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MBA PROFESSIONAL REPORT

MORALE AND PRODUCTIVITY

June 2015

By: Jason Shaw, and
Daniel Stayton

Advisors: Jesse Cunha
Ryan Sullivan

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MORALE AND PRODUCTIVITY

Jason Shaw, Lieutenant, United States Navy
Daniel Stayton, Lieutenant, United States Navy

Submitted in partial fulfillment of the requirements for the degree of

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from the

**NAVAL POSTGRADUATE SCHOOL
June 2015**

Authors: Jason Shaw

Daniel Stayton

Approved by: Jesse Cunha

Ryan Sullivan

William R. Gates, Dean
Graduate School of Business and Public Policy

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ABSTRACT

This research establishes methodology to measure morale as a function of productivity. Relationships between morale, ability, training, and experience are linked to productivity so that managers can incentivize employee productivity more precisely. The data from this survey are effective at the individual level, but are more useful on an aggregate scale, using a theoretical regression. The survey and regression are theoretical, and provide managers valuable information about employees' productivity and factors that affect it over time. Follow-on research should test the survey's viability, adjust data collection procedures and the regression equation, and examine the cost-benefit analysis of modeling morale.

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TABLE OF CONTENTS

I.	INTRODUCTION.....	1
A.	PURPOSE.....	1
B.	RESEARCH QUESTION AND METHODOLOGY	1
C.	BENEFITS OF THE STUDY	2
D.	ORGANIZATION OF STUDY	2
II.	LITERATURE REVIEW	3
A.	DEFINING MORALE.....	3
B.	WHY THE MILITARY SHOULD MANAGE MORALE	4
C.	EXISTING MORALE METRICS	5
D.	MEASURING PRODUCTIVITY	8
E.	PREVIOUS MODELS.....	9
III.	THEORETICAL RELATIONSHIPS.....	11
A.	MARGINAL MORALE.....	11
B.	POSITIVE AND NEGATIVE CORRELATIONS	11
C.	MORALE’S IMPACT ON DESIRABLE DECISIONS.....	14
D.	MORALE AS A FUNCTION	15
E.	PRODUCTIVITY AS A FUNCTION.....	15
F.	MORALE’S INFLUENCE ON PRODUCTIVITY	17
IV.	A POTENTIAL EMPIRICAL METHOD TO MEASURE THE EFFECT OF MORALE ON PRODUCTIVITY	19
V.	POTENTIAL USES OF REGRESSION ANALYSIS	25
VI.	CONCLUSION	29
A.	SUMMARY	29
B.	CONCLUSION	30
	APPENDIX. ALTERNATIVE MORALE SURVEY	31
	LIST OF REFERENCES.....	35
	INITIAL DISTRIBUTION LIST	39

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LIST OF FIGURES

Figure 1.	Positive Morale Factor Function.....	12
Figure 2.	Negative Morale Factor Function	13
Figure 3.	Individual Morale Survey	20
Figure 4.	Individual Morale Scorecard.....	22
Figure 5.	Personnel Evaluation Template	23

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LIST OF ACRONYMS AND ABBREVIATIONS

AET	ability, experience, and training
AFQT	Armed Forces Qualification Test
ASVAB	Armed Services Vocational Aptitude Battery
BAH	basic allowance for housing
BARS	behaviorally anchored rating scales
BAS	basic allowance for subsistence
CASREP	casualty report
OPTEMPO	operational tempo

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I. INTRODUCTION

Morale is a pillar of success in the military and when effectively managed can be a force multiplier in personnel productivity. As stated by Senator John McCain, “Everyone interested in strengthening America’s national security and the well-being of our military men and women should be alarmed by the new *Military Times* survey finding a ‘worsening morale crisis’ in the U.S. armed forces” (McCain, 2014). Many studies have attempted to define and quantify morale, but have often resulted in qualitative or circumstantial data. A mathematical framework and assessment process is necessary to fully realize benefits of managing military morale.

A. PURPOSE

This project creates a theoretical model to analyze the relationship between productivity and morale. More specifically, this project presents a method to measure morale and productivity independently and creates a regression to examine specific factors that may positively and negatively affect each.

This research provides leaders with data to increase morale and productivity within the Department of Defense. Additionally, we define morale within the context of the military, and how it can be viewed as a force multiplier on factors of productivity.

B. RESEARCH QUESTION AND METHODOLOGY

Our research asks, “Is morale a factor of productivity, and, if so, can it be measured and influenced to affect the productivity of an individual or organization?”

This project is theoretical. We create a function to define morale and productivity, where morale was used within the function of productivity. Next, a proposed survey and assessment measure morale and productivity of individuals. Finally, a theoretical regression identifies potential correlation and causation between morale and productivity.

C. BENEFITS OF THE STUDY

This project lays the groundwork for a potential program in the Department of Defense. This program would supply leaders with morale metrics, which could help them cater incentives in order to most effectively and efficiently impact morale and productivity. The data is functional from the individual level up to the service-wide level. Regardless of the methodology used to collect data, more focus on morale of service members would be beneficial to the Department of Defense overall.

D. ORGANIZATION OF STUDY

The study is organized into five chapters. Following this introduction, Chapter II contains a literature review of scholarly research concerning morale and productivity. Chapter III examines the theoretical relationship between morale and productivity and uses functions to define the terms. Chapter IV presents a methodology in measuring morale and productivity. Finally, chapter V examines the potential use of regression analysis of the data to achieve a better understanding of the influences of morale on productivity.

II. LITERATURE REVIEW

Morale is a difficult concept to define. For example, the Navy's trainee guide (Recruit Training Command, 2009), which is issued to new enlisted recruits, uses the term four times, yet never defines it. In those four instances, morale is presented as a result or outcome of some behavior. This framing of the term is shallow and incomplete; if morale is merely an end, the Navy has no incentive to positively affect it. However, when viewed as a direct path to positively affecting a Sailor's productivity and retention, the Navy has the incentive to directly affect morale.

A. DEFINING MORALE

Despite the challenge, researchers study morale and establish common ground for a definition. Manning (1991) explains that if morale were merely an individual's mood or feeling, then it would be of little value to anyone. However, he balks at the idea of a shared personality within an organization, and acknowledges groups as a composite of individuals. Therefore, he defines morale as an individual's enthusiasm and persistence in the context of a group activity.

Motowidlo (1977) claims that morale is not just a mood or feeling of an individual or group; rather, it is combination of motivation and a signal for behavior and performance of an individual and group. In Motowidlo's definition, morale is presented as both an end and a means toward a higher level of productivity and performance.

Britt and Dickinson (2006) go even further, stating that morale is a "level of motivation and enthusiasm for accomplishing mission objectives" (p. 162). They explain that morale is not an emotional state, whether presence of happiness or absence of depression, but a variable that can energize the efforts of an individual leading to a new level of performance. Britt and Dickinson also point out that morale is dynamic, and must be assessed consistently in order monitor and remain aware of the organization's current state.

Maguen and Litz (2006, p. 280) define morale as "the degree of enthusiasm and drive that results from group cohesion and a variety of organizational variables." This

definition alludes to the drive behind productivity decisions and the variables contributing to morale, which we explore further in Chapter III.

For this research, we define morale as an individual's level of satisfaction and motivation that determines effort toward contributing to productivity in a group setting. From an economic standpoint, productivity of a group or individual is an important factor that, if affected, can help managers make organizations more effective. By focusing on morale as a factor for work productivity, a manager can increase effectiveness with the same capital and labor investments in place.

B. WHY THE MILITARY SHOULD MANAGE MORALE

Positively affecting morale has two benefits for the military. First, higher morale results in more enthusiastic service members who are more productive in their job performance. Second, the service member is more likely to remain in the military if he or she experiences high morale. This second point is significant because of the amount of time and money invested in accession and training. The military's ability to observe a positive return on that investment is directly related to service member retention. Research consistently links morale with effectiveness and job performance (Griffith, 1997; Manning, 1991; Bartone, 1998). Research by Maguen and Litz (2006) found correlations specifically relating morale to performance in deployed personnel. By incorporating general overseas stressors, aspects of peacekeeping, positive military experiences, and potentially traumatizing experiences, the researchers showed that morale factors contribute differently to morale and productiveness over time and in relation to the phase of deployment. This further illustrates that morale measurement and alteration cannot be conducted on a randomized cycle without consideration for deployment schedules and operational tempo (OPTEMPO). An effective evaluation method must account for external factors working on individuals rather than assuming that any period is the same for every service member.

Since maximizing productivity in the military is a paramount concern, it is important to identify factors that contribute to productivity. The three primary factors driving military labor productivity are experience, training, and ability (Kavanaugh,

2005). Experience refers to the amount of time a service member performed his or her job, such as pilot flight hours. The training factor is the amount and type of training a service member received. The ability factor is derived from standardized aptitude tests.

Unfortunately, of the three primary drivers of productivity, the military can primarily control for training. For example, the military cannot expect a newly commissioned pilot to fill the gap left by a 25-year veteran pilot. The military could raise its standards for aptitude tests, but risks dwindling recruitment. There is no substitute for experience, training, and ability, but we argue that morale is another factor of productivity no matter a service member's range of experience, level of training, or given ability. Morale can be viewed as a force multiplier for productivity with regards to experience, training, and ability.

C. EXISTING MORALE METRICS

Before the military can consider affecting morale, it must be able to quantify it. There are three primary processes used to measure morale. The simplest method used by most employers, including the Navy, is through periodic self-reporting surveys. This information allows leadership to assess current employee morale and compare it to historical data through trend analysis. The results of this data are revealing, but fail to address morale and productivity directly, and, more importantly, how to affect it. In order to understand how certain factors could actually affect morale, and therefore productivity, service members need to be assessed more consistently and over a longer period of time.

In the 1970s, the United States Army Research Institute entered into a contract with the Personnel Decisions Institute to study military motivation, job satisfaction, and morale (Motowidlo & Borman, 1977). This study examined morale in 16 Army platoons using behaviorally anchored rating scales (BARS). Researchers argued that self-reported surveys could not directly measure morale alone (Motowidlo & Borman, 1977). Therefore, they established a process to observe a platoon's behavior and correlate specific behavior to the results of a self-reported survey and negative platoon activities to determine if those behaviors were related to morale.

After conducting several interviews and workshops with Army officers, warrant officers, and enlisted service members, Motowidlo and Borman (1977) developed eight behavior ratings scales:

- Community Relations
- Teamwork and Cooperation
- Reactions to Adversity
- Superior-Subordinate Relations
- Performance and Effort on the Job
- Bearing, Appearance, and Military Discipline
- Pride in Unit, Army, and Country
- Use of Time during Off-Duty Hours

The results showed that units rated high on morale scales were also rated high on overall effectiveness and low on frequency of low-morale activities like dissent, drug abuse, and destruction (Borman & Motowidlo, 1977). Members of units rated high on the morale scales were also more likely to report intentions of re-enlisting (Borman & Motowidlo, 1977). Motowidlo and Borman recognized that in order to capture a unit's morale self-reported surveys should not be used as a measurement tool for morale by itself, and that examination of the behavior of a unit coupled with self-reported surveys could offer a clearer picture. They concluded that morale is constructed from three elements—satisfaction, motivation, and group cohesiveness—and defined morale as a group characteristic. It was their belief that measurements should be used to compare differences between groups, not individuals.

Likewise, the Defense Manpower Data Center conducts annual Status of Forces Surveys which in part assess morale and retention (2012). These surveys use self-reported questionnaires to gather summary data combined to the service level. While the summary data shows generalized trends across the military, the data is not ascribable to the individual level and thus cannot be used to assess and affect individual morale. Likewise, the data is so generalized that it cannot be used to draw service level correlations or causations. For example, the survey reports that 43% of respondents reported higher than usual work stress during the period in question (Defense Manpower Data Center, 2012). One can assume that an increase in stress results in a decrease in morale, but the data does not allow for this link to be quantified, nor can it identify

causation because so many factors contribute to perceived morale. At best, the data allows researchers to ascribe relative rankings to morale factors and assume that the most frequently reported negative influence should receive the greatest effort toward correction. A more complete system would provide data for the individual service member and provide quantified metrics rather than relative rankings in an effort to more efficiently manage morale. This would also address the selection bias problem present in any self-reported survey, and take account for extremes in reporting.

All methods discussed thus far use historical data to assess past morale in relation to past performance. In a different approach, some private companies, like Google, take a more direct path. In Fast Company's 2013 article, "Not a Happy Accident: How Google Deliberately Designs Workplace Satisfaction," the author reported that Google asks employees point-blank questions about what incentives they would care most about. Unlike the military, which is reactive to historical morale and performance reports, Google begins seeking information about employees from the moment hired (Crowley, 2013). Google and other private companies are not merely asking, "Are you happy and motivated?"; they are asking, "What makes you happy and motivated?"

This distinct difference is significant. First, the question itself signals a higher level of concern toward employees. It pushes the envelope by implying that, even if you are very satisfied with your job, the organization wants to make it better. Second, Google gives itself more time to satisfy its employees' needs and desires by constantly asking what is important to its employees (Crowley, 2013). Third, Google is constantly encouraging employees to provide feedback. There is no annual survey filled out and forgotten by employees. At Google, company morale is a dynamic issue captured and addressed every day, not a semi-annual event that captures the last six months' complaints. Finally, Google is able to gather information about each of its employees and tailor incentives that would be most beneficial for the company as a whole (Crowley, 2013). When examining the three approaches, it is clear that the military could do more to effectively assess morale. This project provides a framework for measuring, assessing, and impacting morale in an effort to improve productivity.

D. MEASURING PRODUCTIVITY

Similar to morale measurement, productivity must be defined and measured in order to attribute correlation or causation and track results of morale enhancement methods. Motowidlo and Van Scotter (1994) explore the idea that performance is not clearly defined and is multidimensional. They further make a distinction between task performance and contextual performance. Behaviors can be prescribed (meeting standards prescribed by organizational roles) or discretionary (going beyond roles to cooperate with others, protect the organization, and offer improvements). Supervisors should consider both prescribed and discretionary behavior when judging job performance. Raw materials are the resources an organization attains, and they are used to produce or provide goods and services. Task performance is the transformation of raw materials into goods and services as well as the replenishment of those raw materials. Contextual performance supports the organizational, social, and psychological environment, including volunteering outside one's job roles, having extra enthusiasm, helping others, following rules, and defending organizational objectives. Motowidlo and Van Scotter's research rated Airmen by three supervisors based on task performance, contextual performance, or overall performance, and concludes that it is useful to distinguish between task and contextual performance.

Van Scotter and Motowidlo, in a later study (1996), further divide contextual performance into interpersonal facilitation and job dedication. Interpersonal facilitation includes acts to improve morale, remove barriers, and help others perform their task-oriented jobs. Job dedication is self-discipline, like following rules, working hard, and taking initiative. Evaluation of Likert performance measurements shows that definitions of performance should include motivational elements such as job dedication.

An effective performance measurement methodology should include quantitative metrics specific to task performance as well as more qualitative contextual performance factors. The relative importance of these domains can be adjusted by the supervisor or command to account for valuation of highly technical skill sets and variation among job descriptions.

Once morale can be effectively measured and linked to measures of productivity, leadership can make informed decisions to affect morale in an effort to efficiently manage productivity, retention, and numerous other benefits. For example, research by Britt, Adler, Bliese, and Moore (2013) shows that morale can displace negative consequences of combat stressors. Their research shows that morale in terms of personal morale, energy, drive, enthusiasm, and eagerness contributes to lower incidence of post-traumatic stress disorder symptoms. The researchers conclude by calling for methodology to implement morale management as part of medical treatment. This is just one example of a practical application for morale research. In order to provide such a real-world impact, morale factor forecasting can help leadership make informed decisions.

E. PREVIOUS MODELS

Research by Artelli, Zalewski, Leach, and Perry (2009) explores the use of modeling based on control theory as a means to predict combat fighting effectiveness. The researchers used three divisions of morale (individual, small group, and unit) to forecast productivity in terms of fighting effectiveness. The model was based on a Stafford-Clark morale model and Menninger's Morale Curve (Menninger, 1988), which results in a model that is universal and scalable. The overall model explains that individuals and units undergo morale progression through phases (arrival, engagement, acceptance, and reentry), which have corresponding peaks and valleys for morale and, by extension, productivity.

The Artelli et al. model (2009) is based on the idea in control theory that systems at equilibrium (morale) respond to impulses (morale factors). Undamped systems will elicit a response that can be expressed mathematically. In this example, the model includes an equation for soldier morale at given time in theater and length of deployment. The proposed application of Artelli's research is to model deployment morale so that commanders can plan operations when morale is at higher levels. We propose that, instead of passively measuring morale and being constrained by it, commanders should instead learn how to forecast and manipulate morale to their advantage. Additionally, Artelli's model is purely theoretical and does not represent actual unit morale. We strive

to go one step farther and model actual unit morale based on morale measurement, not generalized assumptions. Generalized factors utilized to create models like the Menninger Morale Curve would be replaced with actual values collected through periodic survey and performance evaluation. Morale could then be modeled as a function for individuals in an effort to optimize efficiency for each service member based on morale and other factors such as training, experience, and ability.

Existing research fails to quantify morale in a way that lends to numerical analysis of individuals and units over time. Existing models are purely qualitative and neglect to connect morale to other performance factors. As a result, managers are unable to identify causal relationships between morale factors, morale level, and resulting labor productivity. Conceptualizing theoretical morale relationships and standardizing measurement methodology is the key to effectively understanding and managing morale in the military.

III. THEORETICAL RELATIONSHIPS

This research identifies specific factors to conceptualize morale in an effort to direct productivity and retention decisions. Morale is a construct of many factors and conditions imposed on individuals. These factors affect individuals differently and impact the same individual differently over time (Bartone et al., 1998). Although morale is so dynamic that it could change even hourly throughout a day, certain trends can be drawn for individuals and collectively extrapolated to groups. The relative effect of each factor is subject to interaction with other morale factors acting on an individual. Each morale factor can be modeled to productivity using theoretical or mathematical frameworks.

A. MARGINAL MORALE

Similar to the economic concept of marginal utility, morale is subject to marginal gains and losses from consumption. The concept of morale takes the place of utility while the positive and negative morale factors become the “goods” that the service member consumes. Positive morale factor consumption results in a marginal increase in total morale (utility) and consumption of negative morale factors results in a marginal decrease in total morale. Marginal morale in both the positive and negative direction is subject to laws of diminishing return where marginal morale utility decreases as more units are consumed. At some consumption point, marginal increases in morale factors fail to create desired morale gains and result in either substitution behavior by the individual or inefficient use of morale factor resources by the government.

B. POSITIVE AND NEGATIVE CORRELATIONS

Positive morale factors are triggers or situational contexts that improve personal or unit morale. Individuals and groups will be expected to show increasing morale as presence of the morale factor increases and decreasing morale as the morale factor is removed. These factors will exhibit increasing correlation at a constantly decreasing rate and be subject to the law of diminishing returns. Each individual may also exhibit high and low thresholds outside of which the morale factor no longer affects morale. The

illustration in Figure 1 provides a representative curve for positive morale correlations that shows diminishing returns.

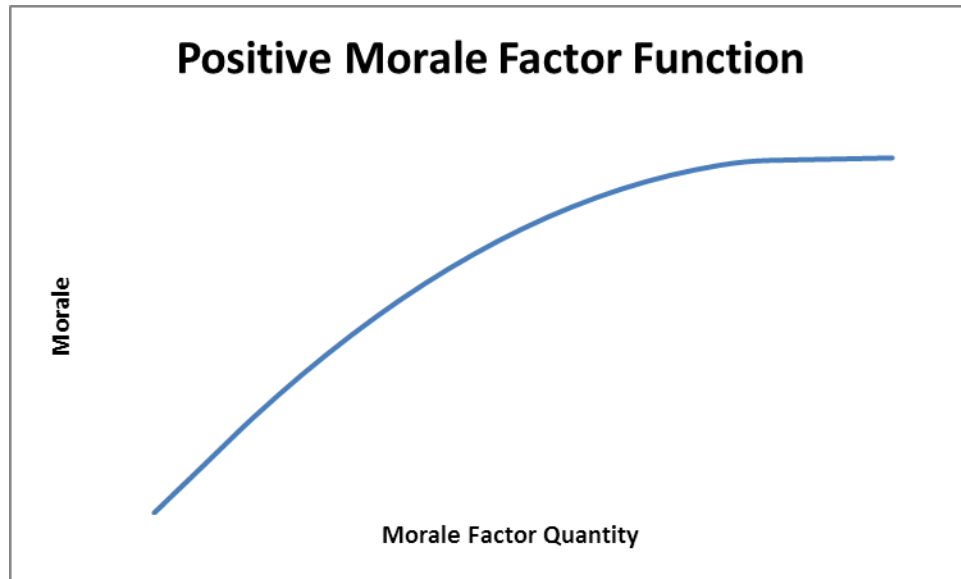


Figure 1. Positive Morale Factor Function

Negative morale factors tend to decrease morale as presence of the morale factor increases. Similar to positive correlation, negative morale factors will have varying effect on productivity in relation to the importance an individual places on the morale factor. Likewise, grouping functions into positive and negative domains is based on extrapolated survey data and may not apply to every individual in a population. There may be individuals for which morale actually improves with increasing quantity of what we consider negative factors. Later discussions of individual morale factors in Chapter III clarify application of morale factors to individuals. A generalized curve for negative morale functions is included in Figure 2.

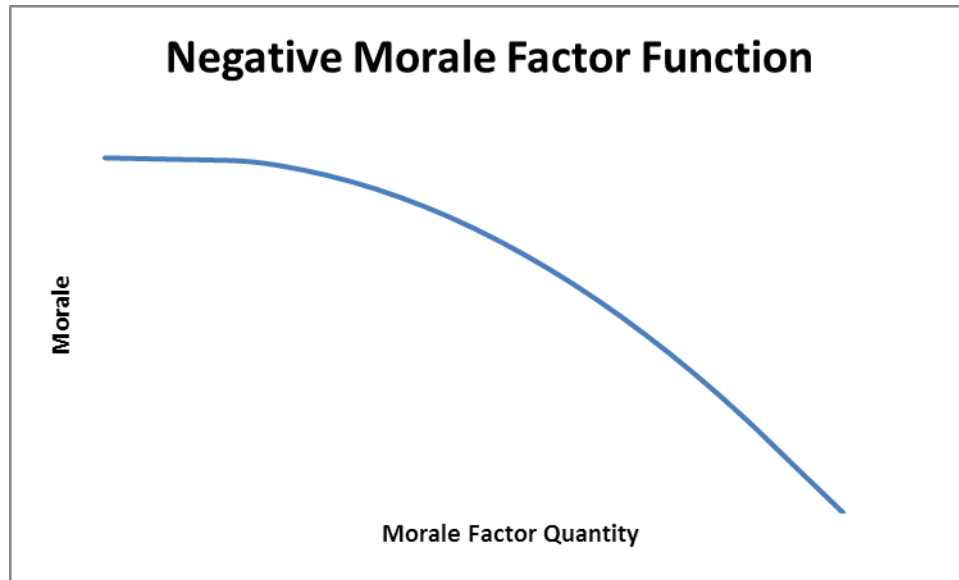


Figure 2. Negative Morale Factor Function

Specific morale factors will likely exhibit either positive or negative trends, but we reject labeling specific factors as either positive or negative so as to not place unwanted assumptions or constraints. To assist later analysis and practical implications, we group morale factors in functional categories.

(1) Financial Incentives

- Pay and entitlements: includes Base Pay, Basic Allowance for Housing (BAH), Retirement Benefits, and Basic Allowance for Subsistence (BAS)
- Incentive Pays: includes Bonuses, Incentive Pays, Combat Zone Tax Exclusion
- Advancement: incorporates ability to advance to next pay grade in terms of average advancement timeframes and controllable factors

(2) Time Incentives

- *Liberty*: Time away from work defined by MILPERSMAN 1050-280 as “Routinely authorized absence which lasts from the end of normal working hours on one day to the beginning of normal working hours on the next workday” (Department of the Navy, 2002). Liberty would also include duty schedules and watch rotations during non-deployed periods.

- *Leave:* Time away from off from work defined by MILPERSMAN 1050-010 as “authorized absence of a service member from a place of duty, chargeable against such member” (Department of the Navy, 2002). Leave includes multiple forms chargeable and non-chargeable such as ordinary, emergency, paternity. Leave as addressed here includes not just the accrual of leave days but also the ability to take leave days within desirable timeframes to avoid loss of those days.

(3) Operational Tempo Incentives

- *Days deployed:* Days away from home station during unit deployments or Temporary Additional Duty. Deployment days can be expressed as days per year or days since leaving home station depending on the desired analysis. It is important to note that in certain contexts such as peacekeeping operations, deployments actually improve morale (Maguen & Litz, 2006). However, continued deployment status would ultimately become a negative factor.
- *Deployment Frequency:* This metric accounts for multiple deployments with short dwell time between which wouldn’t otherwise come into effect when only counting days deployed. This factor can be expressed fractional form in relation to days spent at home station. Computations can be based on calendar year or total career to date.

(4) Quality of Work Life Incentives

- *Satisfaction:* Includes desirability of work assignment, sense of belonging, patriotism, and mission accomplishment. Satisfaction factors are also measured using self-reported surveys.
- *Motivation:* Self-reported enthusiasm toward daily work.

C. MORALE’S IMPACT ON DESIRABLE DECISIONS

Measuring morale and understanding relationships between morale factors and total morale is just the first step toward a useful management tool. The real implication is tying morale to decisions to be productive. Without this connection, measurement of morale is purely a scholastic pursuit. With an effective linkage between morale and productivity, economic functions and modeling can determine cost effectiveness of morale factors as measured by increases in production. Once a correlation or causation

relationship is identified, organizations can work backwards to manipulate morale factors to direct the desired productivity behaviors.

D. MORALE AS A FUNCTION

As previously stated, morale factors are not uniform, static, or constant for individuals or organizations. However, aggregated morale factor values can provide a data point of morale at a given time and place. Because morale factors both add and detract to composite morale, numerous combinations of positive and negative morale factors exist to create the same composite morale level. Total morale can be represented in the following function:

$$M = f(Q_F, Q_T, Q_O, Q_U, \bullet)$$

where Q_X = Quantity of given morale factor functional category (Financial, Time, Operational Tempo, and Quality of Life), $f' > 0$, and $f'' < 0$.

Each functional category can then be expressed as the function:

$$QF = f(Q_P, Q_I, Q_A, Q_R, \bullet)$$

where Q_X = Quantity of morale category sub-components (Pay, Incentives, Advancement, and Retirement), and $f' > 0$, and $f'' < 0$.

Composite morale on an individual or group level then becomes one of many factors determining productivity and retention. For purposes of this project, we assume factors other than morale remain constant and will not offset adjustments to morale. Generalized productivity and retention functions are listed in the next section.

E. PRODUCTIVITY AS A FUNCTION

RAND's study on productivity illuminates ability, experience, and training (AET) as the three factors contributing to service member productivity. Ability is assessed using score from the Armed Forces Qualification Test (AFQT). The AFQT is the section of the Armed Services Vocational Aptitude Battery (ASVAB) that measures mathematical and verbal skills. This variable is unique in that it is a one-time snapshot of a service member, and is not measured over a period of time. In order for the military to affect this factor, it would need to raise or lower acceptance standards based on AFQT scores. It is also

unique because it serves as a signal to how effective experience and training will be for a service member based on their ability.

A service member's higher experience generally led to that service member being more productive (Kavanuagh, 2005). This finding has several inclinations. First, it is in the military's interest to retain those with the most experience. They provide the highest productivity per man hour, and also serve to train those that are less experienced. Also, those with more experience are able to complete more complex tasks. This variable can be affected by the military by offering incentives to experienced service members to remain in the military, but the variable is also limited because time on the job is the only factor that can increase a service member's experience.

Training is a much more malleable factor because the military can directly affect the amount of training service members receive. Kavanaugh (2005) found that there were two types of training correlated with productivity: long-term and short-term. Long-term training was identified as training was aimed at increasing the knowledge of a service member on the general facets of their job (Kavanaugh, 2005). The example used was overall flight hours. Short-term training was more focused on a particular mission or event. Kavanaugh found that while short-term training improved the work of the service members, the accrued long-term training was a better predictor of performance.

Using these three factors, productivity can be expressed as the function:

$$QP = f(Q_A, Q_E, Q_{TR}) \text{ where } f' > 0, \text{ and } f'' < 0$$

These factors within the function directly correlate to productivity. Under this premise, as time passes, an individual will become more productive, with ability remaining constant and experience and training increasing. This seems too idealistic. There are several factors, including an individual's morale that could affect productivity, independent of ability, experience and training.

F. MORALE'S INFLUENCE ON PRODUCTIVITY

In order to obtain a better picture of productivity and how it can be measured, we incorporate morale into the productivity function. There are two approaches to how this may be accomplished.

$$QP = f(Q_A, Q_E, Q_{TR}, Q_M, \bullet)$$

$$\text{where } Q_A = g(Q_M, \bullet), Q_E = h(Q_M, \bullet), Q_{TR} = i(Q_M, \bullet), f' > 0, \text{ and } f'' < 0$$

By identifying morale as both a function of productivity and a function of each of the other factors for productivity, we realize its compounding effect on the other factors. The claim is made that an individual can overachieve or underachieve on his or her productivity (based on the three given factors) based on that individual's morale. This function does not state that the morale of an individual can increase or decrease their ability, experience, or training. Rather, it states that morale leverages on ability, experience, and training with respect to productivity.

The second functional option places morale at the same level of importance as ability, training, and experience.

$$QP = f(Q_A, Q_E, Q_{TR}, Q_M, \bullet) \text{ where } f' > 0, \text{ and } f'' < 0$$

In this function, morale is still a factor of productivity, but is placed on equal footing with ability, experience, and training. In this model, high or low morale can be offset by high or low AET. For example, if an individual is suffering from a poor command climate, they can still be productive because of AET, but will be unable to reach their full potential of productivity.

Regardless of which function is used, morale can be replaced by the equation of its function. Doing this shows all of the factors for this model that theoretically drive production.

$$QP = f(Q_A, Q_E, Q_{TR}, Q_M, \bullet)$$

$$QP = f(g(Q_M, \bullet), h(Q_M, \bullet), i(Q_M, \bullet), j(Q_F, Q_T, Q_O, Q_U, \bullet), \bullet)$$

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IV. A POTENTIAL EMPIRICAL METHOD TO MEASURE THE EFFECT OF MORALE ON PRODUCTIVITY

We recommend that the military conduct semi-annual individual morale surveys (see Figure 3). The questions are grouped by morale factor category and are designed to provide an overall representation of morale. The questionnaire focuses on factors shown to have the greatest impact on composite morale. While additional factors may exist, using a representative set will allow leaders to analyze trends over time. The five-point Likert scale allows for a full range of responses lending to mathematical computation of results while eliminating bias because answers are balanced on either side of a neutral response.

Morale Factor	Survey Question	Relative Importance	Current Period
Financial			
Base Pay	How satisfied are you in general with your base pay? 1 = very dissatisfied 2 = dissatisfied 3 = neither satisfied or dissatisfied 4 = satisfied 5 = very satisfied		
BAH / BAS	How satisfied are you in general with BAH / BAS? 1 = very dissatisfied 2 = dissatisfied 3 = neither satisfied or dissatisfied 4 = satisfied 5 = very satisfied		
Bonus and Incentive Pay	How satisfied are you in general with your career bonuses 1 = very dissatisfied 2 = dissatisfied 3 = neither satisfied or dissatisfied 4 = satisfied 5 = very satisfied		
Advancement	How satisfied are you in general with your opportunities for promotion? 1 = very dissatisfied 2 = dissatisfied 3 = neither satisfied or dissatisfied 4 = satisfied 5 = very satisfied		
Time			
Liberty	How satisfied are you in general with the amount of time you get off from work while in homeport? 1 = very dissatisfied 2 = dissatisfied 3 = neither satisfied or dissatisfied 4 = satisfied 5 = very satisfied		
Leave	How satisfied are you in general with your ability to earn and use leave? 1 = very dissatisfied 2 = dissatisfied 3 = neither satisfied or dissatisfied 4 = satisfied 5 = very satisfied		
OPTEMPO			
Days Deployed	In the past 30 days, how many nights have you been away from your permanent duty station because of your military duties? 1 = All 30 2 = 21-29 3 = 11-20 4 = 1-10 5 = 0		
Deployment Frequency	What impact has time away from your permanent duty station in the last 12 months had on your military career intentions? 1 = greatly decreased desire to stay 2 = decreased desire to stay 3 = neither increased or decreased desire to stay 4 = increased desire to stay 5 = greatly increased desire to stay		
Quality of Life			
Satisfaction	I feel satisfied with my present job 1 = strongly disagree 2 = disagree 3 = neutral 4 = agree 5 = strongly agree		
Motivation	Most days I am enthusiastic about my work 1 = strongly disagree 2 = disagree 3 = neutral 4 = agree 5 = strongly agree		

Figure 3. Individual Morale Survey

Once surveys are administered, data could be collated using Individual Morale Scorecards (see Figure 4). “Career Average” represents the average of raw scores from all surveys taken by an individual. It is likely that the more surveys a person takes, the more accurate the morale value represented by career average. “Change” is mathematical difference between current period values and career average. Differences here could be compared to external factors occurring during that period. Use of regression analysis could potentially identify causal relationships and leaders could go one step further to enter possible solutions into the regression model as a forecasting method. “Relative Importance” allows a survey respondent to apply relative weighting scales to the morale factors. Respondents would apply any combinations of weights summing to 100. For example, if a respondent viewed all factors as having an equal effect on his or her morale, he would apply a weight of 10 to each of the 10 morale factors. This relative weighting is essential for tailoring regression and incentive programs as efficiently as possible. The final column for “Weight Coefficient” is the result of multiplying the current period score for each morale factor by the relative importance to obtain a weighted value for each factor during that period. The summation of the weighted coefficient column yields a total weighted morale factor for that period. This value would be carried forward to trend analysis and regression. Individual Morale Scorecards could be used by leaders to monitor and manage individuals in an organization or aggregate individual level data into higher echelon data such as Division, Department, or Command.

Morale Factor	Current Period	Career Average	Change	Relative Importance	Weight Coefficient
Financial	4	4.2	-0.2	7.5	
Base Pay	5	4.2	0.8	10	0.5
BAH / BAS	5	4.8	0.2	5	0.25
Bonus and	3	3	0	5	0.15
Advancement	3	4.8	-1.8	10	0.3
Time	5	2.4	2.6	15	
Liberty	5	2.6	2.4	20	1
Leave	5	2.2	2.8	10	0.5
OPTEMPO	4.5	2.7	1.8	10	
Days Deployed	5	3	2	15	0.75
Deployment Frequency	4	2.4	1.6	5	0.2
Quality of Life	3.5	2.65	0.85	10	
Satisfaction	3	2.4	0.6	10	0.3
Motivation	4	2.9	1.1	10	0.4
Composite	4.2	3.23	0.97	10	4.35

Figure 4. Individual Morale Scorecard

At the individual level, we suggest that productivity be measured using a supervisor evaluation. Figure 5 provides an evaluation template incorporating both prescribed and discretionary behavior to achieve a holistic picture of performance. At unit levels, productivity could be assessed by standardized metrics such as time ship spends in serious failure, time ship spends free of mission degrading failure, and frequency and level of Casualty Reports (CASREPs). Regardless of the chosen productivity measure, morale survey data for the group in question would be summarized and compared to performance metrics to investigate trends and assist in regression.

	1 = Significantly Below Average	2 = Below Average	3 = Average	4 = Above Average	5 = Significantly Above Average
Job Attributes					
(Task Performance)					
Bearing, appearance, military discipline					
Performing routine maintenance					
Using technical documents and publications					
Operating equipment					
Planning and organizing work					
Working safely					
Overall technical performance					
Contextual Attributes					
(Interpersonal Facilitation)					
Praise co-workers					
Support co-workers with personal problem					
Treat others fairly					
Help without being asked					
Encourage others to get along					
Provide work related motivation					
Exhibit teamwork					
Superior - subordinate interactions					
Contextual Attributes					
(Job Dedication)					
Puts in extra hours to accomplish job					
Pays attention to detail					
Volunteers for challenging work					
Shows initiative to solve problems					
Persists through difficulty to finish job					
Exhibits enthusiasm during difficult work					

Figure 5. Personnel Evaluation Template

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V. POTENTIAL USES OF REGRESSION ANALYSIS

In addition to the benefits that managers can collect from the raw data of the survey results, statistical analyses could identify possible correlation and causation between productivity and morale factors. Having identified four primary factors for productivity, managers can analyze the aggregate data to better understand and control possible catalysts for productivity. Regression analysis of survey data could determine extent of relationships. The theoretical equation for that regression would be:

$$Qp = \beta_0 + \beta_1 Q_M + \beta_2 Q_A + \beta_3 Q_E + \beta_4 Q_T + e$$

Where the variable for productivity (Qp) is the “dependent” variable, and Q_M , Q_A , Q_E , and Q_T are the “independent” variables and e is an error term. β_0 represents the baseline value of productivity that would occur assuming all of the factors are at zero. β_{1-4} represent the effect of an additional “unit” of morale, ability, experience, or training on productivity, all hypothesized to be positive for each of the factors.

With this theoretical regression, organizations could understand which of the independent factors had the greatest influence on productivity. This information could be monitored over time, and patterns observed for different organizations throughout training cycles and deployments. With a consistent measurement of morale factors driving productivity, organizations could have a clearer picture of how to incentivize its service members to maximize productivity. This regression and the information it contains could be used at the individual, unit, and force level and have equally valuable information about the morale and productivity factors within an organization.

Overlaying these results on a timeline of individual, unit, or force events such as deployment schedules, work hours, and traumatic events will bring the full picture into focus. The results of this regression with no contextual information would be beneficial but not transformative. Understanding how regression results coincides with planned operations and unplanned events will give leaders a better understanding of their organizations, and will give managers the best opportunity to maximize productivity for their area of responsibility.

Because this data is fluid, it would need to be collected and regressed on a frequent basis. We recommend that the survey and regression be completed at least at six month intervals in order to identify patterns and maintain the moving baseline for organizations. Using the results of the data, the regression analysis, and the applicable timeline for unit activities will maximize the functionality for this approach in measuring the effects of morale on productivity. With sufficient historical data, leaders can utilize regressions and various forecasting methods to project future morale given an adjustable set of parameters. Such a frequent survey would benefit commands by effectively accounting for personnel turnover and benefit individuals by accounting for life changes that affect a service member's incentive paradigm over time.

Personnel morale and, by extension, productivity, should be considered in Cost Benefit Analysis and Course of Action Analysis alongside traditional evaluation factors. Service members' productivity can directly affect combat effectiveness, mission accomplishment, and resource efficiency. Leaders should use timely measures of morale to plan key operations during periods of predicted high morale or utilize adjustment of morale factors to inflate morale to desired levels in concert with operational planning.

Utilizing regular morale metrics will provide a running estimate of unit morale at any given point. This estimate is helpful for planning operations and providing a commander the pulse of unit morale. Presently, morale is measured through random service level surveys which only provide historical data and cannot be ascribed to particular units. As a result, morale data is simply a curious metric, not a useful tool.

Cost benefit analysis can be conducted at the unit or individual level. On the unit level, commanders can adjust incentives to account for other productivity actors such as extended deployments in an effort to maintain a desired level of productivity. Similarly, unit commanders can determine that the cost of offsetting negative morale factors with incentives is greater than the benefit or need for productivity. Such objective insight into spending analysis would be a vital asset in the constrained fiscal environment.

At the individual level, cost benefit analysis of morale factors can be used to manage retention incentives. Currently, retention incentives like career specific pays and

bonuses are applied in a blanket fashion to all personnel in a specific year group or military designator. There are certainly individuals within the population who don't require additional incentive to remain in active service. Incentives and bonuses are wasted on those service members. Additionally, the incentives applied could be inefficient for all or some of the population because they don't cater to specific desires or motivations. For example, a pilot may be relatively comfortable with his wage, but desire more time with his family. The financial cost to increase his wage to sufficiently overcome his desire for time may be significantly more costly than just allowing more time off. Furthermore, cost benefit analysis of individuals and personnel groups could show that some investments are not cost effective. Take, for example, a relatively low tech career field with minimal accession and training costs. There could be situations where the continued use of incentives of personnel in this career field is more costly than recruiting new personnel. Leadership could take this one step farther in over manned fields. Incentives could be lowered progressively with the intention of reducing troop strength. Rather than arbitrary personnel cuts or subjective review boards, personnel downsizing could be controlled economically by reducing incentives and compensation until enough people leave voluntarily. Obviously with this method, studies would need to evaluate the quality of personnel opting to leave as one could assume those with the greatest external earning potential would be most likely to exit the service in the face of decreasing benefits. In this instance, a right sized force does not necessarily contain the optimum quality personnel.

Additionally, the current incentive system is retrospective and lags behind the desired effect. By the time a historical survey is conducted and incentives devised and implemented, the target population has moved past the next career milestone and potentially separated from service. Likewise, the maximum productivity wasn't realized during the period at issue. A regression system with established coefficients for each morale factor could be used to forecast morale and productivity. One such method would input variations to the morale coefficients to test the result of prospective incentive changes. Another method would adjust morale factors to an anticipated organization climate as a means to model resultant morale and productivity.

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VI. CONCLUSION

In a fiscally constrained environment, the Department of Defense is constantly seeking to maximize taxpayer dollars. It is in the best interest of the Department of Defense to ensure maximum return on its investment. In order to do this, each service member must maintain his or her highest potential productivity.

Instead of only relying on service member ability, experience, or training as factors of productivity, the Department of Defense should include employee morale as a force multiplier influencing productivity. By doing this, the Department of Defense can have more control over its return on investment by injecting positive morale factors, and thereby increase productivity.

A. SUMMARY

This project presented a theoretical model to analyze the relationship between productivity and morale. More specifically, this project set out to present a method to measure morale and productivity independently and create a regression to examine specific factors that may positively or negatively affect productivity. The model and regression require further discussion and experimentation in order to maximize effectiveness.

The first step in the research process was a thorough literature review of works on productivity and morale. The literature review illustrated that morale has an elusive definition dependent on context. This project presented a definition for the context of the Department of Defense, in relation to morale's effect on productivity.

We then created functions to identify the factors of these two concepts. These functions show the relationship between morale and productivity, and hypothesize that morale is a force multiplier for some of the factors affecting productivity. Our individual morale survey, individual morale scorecard, and personnel evaluation template can collect data on morale and productivity at an individual level. Finally, we presented a regression to identify causation and correlation among four primary factors of productivity on productivity.

B. CONCLUSION

This project concludes that the relationship between morale and productivity can assist leaders throughout the Department of Defense to obtain data and analysis on the morale of service members and inject the most effective positive morale factors in order to have the largest impact on productivity.

The challenge is finding the most effective methodology to obtain the data and keep it current for every individual. This project presents one way to do this, but acknowledges that experimentation is necessary to improve the product. Despite the challenges and no matter the methodology used, the Department of Defense should make managing the morale of its service members a priority in order to maximize taxpayer dollars and the effectiveness of its force.

APPENDIX. ALTERNATIVE MORALE SURVEY

Morale Factor	Survey Question	Relative Importance	Current Period
Financial			
Base Pay	How satisfied are you in general with your base pay? 1 = very dissatisfied 2 = dissatisfied 3 = neither satisfied or dissatisfied 4 = satisfied 5 = very satisfied		
BAH	How satisfied are you in general with BAH? 1 = very dissatisfied 2 = dissatisfied 3 = neither satisfied or dissatisfied 4 = satisfied 5 = very satisfied		
BAS	How satisfied are you in general with BAS? 1 = very dissatisfied 2 = dissatisfied 3 = neither satisfied or dissatisfied 4 = satisfied 5 = very satisfied		
Bonus	How satisfied are you in general with your career bonuses 1 = very dissatisfied 2 = dissatisfied 3 = neither satisfied or dissatisfied 4 = satisfied 5 = very satisfied		
Incentive Pay	How satisfied are you in general with your incentive pays 1 = very dissatisfied 2 = dissatisfied 3 = neither satisfied or dissatisfied 4 = satisfied 5 = very satisfied		
Advancement	How satisfied are you in general with your opportunities for promotion? 1 = very dissatisfied 2 = dissatisfied 3 = neither satisfied or dissatisfied 4 = satisfied 5 = very satisfied		
Retirement	How satisfied are you in general with military retirement? 1 = very dissatisfied 2 = dissatisfied 3 = neither satisfied or dissatisfied 4 = satisfied 5 = very satisfied		

Time			
Liberty	How satisfied are you in general with the amount of time you get off from work while in homeport? 1 = very dissatisfied 2 = dissatisfied 3 = neither satisfied or dissatisfied 4 = satisfied 5 = very satisfied		
Leave	How satisfied are you in general with your ability to earn and use leave? 1 = very dissatisfied 2 = dissatisfied 3 = neither satisfied or dissatisfied 4 = satisfied 5 = very satisfied		
Physical			
Food	How satisfied are you in general with food provided? 1 = very dissatisfied 2 = dissatisfied 3 = neither satisfied or dissatisfied 4 = satisfied 5 = very satisfied		
Rest	How satisfied are you in general with amount of sleep and down time during deployment and duty? 1 = very dissatisfied 2 = dissatisfied 3 = neither satisfied or dissatisfied 4 = satisfied 5 = very satisfied		
Living Conditions	How satisfied are you in general with deployed living conditions? 1 = very dissatisfied 2 = dissatisfied 3 = neither satisfied or dissatisfied 4 = satisfied 5 = very satisfied		

OPTEMPO			
Days Deployed	In the past 30 days, how many nights have you been away from your permanent duty station because of your military duties? 1 = All 30 2 = 21-29 3 = 11-20 4 = 1-10 5 = 0		
Deployment Frequency	What impact has time away from your permanent duty station in the last 12 months had on your military career intentions? 1 = greatly decreased desire to stay 2 = decreased desire to stay 3 = neither increased or decreased desire to stay 4 = increased desire to stay 5 = greatly increased desire to stay		
Work Hours	How many hours have you worked per week on average over the last month? (count duty days and deployed days as 24 hours) 1 = Greater than 81 2 = 61-80 3 = 41-60 4 = 21-40 5 = less than 20		
Quality of Life			
Co-workers	How satisfied are you in general with your co-workers? 1 = very dissatisfied 2 = dissatisfied 3 = neither satisfied or dissatisfied 4 = satisfied 5 = very satisfied		
Supervisor	How satisfied are you in general with your supervisors? 1 = very dissatisfied 2 = dissatisfied 3 = neither satisfied or dissatisfied 4 = satisfied 5 = very satisfied		
Satisfaction	I feel satisfied with my present job 1 = strongly disagree 2 = disagree 3 = neutral 4 = agree 5 = strongly agree		
Motivation	Most days I am enthusiastic about my work 1 = strongly disagree 2 = disagree 3 = neutral 4 = agree 5 = strongly agree		
Intention to Stay	What best describes your current career intentions 1 - Definitely leave after current obligation or next 2 years 2 - Probably leave after current obligation or next 2 years 3 - Definitely stay a few years, but not until retirement 4 - Probably stay until retirement 5 - Definitely stay until retirement		

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