest retest scores during the CTIAS Phase 2 work sample test. The data from Study 2 illustrated the personality profile of Swedish CTIU officers, marked by lower N and higher E and C relative to the general population. Study 3 identified aerobic capacity as a determinant of success in the CTIAS Phase 1. Finally, Study 4 identified an empirical optimal personality profile in Swedish SWAT teams based on ratings by 159 SMEs. The experts SWAT profile is characterized by lower neuroticism, higher E and C, and facet traits such as high competence, dutifulness, self–discipline, and altruism. These findings broaden our understanding of cognitive abilities and personality traits and their implications for selection and performance in tactical intervention units.

5.1   Cognitive abilities in tactical intervention units

Study 1 evaluated the cognitive abilities—specifically, EFs—of CTIU applicants and compared them with those of police officer trainees using standardized EF norms. The goal was to understand how the EFs of CTIU applicants responded to the stress of Phase 2 of the Swedish CTIU's CTIAS. The results demonstrated a difference in Design Fluency (DF) Total Correct scores between the CTIU applicants (NIA) group and the Police Officer Trainee (POT) group, with the NIA group performing better than the POT group (Cohen's d = 1.03). This tendency persisted across all DF subtests: DF1 (Cohen's d = .79), DF2 (Cohen's d = .63), and DF3 (Cohen's d = 1.12). For the DF3 subtest, older age was associated with higher scores [$F_{(1, 71)}$ = 4.76, p = .032, η^2 = .063]. The scores of the NIA group's baseline assessment (M = 14.98, SD = 2.44) with their field assessment (M = 15.30, SD = 2.27) were compared. No difference was found [$t_{(39)}$ = –0.86, p = .39]. There was a strong correlation between the baseline and field assessment scores [$r_{(40)}$ = .49, p = .001]. During the extreme field assessment, participants with higher baseline DF3 scores experienced a more considerable performance drop. However, even after this drop, participants with higher baseline scores still performed better than those with lower baseline scores.

Key findings indicated that CTIU applicants distinguished police trainees in design fluency, an essential component of EFs. The findings from our study align with the studies of Beal (2010), Soccorso et al. (2019), and Picano (2016), who found that high cognitive abilities increased the odds of performance in the selection processes within tactical intervention units. Furthermore, the results in Study 1 indicate the resilience of

individuals with high cognitive abilities when faced with stressors. The results are in harmony with wider research that underscores the impact of cognitive abilities on job performance (Gonzalez–Mulé et al., 2014; Schmidt & Hunter, 1998). For instance, strong cognitive abilities have been linked to better work performance and learning ability, especially in jobs demanding high cognitive complexity (Der & Deary, 2017; Hunter & Hunter, 1984; Warne & Burningham, 2019).

Another point is the comparison between GMA and EFs. Understanding their distinction and potential overlap could offer insights into whether EFs add incremental validity beyond GMA in predicting performance, selection outcome, and work performance within tactical intervention units. Especially when EF, as a component of cognitive abilities, may be pivotal for handling the tactical intervention units' work, which often requires rapid learning and adaptation to new technologies and strategies (Baard et al., 2014; Pulakos et al., 2002). The findings in Study 1 reinforce the need to understand whether EFs can provide additional predictive validity over GMA in the selection process and for work performance.

Adaptive performance, considering evolving work landscapes, may be a relevant ability. There is predictive validity of GMA for future job adaptation and performance adaptability (Stasielowicz, 2020). Cognitive abilities and certain personality traits, such as C and O, are also positively linked with adaptive performance. This implies the usefulness of cognitive tests and personality inventories in talent selection (Scharfen & Memmert, 2019). A comprehensive approach incorporating cognitive abilities and personality evaluations promises a more effective selection and development of personnel selection in tactical intervention units.

5.2   Personality traits in tactical intervention units

Studies 2 and 4 delve into the personality characteristics of CTIU and SWAT team members while exploring potential disparities between Swedish CTIU police officers and the broader Swedish populace. In Study 4, the scope was to identify the optimal personality traits for SWAT team members by applying the FFM of personality (McCrae et al., 2005). The results underscored the importance of low N and high C. Similarly, Study 2 aimed to uncover differences in personality traits between Swedish CTIU officers and the general Swedish population. The findings aligned with those of Study 4, highlighting low N and high C as key personality traits common among CTIU officers.

In Study 2, we aimed to identify personality trait differences between Swedish CTIU police officers and the general Swedish population. We employed the FFM of personality, focusing on N, E, O, A, and C and their associated facets. Our findings indicated personality trait patterns among CTIU officers. Compared to the general Swedish population, CTIU officers reported levels of N (Cohen's *d* = – .7), specifically in

the facets of vulnerability (Cohen's *d* = − .8) and angry hostility (Cohen's *d* = − .7). Conversely, no notable differences were found in the impulsiveness facet. These observations underscore the emotional resilience associated with CTIU officers. Further, our results showed that CTIU officers scored higher in E (Cohen's *d* = .7), particularly in the facets of excitement–seeking (Cohen's *d* = .9), activity (Cohen's *d* = .9), and positive emotions (Cohen's *d* = .9). There were no differences in facets of assertiveness and warmth. These findings illustrate the energy and positivity prevalent among CTIU officers. While no differences could be found at the factor level for O, a higher affinity was noted for facet action (Cohen's *d* = .5) in CTIU officers. Meanwhile, the A factor and its facets showed no differences from the norm group. The C factor showed only small to medium effect sizes, with a notable difference in self–discipline (Cohen's *d* = .5) but not in order and deliberation facets.

In Study 4, we sought to answer questions about how the FFM of personality could be utilized to operationalize an optimal personality profile for SWAT team members and how this profile relates to DSM personality disorder profiles. Our findings have validated using FFM to construct an optimal personality profile for SWAT team members. We found that certain facets, specifically low vulnerability and high self–discipline, competence, altruism, and dutifulness, were desired characteristics of a SWAT team member. These findings can provide information for developing selection criteria. Further, our correlation analysis revealed dissimilarities between the optimal SWAT profile and several DSM personality disorder profiles. These insights can guide the development of personality–based assessments, complementing cognitive and physical abilities evaluations and improving prediction of individual suitability for tactical intervention units.

Neuroticism – a trait embodying ES (Stanek & Ones, 2023) – is pivotal in managing stress and maintaining a calm demeanor (Fales et al., 2008). Even though the level varies our study has uncovered that a lower degree of N emerges as a trait in tactical intervention units. High C, representing diligence, achievement striving, and dutifulness (McCrae & Costa, 1997), is important in roles filled by SOF, SWAT, and CTIU officers (Huijzer et al., 2022; Young et al., 2018). Study 4 identified that SWAT members exhibited moderate levels of E, a trait associated with assertiveness, sociability, and a tendency for high energy (McCrae & Costa, 1997), which is important in roles filled by SOF, SWAT, and CTIU officers (Huijzer et al., 2022; Young et al., 2018). The Study 4 identified that the optimal SWAT profile exhibited only moderate levels of E, a trait typically associated with assertiveness, sociability, and a tendency for high energy (McCrae & Costa, 1997). This contrasted with the CTIU counterparts, who exhibited high scores in Study 2 across various E facets. The SWAT profile was constructed to create an optimal SWAT profile, which may have influenced how personality traits were reported or interpreted.

Therefore, these variations might reflect the goals and methods of profile construction rather than personality differences between the units.

High O, representative of creativity, intellectual curiosity, and willingness for novel experiences (McCrae & Costa Jr, 1997), was observed in CTIU officers in Study 2 and SWAT team SMEs optimal profile in Study 4. SWAT team members in Study 4 and CTIUs in Study 2 exhibit high scores on the actions facet of O. At the same time, Huijzer et al. (2022) found low values in O for SOF members on factor level. A plausible explanation for this discrepancy could reside in the differing work contexts or selection criteria. Specifically, there might be differences between military and police settings that can influence the value placed on traits encapsulated by O. Huijzer et al. (2022), who did not present facets.

Study 2 showed no differences in the A factor between the CTIU officers and the general population. At the same time, Study 4 indicated a high score in the 'compliance' facet of A for SWAT team members. SWAT team individuals are seen to be cooperative, considerate, and consistently working towards the team's best interests. This aligns with the findings of Wilmot and Ones' 2022 meta-analysis, which demonstrated a positive relationship between A and investment in teamwork. Notably, in our Studies 2 and 4, A also correlated with aspirations for self-growth and motivation to foster positive relationships across various life domains, including work. The emphasis on A, particularly the 'compliance' facet, in SWAT teams can be attributed to their team-based operational dynamics (Lim et al., 2023).

Table 5 presents parallels between our Studies 2 and 4 and the studies conducted on SOF by Huijzer et al. (2022), Skoglund et al. (2020), as well as the study on special forces police by Garbarino et al. (2012). All five studies identified lower N and higher C factors. Variations are observed in O. Huijzer et al. (2022), who reported less O in SOFs, a trend not mirrored by CTIU officers in our Study 2 but aligning with SWAT profiles from Study 4. However, Garbarino et al. (2012) found higher O in special forces police. Regarding A, higher levels were observed in the Huijzer et al. (2022) study, a trend echoed in Study 4. Skoglund et al. (2020) and Garbarino et al. (2012) reported similar norms for A, reinforcing its significance in high-pressure roles. All these findings presented in Table 5 show similarities but also shows the importance of specific personality traits and necessitate further exploration of traits, particularly O. Extraversion also deserves attention due to its high levels in all studies except Study 4, where it was moderate. It should be noted that different studies used varying comparison groups, norm data, statistical methods, and inventories. Specifically, Garbarino et al. (2012) used the Big Five Questionnaire (BFQ), Huijzer et al. (2022) and Study 2 used NEO PI-3, Study 4 utilized a job profiler based on the Five Factor Model, and Skoglund et al. (2020) used the NMPI to measure the Big Five personality dimensions. In summary, this underlines the complexity

of personality traits in high-pressure roles and shows areas for future exploration (Huijzer et al., 2022; Garbarino et al., 2012; Skoglund et al., 2020).

Table 5

Personality traits in Huijzer et al. (2022), Skoglund et al. (2020), Garbarino et al. (2012) and Studies 2 and 4.

FFM factor	SOF (Huijzer et al., 2022)	SOF (Skoglund et al., 2020)	Special forces police (Garbarino et al., 2012	Study 2, CTIU	Study 4, SWAT
Neuroticism	Low	Low	Low	Low	Low
Extraversion	High	High	High	High	Moderate
Openness	Low	Like norm	High	Like norm	High
Agreeableness	Slightly high	Like norm	High	Like norm	High
Conscientiousness	High	High	High	High	High

Notes. In the context of this table, the Five Factor Model (FFM) personality traits from different units and studies are presented. Specifically, "Low" denotes that the group's mean score is significantly below the norm, while "Moderate" implies an average score akin to the norm. "Slightly High" designates a score somewhat above the norm, "High" signifies a markedly above-average score, and "Like Norm" denotes a score roughly equivalent to the norm. In the context of Study 4, there was no norm; instead, a five-point scale was utilized. "Low" denotes low values, "high" denotes high values and "moderate" denotes middle values.

Grubb et al.'s (2015) explored personality traits of UK police hostage negotiators using a personality inventory, showing them to score higher on E, A, and C and lower on N compared to a student sample. Comparing this with our Studies 2 and 4, there is a general agreement on the importance of high C and low N. Extraversion and A showed more variability. In Grubb et al. (2015), both E and A were significantly higher for police negotiators than students, whereas our studies found different levels for CTIU and SWAT teams. The absence of a distinct 'hostage negotiator personality profile in Grubb et al. (2015) research aligns with the overlap seen in Studies 2 and 4. This indicates that while there is a general profile (high C, low N), specific traits may vary depending on role nuances. Detailed facet-level analyses could offer additional insights into these subtle differences in future research.

Hardiness (Bartone et al., 2008) and personality traits taxonomy overlap (Skoglund et al., 2023). Our findings from Studies 2 and 4 offer a perspective on the intricate dynamic of personality traits in law enforcement roles. The traits we observed align with the hardiness construct, a characteristic of adaptability in managing stress and change. In the context of the FFM, hardiness underscores the importance of commitment, control, and challenge, reflecting a resilient personality (Bartone et al., 2008). Further illumination is provided by Oshio et al. (2018)'s meta-analysis on resilience, which correlated all the big five traits.

Consequently, our results imply that CTIU and SWAT officers exhibit a personality profile promoting resilience in high–stress environments. Studies 2 and 4 identified psychological profiles in CTIU and SWAT teams, with low N and high C. Along with moderated E, high O, and varied A, these factors foster hardiness and resilience (Bartone et al., 2008). Our findings align with existing research (Gayton & Kehoe, 2015).

5.3   The Role of Physical Abilities in Tactical Intervention Units

Physical abilities, especially aerobic capacity, are fundamental in sports, combat, and situations with high physical pressure. Our research objective was to ascertain their relevance in CTIU selection and their implications for overall unit performance.

Physical abilities are important for performance in physically demanding occupations such as tactical intervention units (Maupin et al., 2018). Study 3 provided additional support, showing that aerobic capacity contributes to success in the CTIAS Phase 1 among several physical and psychological predictors. The importance of aerobic capacity in physically demanding roles is consistent with previous research and validates the importance of aerobic capacity in the selection process (Farina et al., 2019; Maupin et al., 2018; Thomas et al., 2019). However, while Study 3 found running capacity to be a predictor of selection approval, it highlighted other physical abilities that are possibly utilized in different phases of the selection process or serve other assessment purposes for future work performance, such as fighting and lifting.

Study 3 explored both psychological and physical predictors, distinguishing it from Skoglund et al. (2020) and Soccorso et al. (2019) who included psychological or physical characteristics. Our Study 3 distinguishes from Farina et al. (2019) who examined physical and psychological factors but focused on SOF rather than CTIU. Moreover, the selection quota for Farina et al. (2019) study was higher (31 %) than in Study 3 (17.5 %), and in Study 3, the criteria was only CTIAS Phase 1. However, despite some differences in our approach and those of previous studies, the focus on Phase 1 of CTIAS and the somewhat lower selection quota reveal insights into various predictors for CTIU selection.

Study 3 lends credibility to physical abilities in tactical intervention unit selection, especially running capacity. This leads us to scrutinize the current selection criteria's emphasis on physical fitness, notably running capacity and aerobic ability, and its adequacy in determining performance in highly demanding roles. While these attributes are important, they are not solely decisive. A reassessment of the selection process is recommended to consider the trainability of certain physical skills and to strike a better balance in the evaluation criteria.

5.4 Methodological Considerations

This doctoral project aimed to develop assessments to recruit suitable individuals for CTIUs. The studies conducted throughout this project face complex issues such as criterion problems, usage of personality inventories, and limitations concerning generalization. All these have emphasized the difficulty in establishing valid and reliable measures to predict success. The cultural bias presented in using existing officers to fill out inventories, the potential for social desirability bias in Studies 2 and 3, and the possibility of SMEs upholding stereotypes about the optimal officer in Study 4 illustrate the complex influences that can impact results. Additionally, constraints related to sample size, arising from the specialized and restricted nature of the tactical intervention units, have potential implications on the statistical power of the studies and the generalizability of the findings.

5.4.1 Criterion Problem

The criterion problem (Austin & Villanova, 1992) highlights the complexity of identifying and measuring success indicators in tactical intervention units. Study 1 concentrated on the selection process performance, with physical abilities, an essential predictor in police operations, left unassessed, potentially influencing the results. Its limited sample size and lack of control for GMA and physical abilities may limit the findings' generalizability and may overstate other predictors' contributions. Despite insights provided by Study 3, it suggests caution in generalizing the results beyond the Swedish CTIU context due to criteria limitations, sample size, restricted range, and measurement tools. The study's predictive validity might lessen if future tasks deviate from the assessed work or if basic training is included. Performance criteria must be relevant, comprehensive, and resistant to external contamination (Murphy, 2009). The studies in this thesis and the referenced studies did not use real work performance as a criterion but concentrated on work sample test performance. Therefore, while Study 3 revealed an association between running ability and selection outcomes, additional research is required to identify other influencing factors and build comprehensive, reliable selection processes.

5.4.2 Personality Inventories

We acknowledge that this method has inherent strengths and challenges when utilizing personality inventories across Studies 2, 3, and 4. In Study 2, potential cultural bias can arise when existing officers fill out inventories. The norms and expectations could already influence officers' perceptions, which may distort their responses. On the other hand, their real-life experience brings context to their responses, creating a more genuine representation of the job-related personality traits. Study 3 employed these inventories in a selection context, increasing the risk of social desirability bias (Bäckström & Björklund, 2013, 2014). Applicants might inflate their self-assessments,

possibly skewing the representation of certain traits. As observed in one of the data sets presented in 2019 at the 15th European Conference on Psychological Assessment (Tedeholm et al., 2019, July), self-assessment results in a selection context tend to be inflated. This propensity may be further amplified in a specific group under pressure to be selected, potentially leading to conformity and the application of pressure to participate. Nevertheless, this context reveals important insights into desirable traits in high-pressure selection scenarios. Study 4 introduced SMEs, adding another layer of practical relevance. The possibility of bias is present, as SMEs might uphold certain stereotypes about the optimal officer, thereby influencing their evaluations. However, their expertise also enriches the interpretation of the data and ensures its relevance to the tactical units. The disparate versions of the NEO Personality Inventory employed across these studies—NEO-PI-3 in Study 2 and varying versions in Study 4 compared to the work of Huijzer et al. (2022)—might have influenced the results, underscoring the need to consider the specific work conditions. Therefore, despite the potential biases and methodological complexities, these studies collectively provide a nuanced understanding of personality traits in tactical intervention units and their selection processes, which can be of interest for refining future selection strategies and personality assessments.

5.4.3   Generalization of the Results

Generalizing the results from specialized populations, such as tactical intervention units, is challenging due to the small sample sizes and associated limitations (Cohen, 1992). Study 2 included officers in the CTIU during the study period, and Study 4 leveraged inputs from 159 SMEs across Sweden. This coverage of the real population enhances the stability and reliability of the data (Schönbrodt & Perugini, 2013). Nevertheless, the balance between preserving context-specificity and the need for larger samples to ensure statistical robustness remains essential to achieving dependable generalizations (Faber & Fonseca, 2014).

5.4.4   Addressing the Challenges of Study 4

The inclusion of 159 SMEs distinguishes Study 4 from conventional research on SOF (Huijzer et al., 2022; Skoglund et al., 2020) and CTIUs (Garbarino et al., 2012). This distinction serves to enhance the literature on personality profiling in high-stress law enforcement contexts. The Diagnostic and Statistical Manual IV-TR guidelines for personality disorders have been incorporated to provide initial insights into potential risks associated with maladaptive personality traits in high-risk settings. However, the clinical orientation of the DSM may not be sufficient for validating the SWAT officer personality profile. This limitation underscores the need for broader personality models that consider real-world contexts and draw comparisons with prior research on SOF, CTIU, and SWAT teams. Such evaluations aspire to formulate a profile congruent with

real-world law enforcement scenarios. Employing cut-off scores for specific traits could be constraining, as this approach might overlook the compensatory potential of other traits or cognitive abilities. The significance attributed to certain personality traits should be contrasted with the consideration of other pertinent constructs. A comprehensive understanding of personality in high-risk roles necessitates attention to not only broad personality factors but also individual facets and item-level analyses. Such a focus emphasizes the need for continuous exploration and validation.

6 Conclusions

The studies encapsulated within this doctoral project reveal that CTIU applicants possess solid cognitive abilities and high aerobic capacity. Furthermore, CTIU officers tend to exhibit higher levels of emotional stability, extraversion, and conscientiousness than the general population. Similarly, an optimal SWAT profile may include high levels of conscientiousness and emotional stability. It is suggested that an evidence–based job analysis should be conducted to identify specific work performance criteria and work–related characteristics that enhance the selection program and the probability of appropriate job performance.

7 Points of perspective

This doctoral thesis yields perspectives with implications for the Swedish Police Authority and its tactical intervention units for improving the validity of the selection programs.

Insight 1: Advantages of a Compensatory Selection Model – The implementation of a compensatory selection model, which acknowledges that strengths in one domain can compensate for weaknesses in another, could enhance the validity, reliability, and utility of the selection process. It also promotes inclusivity among applicants and enriching the personnel profile of the Swedish Police Authority.

Insight 2: Implementing a Top-Down Selection Approach Prioritizing applicants with higher initial scores during the early stages of the selection process could improve alignment with the diverse job requirements of the Swedish Police Authority. A top-down approach could boost the validity and utility of the selection process by emphasizing a range of cognitive abilities, physical capacities, and personality traits.

Insight 3: Employing Algorithmic Approaches – Using algorithms as decision-support tools helps mitigate decision-making bias and enhance selection procedures' accuracy, objectivity, and fairness. However, balancing algorithmic support with human judgment is vital to preserving the human element in the selection process.

Insight 4: Role of Job Analysis: Conducting comprehensive job analyses can illuminate the diverse requirements of different roles within the police force. Regular updates to job analysis can guide the design of selection procedures, thereby contributing to a diverse, adaptable, and capable police force. Job analysis offers essential insights into the required competencies and traits for optimal job performance. It informs both the selection process and training initiatives within the Police Authority. Without a continuously updated, research-based, comprehensive job analysis, maintaining a workforce skilled enough to navigate complex responsibilities could be challenging.

Insight 5: Necessity of Regular Validation and Utility Analysis: Selection instruments should be systematically evaluated with a focus on cost-effectiveness, links to job performance, and potential improvements. Regular validation and utility analysis enable the Swedish Police Authority to adapt to changing societal and operational landscapes.

Insight 6: Addressing the Criterion Problem: Regular reassessment of selection criteria to ensure they reflect evolving job demands and maintain a contemporary correlation with future performance is crucial for optimal selection. Creating an accurate evaluation system for personnel selection in tactical intervention units presents unique hurdles. These include developing a system capable of predicting future performance effectively and adapting to the rapidly evolving demands of the work environment.

Future studies

This research presents a stride towards establishing an authentic and steadfast profile for tactical intervention units. The primary takeaway from these four studies is the pressing requirement for continual job analyses to guarantee that the selection criteria are persistently updated with the unendingly changing, dynamic, and challenging job demands. Building an evaluation system that accurately captures work performance in these units is intricate but vital for optimal selection and recruiting of the most fitting staff. Prospective research should concentrate on validating the proposed theoretical personality profile using diverse personality measurement methodologies, such as observed and self-reported personality assessments. As law enforcement technology rapidly evolves, future studies should also aim to craft models that account for these dynamic shifts, focusing primarily on tangible world outcomes. It is crucial to confirm and further enhance the selection process by evaluating the work performance of individuals selected through different models. Beneficial strategies for future research could incorporate multi-site collaborations and/or international cooperation and data amalgamation from various studies, enhancing the understanding of personnel selection in tactical intervention units. A long-term research objective is to shape and assess artificial intelligence processes that may assist in selecting. In tactical intervention units, attributes like cognitive and physical abilities, resilience, stress-informed decision-making, and certain personality traits are vital for success. Since these traits are challenging to instill, they should be at the heart of the selection process.

On the flip side, skills that can be efficiently acquired post-selection and are not immediately crucial for performance should be given secondary importance. This approach ensures a workforce well-prepared to tackle the unique challenges of the role from the beginning, with further development building on a strong base. The methods evaluated and identified in this thesis are expected to provide a foundation for navigating future challenges in the international arena. As Swedish tactical intervention units are expected to perform alongside counterparts from other organizations and countries, the final proposition for future research and collaboration is to establish stronger connections and cooperative endeavors within the Swedish Police Authority, other state agencies, Nordic countries, the ATLAS network, and potential partners within NATO. This collaboration will enable an exchange of strategies and best practices, mutual development, and an enhancement of the collective understanding of the challenges faced in the field.

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