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CAREER ADAPTABILITY, ENGAGEMENT AND JOB SATISFACTION: A PSYCHOLOGICAL NETWORK IN THE MILITARY EDUCATION CONTEXT



PEDRO P. PIRES¹

 <https://orcid.org/0000-0001-8831-9056>

GEORGE H. S. PINTO²

 <https://orcid.org/0000-0001-8988-5842>

MARCOS A. SOUZA¹

 <https://orcid.org/0000-0001-6609-8766>

MAGNO O. MACAMBIRA³

 <https://orcid.org/0000-0002-6453-3020>

GABRIEL L. FIGUEIRA⁴

 <https://orcid.org/0000-0003-2265-1501>

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¹ Federal University of Rio de Janeiro (UFRJ), Rio de Janeiro, RJ, Brazil.

² c (Aman), Resende, RJ, Brazil.

³ Feira de Santana State University (Uefs), Feira de Santana, BA, Brazil.

⁴ Celso Lisboa University Center (UCL), Rio de Janeiro, RJ, Brazil.



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ABSTRACT

Purpose: Evidence indicates that career adaptability and engagement are characteristics that improve coping with challenges inherent in a military career. Job satisfaction appears as a variable that interacts with both because it improves the maintenance of performance. The objective of this paper is to examine a psychological network (PN), including these variables.

Originality/value: The interaction among these is well documented in the literature; nevertheless, it has not been researched in the context of military education. Information on the network can provide important insights for the development of strength-based training directed towards highly influential behaviors and attitudes of students.

Design/methodology/approach: The research design was sectional and based on a quantitative analysis framework. A total of 962 male students from the second ($n = 323$; 33.6%), third ($n = 345$; 35.9%), and fourth ($n = 294$; 30.6%) years of the Academia Militar das Agulhas Negras (Aman), between 18 and 26 years old, completed our survey. Instruments included a demographic questionnaire, Job Satisfaction Scale, Career Adaptabilities Scale, and Utrecht Work Engagement Scale for Students. PNs were estimated for the complete sample and also for every academic year.

Findings: One of our main findings indicates that the PN tends to lose connections across the academic years, especially considering job satisfaction and engagement items. Aman students might experience a natural process of disconnection from the academic environment and, therefore, constructs showing, for example, engagement for students lose configuration as a graphical community. A longitudinal study is needed in order to confirm differences detected among students from different years.

KEYWORDS

Job satisfaction. Engagement. Career adaptability. Psychological networks. Organizational psychology.

1. INTRODUCTION

A military career has several challenges in Brazil. According to the 1988 Federal Constitution, Brazilian military forces have major functions that can be listed as: 1. ascertaining national territorial integrity; 2. defending national interests and Brazilian natural, industrial, and technological resources; 3. protecting the citizens and the national patrimony; and 4. granting national sovereignty over the national territory (Brasil, 1988). Another known function is to act according to the Law and Order Safeguard, which includes the objective of, within a specified period, restoring the exercise of sovereignty and granting the insolubility of the federation. In the last few decades, the Army has acted in peace missions and in in-country interventions in urban areas (e. g., Brasil, 2017), which has certainly added more complex demands, extending its original functions. This new scenario is an important aspect in military education. Physical training is demanding; knowledge incorporates the information needed in order to allow for competent decision processes for situations that range from supporting refugees to battlefield scenarios. Skills need to be acquired and performed excellently because mistakes might result in damaged critical structures or even in the loss of lives, beyond mission failure.

Given the critical responsibilities, it is important to understand the potential stressors involved in the military career and how officials need to be prepared. Part of this education at the Academia Militar das Agulhas Negras (Aman), the Brazilian Army's military academy, is provided by considering specific skill sets critical for operations while also nurturing a strong character and values that should guide conduct, quality, and the military career (Brasil, 2014). That last objective is especially well-matched with the framework of Organizational Positive Psychology, where virtue and strength-based training can be used in order to reinforce students' and future officials' performances (e. g., Van Woerkom & Meyers, 2015; Diener et al., 2017; Di Fabio, 2017), while also providing an emotional scaffold that is well prepared to deal with hardship, adaptation demands, and challenges.

This paper consists of an exploratory framework based on network analysis in order to examine three important variables as an interactive system for Aman's students: 1. work engagement, 2. beliefs in their own adaptation capabilities, and 3. how those variables inform job satisfaction. As will be explained in this paper's method section, network analysis is an innovative methodology used to investigate psychological variables in the form of psychometric measures for a more specific approach, by providing

information on structure, item-level interactions, and how influential every element of a network can be (Epskamp & Fried, 2018).

2. LITERATURE REVIEW

2.1 Job satisfaction

One's satisfaction with one's own function, activities, workplace, and colleagues is of critical importance in human resources (Judge & Klinger, 2008). Job satisfaction has long been known as an aspect that is related to a reduction in turnover intentions (e. g., Jordan, Gabriel, Teasley, Walker, & Schraeder, 2015; Hom, Lee, Shaw, & Hausknecht, 2017; Österberg & Rydstedt, 2018), but the literature includes mixed perspectives on its importance for performance. At this point, the evidence either does not indicate any association with the latter or job satisfaction is related to antecedents of high performance when in interaction with engagement and organizational commitment (e. g., Rich, Lepine, & Crawford, 2010; Gayathiri, Ramakrishnan, Babatunde, Banerjee, & Islam, 2013).

Job satisfaction is also known to be an important mediator between job design and performance in four different aspects: financial performance, labor productivity, absenteeism, and quality-control-related indicators (Wood, Van Veldhoven, Croon, & Menezes, 2012). Moreover, job satisfaction is more widely understood to be an outcome in organizational psychology, which is certainly problematic when one considers that there is a mutualistic dynamic between psychological variables.

In the military context, Zangaro and Kelley (2010) conducted a meta-analysis. The authors indicate that among important factors for job satisfaction verified in 21 studies were: a strong sense of teamwork, favorable work environments, promotions, and leadership opportunities. Sanchez, Bray, Vinicus, and Bann (2009) indicate that there is an important neglected aspect that should be considered, which is if the officer is in reserve or on active duty. Military in reserve usually score higher on job satisfaction. Another critical predictor was job pressure and the comparison between job and non-job issues (e. g., domestic problems). In our literature review, no contributions were detected from military academies.

2.2 Engagement

The framework of Schaufeli, Martínez, Pinto, Salanova, and Bakker (2002) on engagement covers the cognitive-affective aspect of engagement,

conceptualizing it as a positive, satisfying, work-related state of mind which can be represented as a construct of three dimensions: vigor, dedication, and absorption. Schaufeli et al. (2002) define vigor as energy and mental resilience, combined with the willingness to invest in work. Dedication is explained as inspiration, significance, and an approximate sense of self-actualization, while the absorption dimension refers to achieving a state of flow.

Rich et al. (2010) indicate that in addition to its role in job satisfaction, engagement is a more consistent antecedent of performance. High energy levels, which refer to vigor, have been shown to be protective against stress and different types of mental illness, even within the Military. Such is the case in the study conducted by Britt and Bliese (2003), where high self-engagement was related to reduced mental distress and also lower levels of work and family stress. It is important to indicate that for the latter aspect, the military career includes a very peculiar burden on family dynamics due to the constant risk involved in tasks and sudden career changes.

Alarcon, Lyons, and Tartaglia (2010) analyzed antecedents of engagement within the military by assessing leadership, role clarity, organizational culture, and peer group interactions. Among their findings, organizational culture and role clarity/ambiguity influenced engagement. Organizational culture in work environments better characterized by mutualism had a direct positive effect. In the same way, peer interactions also enhanced engagement. Role clarity, in the form of reduced role ambiguity in environments, was important in order to provide better direction to officers while directing energy. Engagement was also detected as being an important mediator for the impact of the aforementioned variables on turnover in a two-step mediational process.

2.3 Career adaptability

Career construction theory implies that human development is a process driven by an adaptation process with a goal of person-environment integration. Professionals need to adapt to new roles, functions, information, interactions, and many other constantly changing aspects. Savickas and Porfeli (2012) define career adaptability as a construct related to an individual's resources for coping with current and anticipated occupational demands that alter social integration, functioning as self-regulating strengths or capacities. Career adaptability comprises four adapt-abilities, as denominated by the authors: 1. concern, 2. control, 3. curiosity, and 4. confidence. Thus, concern about the future represents preparation, while control is

related to one's capacity to shape oneself and the environment. Finally, curiosity and confidence are respectively related to exploring scenarios and trust in capabilities.

Career adaptability is well represented by how students direct their analytical thinking towards long-term objectives in order to nurture independence, a completion drive, and a willingness to make compromises (Gadassi, Gati, & Dayan, 2012; Robertson & Brott, 2014). While engagement is certainly needed in order to solve problems, adaptation is required to either change dysfunctional strategies in the direction of more adaptive and adequate actions to different configurations which may arise from circumstances (Harry & Coetzee, 2013).

Aman, as a military school, presents a wide diversity of challenges and critical decision-making moments. From the moment training begins, students need to plan Army branches' choices, functions, emphasis at studies and even moments where there is an opportunity to take on a leadership role during training maneuvers. Aman also includes in its body of regulations an objective to "educate a basic military personality profile, with a solid ethical scaffold, and attitudinal development...." (Brasil, 2014). This is added to a career where mobility, responsibility, and changes tend to be second nature in the professional trajectory.

Contrarily, most of the studies on career adaptability in the Military are related to retirement or the adaptation of veterans (e. g., Robertson & Brott, 2013; Ghosh & Fouad, 2016; Blackburn, 2016), even though it is an important protective characteristic in psychological health. It is important to understand that transition is implied because the military academy corresponds to an important, but brief, moment in a military career. This is especially true when related to organizational commitment and job embeddedness. Adaptation can provide a smarter framework for energy employment during task performance and other long-term aspects of career, such as choosing a careful educational pathway and assignments. This is also known to not only allow for better career results, but also to foster higher levels of life satisfaction and realization (Ferreira, 2014; Zhou & Lin, 2016).

2.4 A mutualistic perspective on job satisfaction, engagement and adaptability

The last two decades gave rise to an increase in interest in exploring a network analysis of psychological variables. This family of procedures has been long used in sociology to represent relationships within an institutional context or groups. Network analysis is also widely used in other com-

putational scenarios in order to evaluate interconnectedness. In psychology, its use has been called psychological networks (PNs); this offers a rich framework in which to represent psychological phenomena (Epskamp & Fried, 2018).

PNs employ a correlational framework combined with machine learning technology in order to find the best models. Networks can include directed and undirected relationships through different algorithms. This paper is based on undirected PNs, because assuming directions in the assessment of job satisfaction, engagement, and career adaptability would not account for the mutual influence those variables present. PNs also allow for the investigation of active beliefs and behaviors because its approach relates to the role of individual items and not factor scores – although a PN can also be built considering such an analytical level. This activity underpins how influential every item can be in a PN. This characteristic has been used to investigate active symptoms in psychopathology, core beliefs of attitudinal networks and can also indicate more active and influential dimensions of organizational beliefs (Menezes, Moraes, Mendy, Zwiegelaar, & Pires, 2019; Costantini et al., 2019).

The objective of this paper is to examine the relationship between engagement, career adaptability, and job satisfaction in an exploratory framework, considering that those three variables have interchangeable characteristics. This paper hypothesizes that job satisfaction interacts with engagement, and the former is an important factor constantly managed through an adaptation process, providing information feedback to satisfaction. The framework of PNs also makes it possible to understand which constructs' items are of core importance, offering valuable directions for pedagogical planning at Aman.

Evidence indicates that the relationship between job satisfaction and career adaptability is not clear, although a small effect has been reported in a meta-analysis by Rudolph, Lavigne, Katz, and Zacher (2017). Contrarily, job satisfaction has been reported to be associated with employees' engagement for different models (Eldor & Harpaz, 2016; Ilies, Aw, & Pluut, 2015). Rudolph et al. (2017) found stronger evidence of the relationship between adaptability and work engagement, where success in adapting to the work environment can increase a sense of belonging and commitment. Collie, Holliman, and Martin (2017) also found additional evidence of the correlation between the two variables, where adaptability is positively related with behavioral engagement and with a reduction of negative engagement – avoidance and disengagement. Thus, it is possible to present two possible

research hypotheses besides the null hypothesis of a network where all constructs are uncorrelated (H0):

- H1: The estimation of a network, considering the measures for engagement, career adaptability, and job satisfaction, is likely to result in a fully connected and sparse network.

Considering the findings of Rudolph et al. (2017) – which was an extensive meta-analysis –, it is possible that part of the network could be disconnected, and a second hypothesis needs to be considered:

- H2: The estimation of a network, considering the measures for engagement, career adaptability, and job satisfaction, is likely to result in a partially connected and sparse network, where nodes from the job satisfaction measure could disconnect.

As will be described in the following section, our sample comprises of three different classes from a military academy. Considering that different academy years yield specific challenges with regard to the military career – as dictated by Aman’s curriculum – another hypothesis is that a network estimated drawing students according to their academic year will result in different network configurations. Hence:

- H3: The estimation of a network, considering the measures for engagement, career adaptability, and job satisfaction, drawing subjects according to their academic years, is likely to result in distinct network configurations.

Our research team did not elaborate any further hypothesis for an expected influence measure because neither the literature nor the military academy’s curriculum allow for such specific propositions. Expected influence refers to item-level inferences – the complete network consists of more than 40 variables and more than 100 parameter estimates, which incurs such effort being unrealistic due to its complexity.

3. METHOD

3.1 Participants

The sample included 962 male participants, in an age range of between 18 and 26 years old, from the second ($n = 323$; 33.6%), third ($n = 345$;

35.9%), and fourth ($n = 294$; 30.6%) years of the Academia Militar das Agulhas Negras (Aman). Aman is a military school, where activities involve intensive military training and field activities compatible with the concept of work, which includes managing resources and even leadership roles while executing complex tasks.

3.2 Instruments

Survey instruments in this paper were part of a wider initiative of educational and psychological assessment within the military school. Of relevance for the herein reported results were demographic information, the Job Satisfaction Scale (JS; Judge & Klinger, 2000), the Career Adapt-Abilities Scale (CAS; Duarte et al., 2012) and the Utrecht Work Engagement Scale for Students – abbreviated as ESS in the networks and graphs due to character limitations for the qgraph package’s output (Schaufeli et al., 2002).

In the JS scale, students report how often they feel each of the five items described. Answers are provided using a frequency scale from 1. “never”, 2. “sometimes”, 3. “regularly”, 4. “many times”, and 5. “always”. JS measures job satisfaction through a single dimension, which includes both cognitive and affective aspects of the construct (Judge & Klinger, 2008).

For the CAS scale, the instructions were similar, but referred to respondents’ studies using 28 items. Answers were provided also using a five-point Likert scale, but the descriptors were different: 1. “very little”, 2. “little”, 3. “reasonably”, 4. “a lot”, and 5. “mostly”. CAS was built to measure career adaptability abilities in four dimensions: 1. concern, which includes items related to one’s concern with one’s own career, preparation, and career goals; 2. control, which is related to how much one is able to continually perform tasks and accept responsibilities; 3. curiosity, with items related to interest in exploring new opportunities, solutions, and insights; and 4. confidence, which is associated with one’s perception about one’s own performance, skills, and capabilities to deal with problems (Duarte et al., 2012). Its structure was also confirmed in a meta-analysis by Rudolph et al. (2017).

ESS has the same answer system as the one used in JS. ESS measures three different factors related to engagement in studies, which can be listed as: 1. vigor – represented by stamina and energy the student perceives while studying or attending classes; 2. dedication – includes items related to one’s purpose, inspiration, and meaning for studies; and 3. absorption – indicates the experience of flow during studies, combining a feeling of well-being, resulting in not realizing the time or energy spent (Schaufeli et al., 2002).

3.3 Procedure

The research was approved by both Aman's Psychopedagogical Section of the Teaching Division of Aman and by a designated ethics committee board within Plataforma Brasil; the process is available through protocol number 23083.000375/2015-97.

Forms were made available for the students through an internal online platform for 15 days in November. Participation was part of the assessment program, though identification was omitted in order for the researchers to assess the database. The instruments were first presented with a description of the survey, including objectives, duration, possibility for termination of participation at any given time, privacy clause, and other information considered critical for transparency. After reading the consent terms, students were presented with a very brief demographic questionnaire, followed by other survey instruments, and the CAS, ESS, and JS scales. After finishing the form, students were presented with an option to submit the survey form, completing the research protocol.

3.4 Data analysis

The statistical software used for this paper was R v.3.5.1 (R Core Team, 2018), using the packages lavaan (Rosseel, 2012), psych (Revelle, 2018), and qgraph (Epskamp, Cramer, Waldorp, Schmittmann, & Borsboom, 2012). As a first step, the workflow considered if measures had satisfactory psychometric properties – construct level validity through confirmatory factor analysis (CFA) – and internal consistency by estimating McDonald's omega coefficient, which consists of composite reliability considered to perform better than Cronbach's alpha in a series of aspects. Readers are encouraged to find more information in Revelle and Condon (2018).

CFA was estimated using Weighted Least Squares Mean and Variance adjusted (WLSMV), because items were of ordinal measurement level, together with robust standard errors (DiStefano & Morgan, 2014). Evaluation of the models took into consideration both fit and the identification of local dependency. Model fit was assessed according to the recommendations by Brown (2014) for non-significant χ^2 : χ^2 / df ideally below 3.00 but acceptable below 5.00, CFI and TLI as close as possible to 1.00, RMSEA and SRMR preferably below 0.08. More in-depth aspects of the confirmatory models will not be provided because this would be outside the scope of this paper. The same fit indexes were used to evaluate the estimated PN.

After preparing the measures, the PN was estimated. PNs are a family of procedures derived from graph theory – more specifically Markov random fields (MRFs) and closer to what is called Gaussian graphical models. PNs are estimated through a process of machine learning by first providing a correlation matrix, which is transformed into a partial correlation matrix; then an EBICglasso algorithm initiates a process of penalization on the correlation coefficients, where near-zero associations are set to zero in a shrinkage process. Results are transported into a sparse graph where items are represented by nodes, which are connected by edges. Near zero associations that drop to zero turns into absent edges, while the remaining edges are accounted for by space configurations within a force-based graph (Golino & Epskamp, 2017; Epskamp & Fried, 2018).

One of the main advantages of this approach is that PNs allow for stable and reliable results because of their robustness towards collinearity and spurious associations. With regard to the prior aspect, because edges can be understood as partial correlations, networks condition every node to the presence of the entire system, reducing the impact of collinearity (Costantini et al., 2019). Moreover, PNs also provide important information as to how influential every node is: these are called centrality measures and influence measures.

Centrality measures are known to account for the position and connections a node has. Traditionally, one of the most stable centrality indexes is *strength*, which is the sum of the connections a node has, without considering its sign – only absolute values are used in calculations. Thus, nodes high in strength usually receive and transmit information to most of their network. The problem arises in signed networks: a node might receive both positive and negative edges, which implies not necessarily a high activation, but a low level of activation of a node inside a network, because negative edges might neutralize it. In order to account in a more accurate way for influence, Robinaugh, Millner, and McNally (2016) proposed a one-step expected influence based on the non-conversion of weights into absolute numbers. The authors also affirmed that a two-step is possible, by taking into consideration neighbourhood information of the remaining nodes in a network. As in this paper, the PNs resulted in a relevant number of negative edges and preference was given to expected influence as an indicator instead of centrality indexes. It is important, also, to indicate that Robinaugh et al. (2016) distinguish centrality from influence, in which centrality refers more to a matter of position of a node in a graph.

4. RESULTS

4.1 Adequacy of measures

The first step of this paper was to ascertain that all measures had a satisfactory configuration. Thus, confirmatory fit indexes were analyzed for the three scales – ESS, CAS, and JS. All three achieved a satisfactory model adjustment. Factor loadings were above .30 in all scales. Table 1 includes fit indexes for the three measures. Models were estimated through Weighted Least Squares Mean and Variance adjusted (WLSMV). Only one item had to be eliminated due to excessive noise, which was Item 4 on ESS, which was preventing the measure from fitting adequately.

(Figure 4.1.1)

INFORMATION ON CONSTRUCT VALIDITY FOR THE THREE MEASURES:
ESS, CAS, AND JS

Measure	χ^2	df	χ^2/df	CFI	TLI	RMSEA	SRMR
ESS	269.14	62.00	4.34	0.93	0.91	0.059	0.038
CAS	829.16	344.00	2.41	0.91	0.90	0.038	0.035
JS	19.58	4.00	4.90	0.98	0.95	0.064	0.021

Source: Elaborated by the authors.

The scales also performed reasonably well considering reliability: the ESS’s vigour dimension reliability achieved $\omega = 0.85$, while dedication was $\omega = 0.86$ and the absorption dimension achieved $\omega = 0.81$. The complete set of ESS items resulted in $\omega = 0.92$. For the CAS, the concern dimension resulted in $\omega = 0.91$, control $\omega = .88$, curiosity $\omega = 0.91$, and confidence $\omega = 0.92$, and $\omega = 0.97$ for the complete item list. Finally, for the complete set of items, JS resulted in $\omega = 0.80$.

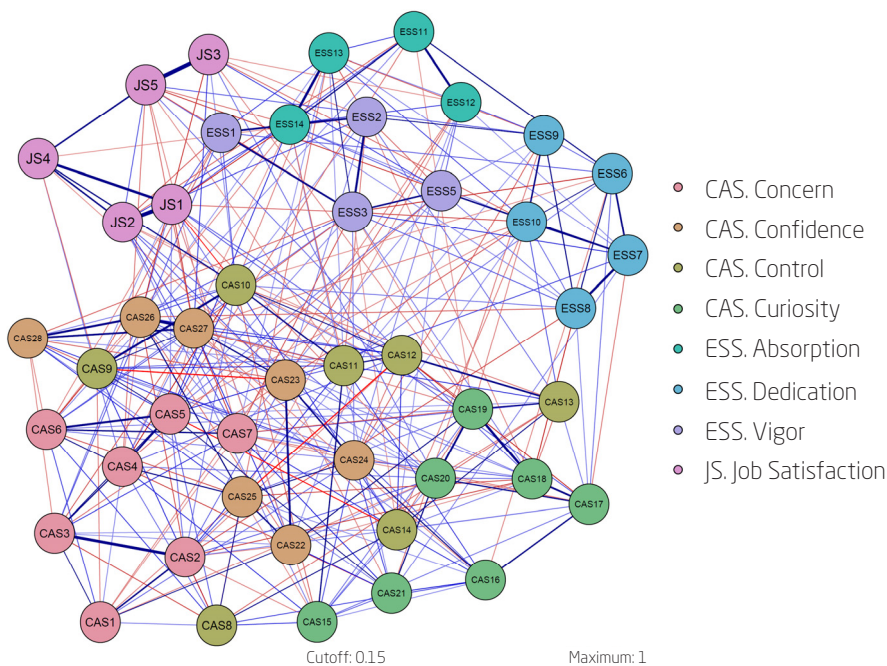
4.2 Network analysis

After ascertaining the quality of measure for the three scales, the initial process of estimating PNs involved the estimation of a polychoric correlation matrix, by detecting items as being ordinal through the *cor_auto* algorithm. The unregularized partial correlations network (Figure 4.2.1) resulted in a very dense network, where the highest correlation was 0.54 for the edge

JS3 “Each day at work seems like it will never end”óJS5 “I consider my job to be rather unpleasant”. Figure 4.2.1 indicates a tendency of collision between engagement and job satisfaction items. Edges are both positive and negative between the three higher-order constructs. First-order dimensions are apparently well preserved, except for the control dimension from CAS, which seems to scatter in the unregularized network. In this step, it is early to determine relevant edges and most of the unregularized partial correlations help the understanding of differences before and after the shrinkage process within EBICglasso.

(Figure 4.2.1)

UNREGULARIZED PARTIAL CORRELATIONS NETWORK. THICKNESS OF EDGES INDICATE THE STRENGTH OF ASSOCIATION; BLUE EDGES INDICATE POSITIVE ASSOCIATIONS; RED EDGES INDICATE NEGATIVE PARTIAL CORRELATIONS

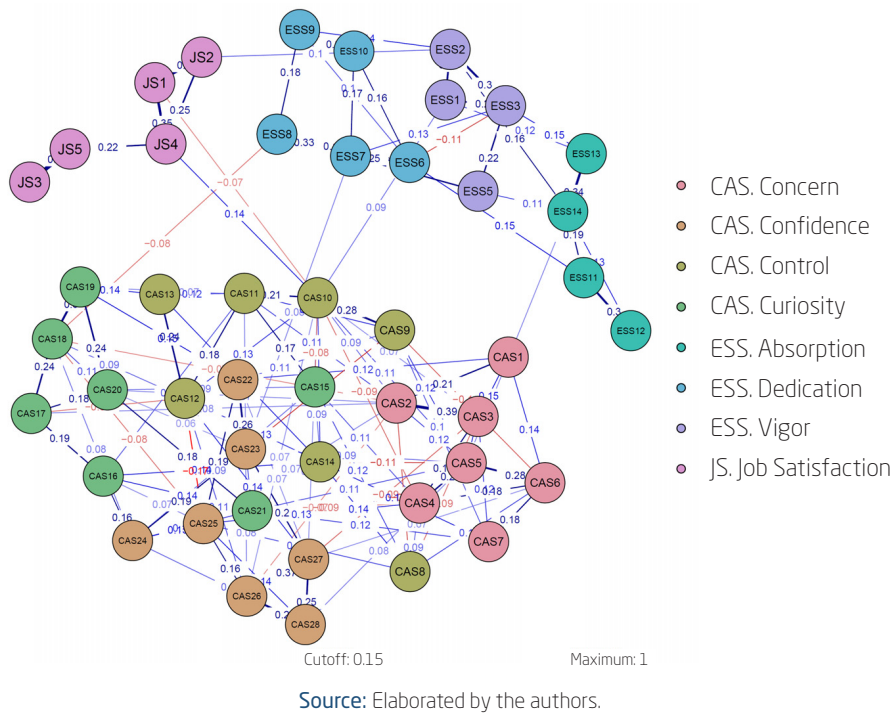


Source: Elaborated by the authors.

For the regularized network, a covariance matrix was also estimated in order to later add information to the model fit function – GGMfit. After estimating the correlations matrix, the PN was finally estimated with a tuning parameter of 0.50, an enabled threshold option, and a minimum lambda

ratio of .01 in order to guide the machine learning process to find the best model. The chosen estimation process was EBICglasso. The process results are presented in Figure 4.2.2 with the network plotted using the spring layout, which is a force-based graph. Structure fit indexes resulted in $\chi^2 = 1981.83$, $df = 942$, $\chi^2 / df = 2.10$, CFI = 0.96, TLI = 0.96, RMSEA = 0.034, SRMR = 0.054.

(Figure 4.2.2)
PSYCHOLOGICAL NETWORK PLOTTING ITEMS AS NODES. BLUE EDGES INDICATE POSITIVE ASSOCIATIONS, WHILE RED EDGES REPRESENT NEGATIVE. ‘CUTOFF’ INDICATES THE CORRELATION VALUE FROM WHICH COLOUR AND WIDTH OF EDGES ARE MORE INTENSELY COLOURED



The highest edge value within the network was 0.53, which was kept between JS3óJS5, and was consistent with the unregularized network. Feeling the workplace to be unpleasant was then connected to perceiving time differently, resulting in energy loss. Considering the connection between engagement and job satisfaction, ESS2 “I can continue for a very long time when I am studying”óJS2 “Most days I am enthusiastic about my work”

have a positive edge of 0.10, indicating students will persist and report more stamina when feeling positive. Considering career adaptability, there's a connection between JS1 "I feel fairly satisfied with my present job" ó CAS10 "Taking responsibility for my actions", but the connection gave a negative result (-0.07). The adaptability item was also connected with JS4 "I find real enjoyment in my work" by 0.14. The contrast between both items JS1 and JS4 implies that satisfaction might not add to engagement but enjoying one's experience at work will have a more efficient human agency activation.

Other connections were also detected between engagement and career adaptability in a total of four edges. This indicates again that gratification feelings during task performance increase the sense of duty. The same is confirmed by the connection between ESS7 "My studies inspire me" ó CAS23 "Taking care to do things well" (0.07). Unexpectedly, being open to a diversity of solutions is also negatively related to being enthusiastic: ESS8 'I am enthusiastic about my studies' ó CAS18 "Observing different ways of doing things" (-0.08). Finally, it also enhances consciousness about career planning – ESS14 "I can get carried away with my studies" óCAS5 "Becoming aware of the educational and career choices that I must make" (0.07).

4.3 Expected influence

The three most influential items of the PN were CAS5 "becoming aware of the educational and career choices that I must make", CAS10 "taking responsibility for my actions", and ESS7 "My studies inspire me". The most influential job satisfaction item was JS4 "I find real enjoyment in my work". The results indicate how awareness and being mindful of one's own career are the most active beliefs in the network. Within the ten most influential, there is an important placement for item ESS2, which is related to the perception of stamina during studies. In general, the top items seem to indicate the relevance of cues for self-efficacy as a core activated functioning.

(Figure 4.3.1)

EXPECTED INFLUENCE (EI) FOR THE PSYCHOLOGICAL NETWORK NODES. ITEMS ORDERED BY INFLUENCE LEVELS

Node	EI	Node	EI	Node	EI	Node	EI
CAS5	1.22	CAS23	0.91	JS1	0.76	ESS13	0.60
CAS10	1.18	CAS19	0.91	JS5	0.75	ESS8	0.59

(continue)

(Figure 4.3.1 (conclusion))

**EXPECTED INFLUENCE (EI) FOR THE PSYCHOLOGICAL NETWORK NODES.
ITEMS ORDERED BY INFLUENCE LEVELS**

Node	EI	Node	EI	Node	EI	Node	EI
ESS7	1.17	CAS22	0.90	CAS4	0.74	CAS18	0.59
CAS11	1.11	CAS24	0.89	ESS1	0.71	CAS15	0.57
CAS26	1.00	CAS2	0.89	ESS6	0.71	ESS10	0.56
ESS14	1.00	CAS3	0.88	CAS21	0.70	ESS5	0.55
CAS27	1.00	CAS12	0.86	CAS7	0.67	JS3	0.53
ESS2	0.97	CAS6	0.86	ESS9	0.65	CAS9	0.52
JS4	0.95	JS2	0.83	CAS13	0.64	ESS12	0.43
CAS20	0.94	CAS16	0.81	ESS11	0.64	CAS8	0.38
ESS3	0.92	CAS14	0.78	CAS1	0.61	-	-
CAS28	0.92	CAS25	0.77	CAS17	0.61	-	-

Source: Elaborated by the authors.

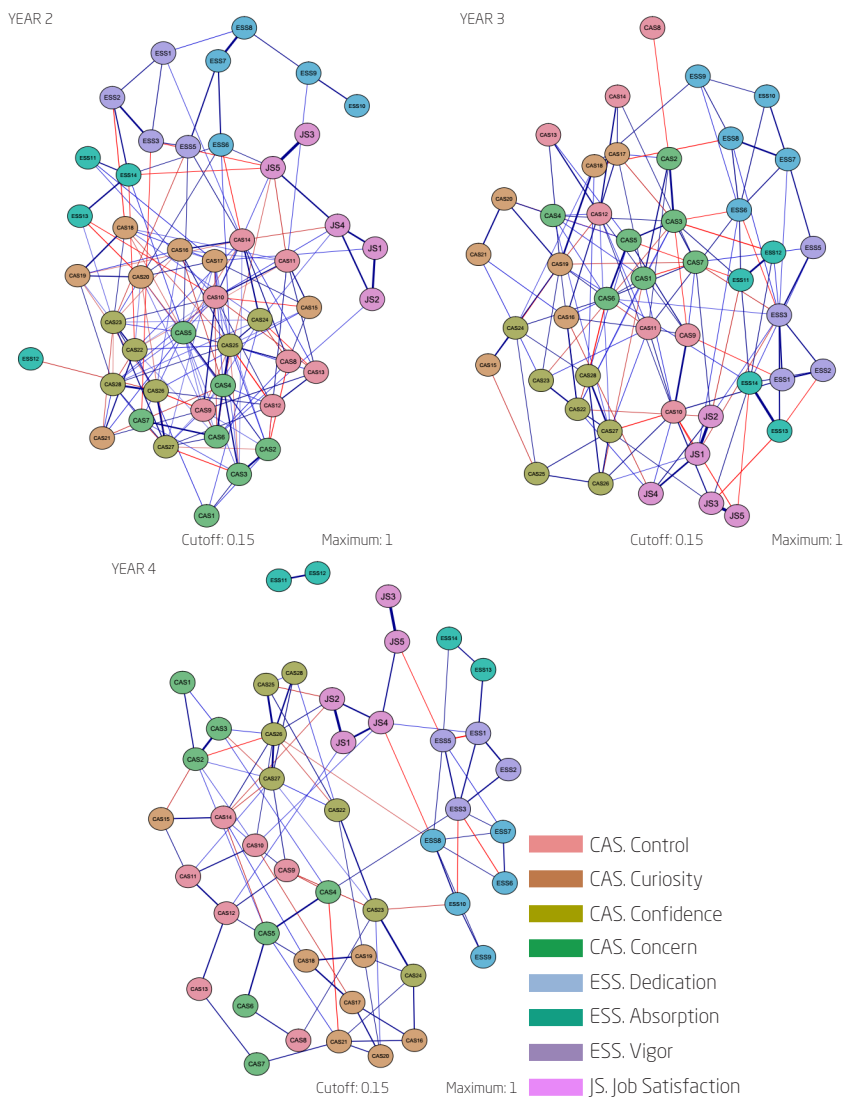
4.4 Differences in expected influence between classes

The first aspect that is important to determine is an estimation of the network for the three groups. Figure 4.4.1 presents the networks for second, third, and fourth year students. Edge labels were not included because the font size would not be legible. Graphs were set with the same parameters in order to be comparable.

First, it is possible to note that the network between JS, ESS, and CAS becomes progressively sparse, reducing the number of connections different from zero. Compared with students of the second year (176 edges), the third year has approximately 19% less edges (143 edges), while the fourth drops by 55.7% (98 edges). The third graph for the fourth year breaks down the absorption dimension into two dissociated aspects and part does not connect anymore to the rest of the network, as is the case for the items ESS11 “Time ‘flies’ when I’m studying” and ESS12 “When I am studying, I forget everything else around me”.

(Figure 4.4.1)

SET OF NETWORKS FOR SECOND, THIRD, AND FOURTH YEARS. BLUE EDGES INDICATE POSITIVE EDGES, WHILE RED INCLUDES NEGATIVE ASSOCIATIONS



Source: Elaborated by the authors.

A comparison of the expected influence of the items from the three networks results in slightly correlated measures. Significant but small Pearson correlations were detected between expected influence measures for second

and third year ($r = 0.30$, $p = 0.040$, 95% CI [0.01, 0.55]), second and fourth year ($r = 0.35$, $p = 0.018$, 95% CI [0.07, 0.58]), and third and fourth year students ($r = 0.35$, $p = 0.016$, 95% CI [0.07, 0.58]). The results indicate that expected influence tends to be more unstable, which demands direct analysis of this discrepancy. For the second year, the most influential items were CAS05 “Becoming aware of the educational and career choices that I must make”, CAS10 “Taking responsibility for my actions”, and CAS17 “Investigating options before making a choice”. The third year has the most influential items, listed as ESS14 “I can get carried away by my studies”, CAS27 “Solving problems”, and ESS03 “When I study, I feel like I am bursting with energy”. Fourth year does not repeat any of the related items, with the top items listed as: CAS26 “Overcoming obstacles”, CAS12 “Counting on myself”, and JS4 “I find real enjoyment in my work”. Figure 4.4.2 includes expected influence ordered by item insertion, because ordering by intensity would not provide a consistent perspective throughout the three groups.

(Figure 4.4.2)

RELATION OF ITEMS AND EXPECTED INFLUENCE FOR THE 2ND (T2), 3RD (T3), AND 4TH (T4) YEARS

Items	t2	t3	t4	Items	t2	t3	t4	Items	t2	t3	t4
ESS1	0.66	0.62	0.69	CAS4	0.98	1.00	0.28	CAS20	0.74	0.61	0.75
ESS2	0.60	0.56	0.55	CAS5	1.62	0.99	0.73	CAS21	0.43	0.57	0.73
ESS3	0.38	1.29	0.74	CAS6	0.93	1.09	0.51	CAS22	0.90	1.04	0.76
ESS5	0.65	0.81	0.33	CAS7	0.36	0.58	0.41	CAS23	1.02	0.62	0.70
ESS6	0.68	0.95	0.21	CAS8	0.57	-0.15	0.38	CAS24	0.86	0.98	0.90
ESS7	0.94	1.16	0.70	CAS9	0.60	0.71	0.27	CAS25	1.28	0.44	0.54
ESS8	0.77	0.68	0.64	CAS10	1.41	1.05	0.77	CAS26	0.87	0.89	1.30
ESS9	0.58	0.67	0.38	CAS11	1.03	1.12	0.81	CAS27	0.90	1.31	0.97
ESS10	0.25	0.63	0.15	CAS12	0.66	1.08	1.05	CAS28	1.28	0.64	0.75
ESS11	0.51	0.64	0.33	CAS13	0.62	0.59	0.46	JS1	0.87	0.82	0.96
ESS12	-0.14	0.49	0.33	CAS14	1.07	0.61	0.31	JS2	0.84	0.77	0.68
ESS13	0.03	0.38	0.49	CAS15	0.65	0.35	0.29	JS3	0.53	0.94	0.51
ESS14	0.76	1.34	0.39	CAS16	0.83	0.80	0.69	JS4	1.06	0.69	0.99

(continue)

(Figure 4.4.2 (conclusion))**RELATION OF ITEMS AND EXPECTED INFLUENCE FOR THE 2ND (T2),
3RD (T3), AND 4TH (T4) YEARS**

Items	t2	t3	t4	Items	t2	t3	t4	Items	t2	t3	t4
CAS1	0.59	0.81	0.39	CAS17	1.35	0.86	0.64	JS5	0.52	0.22	0.60
CAS2	0.77	0.76	0.66	CAS18	0.40	0.90	0.91	-	-	-	-
CAS3	0.94	0.65	0.69	CAS19	0.73	1.18	0.80	-	-	-	-

Source: Elaborated by the authors.

5. DISCUSSION

This paper attempts to understand the dynamics between engagement (absorption, dedication, and vigor), career adaptability (control, curiosity, confidence, and concern), and job satisfaction considering students from second, third, and fourth year of the Aman. Addressing the specific hypotheses of this paper, our data indicate that H0 can be rejected because the resulting networks tended to be sparse, though included patterns of inter-connectedness among selected constructs, satisfying the fundamental assumption of PNs (Epskamp & Fried, 2018). H1, which comprises a fully connected network, was valid only when considering the unregularized network – before processing data under EBICglasso; thus, rejection is recommended for this hypothesis. The results indicate a scenario that is closer to H2, where the network was partially connected. Our data indicates that engagement and career adaptability tended to have more connections through all of the networks when comparing bridges between both constructs and job satisfaction. Finally, estimating PNs for the different academy years resulted in different configurations.

Our data agree with contributions that found associations between engagement and job satisfaction as being weak and positive (e. g., Eldor & Harpaz, 2016; Ilies et al., 2015). One of the strongest edges was between perceived job satisfaction related to how uninteresting one's job is (JS10) when time perception increases (JS8). In fact, some of the activities at Aman also challenge students' resistance and endurance during time-consuming tasks. An example involves guarding the headquarters and long excursions into the wilderness. Maybe one of the most curious associations was the triangle formed by the sense of enjoyment (JS4), mere satisfaction (JS1),



and sense of responsibility (CAS10). In this context, just being satisfied was negatively associated with taking responsibility, which seems to require actual enjoyment in order to activate positively. Considering the problem of taking responsibility, it is possible to refer to it in parallel with organizational citizenship behavior (OCB). Job satisfaction, as an enjoyment indicator, has been associated with higher OCB levels (Li, Liang, & Crant, 2010; Zeinbadi & Salehi, 2011). A limitation of such an interpretation is caused by the use of an analogy of the item's content in terms of OCB, though it is inserted in a career adaptability measure. More research is needed in order to understand the moderation effect of the different levels of job satisfaction.

Connections between career adaptability and engagement were detected, replicating the findings of Rudolph et al. (2017) and Collie et al. (2017). Career adaptability has a total of four edges connecting to engagement, while job satisfaction has a maximum of two edges connecting to career adaptability. ESS8 "I am enthusiastic about my studies" was responsible for at least two edges within the network between engagement and career adaptability. Interpretation of item content indicates that the role of feeling enthusiastic is related to having higher adaptability and, conversely, a lower level of aversive responses to situations (e. g., CAS10 "Taking responsibility for my actions"). The link between job satisfaction and career adaptability included two edges which shared a common connection from the item CAS10. The findings also reflect the known associations between both variables, where career adaptability, in higher levels, is a predictor of higher scores for job satisfaction due to a reduction in the experience of negative affect (e. g., Fiori, Bollmann, & Rossier, 2015; Zacher, 2015).

A last unexpected association was between one being enthusiastic (ESS8) and open to new solutions (CAS18), which resulted in a negative edge. In military psychology, we could not find conclusions parallel with our results; nonetheless, work involving public security demands standardization of processes and creation of protocols. One hypothesis is that enthusiasm rises with the understanding and naturalization of activities and tasks, which tend to move in the direction of stability. Our networks included a disconnection for the nodes ESS11 "Time 'flies' when I'm studying" and ESS12 "When I am studying, I forget everything else around me" from the engagement measure. This hypothesis was not expected, though it is possible that both items refer to beliefs strongly related to studies, while later military academy years at Aman are increasingly disconnected from a traditional academy setting, as they are directed towards the operational activities carried out in the barracks.



The measures of influence indicate the most active nodes for those students were related to adaptability where, in our estimated networks, items referring to awareness of career choices, along with a sense of responsibility and inspiration, were the most active. The activation of the sense of responsibility is a core aspect in educating new candidates to the military as a reflection of duty. Inspiration was also associated with being an important aspect in this context; this converges with other studies on engagement if interpreted as realization (Ivey & Kline, 2010; Zangaro & Kelley, 2010). The most active nodes also indicate the ones with the highest capability of reflecting changes in the network. A pedagogic recommendation would be to invest more in transformational leaders, because their characteristics would cause easier reach and greater influence on other parts of the network with regard to engagement, adaptability, and job satisfaction. Thus, an effort towards leadership diagnostics at Aman is of critical importance.

An examination of influence also seems to offer an important warning. Items related to autonomy (CAS9), keeping an upbeat spirit (CAS8), and providing opportunities to experience a deep flow while performing tasks (ESS12) are aspects related to needing interventions of positive psychology, because these could be key aspects for enhancing resilience. This is in line also with the recommendation of working with transformational leadership. According to Meredith et al. (2011), a systematic literature review of resilience protocols applied to the Military indicates that positive thinking, positive affect, positive coping, realism, and behavioral control are aspects that show strong evidence of fostering resilience levels.

The expected influence measure for the three academic years allows us to interpret the second year as a moment of awareness of career branches when learning about and deciding upon roles and career choices; the third year reflects a pattern of developing a sense of commitment and organizational citizenship. The fourth year's most influential nodes tended to include items that reflect more practical and work-related matters. More research is needed in order to infer that this configuration represents the growth process within military education. This limitation of our conclusions reflects a weakness in our study's design, which comprised an independent sample design. A future study should consider a longitudinal design as a proper framework to answer such hypotheses. Another weakness of our study consists of the scarcity of other contributions discussing the associations between constructs for an item-level analysis. This is a relevant obstacle in understanding the meaning of the dynamics for the analyzed data, and the authors of this paper recommend caution until more contributions following a similar framework are carried out, allowing for a more thorough discussion.

One of the strengths of this study is its sample size, which allows for high statistical power. This is important because networks are increasingly demanding in terms of variance (Epskamp & Fried, 2018) due to the volume of edges, which in turn are counted as estimated parameters. Nevertheless, one theoretical problem is the absence of performance or other related indicators to better understand the role of the three studied variables towards efficiency and performance.

ADAPTABILIDADE DE CARREIRA, ENGAJAMENTO E SATISFAÇÃO NO TRABALHO: UMA REDE PSICOLÓGICA NO CONTEXTO DA EDUCAÇÃO MILITAR

RESUMO

Objetivo: Evidências apontam que a adaptabilidade de carreira e o engajamento são características que contribuem para o enfrentamento de desafios inerentes à carreira militar. Satisfação com o trabalho surge como uma das variáveis que interagem com ambas, uma vez que otimiza a manutenção da *performance*. O presente artigo tem por objetivo examinar a rede psicológica (RP) das variáveis mencionadas.

Originalidade/valor: A interação entre as variáveis mencionadas é bem documentada na literatura, porém não são observados estudos no contexto da educação militar. Informação sobre redes oferece *insights* críticos para o desenvolvimento de treinamento baseado em forças, direcionados para comportamentos, crenças e atitudes altamente influentes para os estudantes.

Design/metodologia/abordagem: O desenho de pesquisa foi seccional e de base quantitativa. Um total de 962 alunos do sexo masculino do segundo ($n = 323$, 33,6%), terceiro ($n = 345$, 35,9%) e quarto ($n = 294$, 30,6%) anos da Academia Militar das Agulhas Negras (Aman), entre 18 e 26 anos responderam aos formulários. Dentre os instrumentos, é possível listar: questionário sociodemográfico, a Escala de Satisfação com o Trabalho, Escala de Adaptabilidade de Carreira e a Escala Utrecht de Engajamento no Trabalho para Estudantes. Redes psicológicas foram estimadas para a amostra, considerando também a alocação dos participantes por ano de formação.

Resultados: Um dos principais achados indica que a RP tende a perder conectividade durante os anos de formação, especialmente considerando os itens de satisfação e engajamento. Estudantes da Aman podem experimentar naturalmente um processo de desconexão de um contexto acadêmico/educacional, e, por esse motivo, constructos representativos desse tipo de experiência começam a perder configuração como um gráfico. Estudos longitudinais são necessários para confirmar diferenças detectadas entre estudantes dos diferentes anos.

PALAVRAS-CHAVE

Satisfação com o trabalho. Engajamento. Adaptabilidade de carreira. Redes psicológicas. Psicologia das organizações.

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AUTHOR NOTES

Pedro P. Pires, PhD from the Postgraduate Program in Psychology, Federal University of Rio de Janeiro (UFRJ); George H. S. Pinto, master from the Department of Psychology, Federal



Rural University of Rio de Janeiro (UFRRJ); **Marcos A. Souza**, PhD from the Postgraduate Program in Psychology, UFRJ; **Magno O. Macambira**, PhD from the Postgraduate Program in Psychology, Federal University of Bahia (Ufba); **Gabriel L. Figueira**, bachelor from the Institute of Psychology, UFRJ.

Pedro P. Pires is now adjunct professor and head of the Department of Psychometrics of UFRJ; George H. S. Pinto is now head of the Psychopedagogical Section of Military Academy of Agulhas Negras (Aman); Marcos A. Souza is now associate professor IV and head of the Department of Psychometrics of UFRJ; Magno O. Macambira is now assistant professor at the Department of Human Sciences and Philosophy (DCHF) of Feira de Santana State University (Uefs); Gabriel L. Figueira is now assistant professor at the Department of Psychology of Celso Lisboa University Center (UCL).

Correspondence concerning this article should be addressed to Pedro P. P. Santos, Avenida Pasteur, 250, Urca, Rio de Janeiro, RJ, Brasil, CEP 22290-902.

E-mail: pedropires@psicologia.ufrj.br

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