A Mixed Methods Study of Ranger Attrition:

Examining the Relationship of Candidate Attitudes, Attributions and Goals

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Abstract

Elite military selection programs like the 75th Ranger Regiment's Ranger Assessment and Selection Program (RASP) are known for their difficulty and high attrition rates, despite substantial candidate screening just to get into such programs. The current study analyzes Ranger candidates 'attitudes, attributions, and goals (AAGs) and their relationship with successful completion of pre-RASP, a preparation phase for the demanding eight-week RASP program. Candidates' entry and exit surveys were analyzed using natural language processing (NLP), as well as more traditional statistical analyses of Likert-measured survey items to determine what reasons for joining and what individual goals related to candidate success. Candidates' Intrinsic Motivations and Satisfaction as measured on entry surveys were the strongest predictors of success. Specifically, candidates' desire to deploy or serve in combat, and the goal of earning credibility in the Rangers were the most important reasons and goals provided through candidates' open-text responses. Additionally, between-groups analyses between Black Candidates, Hispanic Candidates, and White Candidates showed that differences in candidate abilities and motivations better explains pre-RASP attrition than demographic proxies such as race or ethnicity. The study's use of NLP demonstrates the practical utility of applying machine learning to quantitatively analyze open-text responses that have traditionally been limited to qualitative analysis or subject to human coding, although predictive models utilizing more traditional Likert-measurement of AAGs had better predictive accuracy.

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GENERAL AUDIENCE ABSTRACT

Elite military selection programs like the 75th Ranger Regiment's Ranger Assessment and Selection Program (RASP) are known for their difficulty and high attrition rates, despite substantial candidate screening just to get into such programs. The current study analyzes Ranger candidates' attitudes and goals and their relationship with successful completion of pre-RASP, a preparation phase for the demanding eight-week RASP program. Candidates' entry and exit surveys were analyzed to better understand the relationship between candidates' reasons for volunteering and their goals in the organization. Candidates' Intrinsic Motivations and their Satisfaction upon arrival for pre-RASP best predicted candidate success. Specifically, candidates' desires to deploy or serve in combat, and the goal of earning credibility in the Rangers were the most important reasons and goals provided through candidates' open-text responses. Additionally, between-groups analyses between Black Candidates, Hispanic Candidates, and White Candidates showed that differences in candidate abilities and motivations better explains pre-RASP attrition than demographic proxies such as race or ethnicity.

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1. Introduction

1.1 STT Program Attrition

Bartone et al. (2008) used the label "high reliability occupations" (HROs) to describe jobs where performance failures risk physical harm to the employee and others—whether teammates or the public. Due to the severe consequences of poor performance and the need to perform well in stressful situations, selection into a HRO usually involves successful completion of a rigorous training program, what Coombs (2020) labeled selection through training (STT). HROs that utilize STT include military occupations (Colosio et al., 2016; Coombs, 2020; Binsch et al., 2015) police (Nevers, 2019; Ryan et al., 2000), firefighter (Anderson, 2001) and commercial pilots (Hunter & Burke, 1994). STT programs typically include an education component to impart job-relevant knowledge, but the STT assessment process is distinguished by the inclusion of high-fidelity work sample tests designed to simulate the physical and/or psychological stress experienced on the job. The physical demands and the psychological strain on trainees result in high rates of attrition due to voluntary withdrawal, i.e., self-selection out of STT programs (Lytell et al., 2018; Schmitt & Ryan, 1997). In addition, successful completion of STT is usually the final stage in a multiple hurdle selection process. Prescreening of candidates based on less expensive selection instruments is featured as the entry hurdle for STTs.

In any selection context, the ideal organizational situation is for large numbers of qualified applicants to enter the selection process and to minimize voluntary withdrawal throughout the selection process. This optimum combination of a large applicant pool and low voluntary withdrawal allows the organization to be more selective, amplifying the importance of STT program performance, and maximizing the organization's probability of achieving staffing goals with qualified hires (Swider et al., 2015). For HROs, failure to attract applicants to the STT

program, in combination with high rates of voluntary withdrawal, will lead to failures to meet staffing goals assuming hiring standards remain exacting. The primary focus of the current study is to better understand the attitudinal and motivational antecedents of voluntary withdrawal from the 75th Ranger Regiment's Assessment and Selection Program (RASP), a STT program for an elite US Army Special Operations Unit.

1.2 Self-Regulation and Attrition

Several theories of human motivation applied to work contexts, such as self-efficacy theory (Bandura, 1997), goal setting theory (Locke & Latham, 1990), and self-determination theory (Deci & Ryan, 2000), provide insights into the cognitive-affective processes involved in decisions to remain in or attrit from STT programs. In addition, Kanfer and Chen (2016) posited that intra-individual influences, such as needs and motives, more proximally influence goal choice and goal pursuit of workplace outcomes than external influences. At a broader psychological level, all of the above theories and arguments fall under a more general concept of self-regulation as specified in Diefendorff & Chandler's (2011, p. 69) "model of action goals" (See Figure 1).

Figure 1: Diefendorff & Chandler's (2011) Model of Action Goals[1]

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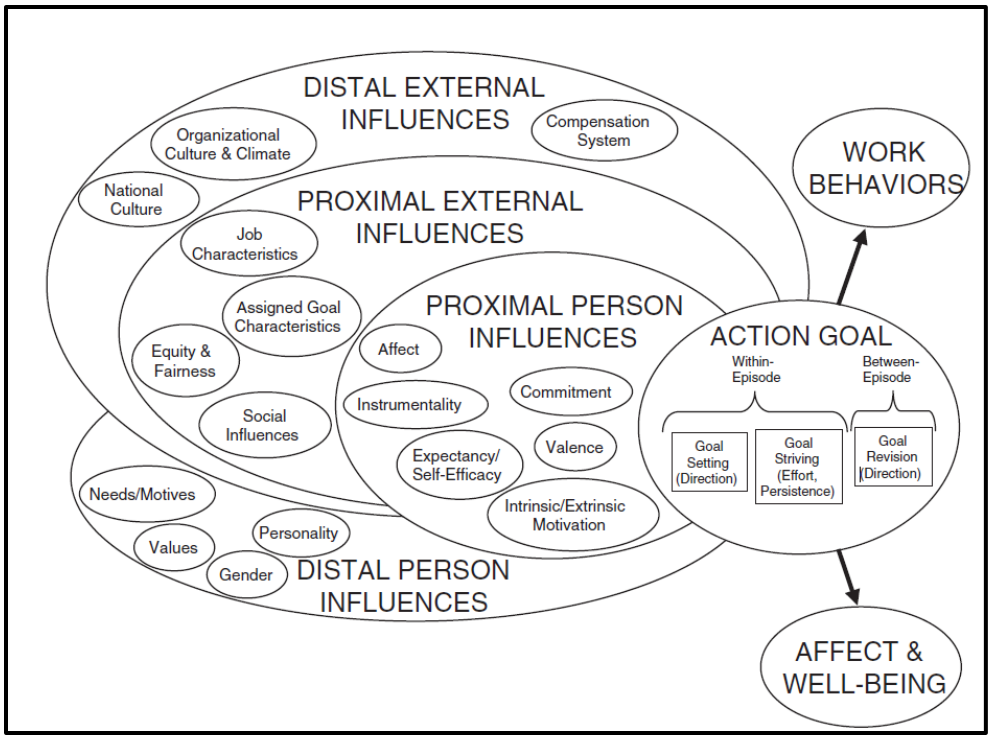


In the context of the current study, a candidate's pursuit of RASP classing up and RASP completion represent the action goal process. A candidate's attrition decision process represents goal revision. In Diefendorff & Chandler's model, proximal person influences such as intrinsic or extrinsic motivations, outcome expectancies, and individual affect are posited to most directly influence goal striving and goal revision. Proximal external influences, such as job characteristics, or social influences, are also posited to directly influence goal striving and goal revision, while personality influences are suggested to be more distal antecedents of individual's decisions. Evidence suggests that intrinsically motivated candidates believe they will be successful by creating specific and challenging goals informed by an accurate understanding of the job and the organization are most likely to be successful (Cho & Perry, 2012; Deci et al., 2017; Grant, 2008; Locke & Latham, 1990). Therefore, in consultation with the Ranger command, it was decided to measure both the action goal process directly and to measure relevant antecedents of action goals to inform future organizational efforts.

1.3 RASP Overview

RASP is operated by the 75th Ranger Regiment in the southeast United States. Arriving candidates enter pre-RASP training and are subsequently evaluated for entry into RASP, known as the "classing-up" decision. The primary focus of pre-RASP training is to improve candidates' physical abilities; in addition, candidates complete individual difference assessments of cognitive abilities and personality, and a diagnostic assessment for mental illnesses. At any time from a candidate's arrival through the completion of pre-RASP and the eight-week RASP training, candidates attrit for multiple reasons. The largest share of attritting candidates voluntarily withdraw from the process (Coombs, 2020). Other reasons for quitting include failure to meet RASP entry requirements for cognitive abilities, mental illness risk, physical injuries, and disciplinary (rule-breaking) reasons.

The Rangers invite approximately 2800 candidates per year to pre-RASP. Of those arriving for pre-RASP, there is historically a 50% class-up rate, resulting in 1320 candidates admitted to undergo an eight-week RASP course that combines aspects of training, organizational socialization, and assessment/selection of candidates. Attrition has been an issue of specific organizational concern for several years, with dramatic increases in attrition occurring between 2015-2017 (Kloepper, 2020). While some attrition is desirable to screen out those without the ability or the will to serve under the harsh conditions required of Rangers, attrition rates of 50% during pre-RASP, and additional attrition rates averaging 50% during the eight-week RASP phase strain the organization's ability to meet human resource staffing needs (Kloepper, 2020; Coombs, interview with RASP cadre, August 31, 2022).

Candidates are recruited from three sources. The majority are recruited during the Army service recruiting process, where highly qualified Army recruits are offered incentives such as

monetary bonuses to sign up for a limited number of offers to join the elite military unit, known as option 40 contracts (US Army, 2019). A second source of recruiting occurs during Army basic training and job training, where high performers from the initial entry training programs for each relevant occupational specialty (Infantry, Artillery, Medic, e.g.) are encouraged to volunteer for a more challenging assignment that also offers monetary and developmental incentives such as more advanced job-relevant education and training. The smallest number of candidates come from first-term active-duty Soldiers who have completed basic training, have begun service in an operational Army unit, are between the rank of E-1 to E-5, and volunteer to attempt the RASP and a subsequent assignment in the Rangers (Coombs, 2020; Coombs, interview with RASP cadre, August 31, 2022).

Once candidates complete pre-RASP screening requirements for classing up, they are admitted to the RASP. RASP training consists of an eight-week program of instruction consisting of increasingly difficult individual and team tasks that must be executed to exacting standards of performance. The program includes aspects of physical fitness, mental toughness, and learning and applying military skills such as land navigation, fast-roping, advanced weapons mastery, and performing medical trauma care as examples (Interview with RSTC Commander, November 9, 2022). In addition to skill development and assessments, the program also performs a socialization function for the Rangers and exposes candidates to important aspects of unit climate and culture.

1.4 Coombs (2020) RASP Study

The Rangers follow the military tradition of collecting physical ability assessments and standardized tests of both general mental ability and personality as part of the RASP screening process. However, these individual difference assessments are utilized in a subjective, clinical

judgment process to make class-up decisions. Coombs (2020) demonstrated that entering these individual difference assessments in algorithmic prediction models improved on the expected base rate of success in RASP. However, in subsequent conversations with the Ranger command, it was decided to continue the research program by focusing on proximal predictors of candidate attrition during pre-RASP. Specifically, the goal of the organization was to better understand relationships between candidate motivations and attrition outcomes. As such, for the current study, a survey was created to measure candidates' attitudes, attributions, and goals (AAGs) related to their pursuit of a Ranger assignment—from the time candidates arrive for pre-RASP training through the completion of RASP. Additionally, given Ranger command's goal to increase racial diversity, they agreed that the survey process presented an opportunity to study race differences in AAGs, and to test for race as a potential moderator of AAGs related to the decision to quit/stay.

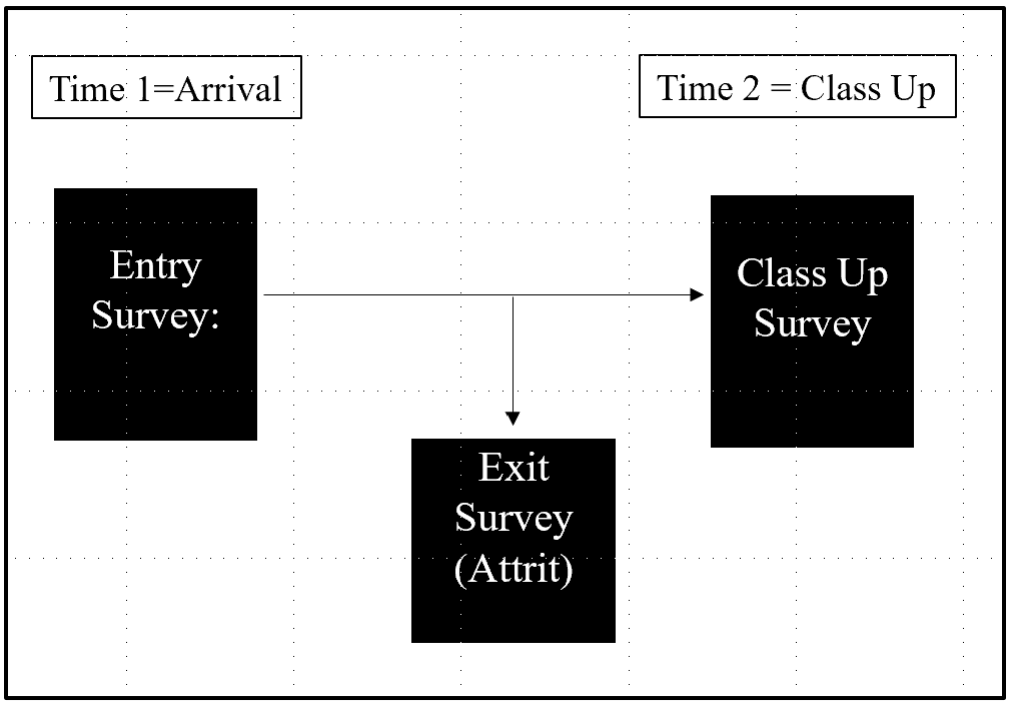
1.5 Current Study Overview

Ranger command desired to proceed with the project immediately. As such, candidate entry and exit surveys were developed and refined from January - February 2022, and IRB approvals were received from the United States Army Special Operations Command. Surveys were administered from March 2022 through December 1, 2022, rendering the current study an archival data analysis.

The plan was to execute a study of two separate attrition hurdles: the pre-RASP class-up hurdle, and the RASP graduation hurdle. As such, surveys were designed to measure candidate AAGs at arrival for pre-RASP, at class-up, and at program exit: either by attrition (pre-RASP or RASP) or by successfully completing RASP. However, poor survey completion rates, particularly regarding class-up surveys and RASP attrition and passing surveys, required that the

current study scope be reduced to just a study of pre-RASP attrition (see Figure 2). Candidates were asked to complete a survey when they arrived for pre-RASP and when they either classed-up or attritted.

Figure 2: Study Overview



1.5.1 Practical Constraints

Ranger command goals and practical concerns about time spent completing surveys and the inconsistency of survey response rates over multiple administrations did not lend itself to a traditional administration of multiple, validated scales of established psychological constructs. The entry survey contained demographic variables and service-related background variables (e.g., recruiting path and pay grade) potentially related to AAGs for staying or quitting. Each survey contained open-ended questions and Likert items. For the open-ended questions, in the entry survey (See Appendix A) candidates were asked to make attributions about why they

wanted to join the Rangers and why other candidates wanted to join the Rangers, and to describe their personal goals going forward. In the class-up survey (see Appendix B), candidates were asked to restate both their attributions for joining and their personal goals. In the attrit survey (see Appendix C), candidates were asked to choose among multiple options for why they quit (e.g., voluntary, medical, etc.) and to make attributions for why they and other candidates quit, and to opine on ways to improve recruitment and retention.

For the Likert items, each survey included the same facet-level satisfaction items targeting a candidate's satisfaction with type of work, peers, supervisor satisfaction, and organizational satisfaction. The remaining Likert items for the entry survey and the class-up survey were identical, except for one item. Items tapped into candidates' beliefs about the Rangers (e.g., prestige), extrinsic motivators (e.g., pay), intrinsic motivators (e.g., the challenge), fit (e.g., person-organization fit), preparedness (e.g., for physical challenges), and sources of social influence (e.g., recruiter or family member). The Likert items for the attrit survey included the preparedness, person-organization fit, and satisfaction-related items, but the questions were worded in the past tense. It also featured items that focused on different beliefs regarding the pre-RASP or RASP process, including perceptions of inclusion ("I felt valued here") and the candidate's perception of the difficulty, effectiveness, and fairness of the assessment process which previous studies (Ryan et al., 2000) found related to police STT attrition.

1.5.2 Analyses of Archival Data

Candidates' open-ended responses will be analyzed using latent profile analysis (LPA), a statistical method that identifies latent sub-populations based on a collection of variables (Spurk et al., 2020). The combination of text theme extraction of candidates' open responses and LPA enables an individual differences approach to quantitatively analyzing candidates' openly

reported AAGs. The advantage in LPA over cluster approaches such thematic extraction method of term frequency and inverse document frequency (TF-IDF; cf. Grootendorst, 2022), is that it allows use of statistical fit metrics such as Bayesian Information Criterion (BIC) in assessing model fit (Peugh & Fan, 2013). In addition, LPA enables a probabilistic assignment of individuals to clusters, and it enables subsequent analysis of individuals' cluster (group) membership based on continuous variables (Sturk et al., 2020; Woo et al., 2018). This type of analysis will allow numerical categorization of candidates by their motivations to volunteer, as well as by their goals, and the subsequent likelihood of successfully classing up to RASP. The LPA will enable the open-response answers to be used to predict what motivations to volunteer predict classing up.

In addition to the exploratory analysis of the candidate's open-ended responses, more traditional quantitative methods will be conducted. Data from the Likert-scale responses will be analyzed via mean group differences to compare characteristics of candidates who successfully class-up to those candidates who attrit during pre-RASP. First, Likert scale items will be analyzed to determine where there are differences in motivations to volunteer between passing and voluntarily withdrawing candidates. Next, items will be analyzed to test differences between groups of interest to the Rangers: race/ethnicity, military occupational specialty (MOS), and recruiting path to RASP.

Beyond analysis of group mean differences, a predictive model will be developed for the Likert-scale responses using multivariate logistic regression, and the final model compared to the predictive model developed from open-ended responses for predictive accuracy.

2. Review of Literature

2.1 Introduction

There is a relatively limited literature on voluntary withdrawal from military STT programs (e.g., Binsch et al., 2015; Colosio et al., 2016; Finton, 2016; Kiernan et al., 2015; Moran et al., 2011, Lytell et al., 2018; Rose et al., 2013) that are similar to the RASP training process, and most of the research does not empirically examine proximal reasons for quitting. Instead, military STT program attrition studies predominately analyze new methods of analyzing stable traits, or the validation of new measurement scales. However, military attrition researchers often conclude that motivation variables, i.e., "[unobservable forces] that directs, energizes, and sustains behavior over time and across changing circumstances," (Diefendorf & Chandler, 2011, p.66) are the key to understand voluntary attrition from elite military training programs, and often point to the lack of measurement of candidate's interests and motivations for volunteering for such duty (Finton, 2016; Lytell et al., 2018) as a necessary future direction.

Despite efforts to recruit and screen applicants on individual physical and mental traits, military STTs for elite units typically experience attrition rates of 50% or more (Binsch et al., 2015; Colosio et al., 2016; Coombs, 2020) over the course of programs that vary from several weeks (Coombs, 2020; Kiernan et al., 2015) to several months (Binsch et al., 2015; Colosio et al., 2016; Kiernan et al., 2015; Moran et al., 2011). Such high attrition despite organizational efforts to recruit and prescreen candidates supports the argument that more research is needed on proximal factors better explain attrition from STT programs, with some authors explicitly suggesting the need to study attitudinal/ motivational antecedents (Colosio et al., 2016; Finton, 2016; Kilcullen et al., 1999, Lytell et al., 2018).

2.2 Self-Regulation and the Action Goal Process

Processes related to determining an individual's goal choice and their actions related to goal striving and goal revision are central to the most prominent work motivation theories (Kanfer & Chen, 2016). In conversations with the United States Army Special Operations Command Psychologist, he noted that qualitative approaches and candidate open-ended surveys may be more useful than relying on latent variable-oriented approaches to better understand the high rates of candidate attrition during pre-RASP (Interview with USASOC Ops Psych, April 2021). This belief was reinforced during interviews with the Rangers in November 2021 regarding organizational preferences for a study design about RASP (Interview with Ranger Regiment Special Troops Battalion Commander, November 6, 2021; November 20, 2021). Based on these conversations, it was decided to use a qualitative approach to focus the current study on the central issue of action goal processing as it relates to candidates' attrition or perseverance, supplemented with more traditional survey methods to study self-regulatory attrition decision processes.

Qualitative methods are often used in studies of attrition. Kiernan et al (2015) conducted exhaustive exit interviews with attritting candidates from British Infantry Training and qualitatively presented their findings regarding a theoretical and complementary spiral of candidate low performance and low self-confidence that, over time, contributed to candidates' voluntary withdrawal. In police academy training and selection, Ryan et al (2000) conducted telephonic interviews with those candidates self-selecting out, in order to measure attitudes regarding the selection process as well as to gain insights as to why candidates attritted. The researchers found that a variety of reasons such as lack of confidence in the process, lack of self-efficacy in being selected, and external conflicts such as other work requirements or family/personal requirements heavily influenced quit decisions of candidates (Ryan et al., 2000).

In elite marine training, Barrett et al (2021) analyzed and coded open-ended candidate entry and exit surveys, relating candidates' given attributional reasons for volunteerism with candidates' explanations for the why they quit. The researchers found that in this elite military training and selection program, candidates who quit attributed their decisions most strongly to broad categories of mental stress, followed by aquatic rigor, followed by general physical stress.

2.3 Military STT Program Attrition.

Studies of military STT program attrition are often unpublished technical reports archived in military service research divisions, but consistent themes emerge across these studies. A consistent recent theme is to increase the probability of success in STT programs by using algorithmic prediction models of traditional individual difference variables (Barrett et al., 2021; Lytell et al., 2018; Rose et al., 2013). Physical abilities and cognitive abilities have long been pillars of selection screening for elite military units from the time of the OSS in WWII (Ryan, 1949) up until present day (Barrett et al., 2021, Coombs, 2020). The inclusion of personality assessments into these prediction models is a more recent development. The few studies that incorporate all three types of predictors explain approximately 20% of the variance in attrition from training, but aptitude and personality scores only account for a small percentage of the explained attrition variance (Coombs, 2020; Finton, 2016). Such small amounts of incremental variance due to stable, distal psychological predictors lends credence to arguments to focus research efforts on more malleable, proximal antecedents of attrition. In a comprehensive study of attrition from five US Air Force elite combat job specialties, Lytell et al (2018) concluded that insufficient attention to candidates' motivations, or reasons for volunteerism, was a deficiency in the Air Force's approach to STT program screening. A similar conclusion was also reached in the aforementioned RASP research by Coombs (2020). Colosio et al (2016) concluded that

"targeting individual motivation, self-efficacy, and resilience" (p. 483) was recommended to further reduce attrition over screening on physical ability scores. Finton (2016) took this suggestion further, arguing that differences in intrinsic vs. extrinsic motivation were likely to influence a candidates' ability to persist in demanding military selection programs for special forces, among others, even going so far as to suggest the use of specific motivational scales in candidate screening (p.108).

2.4 Empirical Studies of AAGs and STT Program Attrition

In a largely qualitative study of attrition from infantry training in the British Army, Kiernan et al (2015) observed that recruits for elite combat training had almost universally high motivation at the outset of training, and that a subsequent decline in mood and in performance often were followed by thoughts of quitting as recruits questioned whether they belonged and/or their ability to continue. In a study of elite Marine Reconnaissance selection and training, Barrett et al (2021) found that program success was a function of motivational antecedents related to volunteering, such as "wanting to be the best," and the effects of social influence from family or friends. In contrast, Marines who attributed a recruiter's influence as central to their pursuit of the elite program were less likely to be successful. Binsch et al (2015) studied attrition from Dutch Maritime Forces training and hypothesized and tested motivational antecedents of attrition in addition to the more commonly studied physical and cognitive ability factors. The researchers found that candidate self-efficacy was the highest risk factor (negative relationship) with attrition from training, providing incremental validity beyond the commonly used physical screening measures.

In the current study, candidates completing the entry survey were asked to "describe what you want to accomplish (goals) in the Rangers." In addition, candidates were asked to "describe

the most important reason or reasons you volunteered for the Rangers." Attributions about volunteering reflect the underlying reasons that explain both the setting of goals and the revision of goals (cf. Eberly, et al., 2013). Candidates attritting during pre-RASP were not asked to restate goals given their abandonment of the goal to become a Ranger, but attritting candidates were asked to "describe the most important reasons you are leaving the RASP process without completing it", thus attributing what led to their goal abandonment.

2.5 Open-Ended Responses and Natural Language Processing

Advances in machine learning have provided new ways to analyze open-ended responses using natural language processing (NLP). Machine learning has changed the way many organizations identify, recruit, and select job applicants more effectively (Gonzalez et al., 2019), and NLP has been successfully employed to predict leadership potential (Campion, 2016) from text fields in candidate essays, as well as to measure personality constructs without the use of latent variable scales (Park et al., 2015). NLP will be used to analyze responses from candidates about goals related to becoming a Ranger and attributions about volunteering to become a Ranger.

The specific method of analysis for the open-text responses is Latent Profile Analysis (LPA). LPA is a growing person-centered latent variable approach (Woo et al., 2018) that has recently overtaken algorithmic approaches in analytic predominance in organizational studies, as shown in Figure 3 (below; Woo et al., 2018, p. 824).

Figure 3: Prevalence of Algorithmic and Latent Variable Approaches (Woo et al., 2018)[2]

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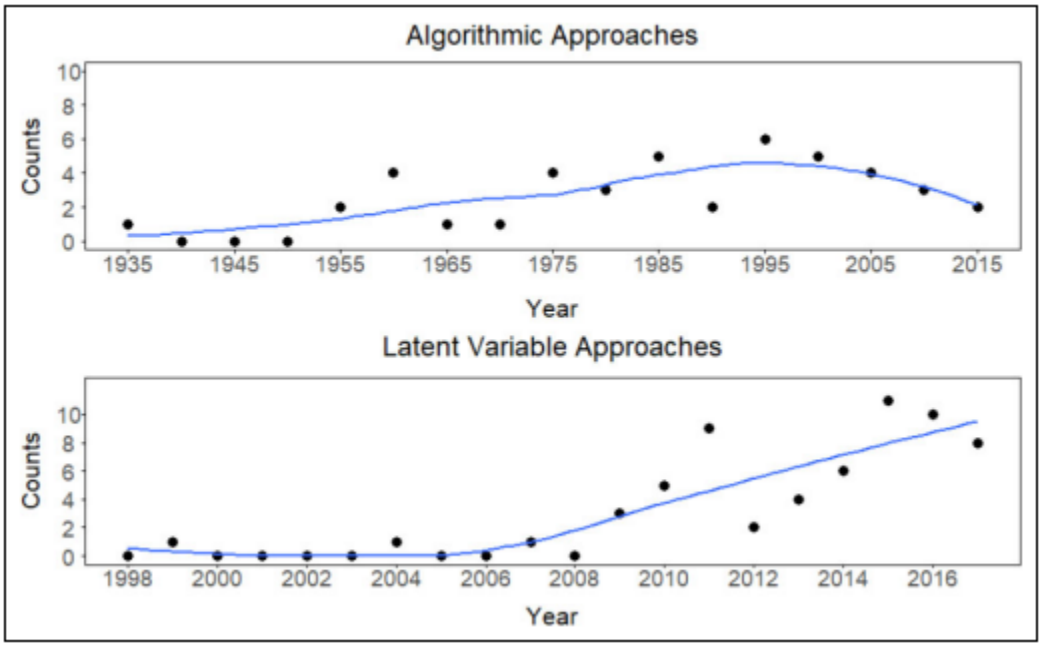

While latent profile analysis can be completed on any collection of variables of interest (Woo et al., 2018), in the current study it is used to model transformed text variables into sub-groups, or classes, of underlying characteristics. First, sentence transformers are used to encode text and sentence information into embeddings, or numerical values (Devlin et al., 2018). After text responses are transformed into embeddings, the numerical form can be further analyzed via LPA, specifically gaussian mixture modeling (Ferguson et al., 2020) to model the underlying number of groupings, also referred to as themes or clusters. In LPA, an advantage over other types of cluster modeling is that model selection is based on common statistics, most commonly BIC (Ferguson et al., 2020; Spurk et al., 2020). An additional advantage is that after the number of underlying groups is selected, an individual's group membership is based on probability (Spurk et al., 2020), so that the resulting scores on topic themes can be treated as continuous variables in subsequent predictive modeling. In the current study, these NLP analyses will allow categorization of candidates by their given motivations and goals at entry, and an analysis of

their likelihood of successfully classing up vs. attritting based on topic themes. Candidates' resulting scores on LPA themes will be analyzed as predictors of class-up.

2.6 Antecedents of Action Goal Processes

Although action goal processes are important, understanding the antecedents of action goal processes is necessary to provide a fuller understanding the attrition decision process. Diefendorff & Chandler's (2011) classification of antecedents on the dimensions of internal-external and proximal-distal provides general guidance on antecedents. However, decisions about what antecedents to include in the surveys was guided by bodies of research most relevant to the current study such as research on attrition from elite military units (e.g., Barrett et al., 2021, Finton et al., 2016, Lytell et al., 2018), voluntary job turnover (e.g., Griffeth et al., 2000; Lee et al., 2017; Lee et al., 2018, Rubenstein et al., 2018), and recruiting and applicant attraction (e.g., Chapman et al., 2005; Ployhart, et al., 2017; Uggerslev et al., 2012). Supplemental literatures informing secondary arguments and analyses include those relevant literatures that address racial differences in job applicants' motivations, attitudes, and voluntary withdrawal behaviors (Helmus et al., 2018; Lutz, 2008; Woodruff et al., 2006).

Although much of the empirical literature reviewed is based on analyses of multiple item scales to measure a single or a few focal constructs, the practical limitations of surveying candidates, mainly time taken to respond, necessitated a decision whether to study fewer constructs with more psychometrically valid scales, or to consider multiple factors related to attrition by sampling two or three items from each construct. Because of this practical necessity, as well as the presence of single-item or limited-item measures of many constructs of interests, the decision was to use the latter approach because of the exploratory nature of the study and the RASP command's preference for inclusion of many potential factors related to attrition (RASP

Command interview, 4 November 2021). The literature review is therefore framed by those streams of research that influenced decisions of why to use open-ended responses of candidate's motivations to volunteer and to quit, and what Likert rated response survey items to include in the study. Using Diefendorff and Chandler's (2011) taxonomy, antecedents chosen to be included in the surveys are organized by the four combinations created by the internal-external and proximal-distal dimensions.

2.6.1 Proximal-Internal Antecedents

Individual motivations affect not only what people choose to pursue, but what amount of effort they will apply in those pursuits. Pinder (1998) described work motivation as "a set of energetic forces that originates both within as well as beyond an individual's being, to initiate work-related behavior, and to determine its form, direction, intensity and duration" (p.11). Motivation is therefore believed to be an important factor relating to a RASP candidate's ability to persist during the pre-RASP process and to sustain enough effort to successfully class-up.

A research goal of the Ranger command was understanding both the reasons influencing candidate's reasons for volunteering for RASP, as well as the reasons influencing candidate's attrition. In addition to the open-response questions crafted for the entry and exit surveys, demographic variables and Likert items were used to reflect motivational antecedents. Intrinsic and extrinsic motivations are classified as proximal intra-person influences on goal striving and goal revision in the Diefendorff & Chandler (2011) taxonomy. A selection of survey questions was developed to measure candidates' AAGs for their volunteerism and for their reasons for attritting or succeeding. The questions were based on empirically-supported intrinsic or extrinsic factors that were determined to be most relevant to the RASP context, but generally not derived from existing scales due to the breadth of constructs included. As such, surveys for the study

sought to collect candidates' attributions of their motivations, or factors most strongly affective their action goal of serving with the Rangers. Two specific motivational theories related to those proximal intra-personal influences provided the basis for the development of the open-response survey questions: Self-Determination Theory (SDT; Deci & Ryan, 2000), and Goal-Setting Theory (GST; Locke & Latham, 1990). Other antecedent influences of goal striving and goal revision, such as affect, social influences, and organizational characteristics, were also measured using Likert scale items.

2.6.1.1 Extrinsic Motivational Variables

Extrinsically-motivated behavior "involves doing a behavior to attain a separable consequence" (Deci et al., 2017, p.21). Examples of extrinsic motivational variables found in the applicant attraction research and/or with attrition research includes pay, benefits, promotion, and advancement opportunities. These tangible job-related benefits represent consequences distinct from the job itself or the process of working.

2.6.1.1.1 Pay

Despite the prevalent belief that Rangers don't volunteer because of tangible incentives such as pay, Rangers are well-compensated in comparison to their peers in general purpose forces, often earning monetary bonuses for enlisting as well as additional incentive and bonus pays each month while serving (Myers, 2019). In addition, it is well known in the general-purpose Army and within the Rangers that service in the Ranger Regiment affords Soldiers greater opportunities for skill and educational advancement, as well as faster promotion and advancement opportunities. In fact, a common tactic used to improve recruitment is to target potential applicants with monetary incentives for volunteering, which is where the option-40

enlistment program is derived from (Cox, 2019). Pay is one of the most well-established predictors of applicant attraction to job pursuit in the applicant attraction and recruiting literature (Chapman et al., 2005; Darnold and Rynes, 2012; Uggerslev et al., 2012), and pay has been found to have consistent, albeit weak relationships with voluntary turnover in organizations (Griffeth et al., 2000, Rubenstein et al., 2018).

In the military STT program attrition literature, pay is usually studied in relation to joining the military and to extending ones' service in the military after completing contractual obligations related to time-served. It is well-established that strong US labor market conditions hurt military recruiting and retention (Helmus et al, 2018), and relative pay has been established as a key reason why individuals join the Army (Putka & Strickland, 2005). However, the degree to which pay and monetary incentives directly influence volunteerism for elite units, and the degree to which they are related to attrition are relatively unexamined. This is despite Finton (2016) suggesting that elite military units specifically screen candidates based on the degree to which intrinsic vs. extrinsic motivations influence their candidacy. Therefore, pay-related questions were included in candidate entry surveys.

2.6.1.1.2 Promotions

Regarding promotion opportunities, Soldiers in elite units are promoted at faster rates than Soldiers in general purpose units, and promotion rates for Rangers are often as much as three times as high as the Army at-large (Bannon & Keyes, 2016). The accelerated promotion opportunities are an important recruiting narrative for the Rangers, and perceptions of promotion opportunities have been demonstrated to be moderate predictors of applicant attraction (Chapman et al., 2005; Uggerslev et al., 2012). The importance of promotional opportunities slightly wanes after employees join organizations, however, with turnover meta-analyses

showing that promotional chances have a small negative correlation with turnover (Griffeth et al., 2000). As such, items related to RASP candidate's attitudes about the importance of accelerated promotion opportunities were included in surveys.

2.6.1.1.3 Deployments

Deployments, unique to a military context, are relevant to recruits and an item about the importance of deployment opportunities was included in the candidate entry survey at the request of the RASP cadre. Deployment opportunities can be thought of in two ways. Although a desire to deploy to combat may seem altruistic and, in some ways, an intrinsic motivation—i.e., the service or the process is what is valued—young Soldiers seeking to deploy are more likely extrinsically motivated by the outcome, or the ability to claim status as a combat veteran. Combat veterans, particularly in operational brigade-level organizations, have status over non-combat veterans (Pawlyk, 2015) and therefore represent more of an extrinsic than intrinsic motivation for volunteering. Because of their special operations role, Rangers deploy more for specialized multinational training and for combat operations than other units (75th Ranger Regiment Public Affairs, 2020).

2.6.1.1.4 Avoiding a Worse Alternative

In the case of elite military STTs, in addition to the extrinsic rewards offered by greater pay and promotion opportunities, some may pursue assignments for the purpose of avoiding an alternative assignment of lower desirability, which can be undesirable for the organization or duty location. An elite unit assignment, because of its priority within the military services, often takes priority over other assignment possibilities and thus offers a way out. For example, Soldiers who anticipate serving in undesirable locations or in units with poor reputations may

purse a special assignment as one of the few means they have to avoid the bad alternative. In the organizational turnover literature, alternative employment opportunities have shown a moderate relationship with turnover (Griffeth et al., 2000; Rubenstein et al., 2018), and therefore a question relating to the importance of alternatives was included in both the candidate entry surveys as well as the candidate exit surveys.

2.6.1.2 Intrinsic Motivational Variables

Self-Determination theory describes intrinsically-motivated activities as those where "the motivation lies in the behavior itself" (Deci et al., 2017; p.21). With their motto of "Sua Sponte" (Latin: of their own accord; Couch, 2012), the Rangers, as an elite organization, emphasize the narrative that candidates volunteer for a hazardous profession for largely intrinsic reasons. Three intrinsic motivation variables—the desire for a challenge, a chance to better oneself, and opportunities for development—were included in the candidate surveys due to the strength of their relationships in the applicant attraction and employee turnover literatures.

Ranger commanders, among other elite military unit leaders, perceive that individuals pursue elite military assignments solely because of the challenge, or the ability to better oneself. Based on informal entry interviews that organizational psychologists had conducted with RASP candidates (MAJ Simonette Interview, February 2021), Ranger commanders requested that surveys included an item about the challenge of becoming a Ranger. The applicant attraction and recruiting literature includes evidence of a strong relationship between perceived challenges of a potential job, and applicant attraction to organizations (Uggerslev et al., 2012).

In addition to challenges, opportunities for personal development are intrinsically-motivated reasons for joining or for remaining with organizations which are distinctly

categorized and measured in the applicant attraction and the employee turnover literature. Opportunities for development or personal growth have shown to be strongly related to applicant attraction (Uggerslev et al., 2012) as well as moderately related to remaining with organizations (Rubenstein et al.,2018). Rangers and other special operations forces provide their members with better training and more developmental opportunities, factors that are well-communicated during recruiting (75th Ranger Regiment Recruiting, 2022). As such, a question relating to the importance of opportunities for personal development was incorporated into the entry survey.

2.6.1.3 Fit Perceptions

The need to belong (Baumeister & Leary, 1995) is one of the most fundamental human psychological needs, and people form important social attachments even in competitive work settings. Manifested in organizational domains, a sense of fit (or belonging) is important to prospective job applicants, to those undergoing a selection program, and to those tenured employees to stay because "people select environments that fulfill their needs" (Cable & Judge, 1996; p. 294). Fit is often defined as the compatibility between individuals and an external entity-such as organization, group, job, or supervisor, and is therefore a measure of a relationship (Kristoff, 1996). In applicant attraction research, perceptions of fit have been shown to be one of the strongest predictors of continued job pursuit, with strong meta-analytic estimates between person-job and person-organization fit and applicant attraction (Chapman et al., 2005; Kristoff-Brown et al., 2005; Uggerslev et al., 2012). In a more concerted study of fit perceptions at different times in the recruiting process, Swider et al (2015) found support that increasing candidates' fit perceptions improved selection utility in multiple ways, including through the limitation of employee self-selection.

The importance of fit continues beyond recruitment and selection to the employee's tenure in the organization. Kristoff-Brown et al (2005) conducted a meta-analysis of several facets of fit with a variety of workplace outcomes such as employee satisfaction, wellness, job performance, and turnover. Person-organization fit had a weak but consistent relationship but substantially higher relationship with turnover intentions, meaning that if able to leave, many employees with poor fit would do so. More focal meta-analytic studies of organizational turnover which included fit as a predictor found that perceptions of fit were among the strongest negative correlates with turnover (Rubenstein et al., 2018).

In the military STT attrition literature, fit is not often studied despite the importance of unit cohesion (Golden et al., 2018), a related concept, that is important in elite units where critical operations are most often carried out by small teams (Goodwin et al., 2018). However, analysis of team or group cohesion was beyond the scope of the current study because of the constraint to measure only individual-level AAGs. Therefore, fit questions were included in the surveys of candidates' attitudes at entry, class-up, and at attrition, with a specific focus on fitting in with the unit (organizational fit) and fitting in with peers (group fit).

2.6.1.4 Satisfaction

Job satisfaction is one of the most studied affect-related constructs in organizational settings and the "centrality of job satisfaction and organizational commitment" to attrition is reinforced by a 100-year review of turnover literature (Hom et al., 2017, p. 532). Like other affect-related antecedents of goal striving and goal revision, job satisfaction is a proximal, intra-personal influence on workplace behavior (Diefendorff & Chandler, 2011). The important of job satisfaction is reinforced by relatively contemporary meta-analyses on organizational turnover (Rubenstein et al., 2018), and the importance of satisfaction or process affect has also been

shown to relate to attrition in hiring and selection programs. However, when satisfaction has been studied in the applicant attraction or recruiting/selection literature it has been more heavily featured as a criterion resulting from perceptions of procedural justice or perceived validity of hiring processes (Garcia-Izquierdo et al., 2012).

In the organizational literature, satisfaction shows one of the strongest and most robust relationships with turnover due to its proximal and affective relationship with quit intentions. Recent meta-analyses of organizational turnover found that job satisfaction was one of the highest correlates with a negative relationship with turnover (Griffeth et al., 2000; Rubenstein et al., 2018). In these meta-analyses, results combined from large sample size studies across a variety of organizational contexts and studies have shown that both global satisfaction and different sub-facets of satisfaction predict attrition. In contrast to the voluntary turnover literature, satisfaction is not commonly studied in the military attrition literature. One exception is a study of the influence of changes in satisfaction over time on turnover. Chen et al (2011) found that in both a British and a US military sample, both average job satisfaction and job satisfaction change both predicted turnover (attrition) intentions. Because of the substantial evidence of the relationship between satisfaction facets and attrition in a variety of contexts, questions related to candidates' satisfaction levels with the organization, with their cadre and with their peers were included in both entry and exit surveys.

2.6.2 Proximal-External Antecedents

In the Diefendorff & Chandler (2011) taxonomy of motivational antecedents, social influences are categorized as proximal external influences on goal striving and goal revision. The effects of social influence are well established in the literature on applicant attraction and on organizational turnover, and it is clear that social influences affect attrition in both. Social sources of

recruitment or influence in the job-pursuit/ acceptance intention process have been widely studied and shown to moderately relate to applicant's perseverance in hiring processes (Chapman et al., 2005). In the recruiting literature, job applicants who have close personal ties or immediate family members have been shown to have higher organizational attraction and higher job acceptance rates (McFarland & Kim, 2019). Additionally, in the organizational turnover literature, Weller et al. (2009) demonstrated that employees hired via personal recruitment sources have lower turnover risk than those recruited by more formal sources, with social networks being important to employees' tenure (Ballinger et al., 2016).

There are several potential explanations for the effect of social influences on attrition. One attempted explanation with some empirical support is the concept of "diagnosticity," or the amount, specificity, and relevance of information related to the job, organization, and work environment (Campion et al., 2017). Those job applicants with close personal relationships inside the organization have access to better information to inform expectations, and therefore attrit at lower rates than those who rely upon formal sources, such as military recruiters. Another way in which close personal relationships may explain lower turnover is through social pressure. The reputational costs of quitting for those individuals with close personal networks in the organization are higher than of those without such relationships (Ballinger et al., 2016). The military in general and elite military units in particular are widely believed to bear out this phenomenon. It is commonly stated that military occupations are "a family business" and recent surveys have demonstrated that greater than 75% of all military enlistees have an immediate family member already serving (Philips & Arango, 2020). The remaining population that lacks immediate social influences rely heavily on formal recruitment sources for information, such as information/ advertisement campaigns or military recruiters. Those individuals have less

reputational pressure to perform and to persevere than candidates with close social ties to the organization. Because of the demonstrated importance of social sources of recruitment, and the believed importance to RASP candidates' attrition, the candidate surveys included questions relating to the importance of a recruiter, of a mentor or family member, or of a peer, in their attraction to RASP.

2.6.3 Internal-Distal Antecedents

In the Diefendorff & Chandler taxonomy of work motivation, demographic and background factors relate to distal influences. Although demographic variables have been studied extensively in the organizational turnover literature (e.g., Hom et al., 2017), there is less emphasis on demographics in applicant attraction and recruiting literatures. The latter literatures focus instead on organizational and job-related characteristics or recruiting/hiring process factors that affect the attrition of prospective job candidates through the recruitment process to job acceptance. The military STT literature includes some demographic variables shown to relate to attrition, such as military occupational specialty, years of education, age, and time in the selection process.

2.6.3.1 Empirically Established Demographic Variables

Several demographic variables have demonstrated empirically-established relationships with employee turnover. Demographic variables that predict turnover in more traditional organizational settings include age, marital status, parental status, and years of educational experience (Griffeth et al., 2000; Rubenstein et al., 2018). Coombs (2020) found that candidate age did not predict attrition, not a surprising finding given that large majority of RASP candidates are young adults. Similarly, RASP candidates are almost exclusively single and without children. There is evidence that education level has a positive relationship with turnover

in a variety of organizational settings (Griffeth et al. 2000; Rubenstein et al., 2018). However, in the military STT attrition literature, there is little evidence that education level predicts attrition when controlling cognitive abilities (Zazanis et al.,1999). Several variables with an empirically established relationship with turnover were not measured in the current study because they were not of organizational interest. For example, marital status and parental status were not measured. Some variables were measured to enable an analysis of their importance despite low organizational interest, based on empirical evidence in previous studies. These include candidate age and education level.

2.6.3.2 Military Specific Demographic Variables

In terms of predicting attrition from elite STT programs, military-specific demographic variables may be more useful than traditional demographic variables. For example, Zazanis et al (1999) found that in SFAS, Soldiers from an Infantry occupational specialty and Soldiers having already completed Ranger School had a higher probability of being selected to become green berets. The Ranger Regiment is somewhat unique in special operations formations in that it maintains an organizational structure and the military occupational specialty ratings of an Army General-Purpose Infantry unit, rather than all selected/trained candidates being re-categorized as a special operator. As such, the Ranger Regiment has Soldiers from over 60 different military occupational specialties (75th Ranger Regiment recruiting website, 2022) which are all important to mission accomplishment. Historically, Infantry Soldiers have passed RASP at a higher rate than non-combat military occupational specialties (75th Ranger Regiment DEI Brief, July 2021), and it is unknown whether that is due to higher individual abilities of those populations relative to the RASP course standards, or whether there are motivational/ attitudinal differences in the

candidates from the different occupational specialties. Therefore, the entry survey collected candidates' military occupational specialty.

In addition to occupational specialty, the recruiting pathway to RASP was a demographic variable of interest to the RASP command. Candidates who arrive to RASP through the signing of an enlistment bonus, Option 40 contract, attrit at highest rates and make up the largest number of recruits (Interview with RSTC Commander, FEB 2022). Candidates who are recruited from their performance in initial entry training represent the next highest proportion of RASP candidates and have historically demonstrated the second-highest rates of attrition (Interview with RSTC Commander, FEB 2022). Lastly, in-service volunteers make up the smallest proportion of RASP candidates but are also the most successful; those candidates who come to RASP after first serving in an operational unit have a higher likelihood of passing. As such, the entry survey included a question regarding the candidate's recruiting pathway to RASP.

2.6.3.3 Race Effects

A final demographic variable collected in the candidate entry surveys was race/ethnicity. Beyond the general need to limit voluntary attrition from STT process, Federal organizations often pursue the simultaneous goal of increasing the diversity of their workforce (Presidential Executive Order, 2021). Elite military units are overwhelmingly made up of White Males (Congressional Research Service, 2019), despite Black Youths and Hispanic Youths showing a higher propensity to serve from among U.S Youth more generally (Poling & Heland, 2011). Both practical and social justice considerations are influencing concerted efforts in military units to increase their representation of ethnic minorities and women. However, research on willingness to serve in the armed forces (Woodruff et al., 2006) and in combat occupations specifically (Maclean & Parsons, 2010; Harrell et al., 1999) has found meaningful differences in

service preferences and in the tendencies to serve in combat vs. support occupations as a function of both gender and race, with Hispanic and White Males more likely to serve in combat or elite units.

In the current study, candidate AAGs may explain subgroup differences in rates of volunteerism as well as subgroup differences in rates of attrition from the STT recruitment/training process. Such differences in perceptions and attitudes have been found in the applicant attraction and self-selection of applicants in military (Poling & Helland, 2011) and in other selection contexts. For example, Schmitt and Ryan (1997) specifically studied the differences between White and Black Applicants to a police academy, finding that there were significant differences between races in the attitudes about the selection process as well as probability of self-selection between Black Applicants and White Applicants. Racial differences were similarly found in a later study of police applicants examining attrition from a multiple hurdle selection process (Ryan et al., 2000).

Diagnosticity may also affect racial/ ethnic differences. It has been shown that informal and personal recruitment sources (Weller et al., 2009) result in lower early organization turnover. However, White Males have the greatest access to the informal social referral networks used in this type of recruiting (Darold & Rynes, 2013). More recently, in a study of firefighter applicants, White Applicants were shown to use the most diagnostic sources of recruitment information and had lower rates of withdrawal in the application process, than racial minorities (McFarland & Kim, 2019). This suggests support for Schneider's (1987) Attraction-Selection-Attrition framework—that organizations tend to attract and to select those with similarities to those already within the organization—while illustrating a practical difficulty increasing racial diversity in elite military units.

A better understanding of the relationship between motivations to serve and STT program success could be used to change recruiting, allowing the organization to identify and recruit those with the attitudes and motivations most predictive of success. Recruiting specifically for those attitudinal/motivational antecedents of STT program success, especially in ethnic minority candidate populations, is an example of what Campion et al (2019, p. 1090) referred to as "looking upstream of the selection process" to achieve diversity goals. Beyond looking upstream, a firm understanding of racial differences in motivations to volunteer will allow the organization a more granular understanding of organizational selection rates when explaining diversity, equity, and inclusion (DEI) initiatives to stakeholders. To the extent it is possible, the current study will focus on race differences, comparing minority Black and Hispanic Candidates' motivations and attitudes with those of majority White Candidates. Analyses of gender differences is not possible because too few women apply for RASP.

2.6.4 External-Distal Antecedents

Organizational characteristics not directly categorized as intrinsic or extrinsic motivations have nevertheless exhibited consistent empirical relationships with applicant attraction and turnover. These distal external influences (Diefendorff & Chandler, 2011) affect individuals' action goals through the levels of effort and persistence they will commit to attaining those related goals. When considering withdrawal or continuation in a hiring process, or the decision to stay or leave an organization, weighing alternatives has been well-established both theoretically (March & Simon, 1958) and empirically (Trevor, 2001). Organizational reputation or image is among the most important factors and has been of increased importance as organizations have had to compete with competitors for talent (Ployhart et al., 2017). In meta-analyses, organizational reputation and image variables had one of the highest correlations with job pursuit intentions

(Chapman et al., 2005; Uggerslev et al., 2012). In the organizational turnover literature, the importance of job-related characteristics and organizational characteristics are similarly important. While organizational prestige becomes less important after an individual is hired, it remains a significant predictor of organizational turnover (Rubenstein et al., 2018). Meanwhile, during the selection process and during employment tenure, perceptions of the climate of organizational support are more important as employees weigh their alternatives to stay or leave. In elite military selection contexts, candidates are in-between recruits and tenured employees. They are part of the broader military service, but have not yet matriculated into the smaller, elite organization. The prestige associated with joining military units has also been demonstrated to be important (Lievens et al., 2005) to candidates. Organizational reputation and the prestige of joining an elite unit were therefore included in surveys.

2.7 The Current Study

The current study aims to understand the effects of AAGs on attrition from elite military training using two empirical strategies: a qualitative approach based on NLP analyses of open-ended survey responses, and a quantitative approach based on measuring relevant demographic variables and measuring AAGs using Likert-scale items. Central themes informing these questions include why do candidates volunteer for service in the Rangers, and for what reasons do candidates attrit from pre-RASP? Of the different populations of candidates, such as different military and occupational specialties, different recruiting paths to RASP, and different race/ethnicity, how do their AAGs differ and how do those differences relate to variance in success or attrition from RASP? The use of open-response questions with the intent of using NLP to discern topic clusters and correlations with candidate success is an important component of the study. In addition, demographic information collected will enable analysis of differences

in candidate success by military occupational specialty, by race/ethnicity, and by recruiting path to Ranger candidacy. Finally, rated response survey items related to candidates' extrinsic and intrinsic motivations, and candidates' attitudes regarding justice perceptions, fit perceptions, and satisfaction were included as items of interest to determine what AAGs predict candidate success.

2.7.1 Research Questions

1. How do thematic clusters of classing up candidate's open-response AAGs differ from those of attritting candidates?

2. How well does a candidate's open-response AAG thematic cluster predict candidate success from pre- RASP?

3. How do AAGs and the prediction of attrition differ by three demographic factors of organizational interest: race, MOS, and recruitment source?

4. What is the relationship between attitudinal variables and pre-RASP success?

5. How does prediction of class-up from NLP-derived thematic clusters compare to a more traditional multivariate logistic regression model of prediction?

3. Methods

3.1 Participants

3.1.1 Preliminary Data/ Quality Check

Surveys were administered beginning March 15, 2022, and preliminary screening of data was performed on December 2, 2022. Candidates for the 75th Ranger Regiment's assessment and selection program 1 (RASP 1) took the surveys at Fort Benning, GA. Three types of screening were conducted to determine the working sample size for analysis. First, records were screened

by timestamp of completion. Only surveys taken between 23 March 2022 and 2 December 2022 were included. Previous survey responses were cadre and researcher tests of the survey software. Second, only completed surveys were included. Surveys begun and not completed were omitted from analysis. Third, surveys were analyzed to match entry surveys with subsequent surveys (either a class-up or attrition survey). Because data collection on all surveys began at the same time, there were substantially fewer matched surveys than total entry, total attrition, or total class-up surveys. There were 555 completed entry surveys (matched and unmatched), and a total of 412 completed pre-RASP attrition surveys and 250 completed class-up surveys. There were 306 matched entry surveys: 186 of them matched to a subsequent attrition survey, while 120 of them matched to a subsequent class-up survey. Because of this, it was decided to use the total survey numbers for descriptive statistical analysis, and to use the matched surveys for NLP analysis of open-ended responses and for predictive analysis of pre-RASP attrition. The sections below describe the characteristics of the samples of both the total surveys and the matched surveys.

3.1.2 Total and Matched Survey Responses

A total of 412 individuals completed the pre-RASP attrition survey, and 186 could be matched to an entry survey. Further distinguishing the attrition survey sample, a total of 205, or 49.8% of candidates reported voluntary withdrawal as their reason for attrition, while 111 or 26.9% were from medical drops. An additional 38 or 9.2 % attritted for failing the psychological screening, and 25 or 6.0 % were dropped for violating rules packets. A total of 250 individuals completed the class-up survey, while 120 could be matched to an entry survey and its demographics

questions. Table 1 shows a breakdown of the participant demographics of interest for the surveys (total and matched).[3]

Table 1. *Overview of Survey Completion by Demographics of Interest*

	Entry Survey		Class-up Survey		Attrition Survey (pre-RASP)	
	Total	Matched	Total	Matched	Total	Matched
Total	555	306	250	120	412	186
Whites/Blacks/Hispanics[a]	341/54/99	197/29/50	Unk[c]	76/10/21	Unk[c]	121/19/29
Option 40/In-Service/ABN-18X	355/78/122	191/47/103	Unk[c]	65/27/28	Unk[c]	126/20/40
Infantry/ Combat/ Non-Combat[b]	283/97/175	156/47/103	Unk[c]	68/18.34	Unk[c]	88/30/68

Note: [a]comparison groups for race/ethnicity constrained to Black Candidates and Hispanic Candidates due to power concerns
[b]comparison groups for MOS: Combat includes all non-Infantry MOS assigned to rifle companies; Non-Combat category includes all others.
[c]Because matching to entry surveys is required to retrieve demographic data, those class-up and attrition surveys not matched to an entry survey do not enable demographic analysis.

3.2 Procedure

Candidates were informed of the study purpose and asked to take the surveys at the time periods shown in Figure 2. The cadre provided candidates with the QR code for the entry survey during administrative in-processing for pre-RASP, the QR code for attrition during out-processing if they attritted, and the QR code for class-up during class-up administrative processing. The surveys were mobile-phone enabled through Questionpro survey software; candidates had access to their personal mobile phones at the times that they were asked to complete each survey. Candidates were instructed to take the surveys during their administrative

[3] Exit surveys for candidates who passed RASP (see Appendix D) and attrition surveys for candidates who attritted during RASP (Appendix C; survey component) were also developed and administered; however, low participation prevented inclusion in the current study. For example, there were no matched exit surveys for passing candidates. For predictive analysis, only the matched samples were used.

processing and provided time to take the surveys and were asked to give informed consent at the beginning of each survey.

Research ID#'s were non-identifying alphanumeric codes used to match entry surveys with subsequent surveys while protecting the privacy of survey participants. They were chosen in one of two ways: candidates could choose their own research ID #, much as an individual would choose their own password for an internet account such as an email account, or alternatively, the cadre would assign candidates a research ID# randomly generated from a computer software program. Candidates were prompted to enter this research ID# for each of the surveys.

3.3 Measures

3.3.1 Entry Survey

The entry survey collected candidates' research ID#, as well as demographic and background data. For items related to psychological constructs, the open-ended attribution/goal questions were presented first in each survey, followed by a section dedicated to attitudinal beliefs, while facet satisfaction items were presented last. Within each category of psychological variables, items were randomly presented to each candidate. Two attention check items were embedded in each survey; candidates were asked to "click" on a letter. Attention check items were presented at random points in the surveys.

3.3.1.1 Demographics and Background Information

Demographic and background information were asked in the first section of the entry survey. Demographic data collected included age, biological sex, and race/ethnicity. Background information included occupational specialty (MOS), educational attainment, and type of recruiting path followed to arrive at pre-RASP. There were also three items related of physical

fitness: the type of the latest fitness assessment, i.e., the Army physical fitness test (APFT) or the Army Combat Fitness Test (ACFT), the score on the latest physical abilities assessment, and a five-option relative comparison to peers ("Among the best", "Better than most", "About average", "Below average", and "Among the worst). Background items were chosen for their previously established relevance to attrition in similar military selection contexts (Coombs, 2020; Zazanis et al., 1999; Putka & Bradley, 2008), and from cadre interviews.

Fitness Score and Pay Grade (equivalent to military numerical rank), were treated as continuous variables, while Age and Education Level were treated as ordinal variables because response categories enabling a choice of range were used in the surveys. The other demographic/ background variables (biological sex, race/ethnicity, MOS, recruiting path) were treated as nominal variables in analyses.

3.3.1.2 Open-Response AAGs

Attributions were measured using two questions with open-ended responses using a minimum of 25 characters and a maximum of 250 characters. Candidates were asked two attributional questions in the entry and class-up survey. "In your own words, using a few statements or sentences, describe the most important reason or reasons you volunteered for the Rangers." and "In your own words, using a few statements or sentences, describe the most important reasons why your peers volunteered to join the Rangers." The second question was of organizational interest to determine if self-reported interest clusters were the same as peer-reported interests, but were not intended for analyses in the current study.

Candidate goals were measured using the prompt "In your own words, using a few statements or sentences, describe what you want to accomplish in the Rangers.", again with the 25/250-character constraint.

3.3.1.3 Cognitive Beliefs

Cognitive beliefs were measured using a five-point Likert scale (5 = Strongly agree, 4 = Somewhat agree, 3 = Neutral, 2 = Somewhat disagree, 1= Strongly disagree). Candidates were instructed that "The following questions include multiple reasons why people choose to join or leave organizations. Rate each question based on how you think it applied to your motivation to volunteer." 17 attitudinal belief items reflected a multitude of constructs. Extrinsic motivational items included four questions: better pay and benefits, faster promotion opportunities, avoiding a bad assignment, and deployment opportunities. Intrinsic motivational items included three questions: I wanted a challenge, a chance to better myself, and opportunities for personal development. Social factors included three questions relating to the influence of others: a recruiter, peers or friends, and a mentor or family member. Organizational factors included two questions: the organization's reputation, and prestige of joining an elite unit. One fit related question asked candidates to rate "I thought I would fit in".[4]

3.3.1.4 Satisfaction Items.

Satisfaction was measured using a five-point Likert scale using the anchors of 5=Extremely Satisfied, 4=Somewhat Satisfied, 3=Neither, 2=Somewhat Dissatisfied, and 1=Extremely Satisfied. All three surveys include the same facet satisfaction items where candidates were instructed that "In this part, you will rate your level of satisfaction in several areas." The satisfaction items include five facets: satisfaction with your co-workers/peers, the type of work, the Army, the Rangers, and the RASP Cadre.

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[4] After an interim review of survey participation with the Rangers in May 2022, it was agreed to add four additional questions related to self-efficacy and candidate preparedness for RASP. However, because of low survey participation following the addition of self-efficacy items, they were not included in analyses in the current study

3.3.2 Exit Survey (Attrition)

The candidate exit survey (attrition) collected candidates' research ID# to enable matching with the entry survey demographic and background data and AAGs (Appendix B). While some items were the same as the entry survey, many items were different and focused on measuring candidates' AAGs regarding factors related to their attrition. Because the attrition survey was intended to capture attrition-related AAGs regardless of reason, the survey prompted candidates to self-report from among several reasons candidates get dropped. To prevent priming in advance of the open-response questions, the question "what was the recorded reason for your drop" was asked after the open response questions.

Open response questions for the exit survey used the same 25/250-character text constraints as the entry surveys and asked candidates three questions: (1) In your own words, using a few statements or sentences, describe the most important reasons you are leaving the RASP process without completing it? (2) In your opinion, what is the most important reason why other candidates leave the RASP process without completing it? (3) What should the Rangers change in recruiting and preparation of candidates to improve RASP candidate success? Of these three open-response questions, only the first was intended for analysis in the current study, while the other two were of organizational interest.

The 19 items in the attitudinal beliefs section of the exit survey focused on several reasons for quitting pre-RASP. Three questions were related to fit: I fit in with the unit, I fit in with my peers, and I felt valued here. Four questions were related to perceptions of fairness and validity: the assessment was job relevant, the assessment allowed me to show my performance, and the assessment was too difficult, the assessment process was fair. Three additional questions included attitudes external to RASP or the Rangers specifically: I had better assignment options,

external factors influenced me, I was misled by a recruiter/ during recruiting. Finally, three questions related to the perceptions of the job characteristics and of the cadre were included at the request of the Rangers: I like the type of work, the cadre prepared me well for integration with the unit, and the cadre trained me well for RASP.[5]

The facet satisfaction items on the exit survey (attrition) were identical to those on the entry and class-up surveys.

3.3.3 Class-Up Survey

The class-up survey was intended to provide a second time period measure of the same items included in the entry survey. As such, with the exception that there were no demographic or background items, it was identical to the entry survey in open-ended response questions and in Likert rated-response items. (See ~~Appwendix~~Appendix C).[6]

3.4 Analysis

3.4.1 Introduction/Overview

Because of the exploratory nature of the study and its intention to answer organizationally relevant questions regarding the RASP recruitment and attrition process, several analyses are proposed. The proposed analyses are those questions of interest to both the hosting organization and the researcher, and thus, many survey items which were only of organizational interest will not be specifically analyzed for the purposes of this study. However, entry survey items with an

[5] Four questions related to preparedness and self-efficacy and were added to the surveys in May 2022 similar to the entry survey: I was unprepared for the physical demands, I was unprepared for the mental demands, I am confident I could pass, I am confident I could be a good Ranger.

[6] An exit survey designed and administered to Rangers successfully completing RASP (See Appendix 4) was intended to mirror the exit (attrition) survey and enable a comparison of candidates' AAGs regarding their reasons for success or attrition. However, low participation on this survey prevented its use in the current study.

empirically established relationship with attrition will be analyzed to determine if they need to be controlled in subsequent analyses.

3.4.2 Checking the Effects of Measures Collected but not of Interest

Four demographic/ background items will be checked to determine the significance of their relationship with attrition. Candidates' age, education level, and military rank have all been demonstrated to relate to attrition in elite unit selection programs but are expected to be non-significant in the pre-RASP attrition context because of restricted range: RASP candidates are overwhelmingly comprised of 18–22-year-old men (66%), within the pay grade of E-2 or E-3 (73%), and with a high school degree but no college degree (84%). An additional item of interest to the Rangers was the status of candidates' prior service. The Ranger cadre's belief is that the small proportion of candidates who have prior military service (i.e.- have served and separated from the military, then re-joined after discharge) are more likely to succeed in the RASP process.

For each variable, sequential analyses will be performed: first, a comparison of group means between classing-up and attritting groups for statistical significance. If the variables are significant and the effect size meets the threshold of small effects for odds ratios (Ferguson, 2009) they will be further included as controls in multivariate predictive analyses.

3.4.3 Descriptive Analyses

3.4.3.1 NLP

The first focal analysis relates to research question one and provides insights into how candidates who class-up differ from candidates that attrit during pre-RASP on both the open response questions pertaining to factors influencing their volunteerism and their goals. Analysis of candidates' motivations to volunteer and of candidate's RASP goals will be conducted using a

form of natural language processing: LPA, gaussian mixture modeling (GMM; Spurk et al., 2020) to identify sub-groups and to assign sub-group membership scores to enable quantitative analysis. The themes will be analyzed by mean differences between the characteristics of the class-up group and the attritting group.

3.4.3.2 Relevant Demographics

Research question three relates to the sub-group differences in AAGs and in attrition prediction. Analysis of mean group differences will be conducted on the three background/ demographic variables of interest: Race/ethnicity, MOS, and recruiting path to RASP. For these analyses, each of the factors will be separated into three groups. Race/Ethnicity will be analyzed between a group comprised of majority White Candidates and a comparison group comprised of Black Candidates, and then against a minority group of Hispanic Candidates. MOS will be trichotomized into majority Infantry Soldiers and comparison groups of Combat MOS Soldiers (i.e.-all non-Infantry MOS that are routinely assigned to Ranger Rifle Companies), and Non-Combat MOS (all others). The recruiting path will be analyzed as three separate paths as indicated on the survey response options: Option 40 Candidates, In-Service Recruits, and Airborne/18X Recruits. NLP cluster analysis and Likert AAGs will be compared between the two groups to determine the group differences in the open-ended responses.

3.4.3.3 Likert Scales of AAGs

Further analyses of the Likert Scales will help answer research question three and identify on which composites different groups differ. First, the Likert-scale responses will be analyzed using principal components analysis and exploratory factor analysis (EFA) to determine appropriate composite factors. Composite factors will be developed by averaging scores on related variables

and treating the aggregate score as an independent variable. After data reduction, composite scores, and any remaining individual Likert-item AAG scores will be analyzed via MANOVA and subsequent t-tests as applicable, comparing the following groups: (a) classing-up candidate scores vs. attritting candidate scores, (b) White candidate scores vs. Black and Hispanic Candidate scores, (c) Infantry candidate scores vs. Combat and Non-Combat MOS candidate scores and (d) Option 40 candidate scores vs. In-Service Recruiting Path and Airborne/18X recruiting path scores. Variables exhibiting statistically significant differences will be analyzed for effect size by computing Cohen's *d* (Cohen, 2013).

3.4.4 Predictive Analyses

Predictive analyses aim to determine what AAGs best predict class-up based on scores measured at pre-RASP in processing. Both the open-response AAGs (NLP Themes) and Likert-measured AAGs are intended for predictive analyses.

3.4.4.1 NLP

Research question two dealt with how well a candidate's open-responses predict class-up. To answer this question, A predictive model will be developed using a candidate's NLP Theme scores to predict class-up. NLP Theme Scores will be used as predictor variables for individual candidate records, and the probabilistic theme score will be used as continuous variables in predictive analysis of candidates' class-up or attrition. Models will be evaluated based on Accuracy, but other common statistics will be reported (i.e., area under Receiver Operator Characteristic Curve [AUC ROC], Nagelkerke R^2, and Precision) to enable broader comparisons with results from other studies. a common method of evaluating binary classification models.

3.4.4.2 Demographics and Likert Scales

Research question four deals with the predictive validity of attitudinal variables used in the Likert scales. Additional predictive analysis of a candidate's class-up will be completed using multivariate logistic regression. After aggregation of Likert-scale AAGs, the three demographic factors of interest as well as candidates' fitness scores (control) will be included in multivariate models with the aggregated AAG variables. Demographic variables will be dummy coded as 1 or 0 for inclusion in the multivariate logistic regression. Models consisting only of statistically significant predictors will be developed and evaluated by their model accuracy, model precision, AUC ROC and Nagelkerke R^2, to determine the best predictive model.

Research question five: a comparison of the NLP-derived prediction model with the multivariate logistic regression model, will be based on each optimized model's accuracy score.

4. Results

4.1 Demographic/Background Variables

Seven background/demographic variables of interest to the Rangers were measured in the candidate entry surveys, and five were categorical variables. Frequencies and percentages of these variables for both the 249 unmatched entry surveys, the 120 matched class-up surveys, and the 186 matched attrit surveys are shown in Table 2 below. The majority groups of each of the categorical variables were 18–19-year-old, White High School Graduates who had no prior service, were recruited with Option 40 contracts, and were Infantry MOS.

Table 2.
Descriptive Statistics of Categorical Demographic/Background Variables

Variable	N=249 Unmatched Surveys		N=120 Matched Class-up Surveys		N = 186 Matched Attrit Surveys	
	N	*%*	*n*	*%*	*n*	*%*
Age						
1-(18-19)	83	33.3	50	41.7	68	36.6

2-(20-22)	79	31.7	34	28.3	62	33.3
3-(23-25)	41	16.5	21	17.5	28	15.1
4-(26-30)	36	14.5	11	9.2	25	13.4
5-(31-over)	10	4.0	4	3.3	3	1.6
Education Level						
1-(less than HS)	0	0	0	0	1	0.5
2-(HS graduate)	144	57.8	66	55.0	115	61.8
3-(Some College)	62	24.9	33	27.5	53	28.5
4-(2- YR degree)	12	4.8	5	4.2	6	3.2
5-(4-YR degree)	30	12.0	16	13.3	11	5.9
6-(Professional Degree)	1	0.40	0	0	0	0
Race/Ethnicity						
1-Black	25	10.0	10	8.3	19	10.2
2-Native American	1	0.4	1	0.8	2	11
3-Asian	8	3.2	4	3.3	7	3.8
4-Hawaiian/Pac. Islander	1	0.4	1	0.8	0	0
5-White	144	57.8	76	63.3	121	65.1
6-Hispanic	49	19.7	21	17.5	29	15.6
7-Multi-Racial	18	7.2	6	5.0	8	4.3
8-Other	3	1.2	1	0.8	0	0
MOS						
1-Infantry	127	51.0	68	56.7	88	47.3
2-Combat MOS	49	19.7	27	22.5	30	16.1
3-Non-Combat MOS	73	29.3	28	23.3	68	36.6
Recruiting Path						
1-Option 40	164	65.9	65	54.2	126	67.7
2-In-Service Recruit	31	12.4	27	22.5	20	10.8
3-Airborne/18X	54	21.7	28	23.3	40	21.5
Prior Service						
1-Prior Service	19	7.6	11	9.2	181	97.3
2-No Prior Service	230	92.4	109	90.8	5	2.7

In addition to the categorical demographic/background variables, two continuous variables were measured: candidate self-reported score on last fitness test (Fitness Score), and Pay Grade (enlisted rank 1-5). Results are displayed below in Table 3.

Table 3.
Descriptive Statistics of Continuous Demographic/Background Variables

Variable	N=249 Unmatched Surveys		N=120 Matched Class-up Surveys		N = 186 Matched Attrit Surveys	
	M	*SD*	*M*	*SD*	*M*	*SD*
Fitness Score	91.13	7.28	91.22	6.31	86.98	7.75

Pay Grade	2.69	0.99	2.88	0.91	2.35	0.85

4.2 Effects of Demographic/ Background Variables

4.2.1 Demographic/Background Variables of Interest to Rangers

Four demographic/ background variables collected were not of researcher interest but were included at the request of the Rangers: candidate age, educational level, pay grade, and prior military service. For each of these variables measured, a sequential analysis was performed to determine the effects on classing up or attritting. First, a test of between-subjects effects between classing up and attritting groups was conducted to determine whether there were significant mean differences in those variables. Prior Service, Age, and Education Level were analyzed using Chi-squared tests, while Pay Grade was analyzed using a t-test. Age and Education level were not significantly different between the two groups, but pay grade ($p<.001$; $d = .61$) and Prior Service ($\chi^2 = 6.18$; $p < .05$) were both significantly different between the two groups, and were therefore included in multivariate logistic regression model analyses to assess whether they were significant controls.

4.2.2 Demographic/Background Variables of Interest to Researcher

Three categories of demographic and background variables were of interest to the researcher: race, MOS, and Recruiting Path. To determine the differences between classing up vs. attritting groups on categorical variables, χ^2 tests were performed. Pearson χ^2 and significance levels indicated that only Path to RASP ($\chi^2= 8.81$, $p < .05$), was significantly different, and subsequent analysis indicated that in-service recruits classed-up at a 57.4 percent rate in comparison to a 35.9 percent rate ($\chi^2 =7.74$; $p <.05$) among other recruiting sources.

The lone continuous background variable of interest to both organization and the researcher was Fitness Score, and as expected, there was a significant difference in fitness scores between class-up (M = 90.77; SD = 7.72) and attritting (M = 86.84; SD = 8.11) groups (d = .49).

4.3 NLP Analysis of Open-Response Items

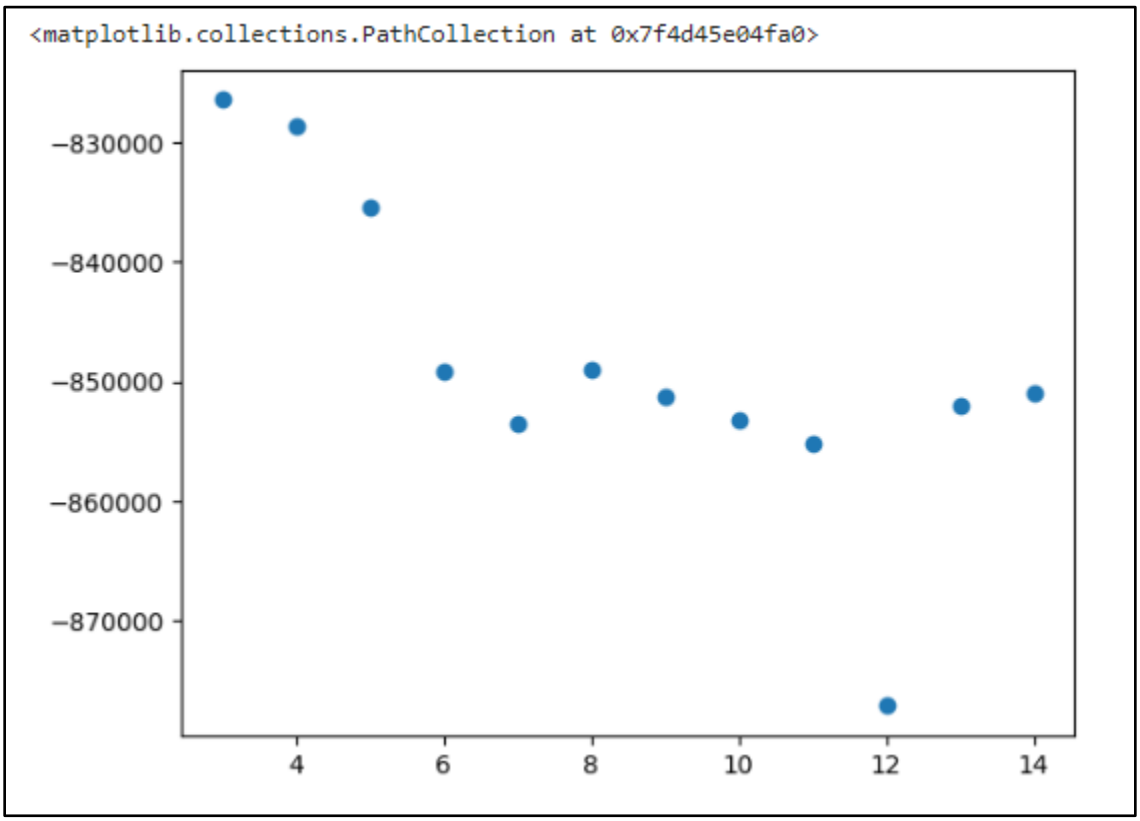
4.3.1 Thematic Extraction of Open-Response Items

Two open-response survey items were analyzed using latent profile analysis gaussian mixture modeling (GMM; Spurk et al., 2020), a natural language processing (NLP) technique of identifying subgroups within a population. The first open-response question asking candidates to explain in a few short statements the reason or reasons they chose to volunteer for the Rangers was labeled as own words reasons (OWR). Responses were manually coded into variables containing a single reason. For example, if a candidate's response was "To serve with the best and be part of best, support the mission and keep our homeland safe.", the response was coded into four variables: "To serve with the best", "To be part of the best", "Support the mission", and "Keep our homeland safe". The recoding resulted in at least one, and up to four reasons per candidate, and 607 total reasons provided for the 306 records, an average of two reasons given per candidate.

After coding responses in single reasons, stop words, commonly used words that do not add meaning to text field responses, such as pronouns and conjunctions, were removed from the text responses, in a process that is commonly used in NLP text analysis (Egger & Yu, 2021). Next, GMM (Spurk et al., 2020) was performed to identify embedding groups. Analysis of Figure 4 (below) suggested a best fit of 12 latent classes, based on a 12-group solution having the lowest Bayesian Information Criterion (BIC) of -88,000, a model selection criterion commonly

used in LPA model selection (Ferguson et al., 2020). Thus, 12-group solution was chosen for subsequent analyses.

Figure 4: Fit Measure (BIC) of different theme groups- OWRs

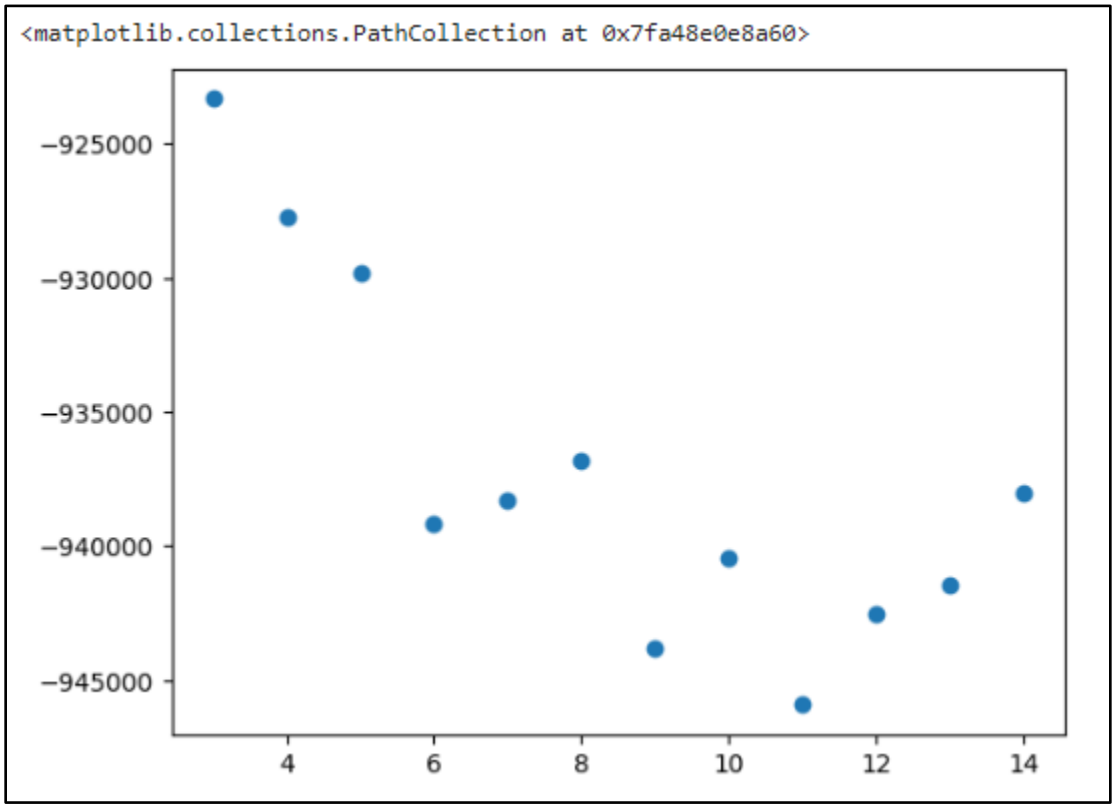


The groups were analyzed qualitatively to assign a group label in a manner common to LPA groups (cf. Campion & Csillag, 2022). The group names and number of responses per group are shown below in Table 4.

The same process was followed for the second open-response question that asked candidates to describe what they wanted to achieve (goals) in the Rangers. Responses were manually coded into discreet reasons for each candidate (maximum = four reasons), resulting in

689 total reasons provided, an average of 2.4 per candidate. After removing stopwords and applying GMM analysis, Analysis of figure 5 (below) suggested a best fit of 11 groups, based on the lowest BIC score of -94,500. Thus, the 11-group solution was chosen as the number of underlying groups and subsequent analyses assigned probabilistic scores between zero and one (0 – 1) for each LPA group, given the OWG responses of each candidate.

Figure 5: Fit Measure (BIC) of different theme groups- OWGs



In effect, the result of the NLP analysis of the two open response questions resulted in 12 new OWR variables and 11 OWG variables per candidate to enable quantitative predictive analysis with classing up. Descriptive statistics showed that several themes exhibited Kurtosis and Skewness in excess of acceptable parameters. OWR 1,2,3,5,6,8,10 and OWG 5,6,8,9, and10

exceeded the Skewness < |2| threshold. OWR 1, 8, 10 and OWG 1 exceeded the Kurtosis < |7| guideline (Hair et al., 2010). No transformation was performed.

Table 4. *Results of LPA NLP Group Names and Group Size:*

Embedding	Name	Number	*M*	*SD*
OWR1	Deploy/Fight	24	.020	.073
OWR2	Training/Skills	59	.048	.107
OWR3	Be the Best	35	.029	.080
OWR4	Selfless Service	96	.078	.126
OWR5	Self-Improve	49	.040	.102
OWR6	Ranger Service	56	.046	.103
OWR7	Personal Challenge	54	.044	.100
OWR8	Be Elite	23	.019	.069
OWR9	Personal Values	84	.069	.135
OWR10	Peer Comparison	11	.009	.047
OWR11	Duty Obligation	59	.048	.103
OWR12	Organizational Prestige	57	.047	.102
OWG1	Skill/ MOS Achievement	15	.012	.054
OWG2	Education/Training	65	.053	.116
OWG3	Ranger Achievement	110	.090	.149
OWG4	Personal Achievement	94	.077	.145
OWG5	Self-Improvement	49	.040	.096
OWG6	Better Myself	41	.033	.085
OWG7	Career Goals	104	.085	.138
OWG8	Deploy	31	.025	.076
OWG9	Leadership Goals	48	.039	.104
OWG10	RASP Achievement	42	.034	.097
OWG11	Ranger Credibility	90	.074	.135

Note: N=607 OWRs; N=689 OWGs
OWR= themes derived from the "own words reasons" question: "describe the reason or reasons you chose to volunteer; OWG= themes derived from "own words goals" question: describe what you want to accomplish (goals) in the Rangers.

4.3.2. Descriptive Statistics- NLP Themes

Extracted NLP themes were analyzed for the mean and the standard deviations of the theme scores for both attritting and classing up groups. Differences between classing up (N=120), and attritting (N=186) groups were analyzed using MANOVA in SPSS statistical software, and three themes showed statistically significant mean differences between the two

groups ($p < .05$): OWR1: Deploy/Fight, OWG8: Deploy, and OWG11: Ranger Credibility. Theme scores with effect sizes $d > |.15|$ were retained for subsequent analyses. Four additional themes met this threshold: OWR11: Duty Obligation, OWR12: Organizational Prestige, OWG2: Education/Training, and OWG3: Ranger Achievement. Results are shown in Table 5 below.

Table 5. *Means and Standard Deviations of NLP Theme Scores*

	Class-up (N=120)		*Attrit (N = 186)*		
	M	*SD*	*M*	*SD*	*d*
OWR1: Deploy/ Fight	**.035**	**.099**	**.009**	**.048**	**.350****
OWR2: Training/Skills	.048	.104	.048	.109	-.004
OWR3: Be the Best	.027	.078	.030	.081	-.031
OWR4: Selfless Service	.090	.129	.071	.125	.145
OWR5: Self-Improve	.042	.109	.039	.098	.026
OWR6: Ranger Service	.046	.102	.046	.104	.001
OWR7: Personal Challenge	.042	.104	.046	.097	-.040
OWR8: Be Elite	.019	.074	.019	.066	-.001
OWR9: Personal Values	.058	.129	.075	.139	-.126
OWR10: Peer Comparison	.013	.055	.007	.041	.124
OWR11: Duty Obligation	**.058**	**.116**	**.042**	**.093**	**.162**
OWR12: Organizational Prestige	**.058**	**.116**	**.039**	**.091**	**.191**
OWG1: Skill/ MOS Achievement	.015	.059	.011	.051	.071
OWG2: Education/Training	**.069**	**.125**	**.043**	**.108**	**.224**
OWG3: Ranger Achievement	**.106**	**.170**	**.079**	**.133**	**.181**
OWG4: Personal Achievement	.067	.140	.083	.148	-.115
OWG5: Self-Improvement	.035	.088	.043	.101	-.079
OWG6: Better Myself	.035	.088	.032	.084	.037
OWG7: Career Goals	.079	.121	.089	.148	-.069
OWG8: Deploy	**.040**	**.092**	**.016**	**.005**	**.314***
OWG9: Leadership Goals	.048	.118	.034	.093	.138
OWG10: RASP Achievement	.040	.107	.031	.090	.089
OWG11: Ranger Credibility	**.098**	**.156**	**.058**	**.118**	**.299***

Note: N = 306.
**p < .05; ** p < .01*
***BOLD** = effect size of |.15| or greater; these items were retained for further analysis in multivariate prediction*
OWR= themes derived from the "own words reasons" question: "describe the reason or reasons you chose to volunteer; OWG= themes derived from "own words goals" question: describe what you want to accomplish (goals) in the Rangers.

4.3.3 Multivariate Prediction Using NLP Themes

Multivariate logistic regression was conducted to determine the combination of NLP themes that resulted in a model with the highest accuracy score using statistically significant NLP themes. First, All NLP themes that exhibited effect size $d > |.15|$ between class-up and attrit groups were analyzed for multicollinearity. None of the predictors had a variance inflation factor (VIF) higher than 1.1, well below the thresholds commonly established for high multicollinearity (Montgomery et al., 2012). Next, the seven NLP themes were entered as predictors in binary logistic regression, and those predictors with significance levels of $p < .10$ were retained in a final model to enable comparison with multivariate models utilizing the AAGs measured with Likert scales. Using this approach resulted in a final model shown below in Table 6.

Table 6. *Logistic Regression Results: NLP Themes Only*

Variable	*B*	*Odds Ratio (OR)*	*STD OR*
Intercept	-1.214	-	
OWR1: Deploy/Fight[a]	4.588	98.31*	1.40
OWR12: Organizational Prestige[a]	2.072	7.94	1.23
OWG2: Education/Training[b]	2.005	7.43	1.26
OWG3: Ranger Achievement[b]	1.632	5.12	1.28
OWG8: Deploy[b]	4.221	68.12*	1.38
OWG11: Ranger Credibility[b]	2.714	15.10*	1.44

Note: * $p < .05$; All predictors significant at Type I error rate of $p < .10$.
STD OR = standardized odds ratio
AUC ROC = .678; Nagelkerke R^2= .137; BIC 417.38; Accuracy = .670; Precision = .646
[a]OWR-themes are theme scores derived from latent profile analysis of candidates' own words reasons for volunteering.
[b]OWG-themes are theme scores derived from latent profile analysis of candidates' own words goals for Ranger service.
To compute individual probability of success, the constant and regression weights represent the exponential terms in the formula:

$$\frac{1}{1 + e^{-}(Constant + regression\ weights)}$$

4.4 Analyses of Likert AAGs

4.4.1 Data Reduction

Using the total entry surveys, items were analyzed using principal components analysis and factor analysis to determine how 18 items could be reduced into meaningful combinations of fewer variables. Using principal components extraction, a parallel analysis was conducted on the 13 Likert AAG survey items, with results suggesting to extract three factors. Next, exploratory factor analyses (EFA) were conducted on the 13 AAG items and results of the EFA also supported a three-factor solution. After applying an oblique rotation (Quartimin) every item loaded onto a factor based on the factor loadings > |.3| and all cross-loadings < |.21|; the three factors were interpreted as intrinsic motivation (7-items), extrinsic motivation (4-items), and social influence (two items).

However, two survey items were retained as individual variables based on a combination of factor loadings and theoretical rationale. Fit expectation was retained as a single-item because of its relatively low loading on the intrinsic motivation factor (.415), and because fit is less relevant to the conceptual definition of intrinsic motivation. Fit is attitude related to an individual's assessment of the dyadic relationship between the person and organization. Additionally, though "Recruiter Influence" loaded onto the extrinsic-motivation factor, it likewise does not fit well with the concept of extrinsic motivation. Retaining these two questions as single-items and re-analyzing the remaining 11 items resulted in the factor loading matrix shown below in Table 7. Of the 57.1 percent of common variance accounted for by the three factors, Intrinsic Motivation accounted for 31.07 percent, Extrinsic Motivation accounted for 16.24, and Social Influence accounted for 9.81 percent. Items loading on the three factors were aggregated to create scale scores.

Table 7. *Factor loading matrix: Motivational Sources AAGs*

	Intrinsic Motivation	Extrinsic Motivation	Social Influence
Intrinsic Motivations			
A chance to better myself	**.706**	.033	-.173
I wanted a challenge	**.660**	-.031	-.034
Opportunities for personal development	**.602**	.170	-.035
The Organization's reputation	**.577**	-.071	.190
Prestige of joining an elite unit	**.559**	.066	.203
Deployment Opportunities	**.421**	-.058	.204
Extrinsic Motivations			
Better pay and benefits	.056	**.885**	-.052
Faster promotion opportunities	.155	**.700**	.009
Avoiding a different/bad assignment	-.133	**.336**	.158
Social Influence			
Peers or friends	.040	.061	**.626**
A mentor of family member	.083	.089	**.534**

Note: N = 555. **Bold** values indicate the items loading on each factor. All item cross-loadings were < |.21|.

A similar process was followed to reduce the five survey items related to individual satisfaction. Although the five satisfaction survey items yielded a single factor, the lowest loading item was "satisfaction with the Army" (.418), which was removed because satisfaction with the Army was viewed as unrelated to RASP goal pursuit/ goal abandonment decisions; all Soldiers remain in the Army if they attrit. A second EFA was conducted using only four satisfaction items: satisfaction with the Rangers, satisfaction with peers, satisfaction with type of work, and satisfaction with cadre/supervisors. The four items loaded on a common factor accounting for 58.90 of the total variance; all factor loadings were greater than .51 (See Table 8). A satisfaction composite was computed as the average scores for the four items.

Table 8. *Factor loading matrix: Satisfaction Items, Excluding Satisfaction with Army*

	Factor Loading
Global Satisfaction	
How satisfied are you with the Rangers?	.850

How satisfied are you with RASP cadre?	.722
How satisfied are you with type of work you do?	.590
How satisfied are you with co-workers/peers?	.519

Note: N = 555

To summarize, four AAG variables were developed as aggregated scores from multiple Likert-scale survey items: Intrinsic Motivation, Extrinsic Motivation, Social Influence, and Satisfaction. Recruiter Influence and Fit Expectations were each retained as single item variables for subsequent analyses, resulting in a total of six Likert-AAG variables.

4.4.2 Descriptive Statistics: Likert Scale AAGs

For AAG variables developed from Likert scales, means and standard deviations were computed for the sample of 249 unmatched entry surveys, and for the 120 matched class-up surveys and 186 matched attrit surveys. The results are shown in Table 9 below. In Table 10 that follows, the inter-correlation matrix of predictor variables is provided, and that table includes both the continuous and ordinal demographic variables as well as the AAGs measured with Likert scales. A check of skewness and kurtosis indicated all distributions were within acceptable parameters (Hair et al., 2010; Skewness < |2|; Kurtosis < |7|), except that Intrinsic Motivation scores were negatively skewed (-2.32) and leptokurtic (6.96). No transformation was performed.

Table 9. *Descriptive Statistics of AAG Predictor Variables*

Variable	N=249 Unmatched Surveys		N=120 Matched Class-up Surveys		N = 186 Matched Attrit Surveys	
	M	*SD*	*M*	*SD*	*M*	*SD*
Intrinsic Motivation	4.72	0.40	4.80	0.29	4.54	0.53
Extrinsic Motivation	3.01	0.89	3.18	0.83	3.27	0.77
Social Influence	3.54	1.10	3.65	0.83	3.57	0.92
Satisfaction	4.07	0.67	4.23	0.54	3.84	0.68

Fit Expectations	4.05	0.93	4.17	0.86	3.77	0.98
Recruiter Influence	2.44	1.23	2.47	1.14	2.95	1.13

Note: Total Sample N = 555

Table 10. *Predictor Inter-Correlation Matrix.*

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
Demographic										
1. Age[a]	-									
2. Fitness	.112*									
3. Education[a]	.504*	.140*								
4. Pay Grade	.368*	.230*	.462*							
5. Prior Serv.[b]	.248*	.081	.068	.361*						
Likert AAGs										
6. Intrinsic[c]	.025	.170*	-.020	.066	.009					
7. Extrinsic[c]	.038	-.105*	-.038	-.102*	-.073	.162*				
8. Social Inf.[c]	.026	.020	-.042	.014	-.023	.316*	.366*			
9. Satisfaction[c]	.004	.133*	-.063	.001	.023	.515*	.073	.267*		
10. Fit	.083*	.260*	.052	.106*	.051	.394*	.126*	.231*	.339*	
11. Rec. Inf.	.012	-.174*	-.041	-.097*	-.015	-.007	.677*	.271*	-.010	.001

Note: N = 555, * $p < .05$
Prior Serv. = whether candidate had a prior military enlistment; Intrinsic = Intrinsic Motivation composite; Extrinsic = Extrinsic Motivation composite; Social Inf. = Social Influence composite; Satisfaction = Satisfaction composite; Fit = candidate expectations of fit; Rec. Inf. = Recruiter Influence.
[a] *Correlation Coefficients of these ordinal variables use Spearman's rho (r_{rho})*
[b] *Point-Biserial Correlation (r_{pb})*
[c] *Composite scores averaged from scores of multiple survey questions in accordance with the factors discovered in factor analysis*

4.5 Group Differences in AAGs

Group differences were analyzed on the basis of the three demographic/background variables of interest: race/ethnicity, MOS, and recruiting path, as well as by class-up vs. attritting groups. For each analysis, a MANOVA was conducted with follow-up t-tests as indicated.

4.5.1 Differences Between Class-up/ Attritting Groups

A MANOVA was performed to analyze mean differences between class-up and attritting groups on continuous variables. Box's test of equality of variances was significant (Box's *M* = 137.4, (F)=1.44; $p < .05$) indicating non-homogeneity between the two groups. Multivariate tests of the general linear model indicated significant differences between the groups, with Pillai's Trace = .250, (F)=7.48, $p < .05$). Multivariate tests of between-subjects factors indicate that Intrinsic Motivation scores, Fit Expectations, and Recruiter Influence were all significantly different between classing up and attritting groups, with Levene's test for equality of variances showing unequal variances for Intrinsic Motivation Scores and for Satisfaction Scores. Therefore, adjusted t-test significance p-values were used for these two variables and the Holm correction (Rubin, 2021) was used to correct for multiple comparisons. Means, standard deviations, and effect sizes of continuous variables are shown below in Table 11.

Table 11. *Mean Differences Analysis: Class-up vs. Attritting Candidates: AAGs*

	Class-Up (N=120)		*Attrit (N=186)*		
	M	*SD*	*M*	*SD*	*d*
Intrinsic Motivation Score[a]	4.80	.29	4.54	.52	.58**
Extrinsic Motivation Score	3.41	.92	3.38	.83	.04
Social Influence Score	3.65	.83	3.57	.92	.08
Satisfaction Score[a]	4.23	.54	3.84	.68	.62**
Fit Expectations	4.17	.86	3.77	.98	.42**
Recruiter Influence	2.47	1.14	2.95	1.13	-.42**

Note: N=306 total sample.
** $p < .001$
* $p < .05$
[a]*Adjusted t-values for unequal variances*

4.5.2 Between-Groups Differences: White, Black, Hispanic Candidates

For each of the three-level analyses of race, MOS, and recruiting path differences, the *a priori* Type I error rate was relaxed to .10 due to concerns over power, and to better enable the ability

to detect and report small effects (d > |.2|). This allowed a power of greater than .96 to detect medium effects (d > .5) and a power of .40 to detect small effects for the comparison groups with the greatest proportional differences (White Candidates vs. Black Candidates). Such an approach balances error rates in a manner advocated by Lieberman & Cunningham (2009). MANOVA was completed to enable an analysis of differences between racial/ethnic sub-groups of interest: White Candidates (N= 402), Black Candidates (N= 54), and Hispanic Candidates (N= 99). Box's test of equality of covariances Box's M = 275.29; (F) = 1.41, p < .05, indicating between groups differences in variance. The overall race effect was significant (Pillai's Trace = .208, (F)=4.95, p <.001). Tests of between-subjects factors suggested significant differences in Fitness Score and Extrinsic Motivation Score. Post-hoc tests were conducted using Dunnett's T3 test to further examine the differences between the three categories and the results are shown below in Table 12. Fitness test scores of Hispanic Candidates differed from White Candidates and Black Candidates differed from White Candidates on Extrinsic Motivation scores.

Table 12. *Mean Differences based on Race*

	White Candidates (N=341)		Black Candidates (N=54)			Hispanic Candidates (N=99)		
	M	*SD*	*M*	*SD*	*d*	*M*	*SD*	*d*
Fitness Scores	90.38	7.14	89.49	7.93	.12	88.15[a]	7.50	.31*
Extrinsic Motivation	3.09	.82	3.42[b]	.82	-.41*	3.11	.90	-.03

*Note: * p < .10; ** p < .05*
[a]*p= .056 between Hispanic and White Candidates*
[b]*p=.063 between Black and White Candidates*

4.5.3 Between-Groups Differences: MOS

MANOVA was completed to enable an analysis of differences between three categories of MOS: Infantry (N= 283), Combat (N=97), and Non-Combat (N=175). Box's test of equality of

covariances Box's M = 343.79; (F) = 2.121, $p < .001$. The main effect for occupational category was significant (Pillai's Trace = .280, (F)=7.35, $p < .001$). Tests of between-subjects factors suggested differences in Fitness Score, Fit Expectations, Recruiter Influence, Intrinsic Motivation Score, Extrinsic Motivation Score, and Satisfaction Score each had a significance level of $p < .05$. Post-hoc tests were conducted using Sheffe's test for those variables having equal variances, and Dunnett's T3 test for those variables having unequal variances between groups (Fitness Score and Intrinsic Motivation Score). Results are shown below in Table 13.

Table 13. *Significant Mean Differences based on MOS*

	Infantry (N=283)		Combat (N=97)			Non-Combat (N=175)		
	M	*SD*	*M*	*SD*	*d*	*M*	*SD*	*d*
Fitness Score[a]	90.49	7.89	91.24	5.45	-.10	87.75	7.50	.35**
Intrinsic Motivations[b]	4.77	.31	4.66	.49	.30*	4.53	.55	.59**
Satisfaction[c]	4.13	.60	3.96	.65	.27*	3.89	.74	.36**
Fit Expectations[d]	4.07	.90	3.99	.98	.09	3.83	.99	.26**
Recruiter Influence[e]	2.57	1.17	2.21	1.15	.31**	2.91	1.20	-.29**

*Note: * p < .10; ** p < .05.*
MOS was trichotomized into three groups for analysis: (1) Infantry = comparison group; (2) Combat MOS's, which were those non-Infantry MOS that exist in Ranger Rifle Platoons and (3) Non-Combat MOS which are those that are assigned outside of Ranger Rifle Companies.
[a]Fitness score differences between non-combat and both Infantry and Combat MOS.
[b]Intrinsic Motivations differences between Non-Combat and Infantry
[c]Satisfaction differences between Infantry, and both Combat and Non-Combat
[d] Fit expectations between Non-Combat and Infantry
[e]Recruiter Influence differences between Infantry and both Combat and Non-Combat

4.5.4 Between-Groups Differences: Recruiting Paths

MANOVA was used to analyze differences between three categories of recruiting path to RASP: Option 40 Contract (N=355), In-service Recruit (N=78), and Airborne/18X Recruit (N=122). Box's test of equality of covariances was significant (Box's M = 269.46; (F) = 1.65, $p < .001$). The effect of recruiting path was significant (Pillai's Trace = .259, (F)=6.72, $p < .001$). Tests of

between-subjects factors indicated significant differences in Pay Grade ($p < .001$) and Fit Expectations ($p < .05$). Post-hoc tests were conducted using Sheffe's test for Fit Expectations, and a Dunnett's T3 test for Pay Grade (See Table 14).

Table 14. *Significant Mean Differences based on Recruiting Path*

	Option 40 (*N=355*)		In-Service (*N=78*)			Airborne/ 18X Contract (*N=122*)		
	M	*SD*	*M*	*SD*	*D*	*M*	*SD*	*d*
Pay grade[a]	2.44	.84	3.18	1.17	-.82**	2.78	.92	-.40**
Fit expectations[b]	3.93	.95	4.26	.80	-.35**	3.98	.99	.32*

*Note: * p < .10; ** p < .05*
[a]Pay Grade differences between both In-Service and Airborne/18X Contract and reference Option 40
[b]Fit Expectations differences between In-Service and Option 40 (reference), and between In-Service (reference) and Airborne/18X

In summary, candidates differed on each of the three demographic/ background groups of interest but in different ways. MOS was the background variable in which candidates had the greatest number (five) of between-groups differences. Additionally, MOS between-group differences exhibited the largest average effect sizes of all the demographic/background groups between Infantry and Non-Combat MOS groups.

Between groups differences based on race were found on Fitness Scores and Extrinsic Motivations, with Black Candidates having higher Extrinsic Motivations than White Candidates, and White Candidates having higher Fitness Scores than Hispanic Candidates. Effect sizes were small for each.

The differences by recruiting path were in Pay Grade and in Fit Expectations, with both in-service candidates and Airborne/18X recruited candidates having higher average Pay Grade

and higher expectations of fit with the Rangers. The strongest effect size overall in terms of background/demographic variables of interest was the difference in Pay Grade between in-service candidates and Option 40 candidates (d = -0.82), while Fit Expectations differences were small effects for each group.

4.6 Predictive Analyses

Predictive analyses were conducted on background/demographic variables, Likert AAG scores, and NLP theme scores to determine the significance and relative strength of items in predicting candidates' class-up, and to determine how different models compare in terms of variance explained and model predictive accuracy.

4.6.1 Bivariate Correlations with Class-up

Point-biserial (r_{pb}) correlations were computed for continuous variables and their relationship with class-up vs. attrition outcomes. For ordinal variables, spearman's rho (r_{rho}) was computed as the bivariate correlation measure. The strongest correlations were Satisfaction (r_{pb}=.289), Pay Grade (r_{pb} = .288), Intrinsic Motivations (r_{pb} =.274), and Fitness Score (r_{pb}=.235). Full results are shown in Table 15 below.

Table 15. *Bivariate relationships with Class-Up*

Continuous Variables	r	Ordinal Variables	r_{rho}
Fitness Score	.235**	Age	-.036
Pay Grade	.288**	Education Level	.099*
Intrinsic Motivations	.274**		
Extrinsic Motivations	.018		
Social Influence	.040		
Satisfaction	.289**		
Fit Expectations	.201**		
Recruiter Influence	-.203**		

Note: N=306.
* $p < .05$
** $p < .001$

4.6.2 Multivariate Logistic Regression-Prediction of Class-up

Multivariate logistic regression was used to develop models to predict class-up, and the results of the logistic regression analyses were used to determine relative strength of predictors, and to determine predictive accuracy of the models. Checks for multicollinearity were performed prior to determining the best model for each of the families of predictor (demographic/ background, Likert-measured AAGs, and NLP themes), and then a final time to check multi-collinearity of all predictors from different families considered in a final model. None of the predictors exhibited a VIF nearing the 5-10 threshold suggested by Montgomery et al. (2012) as risk of multicollinearity. After arriving at a final overall model, standardized odds ratios were calculated for all included predictors to enable comparisons of relative importance via a standardized effect size, a method advocated by Putka & Strickland (2005).

4.6.2.1 Multivariate Model: Background and Demographic Variables

First, a multivariate logistic regression model was developed from the demographic and background variables that demonstrated significant mean differences between class-up and attritting groups in previous analyses. For the three categorical variables of interest: Race, MOS, and Path to RASP, dummy coded variables were developed with a comparison group for each category. For race/ethnicity the comparison group was White Candidates. For MOS, the comparison group was Infantry, and for Recruiting Path, the comparison group was Option 40. Multicollinearity checks indicated no evidence of multicollinearity, so all variables were entered into the logistic regression model and only those that were significant at a relaxed type I error

rate of $p < .10$ were retained. After removing variables with type I error rates of $p < .10$ or higher, a final model was selected which only included Fitness Score and Pay Grade. These results were used as a comparison for subsequent models in determining incremental variance explained and predictive accuracy (AUC ROC, accuracy, precision) of models, and regression coefficients and odds ratios are shown in Table 16 below.

Table 16. *Logistic Regression Results: Demographic and Background Variables*

Variable	*B*	Odds Ratio	STD Odds Ratio
Intercept	-7.912	-	-
Fitness Score	0.065	1.067	1.702
Pay Grade	.640	1.896	1.790

Note: N=306.
All variables were significant at $p<.05$
AUC ROC = .710; Nagelkerke R^2= .167; Accuracy = .667; Precision = .618; BIC = 386.80
To compute individual probability of success, the constant and regression weights represent the exponential terms in the formula:

$$\frac{1}{1 + e^{-}(Constant + regression\ weights)}$$

4.6.2.2 Multivariate Prediction Using AAG Variables Only

A multivariate logistic regression model was developed using only the six Likert AAG predictors. The Likert AAG predictors were entered and only those with a type I error rate of $p < .10$ were retained. In the first iteration, Extrinsic Motivation and Social Influence scores were removed. The second iteration produced a model including four of the predictors, and the model and its diagnostics are shown below in Table 17.

Table 17. *Logistic Regression Results: Likert AAGs Only*

Variable	*B*	Odds Ratio	STD Odds Ratio
Intercept	-8.677	-	
Intrinsic Motivation Score	1.174	3.24	1.74
Satisfaction Score	.660	1.94	1.55
Recruiter Influence	-.351	1.42*	1.50*
Fit Expectations	.250	1.28	1.27

Note: * Denotes negative effect/inverse odds ratio reported for comparison with other variables
All variables significant at $p<.05$ with the exception of Fit Expectations, for which $p = .088$.
AUC ROC = .743; Nagelkerke R^2= .213; Accuracy = .712; Precision = .656; BIC 386.11.
To compute individual probability of success, the constant and regression weights represent the exponential terms in the formula:

$$\frac{1}{1 + e^{-}(Constant + regression\ weights)}$$

4.6.3 Model Comparisons, Incremental Variance and Accuracy

To ultimately find the best predictive model, several combinations of predictor category were modeled and compared. First, the predictive models developed from the NLP themes and from the Likert AAG scores were compared. Subsequently, additional models combining predictor categories were analyzed to determine incremental variance and additional accuracy provided. Specifically, models were developed that included the following combinations: demographic/ background predictors and NLP theme scores, demographic/background predictors and Likert-measured AAGs. and background/demographic predictors, Likert-measured AAGs, and NLP theme scores.

4.6.3.1 Comparison: NLP Themes vs. Likert AAG Scores

The final models developed from NLP themes and from Likert AAG scores were compared side-by-side to determine which predicts better. As shown in Table 18 below, on each of the five metrics of model performance, the model using Likert AAG scores performed better than the model using NLP theme scores.

Table 18: *Comparison of NLP Theme vs. Likert AAG Scores Logistic Regression Models*

Model (# of variables)	Nagelkerke R^2	AUC ROC	Accuracy	Precision	BIC

1. NLP Theme Scores (6)	.137	.678	.670	.646	417.38
2. Likert AAG Scores (4)	.213	.743	.712	.656	386.11

Note: N=306 for all models.

4.6.3.2 Incremental Variance of Models

To analyze the incremental variance provided and additional predictive accuracy provided by different models including combined predictor categories (e.g.- background/demographic, plus AAGs, plus NLP themes), several models were developed for comparison. First, background/ demographic variables were entered as block one in logistic regression, followed by subsequent predictor categories. Similar to previous predictive models, the goal was to find a final model with the best model diagnostics, but with only predictors demonstrating a type I error rate of $p <$ .10 or below. In the first analysis of incremental variance, Likert AAG predictors were entered and analyzed as block 2, followed by NLP theme predictors as block 3 in the next iteration. In the second analysis, NLP theme predictors were entered as block 2, followed by Likert AAG scores as block 3. The results of these models are shown in Table 19 and Table 20 below.

Table 19: *Incremental Model Analysis: Background/Demographic, Likert AAGs, and NLP themes*

Block 1: Background/Demographic					
Predictor	*B*	*OR*			
Pay Grade	.640	1.90			
Fitness Score	0.065	1.07			
Model Diagnostics	AUC ROC	Nagelkerke R^2	Accuracy	Precision	BIC
	.710	.167	.667	.618	386.80
Block 2: Likert AAGs					
Predictor	*B*	*OR*			
Intrinsic Motivation	1.439	4.22			
Satisfaction	0.721	2.06			
Recruiter	-0.359	1.43			
Δ Model Diagnostics	AUC ROC	Nagelkerke R^2	Accuracy	Precision	BIC

	.088	.164	.075	.074	-28.43
Block 3: NLP Themes					
Predictor	*B*	*OR*			
OWR1: Deploy/Fight	3.983	53.68			
OWG8: Deploy	3.843	46.67			
Δ Model Diagnostics	AUC ROC	Nagelkerke R^2	Accuracy	Precision	BIC
	.011	.031	-0.03	-0.044	1.01

Note: N=306. Only predictors significant at a Type I error rate of p < .10 were retained in each model block

Table 20: *Incremental Model Analysis: Background/Demographic, NLP themes, Likert AAGs*

Block 1: Background/Demographic					
Predictor	*B*	*OR*			
Pay Grade	.640	1.896			
Fitness Score	0.065	1.067			
Model Diagnostics	AUC ROC	Nagelkerke R^2	Accuracy	Precision	BIC
	.710	.167	.667	.618	386.80
Block 2: NLP Themes					
Predictor	*B*	*OR*			
OWR1: Deploy/Fight	5.315	203.39			
OWG8: Deploy	4.258	70.65			
OWG11: Ranger Credibility	2.267	9.652			
Δ Model Diagnostics	AUC ROC	Nagelkerke R^2	Accuracy	Precision	BIC
	0.034	0.076	0.032	0.038	-3.15
Block 3: Likert AAGs					
Predictor	*B*	*OR*			
Intrinsic Motivation	1.165	3.21			
Satisfaction	0.754	2.13			
Recruiter Influence	-0.341	1.41			
Δ Model Diagnostics	AUC ROC	Nagelkerke R^2	Accuracy	Precision	BIC
	0.069	0.124	0.023	0.005	-19.08

Note: N=306. Only predictors significant at a Type I error rate of p < .10 were retained in each model block

A final model was created using a combination of background/demographic predictors, AAG predictors, and NLP theme scores to identify the model with highest predictive accuracy. Both backwards, stepwise logistic regression and a single-entry block logistic regression were conducted to determine if one would produce a higher accuracy model. Both methods produced the same result when only predictors significant at $p < .10$ were retained. The model with the highest predictive accuracy included only background/demographic variables and Likert AAGs. That model had an accuracy of .742 and is shown below in Table 21. The standardized odds ratios enable a comparison of predictor strength (Pukta & Strickland, 2005) and show that Pay Grade is the strongest relative predictor of class-up, followed by Intrinsic Motivation, Satisfaction, Fitness Score, and Recruiter Influence (negative effect).

Table 20. *Logistic Regression Results: Demographic/ Background plus AAGs*

Variable	*B*	Odds Ratio	STD Odds Ratio
Intercept	-15.761	-	-
Fitness Score	.051	1.05	1.52
Pay Grade	.778	2.18	2.03
Intrinsic Motivation	1.439	4.22	1.97
Satisfaction	.721	2.06	1.61
Recruiter Influence	-0.359	1.43*	1.51*

Note: * Denotes negative effect/inverse odds ratio reported for comparison with other variables
All variables were significant at $p < .05$
AUC ROC = .798; Nagelkerke R^2= .331; Accuracy - .742; Precision = .692; BIC 358.37
[a]OWR-themes are theme scores derived from latent profile analysis of candidates' own words reasons for volunteering.
[b]OWG-themes are theme scores derived from latent profile analysis of candidates' own words goals for Ranger service.
To compute individual probability of success, the constant and regression weights represent the exponential terms in the formula:

$$\frac{1}{1 + e^{-}(Constant + regression\ weights)}$$

4.7 Results Summary

The results of the multiple predictive analyses of attrition/classing-up demonstrate several important findings. First, results indicate that differences in Fitness Scores, Pay Grade, Intrinsic Motivations, Recruiter Influence, and Satisfaction predicted attrition class-up, whereas demographic factors such as race, recruiting path, or military occupational specialty did not. Second, the predictive analysis provides evidence that motivations, whether measured via traditional Likert scales, or via analysis of open responses, both provide incremental improvement in prediction beyond what fitness scores and demographic factors provide. As a summary snapshot of the increases in predictive validity and model accuracy, Table 21 below provides the Nagelkerke R^2, AUC ROC, Accuracy, and Precision of each of the different final prediction models. When controlling for Fitness Score and Pay Grade, both NLP theme scores and AAG scores added incremental variance in the prediction of attrition. However, when testing the incremental variance of NLP Themes beyond Likert AAGs and the incremental variance of Likert AAGs beyond NLP Themes, the Likert AAGs were the superior predictors of attrition. When entering both Likert AAGs and NLP Themes simultaneously with Fitness Score and Pay Grade, the model accounted for the most total variance, but the predictive accuracy and the precision of this model decreased relative to the predictive model with only Likert AAGs and the control variables.

Table 21: *Model Score Card: Comparison of Different Models in Predicting Class-up*

Model (# of predictors)	Nagelkerke R^2	AUC ROC	Accuracy	Precision
1. Fitness Score (1)	.084	.678	.618	.525
2. Background/ Demographic (2)	.167	.710	.667	.618
3. NLP Themes (6)	.137	.678	.670	.646
4. Likert AAGs (4)	.213	.743	.712	.656

5. Background/Demographic + Likert AAGs (5)	.331	.798	**.742**	**.692**
6. Background/Demographic + NLP Themes + Likert AAGs (8)	**.367**	**.813**	.722	.661

Note: N=306 for all models. **BOLD** = best index score.
Fitness score prediction is shown to provide a reference comparison.

5. Discussion

The goal of the study was to understand the importance of candidate attitudes, attributions, and goals (AAGs) in predicting successful completion of the 75th Ranger Regiment's Pre-RASP. Ultimately, such understanding of candidate attitudes when they enter pre-RASP could be used for organizational interventions to reduce attrition, rather than to simply improve prediction—thus logically building on my prior research on attrition from RASP (Coombs, 2020). Open-response surveys and more traditional Likert-scale survey questions were used to measure candidates' motivational reasons for volunteering for RASP, including their personal goals when becoming a Ranger.

5.1 Research Questions

The first research question related to NLP as a focal analysis of the study in terms of identifying thematic clusters of classing-up candidates' open-ended responses about reasons for volunteering for Rangers and their personal goals related to becoming a Ranger. The NLP latent profile analysis (LPA) resulted in the identification of 23 narrative themes. The themes themselves are of interest and potential value to shape efforts to improve recruiting as discussed later in implications. An analysis and interpretation of Table 5 shows that there were significant mean differences between class-up and attritting groups in scores on three themes: OWR1: Deploy/Fight, OWG8: Deploy, and OWG11: Ranger Credibility. Additionally, OWG2:

Education/Training exhibited a small effect ($d > .2$), $p < .10$. Although these themes resulting in between-group differences appeared to reflect intrinsic motivational goals, other themes that also appeared to be related to intrinsic motivations did not exhibit significant mean differences, e.g., OWR3: Be the Best, OWR4: Self-Improve, and OWR7: Personal Challenge. One interpretation of these results is that candidates have specific, varying underlying narratives of Intrinsic Motivations, with deployment-seeking being the most shared narrative.

The second research question related to how well thematic clusters of candidates' open-ended responses predict candidate success from pre-RASP. Models consisting of only NLP themes showed higher predictive accuracy and precision than models consisting only of demographic/background variables. Compared to the sample base rate of 60.8% passing, a model of only NLP Themes had an accuracy of 67.0%, which represents a 10.2% increase. An interesting finding about this analysis is that the NLP themes OWR1: Deploy/Fight, OWG8: Deploy, and OWG11: Ranger Credibility added incremental variance above models that included demographic/background variables. As shown in Table 20, adding NLP Themes to a model with demographic/background variables improved all of the model performance indices, with Accuracy having a 4.8 % increase and Precision the largest increase at 6.1%. In summary, the analysis of open-response text answers with NLP demonstrated predictive validity for pre-RASP outcomes.

Research Question three was a two-part question; part one dealt with mean differences and correlations between Likert AAGs and the demographic/background variables of interest: race/ethnicity, MOS, and recruiting path. Part two addressed the extent of which demographic variables of interest predicted attrition. There were significant between groups differences on each of the three variables, but none of the three variables predicted classing-up.

There were significant differences between Black Candidates and White Candidates in Extrinsic Motivations and between Hispanic Candidates and White Candidates in Fitness Scores, each with small effects. Black Candidates rated the influence of Extrinsic Motivations as higher than White Candidates, while Hispanic Candidates had lower average Fitness Scores than White Candidates and Black Candidates.

Additional significant differences were observed in relation to MOS, with Non-Combat Soldiers having lower Fitness Scores than Infantry Soldiers and Combat Soldiers with small effects; Additionally, Non-Combat Soldiers had lower average scores than Infantry Soldiers on Intrinsic Motivations with medium effects, and Satisfaction and Fit Expectations with small effects. On the Recruiter Influence question, however, Non-Combat Soldiers had higher average scores that Infantry Soldiers with small effects. Combat Soldiers were more similar to Infantry Soldiers and differed significantly only in Intrinsic Motivation, Satisfaction, and Recruiter Influence—each with small effects. Combat Soldiers had lower levels of Intrinsic Motivation, Satisfaction, and Recruiter Influence that Infantry Soldiers.

The differences between recruiting paths existed in only Pay Grade and Fit Expectations. In-Service Recruits had higher Fit Expectations than Option 40 Candidates and Airborne/18X Candidates, both with small effect sizes. In-Service Recruits had higher average Pay Grade than Option 40 Candidates (medium effect), while Airborne/18X Candidates had lower Pay Grade (small effect).

The finding of modest racial/ethnic differences in AAGs as well as the demographic proportions in the study's sample of RASP candidates supports previous findings of Woodruff et al (2006) that Hispanic and White Males are most likely to pursue and serve in elite military units.

Research question four related to the relationship between attitudinal variables and pre-RASP success, and the over-arching goal was to identify which attitudinal variables predicted classing up, while also assessing the relative strength of those predictors. Intrinsic Motivation, Satisfaction, and Recruiter Influence were significant predictors of classing up when controlling for Fitness Score and Pay Grade. Intrinsic Motivation was the strongest AAG predictor and also had a higher standardized odds ratio that Fitness Score, which has traditionally been the strongest predictor of candidate success in elite military selection contexts (Zazanis et al., 1999; Lytell et al., 2018) and RASP specifically (Coombs, 2020). Interestingly, deployment-related reasons for volunteering loaded onto the Intrinsic Motivation factor, rather than the Extrinsic Motivation factor, which was opposite of expectations. Extrinsic Motivations, Fit Expectations, and Social Influence did not predict class-up, and those findings contrast with the beliefs of Ranger leaders, who largely believe that candidates who volunteer for monetary incentives, who don't think they'll fit in, and who don't have immediate friends or family members' influence are more likely to attrit (Interview with RSTC Commander, FEB 2022).

The final research question asked how prediction of class-up from NLP-derived thematic clusters compared to prediction using more traditional Likert-scale survey responses. The final model using NLP Themes was compared to final model using AAGs measured with Likert scales. As illustrated in Table 18, AAGs measured via Likert scales predicted better than the model derived from NLP Themes. Relative to the NLP Themes model, the Likert AAGs model had better scores on each of the model indices.

Finally, when entering control variables and analyzing the model with best predictive accuracy, the best overall model did not include NLP theme scores, but rather only demographic/ background variables and the Likert AAGs (Table 22, model 5). However, this model did not

exhibit the highest AUC ROC nor the most variance explained, which are more traditional indices of model performance. However, beyond prediction of class-up, the results of logistic regression analyses helped identify what candidates' attitudes should be influenced in the recruiting and selection process to reduce unwanted attrition.

Although the NLP themes OWR1: Deploy/Fight, OWG8: Deploy, and OWG11: Ranger Credibility significantly predicted class-up, the standardized odds ratios were lower than the Likert measured AAGs and lower than both of the demographic/ background variables, meaning they had the lowest relative strength of prediction. Several NLP themes which appeared to be reflective of intrinsic motivations related to training/skills, personal challenge, and self-improvement did not significantly predict class-up, potentially due to positive skewness in excess of two. However, a post-hoc logistic regression analysis after performing a log10 data transformation on those highly skewed variables did not improve model fit.

Post-hoc correlational analyses were conducted on the NLP Themes to determine why themes with statistically significant correlations with class- up would not improve the predictive accuracy of logistic regression models beyond what Likert-measured AAGs and background/demographic variables could provide. Both bivariate correlations and canonical correlational analyses (Thompson, 1984) were performed. In bivariate correlational analysis, none of the NLP themes had a correlation higher than |.2| with any of the Likert AAG variables, and the strongest significant correlation was between Satisfaction and OWG11: Ranger Credibility (r = .176).

For canonical correlational analysis between the six Likert AAG variables and the 23 NLP Themes, six correlations were used for scoring, with only the first root demonstrating significance (correlation = .513; Wilks Statistic = .503; Significance < .001). An examination of

canonical loadings greater than |.3| showed that Intrinsic Motivations (.761), Satisfaction (.665), and Fit Expectations (.367) positively related, and Recruiter Influence (-.422) negatively related only to a single NLP Theme. The NLP OWG11: Ranger Credibility positively related to the four Likert-measured AAGs (.427).

The strength and direction of relationship between the OWG11: Ranger Credibility, and the Likert-measured AAGs is consistent; however, the lack of relationship between the NLP Themes related to deployment goals and the Likert-AAGs suggests that those NLP themes are likely capturing something different than the Likert-AAG question regarding the importance of deploying. To further test this finding, a bivariate correlational analysis was conducted between the Likert-rated survey question related to deployments, and the NLP Themes related to deployments. The two NLP Themes exhibited low but significant correlations with the Likert-AAG question (OWR1: Deployment/To Fight r =.153; OWG8: Deploy r = .157), providing further evidence that the deployment-related variables are empirically different.

5.2 Implications for Ranger Recruiting and RASP

The over-arching purpose of the study was to better understand proximal antecedents of candidates' decisions to persevere or to attrit during pre-RASP. In this respect, the term antecedent is applied consistent with the APA dictionary of psychology: as a variable that precedes an action, rather than implying the current study sufficiently established all conditions required to infer causation. As an applied study, there are three important findings of organizational interest that may improve recruitment and reduce attrition through the recruitment and selection processes before candidates begin RASP. Broadly the implications can be categorized as improving selection, and improving training.

5.2.1 Improving Selection

The study can improve selection for RASP because it identifies proximal AAGs that predict candidate success in pre-RASP, where an average of 50% of candidates historically attrit. For example, it demonstrates the importance of intrinsic motivations. In both the analysis of AAGs measured by Likert scales and AAGs measured by open response and analyzed with NLP, intrinsic motivations such as desire for challenge, desire for deployments and combat, and interests in training and self-development significantly predicted class-up. Ranger recruiters could identify intrinsic-related motivations to serve early in the recruiting process through face-to-face interviews or through the administration of a mobile app-enabled survey consisting of a few questions targeting candidates' motivations to serve. This is important because recruiting influences the characteristics of the applicant pool and thus all subsequent human resource programs (Chapman et al., 2005). Importantly, Intrinsic Motivations provided incremental improvements in accuracy, precision, AUC ROC, and variance explained over the use of background and demographic variables such as Fitness Test Scores. Ideally, in addition to fitness test scores and Soldiers' military pay grade (i.e.- military rank), Ranger recruiters will consider intrinsic-related motivations to identify the candidates with the highest probability of successfully classing up.

A second implication is related to Extrinsic Motivations. The non-significant finding of Extrinsic Motivations on class-up outcomes, combined with Extrinsic Motivations being the lowest average Likert AAG score, is important because it suggests that candidates' interests in earning more money, getting promoted faster, or avoiding bad assignments should not necessarily be considered negative attributes in prospective Ranger candidates. Although the demographic/background predictor Pay Grade did predict class-up, Pay Grade is a term used for military enlisted rank, and a Soldier's Pay Grade during first term of enlistment is a function of

three primary factors: their education level, their tenure, and their duty performance. Thus, although the term encompasses the word “Pay” it should not be confused for an Extrinsic Motivation. This finding suggests that offering monetary rewards may still a suitable approach to increasing candidate volunteerism, but ultimately the candidates’ underlying personal motives related to intrinsic factors, and their satisfaction with the recruiting process will influence their persistence in pre-RASP. This finding supports the Ranger leader perception Rangers don’t volunteer because of pay, but contrasts with the more general military (Helmus et al., 2018; Putka & Strickland, 2005) and broader recruiting research (Chapman et al., 2005; Darnold & Rynes, 2012; Uggerslev et al., 2012) which has shown that pay and incentives positively influence both applicant attraction as well as job acceptance intentions.

5.2.2 Training and Preparation

The importance of Intrinsic Motivations and the lack of predictive validity of Extrinsic Motivations has an implication relating to the ways that Ranger recruiters are trained and in the way that Ranger candidates are treated and prepared for RASP. Beyond just identifying candidates with attributes and characteristics believed to best suited for completion of RASP and Ranger service, recruiters ultimately influence prospective candidates’ goal striving, and therefore their motivations. The results of the study suggest that the greater the impact a recruiter has in that decision to volunteer, the less likely a candidate is to class-up. Recruiter influence also correlated most highly with Extrinsic Motivations ($r = .677$; $p < .05$), likely because recruiters tend to emphasize the practical, extrinsic-related benefits of Ranger service such as increased pay and promotions, as a means of incentivizing otherwise hesitant candidates. Recruiters may be better served by convincing prospective candidates to volunteer through the service-related, skill and training-related, and challenge/ self-development-related aspects of

Ranger service that are also likely to increase organizational commitment in the way that individual-focused interventions have shown to increase motivation in other work contexts (Diefendorff & Chandler, 2011). A training intervention to increase the intrinsic motivations of candidates, or to sustain what Diefendorff & Chandler (2011) referred to as motivational control, to sustain persistence throughout the recruiting and selection process could target educed attrition, much like the resilience-based interventions proposed by Kiernan et al, (2015) to curtail attrition during British Army Infantry training.

Additionally, organizational training of recruiters could focus on recruiting and applicant attraction techniques that emphasize the characteristics of a Ranger assignment that align with intrinsic motivations. Trained to influence candidates' beliefs regarding their own motivations, recruiters may be able to not only find the right candidates but also affect their persevere in pre-RASP. Deci et al (2017) identified that training managers to be more supportive of employees' needs for autonomy, relatedness, and competence increased motivation and satisfaction of employees. Finally, the importance of candidate levels of satisfaction—even as they arrive for pre-RASP, suggests that treating candidates well, keeping them informing, and engaging with them through the recruiting and assignment process may limit unwanted attrition.

5.2.3 DEI Implications

A final implication is related to the Ranger Regiment's DEI initiatives, specifically the goal of increasing racial/ethnic diversity in the organization. First, the results of the study suggest that there are no significant racial/ ethnicity differences in a candidates' probability of classing up or attritting, after accounting for ability-related factors such as physical fitness, and motivation-related factors such as Intrinsic Motivations. Such a finding is of interest to the organization because it can prevent inefficient, and potentially harmful interventions based on a

lay belief that candidates of different race/ ethnicity attrit at different rates. In terms of interventions, the results of the study suggest that identifying and attracting racial minorities with higher military pay grades (and experience), and with Intrinsic Motivations may help keep prospective candidates in the recruiting and selection processes longer. This is an example of an upstream factor (Campion et al., 2019) that is likely to influence diversity goals.

Further, a training intervention could positively influence the Ranger's DEI efforts through training of recruiters and RASP cadre. The relatedness aspect of motivational interventions reviewed by Deci et al (2017) suggests that ensuring previously under-represented minorities feel included and judged as individuals could increase their satisfaction with the recruiting and selection process. Further, arming recruiters with the empirical evidence of what ability, trait, and attitudinal factors relate to success in RASP could ultimately help recruiters message to minority recruits that they have "what it takes" to be successful in an organization that has historically been comprised of White Males.

5.3 Implications for Research

Despite the over-arching purpose of the study being specific to understanding Ranger candidates' motivations and the attitudinal factors related to pre-RASP attrition, the results have implications relevant to the broader STT program literature and to the work motivation literature. It identifies the importance of motivational factors in predicting continuation or attrition in a context relevant to all STTs.

In terms of the broader use of intrinsic motivations and candidate satisfaction as predictors of STT program action goals, the current study builds on the elite military selection literature that largely focuses on more distal and stable traits such as candidates' abilities and

personality, rather than more proximal attitudes and goals (Colosio et al., 2016; Coombs, 2020, Finton, 2016; Lytell et al., 2018). Further, it suggests that the use of Intrinsic Motivations and Satisfaction to predict attrition provides improved accuracy and precision over physical fitness measures and background/demographic variables; thus, they can be used in concert with them, rather than in place of them—all to improve predictive accuracy. To the last point, the current study contributes to the wider literature in that it extends analysis of motivational predictors beyond just validation via significance levels; it provides the relative strength of prediction of various predictor categories in an aim to understand their relative contributions to improving predictive accuracy—something most elite military selection studies do not emphasize (cf. Barrett et al., 2021; Lytell et al., 2018; Rose et al., 2013).

The study reinforces the usefulness of NLP and LPA to analyze open-response entry and exit surveys. The use of LPA to identify relevant sub-groups and to enable quantitative analysis of text fields that were previously constrained to qualitative or human coding. Examples of previous approaches include the use of candidate entry and exit surveys to inform qualitative analyses in previous STT studies (Barrett et al, 2021, Kiernan et al., 2015, Ryan et al., 2000). The ability to quantitatively analyze answers to candidates' motivations and goals, and to subsequently use common predictive analysis has the potential to increase understanding of proximal antecedents of attrition and to inform theory that can guide future study. Additionally, the ability to use open-response text analysis to inform predictive modeling has the potential to reduce the need for validated instruments to administer studies in contexts where organizational leaders tend to be sensitive to time demands of surveys. Although in the current study the NLP themes did not predict as well as theoretically informed, Likert-scale measured AAGs, different

prediction methods paired with the LPA theme extraction have the potential to improve accuracy.

Finally, results of the study were generally consistent with the action goal process meta-theory proposed by Diefendorff & Chandler (2011) that provided the overarching theoretical framework for the study. AAGs were all proximal-internal variables because they were all self-reported. Nonetheless, it is clear some self-reported attitudes were a function of distal-external variables. Organizational reputation and prestige of joining an elite unit were among the strongest predictors of classing-up in post-hoc analyses of Likert Survey items, and these perceptions are a function of the demanding standards and culture of the Rangers. To fully examine the effects of distal-external variables on proximal-internal variables and goal-striving outcomes requires objective measurements or independent perceptions of the organizational characteristics.

Similarly, proximal goals and motives are influenced by more distal individual differences such as motivational traits (Kanfer et al., 2017). Coombs (2020) used psychological individual difference variables to predict attrition from RASP training. The current study used proximal AAGs to predict classing-up for RASP training. An example of a study that would provide more robust support of the model of action goals would be the availability of both distal individual differences and proximal AAGs to enable testing of AAGs as mediating the relationships between individual differences and classing-up and/or RASP success.

5.4 Limitations

A goal of the current study was to track attrition through completion of RASP training; however, a lack of participation in the RASP pass/attrition surveys limited the scope of the

current study to pre-RASP attrition and class-up. Although pre-RASP attrition in itself has been a problem of substantial concern for the Rangers, with historical rates of pre-RASP attrition averaging 50%, understanding the proximal antecedents of attrition during the 8-week RASP is equally important. Ideally, survey participation rates would have enabled analyses of attrition during both pre-RASP and during RASP in order to have more meaningful findings to inform organizational decisions such as the training of cadre or the implementation of programmatic changes to RASP.

Another limitation of the current study was sample size. Although survey completion during study design was anticipated to enable a sample size of over 1,000, low completion rates of class-up surveys and exit surveys resulted in only 306 matched surveys being available for predictive analysis. Combined with the low rates of minority participation, of non-Infantry MOS participation, and of candidates from recruiting paths other than Option 40 contracts, the study had lower than desired power to detect potential differences. Despite relaxing the type I error rate to $p < .10$ for these variables, it is still possible that small but undetected between groups differences exist for race, MOS, and recruiting path effects. For example, to detect small effects in mean differences between categories having a 3:1 ratio, assuming a relaxed type I error rate of $p < .10$ and power of .80, would require a total sample of 602 participants—nearly double the participation rate of the current study. The low rates of Black Candidates in comparison to White Candidates in particular resulted in low power to detect effects. Ad hoc power analysis based on the sub-group sample sizes of 29 Black Candidates and 197 White Candidates in the matched surveys only provided power of .40 to detect a small effect size, even with the relaxed Type I error rate. However, there was adequate power (.90) to detect medium effects ($d = .5$), which is probably more relevant in an organizational setting and is likely a better indicator of practical

meaningfulness of racial differences in a naturalistic setting without the controls of a laboratory experiment.

5.5 Future Directions

Ultimately, better prediction of STT program outcomes, and better understanding of the proximal antecedents of attrition in such contexts, remain an important aim of scientific and practical importance. To that end, future directions recommended for additional study are based on better prediction of STT program outcomes, and on the viability of interventions to influence candidate motivations and perseverance. Stable, trait-based assessments such as cognitive ability tests, personality tests, and physical ability tests still have utility in such selection contexts, but future studies should include a complete array of those measures along with continued investigation of motivational predictors to combine what Diefendorff & Chandler (2011) categorized as distal-person related and proximal-person related influences. Such studies would build on the results of the current study by investigating the incremental variance of motivational variables beyond a more complete array (i.e., both physical and psychological traits) of trait-based predictors in highly selective employment contexts.

An additional direction for continued research is the use of NLP with more recent predictive modeling techniques. Ultimately, when the goal is improved predictive accuracy, it is likely that methods other than multivariate logistic regression, such random forests, and other methods utilizing machine learning algorithms along with k-fold cross-validation techniques (Putka et al., 2018) and the use of stacked models can improve upon the predictive accuracy reached in the current study.

A final direction for future research relates to the viability of interventions. Changing the way in which cadre and recruiters are trained, and subsequently relate to Ranger candidates is an applied organizational intervention which needs to be closely studied for results. Ultimately, any large-scale change would likely require a small sample experimental intervention to provide evidence of utility to stimulate any organizational change.

6. Conclusion

The goal of the current study was to analyze candidates' motivations to volunteer, and candidates' goals, and the relationship with pre-RASP outcomes. Analyzing candidate entry surveys provided a better understanding of proximal attitudinal and motivational antecedents related to completion of pre-RASP. Natural Language Processing (NLP), specifically the use of latent profile analysis (LPA) provided a means of quantitatively analyzing candidates' open-response text answers while candidates' scores on more traditional Likert-measured attitudes, attributions and goals (AAGs) predicted pre-RASP success better than the NLP method. The results have implications beyond just prediction of completion of a recruiting/selection hurdle in an elite military unit. The study helped identify areas for organizational intervention, such as in the training of recruiters and the methods that recruiters use, while also suggesting that intrinsic motivations are one of the strongest predictors of candidate success in a selection hurdle that sees attrition rates of 50% historically. Results of the study further suggest that differences in motivations, physical fitness levels, and candidate's relative Army experience, rather than race/ethnicity, military occupational specialty, or recruiting path are the significant predictors of pre- RASP success. Finally, the study demonstrates the utility of NLP and LPA of candidates' open text responses to identify both meaningful AAG clusters, but also to quantitatively predict completion of pre-RASP. It thus provides another example of the use of modern predictive

analytics to a military selection context and provides new alternatives to the analysis of open-response survey items.

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Appendix A- RASP 1 Entry Survey

Part 1-Informed Consent

This survey is voluntary and anonymous. Data gathered is used to determine general trends in Ranger candidate attitudes and motivations. It should take about 4-5 minutes total to complete and asks you to provide your reasons for dropping out of the assessment and selection process. Results of this study will inform improvements to the recruiting, in-processing, and assessment and selection of Rangers while also informing organizational goals to improve diversity, equity, and inclusion.

- o I understand and agree Enter your Research ID#:_____

Part 2- Demographics

(2) What is your age?
- o 18-19
- o 20-22
- o 23-25
- o 26-30
- o 31-35
- o 35 or older

(3) What is your biological sex?
- o Male
- o Female

(4) What fitness assessment did you last take (example: APFT or ACFT): o APFT
o ACFT
o Other

(5) What did you score on your last fitness test: _____

(6) How well did you perform in comparison to your peers?
o Among the best
o better than most
o about average
o below average
o Among the worst

(7) How many years of education have you completed?
- o Less than high school diploma
- o High school graduate
- o Some college
- o 2-year degree
- o 4-year degree
- o Professional degree (master's or PhD)

(8) What race/ethnicity do you self-identify as? White
- o Black
- o Hispanic
- o American Indian or Alaskan Native
- o Asian
- o Native Hawaiian or Pacific Islander

- Multi-racial/Multiple------(clarification)
- Other

(8) Enter your military occupational specialty (example: 11B, 13F, 25U, 92Y):_____

(9) What was your path to RASP?
   a. Option 40 contract
   b. Volunteer (18x or airborne)
   c. In-service hire (from another unit)

(10) What is your pay grade:
   a. E1
   b. E2
   c. E3
   d. E4
   e. E5

(11) Are you prior service:
   a. Y
   b. N

Part 3-Open Response (in this part you will answer three brief questions)

(13) In your own words, using a few statements or sentences, describe the most important reason or reasons you volunteered for the Rangers. _____(25 character min/ 250 character max)

(14) In your own words, using a few statements or sentences, describe the most important reasons why your peers volunteered to join the Rangers. _____(25 character min/ 250 character max)

(15) In your own words, using a few statements or sentences, describe what you want to accomplish (goals) in the Rangers. _____(25 character min/ 250 character max)

Part 4- Rated Response (this is a rating of 13 questions)
The following questions include multiple reasons why people choose to join or leave organizations. Rate each question based on how you think it applied to your motivation to volunteer

1-strongly disagree. 2-somewhat disagree. 3-Neutral/NA. 4-somewhat agree. 5-strongly agree.

(17) The organization's reputation
(18) I thought I would fit in
(19) faster promotion opportunities
(20) Opportunities for personal development (schools, skill acquisition)
(21) I wanted a challenge
(22) Deployment opportunities
(23) A recruiter
(24) Peers or friends
(25) A mentor or family member
(26) Avoiding a bad assignment

(27) Prestige of joining an elite unit
(28) Better pay and benefits
(29) A chance to better myself
(30) Attention check. Click “D”
(31) I am prepared for the mental demands of RASP
(32) I am prepared for the physical demands of RASP
(33) I am confident I can pass RASP
(34) I am confident I can be a good Ranger

Part 5- Satisfaction and Job-Related Affect. In this part, you will rate your level of satisfaction in several areas.
Extremely Satisfied-Somewhat Satisfied-Neither -Somewhat Dissatisfied-Extremely Dissatisfied

(35) How satisfied are you with the type of work you do?
(36) How satisfied are you with your co-workers/peers?
(37) How satisfied are you with the Army?
(38) How satisfied are you with the Rangers?
(39) How satisfied are you with the RASP cadre?
(40) Attention check. Click “C”

Appendix B- RASP Class-up Survey

Part 1-Informed Consent

This survey is voluntary and anonymous. Data gathered is used to determine general trends in Ranger candidate attitudes and motivations. It should take about 4-5 minutes total to complete and asks you to provide your reasons for dropping out of the assessment and selection process. Results of this study will inform improvements to the recruiting, in-processing, and assessment and selection of Rangers while also informing organizational goals to improve diversity, equity, and inclusion.

- o I understand and agree Enter your Research ID#:_____

Part 2-Open Response

(2) In your own words, using a few statements or sentences, describe the most important reason or reasons you volunteered for the Rangers. _____(25 character min/ 250 character max)
(3) In your own words, using a few statements or sentences, describe what you want to accomplish (goals) in the Rangers. _____(25 character min/ 250 character max)

Part 3- Rated Response

The following questions include several factors related to people staying with or withdrawing from selection processes. Rate each question based on how applicable it is to you.

1-Strongly disagree. 2-somewhat disagree. 3-Neutral/NA. 4-somewhat agree. 5-Strongly agree.

(5) The organization's reputation
(6) I fit in here
(7) faster promotion opportunities
(8) Opportunities for personal development (schools, skill acquisition)
(9) I want a challenge
(10) Deployment opportunities
(11) A recruiter
(12) Peers or friends
(13) A mentor or family member
(14) Avoiding a bad assignment
(15) Prestige of joining an elite unit
(16) Better pay and benefits
(17) A chance to better myself
(18) Attention check. Click "D"
(19) I am confident I can pass RASP
(20) I am confident I can be a good Ranger
(21) I feel valued here
(22) I am prepared for the physical demands of RASP
(23) I am prepared for the mental demands of RASP

Part 4- Satisfaction and Job-Related Affect. In this part, you will rate your level of satisfaction in several areas.

Extremely Satisfied Somewhat Satisfied Neither Somewhat Dissatisfied Extremely Dissatisfied

(24) How satisfied are you with the type of work you do?
(25) How satisfied are you with your co-workers/peers?
(26) How satisfied are you with the Army?
(27) How satisfied are you with the Rangers?
(28) How satisfied are you with the RASP cadre?
(29) Attention check. Click "C"

Appendix C- RASP Exit Survey (Attrit)

Part 1-Informed Consent

This survey is voluntary and anonymous. Data gathered is used to determine general trends in Ranger candidate attitudes and motivations. It should take about 4-5 minutes total to complete and asks you to provide your reasons for dropping out of the assessment and selection process. Results of this study will inform improvements to the recruiting, in-processing, and assessment and selection of Rangers while also informing organizational goals to improve diversity, equity, and inclusion.

- o I understand and agree Enter your Research ID#:_____

Part 2- Attrition

(2) When did you drop?
- o pre-RASP
- o Phase 1 /Week 1 RASP
- o Phase 1 /Week 2 RASP
- o Phase 1 /Week 3 RASP
- o Phase 1 /Week 4 RASP
- o Phase 2 /Week 5 RASP
- o Phase 2 /Week 6 RASP
- o Phase 2 /Week 7 RASP
- o Phase 2 /Week 8 RASP

Part 3-Open Response

(3) In your own words, using a few statements or sentences, describe the most important reasons you are leaving the RASP process without completing it. _(25 character min/ 250 character max)

(4) In your opinion, what is the most important reason why other candidates leave the RASP process without completing it? (25 character min/ 250 character max)

(5) What should the Rangers change in recruiting and preparation of candidates to improve RASP candidate success? (25 character min/ 250 character max)

Part 4- Rated Response

(6) What was the reason recorded for your drop?
O voluntary withdrawal
O medical drop
O rules packet
O critical event failure
O psych drop
O other

The following questions include several factors related to people staying with or withdrawing from selection processes. Rate each question based on how applicable it is to you.

1-Strongly disagree. 2-somewhat disagree. 3-Neutral/NA. 4-somewhat agree. 5-Strongly agree.

(7) The unit supports my needs
(8) The cadre is supportive
(9) Attention Check. Click "B"
(10) I like the type of work
(11) I fit in with the unit
(12) I fit in with my peers
(13) the assessment is job relevant
(14) the assessment allowed me to show my performance
(15) the assessment was too difficult
(16) I am confident I could pass
(17) I am confident I could be a good Ranger
(18) I had better assignment options
(19) I felt valued here
(20) I was unprepared for the physical demands
(21) I was unprepared for the mental demands
(22) External factors influenced me
(23) I was misled by a recruiter/ during recruiting
(24) The assessment process was fair
(25) The cadre prepared me well for integration with the unit
(26) The cadre trained me well for RASP

Part 4- Satisfaction and Job-Related Affect. In this part, you will rate your level of satisfaction in several areas.
Extremely Satisfied Somewhat Satisfied Neither Somewhat Dissatisfied Extremely Dissatisfied

(27) How satisfied are you with the type of work you do?
(28) How satisfied are you with your co-workers/peers?
(29) How satisfied are you with the Army?
(30) How satisfied are you with the Rangers?
(31) How satisfied are you with the RASP cadre?
(32) Attention check. Click "D"

Appendix D- RASP Exit Survey (Pass)

Part 1-Informed Consent

This survey is voluntary and anonymous. Data gathered is used to determine general trends in Ranger candidate attitudes and motivations. It should take about 4-5 minutes total to complete and asks you to provide your reasons for dropping out of the assessment and selection process. Results of this study will inform improvements to the recruiting, in-processing, and assessment and selection of Rangers while also informing organizational goals to improve diversity, equity, and inclusion.

- o I understand and agree Enter your Research ID#:_____

Part 2-Open Response

(2) What is your preferred location of assignment?
(3) In your own words, using a few statements or sentences, describe the most important reasons you completed RASP successfully. _____(25 character min/ 250 character max)
(4) In your opinion, what are the reasons why candidates do not pass RASP? _____(25 character min/ 250 character max)
(5) What should the unit do to improve recruitment and preparation of candidates? _____(25 character min/ 250 character max)
(6) In your own words, what coping skills or mental techniques allowed you to persevere during RASP?

Part 3- Rated Response

The following questions include several factors related to people staying with or withdrawing from selection processes. Rate each question based on how applicable it is to you.

1-Strongly disagree. 2-somewhat disagree. 3-Neutral/NA. 4-somewhat agree. 5-Strongly agree.

(7) The unit supports my needs
(8) The cadre is supportive
(9) Attention Check. Click "B"
(10) I like the type of work
(11) I fit in with the unit
(12) I fit in with my peers
(13) the assessment is job relevant
(14) the assessment allowed me to show my performance
(15) the assessment was too difficult
(16) I am confident I could pass
(17) I am confident I could be a good Ranger
(18) I had better assignment options
(19) I felt valued here
(20) I was unprepared for the physical demands

(21) I was unprepared for the mental demands
(22) External factors influenced me
(23) I was misled by a recruiter/ during recruiting
(24) The assessment process was fair
(25) The cadre prepared me well for integration with the unit
(26) The cadre trained me well for RASP

Part 4- Satisfaction and Job-Related Affect. In this part, you will rate your level of satisfaction in several areas.

Extremely Satisfied Somewhat Satisfied Neither Somewhat Dissatisfied Extremely Dissatisfied

(27) How satisfied are you with the type of work you do?
(28) How satisfied are you with your co-workers/peers?
(29) How satisfied are you with the Army?
(30) How satisfied are you with the Rangers?
(31) How satisfied are you with the RASP cadre?

Attention check. Click "D"