Open Proposal to the Naval Special Warfare Community

What does it take to become one of America's elite maritime warriors? Quite a bit actually. For each Navy SEAL produced, the US Navy spends approximately $480,000 per person on equipment and training costs[1]. At a production rate of approximately 180 new SEALs a year, the total yearly outlay for the Navy approaches $86 million. This figure does not take into account the as yet undetermined amount of money that is spent recruiting, training, and equipping the other 75-80% of SEAL candidates (@720-900 personnel) who *do not* make it through the physically and mentally demanding training pipeline.

Additionally, the creation of a SEAL is at least a three-year investment: six-months of regular military indoctrination and orientation, six months of basic training, six months of advanced training, and an 18-month training cycle at a SEAL Team prior to deploying overseas for the first time. Given the high stakes involved, in terms of time and money, the Navy, specifically the Naval Special Warfare (NSW) community, would benefit from a data-driven analysis that answers the following question:

1. Are there measurable factors that can be used to determine probabilistic outcomes of a person's odds of making it through the three-year SEAL training pipeline?

The current SEAL production model has evolved over the NSW community's 55-year existence. Initial SEAL basic training, known as Basic Underwater Demolition/SEAL training (BUD/S), is consciously designed as a selection course; meaning the course is not designed to graduate as many recruits as possible, but rather to screen out those who don't possess the physical, mental, or psychological profile required for a career in the SEAL Teams. As a result of this approach, starting BUD/S class sizes typically run between 150-200 recruits. Over the course of the six months of training, the class size steadily dwindles, resulting in a mean attrition rate of 75-80% per class. It's worth pointing out that there is no floor or ceiling with regard to the number of graduating recruits. A hypothetical BUD/S class could in fact graduate 100% of its starting members and there is at least one class on record (Class 78) that graduated no one.

Recognizing the high cost in time and money involved in recruiting and training someone in BUD/S only to have them wash out, the NSW community has taken measured steps over the years to improve the screening process which determines who gets a shot at BUD/S training in the first place. The current (as of 2016) screening process has raised physical standards from past iterations, increased the requirement for mental aptitude, and now also includes a cognitive test called the Computerized Special Operations Resilience Test (C-SORT)[2], which is designed to subjectively measure a recruit's ability to handle stressful situations and assess psychological resilience. While the improved screening has arguably improved the quality of the candidates seeking to become SEALs (there are significantly less drop-outs in BUD/S training in the first few weeks than there used to be), large 100+ class sizes are still the norm and attrition rates have maintained their traditional figure of 75-80%.

Recognizing that a revamped screening process alone was not enough to improve its return on investment figures, the NSW community undertook a study documenting how measures of physical performance predict success in BUD/S. This study measured the human performance of over two

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[1] LCDR Goodman, William. Personal interview. 10 October 2016.

[2] "Navy SEAL Requirements." *Official Naval Special Warfare website*, www.sealswcc.com/navy-seal-general-requirements.html, 13 May 2016. Accessed, 12 October 2016.

thousand SEAL recruits over a three-year period and concluded that above average 3-mile run and 1-mile swim times, and above average lower body strength, correlated with increased success rates in BUD/S and reduced rates of injury.[3] However, this study was narrowly focused on a singular aspect of SEAL performance, namely physical fitness. This paper proposes that there is a better way to holistically review a potential recruit's performance across physical, mental, and psychological domains and be able to predict with a high degree of accuracy the recruit's probability of passing SEAL training. The answer lies with predictive Machine Learning modeling.

The problem of predicting recruit success in SEAL training is not one of collecting data, but rather, lies with analysis of said data. A massive amount of data is currently being collected on all potential SEAL recruits, everything from eye color, to boot size, from max bench press to sports played in high school, from TV preferences to region of birth. A wealth of both structured and unstructured multivariable data lies dormant in NSW databases waiting to be analyzed. Once cleaned and organized, this data can potentially unlock the unseen forces which drive a person to want to complete SEAL training.

The data can be fed into unsupervised machine learning models, variable by variable, to ascertain patterns currently unseen by human analysis. Do recruits from Southern states with a fast 3-mile run time and a high school GPA above 3.0 have a significantly higher probability of success than other recruits with differing holistic profiles? If so, then SEAL recruiting teams, armed with this knowledge, would do well to target Southern high school and college track/cross-country teams to improve their odds of getting the "right" guy.

According to the SEAL/Scout recruiting team, in spite of the physical performance study, accessioning personnel into SEAL training remains a reactive process[4]. That is to say, data indicating likelihood of future success in training is not taken into account when conducting recruiting campaigns for potential SEAL candidates. In years past, before the NSW community had the ability to collect and store all of the recruit personnel data, the model of pushing as many candidates through the training funnel and seeing what came out on the other side made sense.

Given current technological breakthroughs in computation and analysis, however, this model is quickly becoming a dead convention. If the analysis of the data reveals patterns of what makes for a successful trainee, then recruiting teams will be able to target their efforts into areas of the country that yield candidates with higher probable rates of success.

Ultimately, the director of SEAL Recruiting and Training will have to decide if he is willing to trust the analysis offered to him through a mix of human and machine "cognition". Hard data alone will not be enough to convince him of changing the recruiting status quo, especially given that the current process does, in the end, produce close to 200 new SEALs each year. But the potential millions of dollars of savings in recruiting and training costs, the likely improvement in candidate quality, and the upside of learning about what makes a SEAL "tick" is well worth the initial cost of conducting research into this important area of national security.

For years the NSW community has invested time and money seeking to find the right ingredients behind what separates those who fail from those who succeed. The answers will not come easily, but they will come, and the results may, in the end, be very surprising…

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[3] "What are your chances of Hell Week Success?" *Official Naval Special Warfare website,* www.sealswcc.com/navy-seal-what-are-chances-hell-week-success.html, 13 May 2016. Accessed, 14 October, 2016.

[4] US Navy SEAL/SWCC Scout recruiting team. Personal interview. 8 October 2016.