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Well-Being At Work: An Engineer Short Circuits Workplace Dysfunction

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Well-Being At Work: An Engineer Short Circuits Workplace Dysfunction

Thomas Heffner

University of Pennsylvania

A Capstone Project Submitted

In Partial Fulfillment of the Requirements for the Degree of

Master of Applied Positive Psychology

Advisor: Judy Saltzberg-Levick

August 1, 2012

Well-Being At Work: An Engineer Short Circuits Workplace Dysfunction
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ACKNOWLEDGEMENTS

For this effort alone, she deserves an honorary MAPP degree. When I think about my meaning

or purpose in life, it is very clear: "Love, be loved, and everything in between." I consider

myself to be the luckiest man in the world because each day I have the opportunity to pursue this

meaning and purpose with my best friend, my love……my beautiful bride.

I. INTRODUCTION

When I first told my family and friends that I would be studying for a Master's degree in Applied Positive Psychology (MAPP) at the University of Pennsylvania (UPENN), most could only shake their head in disbelief. My father asked, "why would you pay so much money to study happiness when you are already happy?" It was a fair question, and to be honest, I would be lying if I did not confess at least some doubt at the time. However, I knew this journey was about more than my own happiness and flourishing. This journey mattered because of the well-being of other people: my family and friends, coworkers, and everyone else. I asked myself, "How can I help to leave this world a better place than when I entered it?" In his book *Flourish*, Martin Seligman (2011) poses a challenge: How can we create a society where the majority of the world (51% or more) is flourishing by 2051? Perhaps it was hubris, or perhaps it was naïveté, but I was certain that I could help reach this global goal by working in my own community and workplace.

Consequently, over the past year I found myself studying the theoretical foundations of positive psychology, as well as advanced topics that include theory and application in specific domains (e.g. business, service-learning, individual, etc). This was an immensely challenging and rewarding time, and I learned a great deal. But, as my high school basketball coach often told me, "talk is cheap, it's time to put points on the board." Similarly, it is time for me to score points for the field of positive psychology, and start making contributions that will help the world to flourish by 2051.

With this capstone project, I aim to reach my goal by focusing on well-being in the engineering profession. In particular, my capstone consists of two major components: a research component in the form of a scholarly research paper, and an accompanying artifact in the form of

a book proposal. This research paper will make a compelling case for boosting well-being in engineering, by arguing that engineers and their organizations face unique challenges that can jeopardize individual well-being and workplace flourishing. I will use theory, empirical studies and my own experience to build my case. The book proposal, as the artifact of my capstone, is the vehicle that will allow me to broadcast my ideas, interventions, and applications to a larger audience. Simply put, using a book as my platform will allow me to translate the underlying research and the theoretical and empirical arguments into a more accessible positive psychology package for the average engineer.

Furthermore, utilizing a book proposal as my artifact creates several new and different opportunities to share my unique perspective in positive psychology. For example, a book proposal, in addition to the book itself, can involve complementary market opportunities such as creating blogs, webinars, speaker series, consulting programs, and even future books as part of an ongoing series (Larsen, 2011). With the potential of a wider audience of readers and a diverse array of complementary applications, I believe I can maximize the impact of positive psychology.

II. POSITIVE PSYCHOLOGY AND ENGINEERING: THEORY AND BACKGROUND

1. Introduction to Positive Psychology and Its Position in Engineering Well-being

As someone who studies positive psychology, I frequently face the question, "What exactly is positive psychology?" Positive psychology, at its most basic level, is the scientific study of how we flourish in our lives – work, family, school, sports, and every other domain (Seligman, 2011). Since World War II, traditional psychology has focused almost exclusively on the identification, removal and remedy of mental illnesses (Seligman, 1999). Positive psychology rejects this tunnel vision approach and argues that what makes life worth living is

just as important as what makes life miserable (Peterson, 2006). Cultivating our strengths is just as important as overcoming our weaknesses (Seligman & Csikszentmihalyi, 2000). Spending as much time as possible to create the best things in life is as essential as repairing the terrible things in our life.

This view does not imply that we should simply forget about those who suffer and abandon the disease model altogether (Seligman & Csikszentmihalyi, 2000). On the contrary, positive psychology acknowledges that human suffering is a legitimate and important concern. It seeks to learn from theory and empirical studies, and create applications to help those individuals that are suffering. At the same time, positive psychology also recognizes that we need to allocate a fairer balance of resources (e.g. time, money, etc) to human flourishing. It understands that meaning and purpose are important drivers of our well-being. With these basic assumptions in mind, positive psychology can become a tool for goodness and excellence in almost any domain in our lives.

This capstone will focus primarily on positive psychology application in technical (i.e. engineering based) organizations and businesses. Technical organizations can include many types, such as for profit organizations like Apple and Google, non-profit organizations like the Johns Hopkins University Applied Physics Laboratory (JHU/APL) where I work, and even government institutions like the Naval Research Laboratory. These technical organizations and businesses present a wonderful opportunity to rewire conventional thinking and approaches. Through my professional experience as both an engineer and manager at a large research and development center (JHU/APL), I have had the opportunity to work with numerous types of engineers – electrical, mechanical, chemical, aeronautical, and biomedical – to name just a few. I have cooperated with engineers in both big and small organizations, for profit and nonprofit

entities, and finally, those in government organizations. During this time, I observed what I believe to be negative thinking styles and workplace behaviors (e.g. pessimistic explanatory style) that are inherent to and pervasive within the engineering community.

This capstone will present theoretical and empirical research that supports my hypothesis: that positive psychology theory, positive psychology interventions, and positive organizational scholarship (POS) applications can improve the performance and well-being of individual engineers as well as their organizations. The intersection between individual well-being and workplace well-being necessitates a synergistic connection between both positive psychology research and its close cousin POS. POS is a branch of research that merges together applied positive psychology and applied sociology in the search of what creates and sustains both human and organizational flourishing (Jane Dutton, personal communication, March 3, 2012). This capstone will utilize research findings from POS to create customized interventions, applications and organizational initiatives aimed at increasing and sustaining individual and organizational flourishing.

2. Today's Engineer

Before we discuss engineers in the context of positive psychology, we first need to define what engineering is exactly. According to the American Engineers' Council for Professional Development (ECPD), engineering is "the creative application of scientific principles to design or develop structures, machines, apparatus, or manufacturing processes, or works utilizing them singly or in combination; or to construct or operate the same with full cognizance of their design; or to forecast their behavior under specific operating conditions; all as respects an intended function, economics of operation and safety to life and property." (Smith, n.d.) As someone who has both undergraduate and graduate degrees in engineering, along with almost ten years of

professional experience working with government, industry and academic engineers, I must

admit that I find this definition cumbersome and longwinded. My view is decidedly simpler.

Engineering is a skill or profession where one applies scientific knowledge to design, build or

analyze something. The beauty of engineering is that "something" can encompass many

different domains or disciplines.

For example, one of my classmates in my undergraduate electrical engineering program

went on to obtain a PhD degree, specializing in nonlinear mathematics and modeling. Using this

training in mathematics and engineering, he decided to pursue a career in modeling financial

markets. Another former classmate decided to use his engineering training and background to

pursue a career designing Formula 1 racecar engines. Even my own career has taken a turn

down a most interesting road. As a research and development engineer, I design electronic

jammer systems that protect American, coalition, and foreign troops from radio controlled

improvised explosive devices (RCIEDs). The only limit to the application of engineering is the

limit of our imagination.

It is worth mentioning here that the engineering profession is distinctly different from the

scientist profession (Kea, 2008; Weaver & Trankina, 1996). Based on my own experiences

working in the field, this is a common misconception held by those outside of the profession, for

example, administrators, business managers, and sometimes even our customers. Within

academia, even social scientists who study engineers and scientists make this mistake (Pelz &

Andrews, 1973). This is unfortunate because if we confuse the two professions we will not

accurately identify and define the unique thinking styles, vocational interests and environments,

and personality traits of engineers. According to renowned strengths researchers Martin

Seligman and Chris Peterson (2004), this is critical because these thinking styles, interests and

personality traits may significantly shape our character strengths. Thus, if we created customized positive interventions or modify existing interventions based on character strengths and thinking styles common to scientists and not engineers, we would run the risk of ending up with a set of ineffective interventions.

To illustrate this difference, let's ask the question, how well would the *strengths development intervention* work if we assumed engineering subjects were the same as scientists (Biswas-Diener, Kashdan, & Minhas, 2011). During this intervention, a strengths coach or practitioner works with the subject to find and develop strengths not just for performance, but also to find the correct balance in using both their signature and lesser strengths (Biswas-Diener et al., 2011). If, for instance, the strengths coach assumed that engineers enjoyed solving more abstract and theoretical problems just as much as scientists do, then he or she would be making a colossal mistake. In fact, engineers prefer solving realistic and practical problems with a more hands-on approach (Hill & Collins-Eaglin, 1985; Kea, 2008). Scientists, on the other hand, prefer thinking through highly abstract technical puzzles over long periods of time. They prefer ambiguity, whereas engineers prefer a clear set of design requirements or specifications. Consequently, if the strengths coach made this assumption and encouraged engineers to exercise their strength of problem solving in an abstract manner, they would operate against the engineer's natural interests.

3. The Thinking Styles of Engineers

While it is helpful to understand the differences in vocational interests between engineers and scientists, we need additional information to help us develop interventions and applications aimed at improving individual well-being and organizational flourishing for engineers. To

accomplish this goal, we must first understand the unique engineering thinking styles, work requirements and environments.

Based on my education and professional experience, I would describe the typical engineering thinking style as highly logical and analytical. In addition, the typical engineer tends to be deficient in the softer, more interpersonal skills (e.g. personal communication). I remember one experience in particular that illustrates this unique engineering portrait quite well. Several years ago, a friend of mine shared an office with another engineer. My friend was working on a large project and, as a result, his desk and entire office started to overflow with various engineering books. At one point, his work literally started to spill over into his office mate's space. His companion was none too pleased about this development. Instead of voicing his displeasure, however, the office companion decided to go about making his point in a different way. While my friend was away on a field test, his office mate proceeded to move all of the books back to my friend's side, piling them up on his desk. In addition, he placed a line of masking tape down the center of the office. When my friend returned, there was no explanation, no confrontation, or no apologies – just a stack of disorganized books and a long piece of tape dividing the room.

While I believe this depiction of engineers is as true as it is humorous, it is not enough to use anecdotes. We must rely on empirical evidence to make a convincing case. One way we can do this is by using the Herrmann Brain Dominance Instrument (HBDI) and its underlying research on thinking styles (Herrmann, 1995). The HBDI is a survey of preferred thinking styles and consists of 120 questions that can be answered without a time limit. It utilizes the well-known left/right brain model and further refines it into four quadrants. A visual breakdown of this physiological model is shown in Figure 1. As we can see, this brain model retains the

familiar left/right distinction, while further subdividing the left hemisphere and right hemisphere

into an upper and lower part. The results of the HDBI survey yield a graphical profile that can

be overlaid on the whole brain model (Figure 2). This profile indicates the preference of

thinking styles, showing both level and relative differences between A, B, C, and D quadrants.

Figure 1. Illustration of Herrmann's metaphorical whole brain model (Herrmann, 1996)
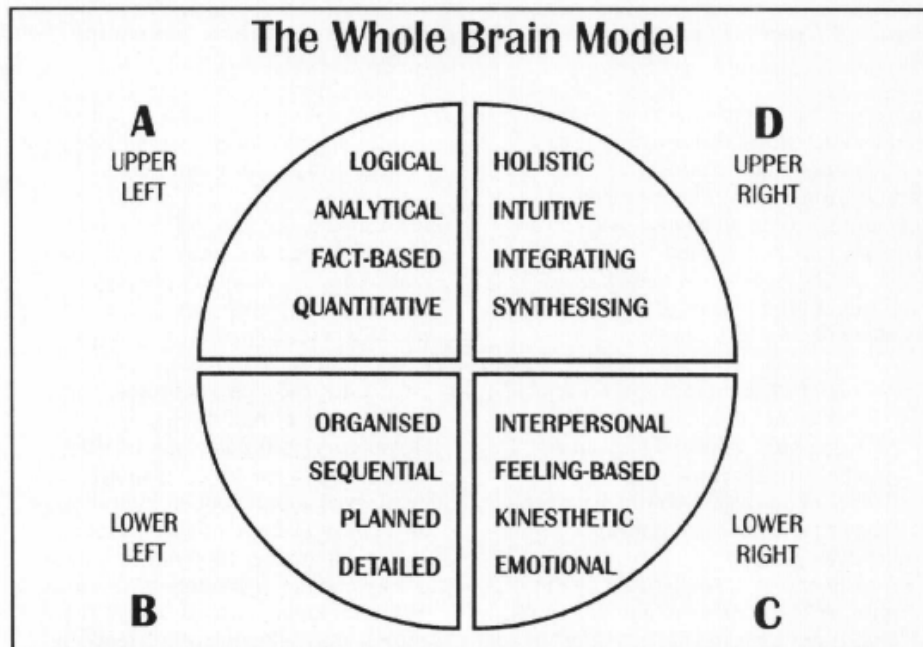
According to Herrmann (1995), someone who exhibits the thinking style preference of

the A quadrant will be inclined towards activities that involve analytical, logical, and fact-based

approaches. Someone who exhibits a thinking style preference in the B quadrant favors a more

linear approach to endeavors. Individuals exhibiting the C quadrant thinking style, however,

prefer activities and approaches that are more interpersonal, emotional, and feeling based. And

finally, people exhibiting a thinking style in the D quadrant tend to be more holistic and

conceptual in their thinking style approach.

If my observations of and intuitions about engineers are correct, then we should expect to observe a strong trend in engineers to have a graphical profile that matches quadrant A, followed by quadrant B, and to a much smaller extent, quadrants C and D. Several research studies examining the HBDI results of university engineering students confirm this hypothesis, as researchers discovered a relationship consistent with my experience and view of engineers (Horak & du Toit, 2002; Lumsdaine & Lumsdaine, 1995b). Figure 2 summarizes these findings, while figure 3 provides a graphical explanation for the findings contained within figure 2.

Figure 2. HBDI graphical profile of a typical engineering student (Lumsdaine & Lumsdaine, 1995a)
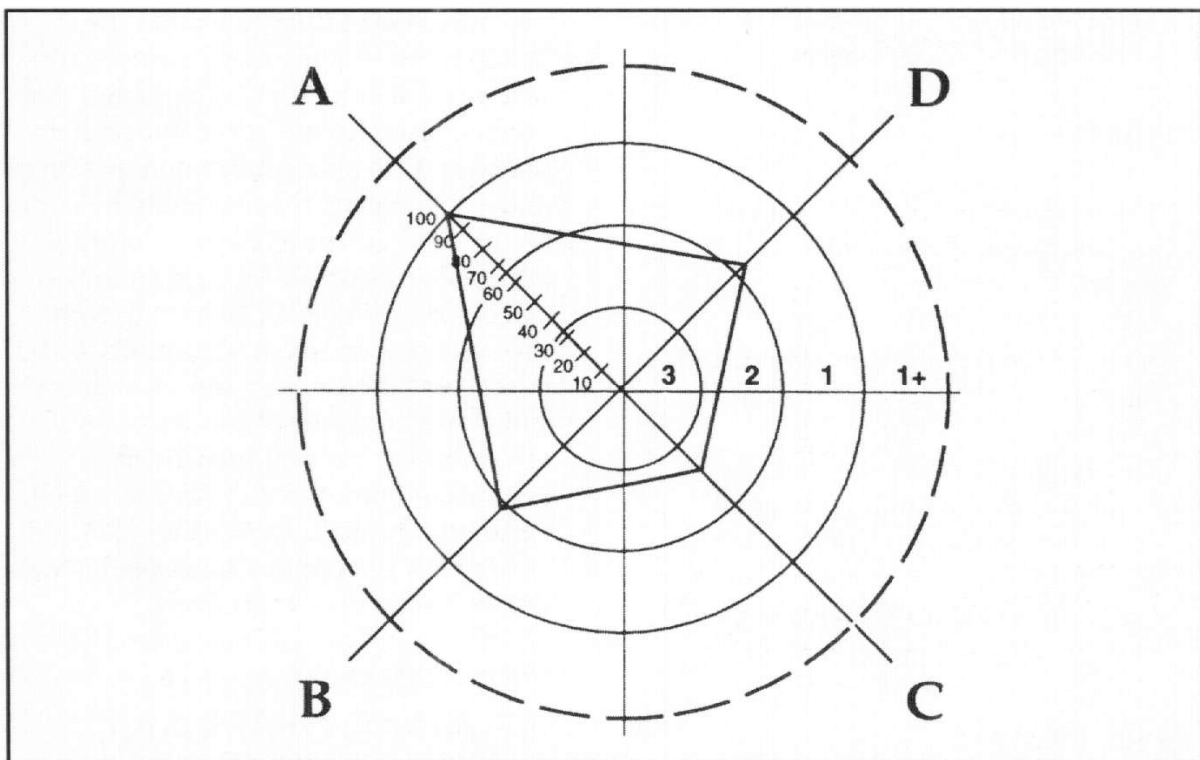
In these studies, researchers Monika and Edward Lumsdaine (1995b), found that the typical engineering student strongly preferred a more analytical and logical approach (quadrant A), followed by a more linear and organized approach (i.e. quadrant B). In contrast to my

expectations, however, their research findings also indicated that engineering students possessed

a reasonably strong preference for a holistic approach, also known as a right brained thinking

style (quadrant D). The study results did confirm, however, that engineering students did not

favor an emotional, feeling-based, and interpersonal approach for their thinking style.

Figure 3. Graphical explanation of HBDI profile interpretation (Herrmann, 1996)
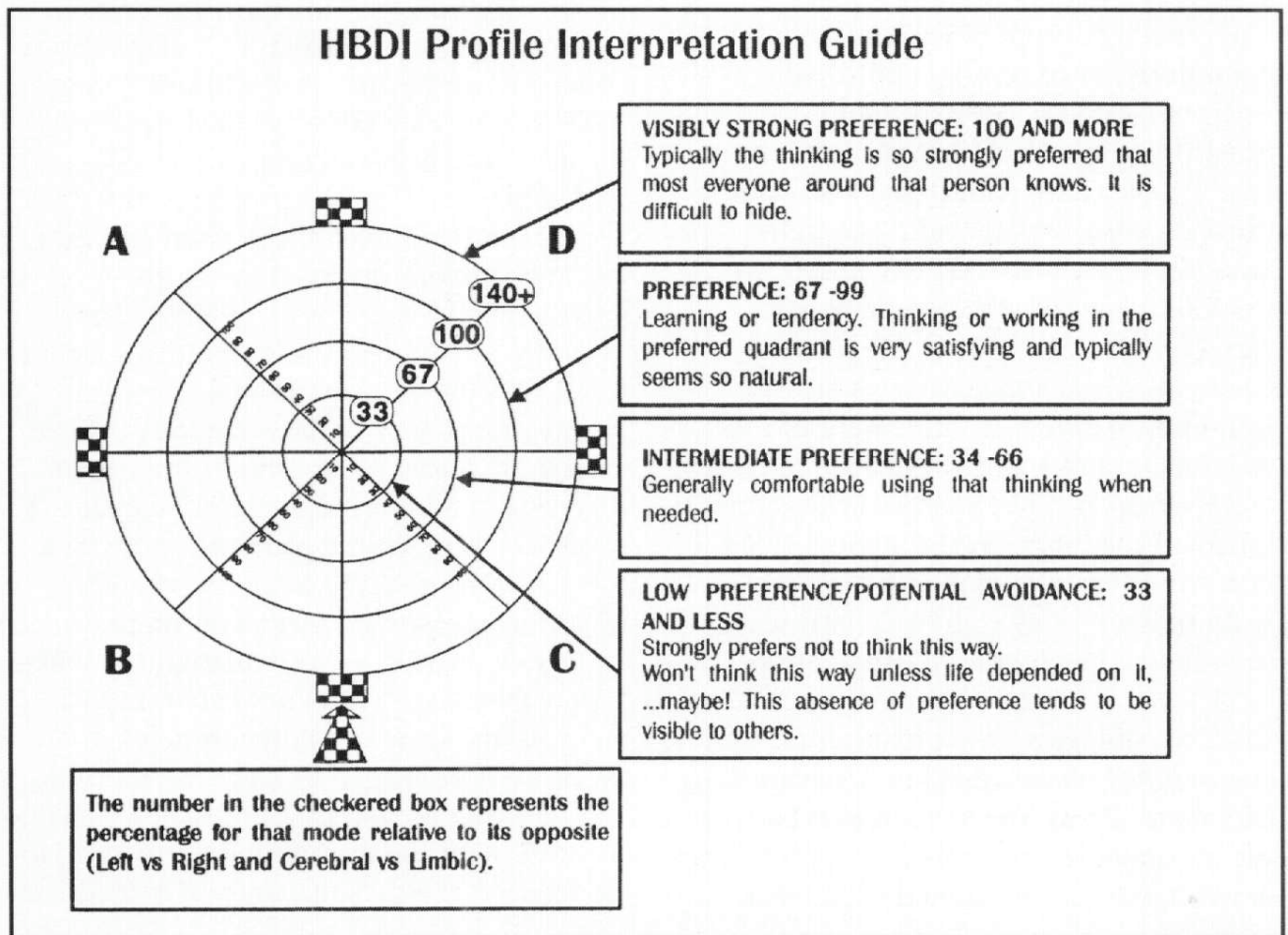
4. Engineers and pessimism

That engineers are a logical and analytical bunch is not exactly earth shattering news. To

this day, whenever I visit with my extended family (e.g. aunts, uncles, cousins, etc), I regularly

receive good-natured, but backhanded compliments such as "look at mister smarty pants, the one who is always so logical" or "mister analytical likes to overanalyze everything in life." Truth be told, the highly analytical, linear, and logical nature that enables success at work can also have a shadow side for engineers. Specifically, this natural thinking style helps foster and sustain a pessimistic explanatory style that does not always benefit the engineer – especially outside of the workplace.

i. The pessimistic explanatory style

A pessimistic explanatory style is not simply our pop culture approach to viewing life's thorny predicaments as the glass being half empty instead of half full. Rather, a pessimistic explanatory style is our predisposition to infer the causes of negative life events as permanent, pervasive, and personal (Seligman, 1998). To illustrate this concept, you might try to think back to your first big failure in life. I remember mine vividly. I was 14 years old and playing in my first Junior Varsity basketball game. Just before the game clock struck zero, I shot a game winning three pointer – and missed!

If I had a pessimistic explanatory style, for example, I would view this event as unchangeable, resulting in the fact that I would never become a good basketball player (Seligman, 1998). Further, I would believe that my missed shot could affect the other areas in my life. I might say or think: "I messed up the game winning shot, just like I mess up everything else in my life." And, finally, I might personalize the event by saying to myself: "It is all my fault that we lost the game." If I had an optimistic explanatory style, on the other hand, I would see this negative event in a completely opposite light: something temporary, isolated (i.e. only affecting that specific area of my life), and external (i.e. not under my control) (Seligman, 1998). For example, I might explain the negative event with a temporary and changeable explanation

such as: "I missed the game winning shot because I haven't practiced my three point shooting

enough. Once I practice this shot more, I'll become a complete basketball player with all the

shots needed to take over and win games." Further, I might look at this experience as an isolated

incident: "I lost the game today, but at least I aced another math exam during class today!" And

finally, I might find other equally plausible reasons for why we lost the game: "I missed the

game winning shot, but the referee missed the foul the defender committed on me when I shot

the ball. Most of the times, the referee makes that call." These distinctions between the two

explanatory styles are critically important and form the connection between pessimism and

unhappiness.

Research suggests that a pessimistic explanatory style places us at a distinct disadvantage

in many of our life's pursuits. For example, a pessimistic explanatory style prevents us from

reaching our full potential on the playing fields of sports (Seligman, 1998). In a study of

National League baseball players, across the 1985 and 1986 season, researchers found that

pessimistic baseball players were more likely to hit at a lower average than optimistic players

during the last three innings of a close game, also known as "late inning pressure." In addition,

the optimistic teams went on to improve their team records during the next season whereas the

pessimistic teams did not. Quite cleverly, the researchers were able to assess individual

explanatory styles not by exhaustively interviewing each player, but rather by using a blind and

reliable content analysis of verbatim explanations (CAVE). By CAVEing, the researchers

analyzed all of the baseball players' causal statements throughout the season. To accomplish this

task, they used quotes directly from the players found in the sports pages, and found significant

differences in explanatory styles between pessimistic and optimistic players.

In a different study on pessimism and sports performance of Division I collegiate swimmers, researchers found that pessimistic swimmers registered poorer performances and bounced back less often from poor performances than optimistic swimmers (Seligman, Nolen-Hoeksema, Thornton, & Moe Thornton, 1990). Not surprisingly, a pessimistic explanatory style also explains how well we perform in school. Pessimistic students are more likely to earn lower grades than optimistic students (Peterson & Barrett, 1987). This relationship remains even when we hold initial ability constant (i.e. when we control for previous SAT scores and high school academic performance) (Peterson & Barrett, 1987).

Perhaps the most alarming finding is that a pessimistic explanatory style may have grave consequences for our overall health, both physical and mental. For example, in a prospective study examining the relationship between optimistic/pessimistic explanatory styles and coronary heart disease (CHD) incidence in the Veterans Affairs Normative Aging Study, researchers found that pessimistic aging men were more likely to develop CHD than optimistic aging men (Kubzansky, Sparrow, Pantel, & Kawachi, 2001). Demonstrating the power of an optimistic explanatory style, researchers found that the protective effect of optimism occurred independently of risky health behaviors like cigarette smoking or alcohol consumption. This means that even bad health behaviors could not erase the benefits of an optimistic outlook. (This is not to suggest that optimists could start drinking and smoking every day!)

With regards to our mental health, there are numerous research studies that suggest that pessimism is a major risk factor for depression (Peterson & Seligman, 1984; Sweeney, Anderson, & Bailey, 1986). If we think about pessimism in terms of hopelessness, this finding makes intuitive sense. If you go through life with a predisposition of expecting bad things to happen by virtue of how you explain negative events as permanent, pervasive, and personal, then

how could you ever avoid depression (Seligman, 1998)? Further compounding a pessimist's

gloomy outlook is the question of whether or not he or she constantly thinks or talks about it.

That is to say, does the pessimistic person constantly ruminate about the good or bad things that

happen in life? As you might expect, pessimists who ruminate about the negative events in their

life further increase the effects of a pessimistic explanatory style (Seligman, 1998).

       ii. Pessimism as a benefit? A lawyer's perspective and its connection to engineers

       While the research appears to suggest, quite convincingly, that pessimism is maladaptive

in most cases, there is at least one area where pessimism may be a virtue, and that is in the law

profession (Seligman, Verkuil, & Kang, 2005). In fact, a pessimistic explanatory style begins to

pay dividends early on for lawyers. A study analyzing students of the class of 1987 from the

University of Virginia Law School found that pessimistic law students outperformed optimistic

law students on traditional measures of achievement, such as grade-point average and law

journal success.

       The logical question, then, is why does pessimism seem to be so helpful or adaptive in

the law profession? This is because a pessimistic explanatory style and approach in law is also

known as a prudent approach (Seligman, Verkuil, & Kang, 2005). A prudent approach requires

a cautious, unconvinced, and reality-based approach. The prudent lawyer is one who expects

negative outcomes to be permanent, pervasive, and personal. With that attitude, a lawyer will go

to great lengths to continually envision the most catastrophic scenarios. He will view the

improbable calamity as the most probable. This behavior is extremely beneficial to their clients,

but becomes dangerous to lawyers when they can no longer turn off their pessimism after leaving

work. And the data is quite clear in this regard: lawyers do a terribly poor job turning off their

pessimism. This is important because pessimism is a mediating variable that predicts more

unhealthy behaviors. Compared to the general population, lawyers are more likely to develop a major depressive disorder, heart disease, or alcoholism, and engage in illegal drug use.

So, what do pessimistic, depressed, and ill lawyers have in common with engineers? For the average person, it might be difficult at first glance to find any commonalities between the two vastly disparate professions. As an engineer, however, I can connect them in several important ways. Like lawyers, engineers work in an environment where a prudent approach is not only valued, but a requirement for success. For example, at my organization, the Johns Hopkins University Applied Physics Laboratory (JHU/APL), engineers work on satellites that will be launched into space, where they will remain in orbit for many years. In order for the satellite to achieve its goals – continue orbiting, taking measurements, and recording images to name just a few – engineers must anticipate a whole array of potential problems ranging from the trivial to the most catastrophic. They must operate under the assumption that failure will happen if they do not accurately set the expectations, because should failure occur, they have very little control over it since the satellite is thousands of miles away in space.

Turning to a more pop culture-like illustration, consider the engineers working at Apple. To achieve success in an industry packed with competitors waiting to wrest away market control, Apple engineers must expect failure at every turn. They must analyze every bit of an iPhone design, knowing they will find faults, weaknesses, and outright failures. Even so, they may miss a weakness. You have to look no further than the first edition of the iPhone 4, which suffered from a poor antenna design. This resulted in poor cell phone reception for many, me included.

Similar to lawyers, pessimism appears to be a workplace requirement for engineers. And as a result, it may be just as difficult for engineers to turn off their pessimistic explanatory styles once they leave their workplace at the end of the day (Seligman, Verkuil, & Kang, 2005). This is

an important connection, because it suggests that pessimism can lead to similar unhappiness for engineers as it does for lawyers.

5. Engineers and their character strengths

In addition to pessimism, engineers face another potential obstacle to finding happiness: their own character strengths. Character strengths are the positive psychological traits we possess (Peterson & Seligman, 2004). Researchers Christopher Peterson and Martin Seligman classified 24 universally-recognized strengths arranged under six larger virtues. The complete list is shown below in Table 1. We can identify our character strengths by completing the Values In Action (VIA) survey provided online by the VIA institute on Character (VIA Institute on Character, n.d.).

Table 1

Listing of Character Strengths and their organizing virtues (Peterson & Seligman, 2004).

Virtue(s)	Strengths
Wisdom and Knowledge	*Creativity* *Curiosity* *Judgment* *Love of learning* *Perspective*
Courage	*Bravery* *Honesty* *Perseverance* *Zest*
Humanity	*Kindness* *Love* *Social intelligence*
Justice	*Fairness* *Leadership* *Teamwork*
Temperance	*Forgiveness* *Modesty* *Prudence* *Self-regulation*

Transcendence	*Appreciation of beauty*
	Gratitude
	Hope
	Humor
	Religiousness

While Peterson and Seligman (2007) argue that enacting and utilizing any or all of these strengths can lead to a fulfilling life, only a handful of the strengths strongly predict happiness and life satisfaction in our lives. These positive traits are *love*, *hope*, *gratitude*, *curiosity*, and *zest*. In additional studies, these strengths frequently correlate to a great degree with other well-being measurements (Park & Peterson, 2006a, 2006b). Perhaps most importantly, in a longitudinal study, researchers discovered that these strengths accurately predicted an increase in life satisfaction months later, even after the researchers controlled for initial levels of satisfaction (Park & Peterson, 2006b). Researchers made this finding by giving the VIA Youth survey and the student life satisfaction survey to a group of adolescent youths at two different times. They were able to correlate the strengths of hope, love, gratitude, and zest with an increase in life satisfaction among the youths several months later. These findings give us confidence that there is something special and unique about these strengths and that their effect is long lasting.

Unfortunately for engineers who tend to have a low score for the C quadrant traits (i.e. strengths of the heart) from the HDBI survey mentioned above, these happiness-inducing strengths appear to embody "strengths of the heart" rather than "strengths of the head." For myself, these happiness-inducing strengths make sense intuitively when I envision them in relation to my own life. For example, when I think of love, I think of my innate, unconditional, and unending love for my wife and son. Or when I think of gratitude, I think about how grateful I am for my wonderful friends. With each of these strengths, I do not have to think, I just feel.

The big challenge for engineers, then, results from the fact that their signature strengths, or those they use effortlessly in most domains of their life, are more likely to be strengths of the head, rather than strengths of the heart. In the discussion above, I made the case that the average engineer is logical, analytical, linear-thinking, and conceptual (Horak & du Toit, 2002; Lumsdaine & Lumsdaine, 1995b). In my own experience as an engineer and in working with other engineers, this thinking style and character strength composite has been quite accurate. While this thinking style does not preclude the happiness-inducing strengths of love, hope, gratitude, curiosity, and zest – it certainly does not encourage or sustain them either. Furthermore, the nature and requirements of the engineering workplace can actively inhibit some of these strengths.

I have argued above that pessimism is an advantageous approach for the successful engineer. However, if an engineer is and needs to be pessimistic in the workplace, can he also be hopeful at the same time? The two thinking styles run counter to each other. Thus, it is unlikely that the average engineer will embody a hopeful thinking style in addition to a pessimistic thinking style. In addition, the engineering profession, in my experience, is characterized by a more reserved, cautious, and prudent approach. Clearly, there are exceptions to this stereotype. For example, Google is known as a risk taking and push-the-envelope kind of company. During an on-site job interview with the company, my wife discovered that they allow employees to take their dogs to work, that they pay for all of your meals all day long, and that they even give you 20% of work time to devote to innovation.

III. POSTIVE PSCYHOLOGY AND ENGINEERING: PRACTICAL APPLICATION

With the theory and background regarding engineers, their innate traits, and unique thinking styles fully explained, I now turn to the more practical portion of this capstone. I will

discuss several interventions, models, and applications that individual engineers can use, as well

as their organizations. In particular I will describe character strengths interventions, job crafting

exercises, appreciative inquiry applications, and resilience boosting interventions and models.

1. Character Strengths Interventions and Applications

As discussed in the introduction to positive psychology, our strengths help form the

foundation of positive psychology theory, study, and application. Positive psychologists and

practitioners believe that cultivating our strengths is just as important as overcoming our

weaknesses (Seligman & Csikszentmihalyi, 2000). Consequently, it makes logical sense to

begin this Intervention and Application section by building a solid foundation based on character

strengths interventions and empirical research results.

i. Signature strengths in the workplace

The beauty of identifying and enacting our character strengths is that doing so yields

impressive results in so many different areas of life. For example, using our signature strengths

(i.e. those strengths that we use effortlessly in most domains of our life) at work is linked with

greater work satisfaction, increased well-being, better work engagement, and finding higher

meaning in life (Biswas-Diener, Kashdan, & Minhas, 2011; Harter, Schmidt, & Hayes, 2002;

Peterson, Stephens, Park, Lee, & Seligman, 2009). Although workplace managers might view

these results as a luxury or a nice side-effect when things are going well, they might probably

view their bottom-line as more important. I know in my own workplace that running a project

on budget is considered paramount. Seen through this lens, strengths can make a compelling

case to increase work performance. In a study of United Kingdom managers, researchers

discovered that when managers emphasized strengths at work, performance (i.e. supervisor

evaluation, employee discretionary effort, employee commitment to the team, etc) shot up by

36.4%; when managers emphasized weaknesses, performance dwindled by 26.8% (Corporate Leadership Council, 2002). Performance in this study was measured by both direct and indirect metrics. For example, direct metrics included supervisor evaluations whereas indirect metrics included employee commitment to the team, as well as employee discretionary effort. Equally impressive was that this study looked at over 19,000 employees from 34 countries across seven industries, using standardized measures of individual performance. With such a large and varied sample, this study suggests the findings are not a chance occurrence.

ii. Signature strengths in other life domains

While work is an important domain for many of us – full time employees spend more waking hours at work than with their families, for example – it is not the only area where our strengths can make an impact. There are numerous studies suggesting that using our signature strengths can positively impact everything from our health (e.g. acts as a buffer to depression), school performance, parenting, and even our sexual behaviors and beliefs (Ma et al., 2008; Park & Peterson, 2006a; Park & Peterson, 2008; Park & Peterson, 2009). The key question is: why do strengths have such a varied and impactful effect? One theory proposes that our signature strengths positively affect our goal setting and our ability to meet our basic needs for independence, relationship, and competence (Linley, Nielsen, Gillett, & Biswas-Diener, 2010). Using this theory as a guideline, I will now introduce several character strengths interventions aimed at identifying and using our signature strengths.

The most exemplary and widely used strengths intervention is the suggestion to use one of our signature strengths in a new and unique way (Niemiec, in press). In practice, we typically name between 3 and 7 VIA character strengths as signature strengths. The research is still ongoing, however, and this should only be considered a general rule of thumb. With this

intervention, we must find new and creative ways to use these signature strengths. The research suggests that this is an especially powerful intervention (Niemiec, in press; Seligman, Steen, Park, Peterson, 2005). In a large, randomized, and controlled trial on the Internet, researchers found that using a signature strength in a new and unique way each day for a week, boosted happiness levels while decreasing depression levels (Seligman, Steen, Park, Peterson, 2005). The intervention positively impacted happiness and depression levels even 6 months later.

In another study, researchers compared three different groups: one group using two signature strengths, one group using one signature strength and one bottom strength, and a control group (Rust, Diessner, & Reade, 2009). The difference in this study was that the subjects wrote about how they successfully applied a signature strength in the past and how they planned to use a signature strength in the future. The researchers found that both treatment groups assigned to using strengths experienced significant gains in life satisfaction. These are just two examples of research studies exploring the use of signature strengths. There are many others that predict similar benefits (Niemiec, in press).

Although many of these interventions differ in subtle ways, they are similar in their nature. They all require a three-step process: *Aware*, *Explore*, and *Apply* (Niemiec, 2009). With the Aware-Explore-Apply model, we first need to identify our signature strengths. This is an important step because less than one third of individuals have a meaningful understanding of their strengths (Linley, 2008). The next step involves digging deeper into the results of the VIA strengths survey results (Niemiec, 2009). Typical questions asked by a coach or oneself during this phase include, but are not limited to: "Do these signature strengths represent the real me?" and "Do I regularly use my signature strengths?" and "When do I typically use my lower strengths?" Finally, in the Apply step, we create an action plan or a set of targeted goals that

details how we will use our signature strengths in new and creative ways. This can include

identifying creative ways to continue using our strengths where we find them most beneficial.

iii. Strengths and their application in the engineering profession

Based on the results of the interventions mentioned above, we can make a strong case for

turning strengths development (i.e. using our strengths in a new way) into a valuable tool.

Anyone and everyone can benefit from this intervention. For this discussion, one important

question remains regarding engineers and technical organizations. How might we

institutionalize this intervention so that both individual workers and organizations benefit from it

together?

One way to do this is by making strengths development a part of an organization or

company's annual evaluation process. In my organization (JHU/APL), as part of our annual

performance review, we create three to five work-focused objectives. The expectation and goal

of this review are that you design your objectives to overcome a weakness. For instance, if you

were not a good C++ programmer during the past year, you might create the following objective:

to develop my C++ programming ability by creating a radar digital signal processing tool.

Instead of focusing only on a worker's weakness, my organization could change their annual

evaluation process to specifically instruct us to focus more on strengths development. For

example, the review could encourage us to create three out of the five or four out of the five

annual objectives that focus on cultivating our signature strengths. We could begin by taking the

VIA survey in order to identify our signature strengths.[1]

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[1] Or we could choose to focus on more business-oriented and workplace-focused strengths, as described in the StrengthsFinder 2.0 (Rath, 2007). These strengths are different than character strengths in that they are talents or abilities one develops over time whereas character strengths are innate.

Another variation of this intervention is to create workplace mentoring based on using our signature strengths. In many organizations, mentoring programs fill a huge need. At JHU/APL, for example, we invite experienced engineers to help mentor less experienced or brand new engineers who are just starting work for the first time. Building on this existing model, we could make the identification and application of our signature strengths the main goal of the mentoring sessions. For example, I discovered that one of my signature strengths is leadership. Working with an experienced manager as a mentor, I could learn to cultivate that strength given my existing work duties or future opportunities in the best possible way. The bottom line is that we need to institutionalize the cultivation of strengths. Here, I have presented two different ideas for engineers and their organizations to do just that.

2. Job Crafting Exercise

Job crafting is an exercise that also incorporates strengths cultivation (Wrzesniewski, Berg, & Dutton, 2010). In particular, it is a process of redefining, reenergizing, and reimagining our job designs in personally meaningful ways (Berg, Dutton, & Wrzesniewski, 2011; Wrzesniewski, Berg, & Dutton, 2010). At its core, job crafting involves rethinking our job to better integrate our motives, strengths and passions. This is especially important for engineers, because career stagnation and lack of professional development and opportunities are common challenges (Bailyn & Lynch, 1983). The natural course of an engineering career can often make it difficult to integrate one's natural strengths and passions. And this is why job crafting can be such an effective and valuable tool.

i. Benefits of job crafting in any profession

Before we turn to job crafting and engineering, let us first consider the fact that job crafting is highly beneficial to workers of all professions (Wrzesniewski, Berg, & Dutton, 2010).

Research conducted on a range of organizations – from Fortune 500 companies to small

nonprofits – suggests that workers who try job crafting end up becoming more engaged and

satisfied with their work lives, increase their performance levels at work, and describe greater

personal resilience (Wrzesniewski, Berg, & Dutton, 2010). In addition, because employees are

incorporating more meaningful work tasks into their job designs, they also experience greater

work motivation (Berg, Dutton, & Wrzesniewski, 2011).

Besides boosting the well-being and performance of the employee, job crafting is also a

boon for employers. Typically, managers bear the burden and responsibility of helping their

employees find satisfaction in their work (Wrzesniewski, Berg, & Dutton, 2010). Unfortunately,

given today's fast paced working environment and pressure, managers rarely have the time to

dedicate to this effort. A powerful tool for leaders, they can use job crafting to empower

employees and give them ownership over decisions in their career and in the workplace. This is

important because, similar to a pessimistic explanatory style, low decision latitude in skilled

workers is predictive of depression and poor physical health (Seligman, Verkuil, & Kang, 2005).

Leaders can further utilize job crafting in times when a company needs to constrain promotions

and limit pay increases. In this scenario, it gives managers a beneficial approach to motivating

and retaining both talented and successful employees.

ii. Job crafting and engineering: A personal success story

We now know what job crafting is and why it is important to us and organizations, but

one important question remains: How do we utilize job crafting in a practical setting for

engineers and technical organizations? In a realistic sense, job crafters can proactively redesign

the boundaries of their jobs using three classes of job crafting techniques: task, relational, and

cognitive crafting (Berg, Dutton, & Wrzesniewski, 2011). In *task crafting*, we change our

responsibilities as defined by our formal job description. We can add or drop specific tasks,

change the nature of tasks, or adjust the amount of time and effort dedicated to tasks. For

example, think of a technical engineering manager who takes on more design tasks because he

enjoys technical work more than managerial work. *Relational crafting* requires changing how,

when, or with whom we interact with at work. For instance, think of a chief engineer who

volunteers to be a mentor for younger staff because he enjoys helping engineers grow and

achieve their career goals. Finally, *cognitive crafting* involves altering how we perceive our job

tasks and the relationships that make up our jobs. In my own career, I do not view myself as just

another engineer who designs electronics, but rather as part of an elite engineering team that

saves thousands of lives every day designing IED protection equipment for our soldiers.

Although it may seem as though job crafting is a one-time effort, it is actually a

continuous process that is likely affected by where employees find themselves in their careers

(Fried, Grant, Levi, Hadani, & Slowik, 2007). By continually engaging in job crafting,

employees can adjust any one (or all) of the job crafting categories, in order to maximize the

meaningfulness and satisfaction of their work. I know this is not only possible, but highly

fruitful, because I have used job crafting to do just that.

I have worked at JHU/APL for the past eight years as both an engineer, and more

recently, as an engineering manager. Over the last year and a half, I found myself feeling

"stuck" professionally. I have become a successful project manager, but because our

organizational structure is very flat, I found myself with very few opportunities to move up or

change my role in the organization. Consequently, I was stuck performing the same duties I

have for the last several years – managing schedules, resources, and budgets in addition to my

technical responsibilities (design and analysis).

After learning about job crafting, I decided to change the boundaries of my job. First, I completed an assessment of my current work tasks by graphically diagramming them using a series of squares: large, medium, and small. Large blocks represented tasks taking up *most of my time*, while medium blocks represented tasks taking up *medium amounts of my time*, and finally, smaller blocks represented tasks taking up the *least amounts of my time*. Doing this gave me a great snapshot of where I was professionally. In doing so, I realized I was spending much of my time in isolation – plugging away at Microsoft Project, managing budgets, personnel, deliverables, and a never-ending list of administrative tasks. As an extrovert whose signature strength is social intelligence, I finally understood why I was unhappy at work during the previous few years. With this observation and other insights in hand, I could now go about redesigning my job.

Using job crafting, I first identified my work motives, strengths, and passions. These three categories are important predictors of meaningful work (Wrzesniewski, Berg, & Dutton, 2010). Each of these categories is represented graphically by different colors, so that I could begin redesigning my job pictorially on paper. Figure 4 illustrates how someone might use these different categories to redesign their job. In this instance, an administrative assistant uses the job crafting categories to redesign his job.

Figure 4: Job Crafting Example of an Administrative Assistant
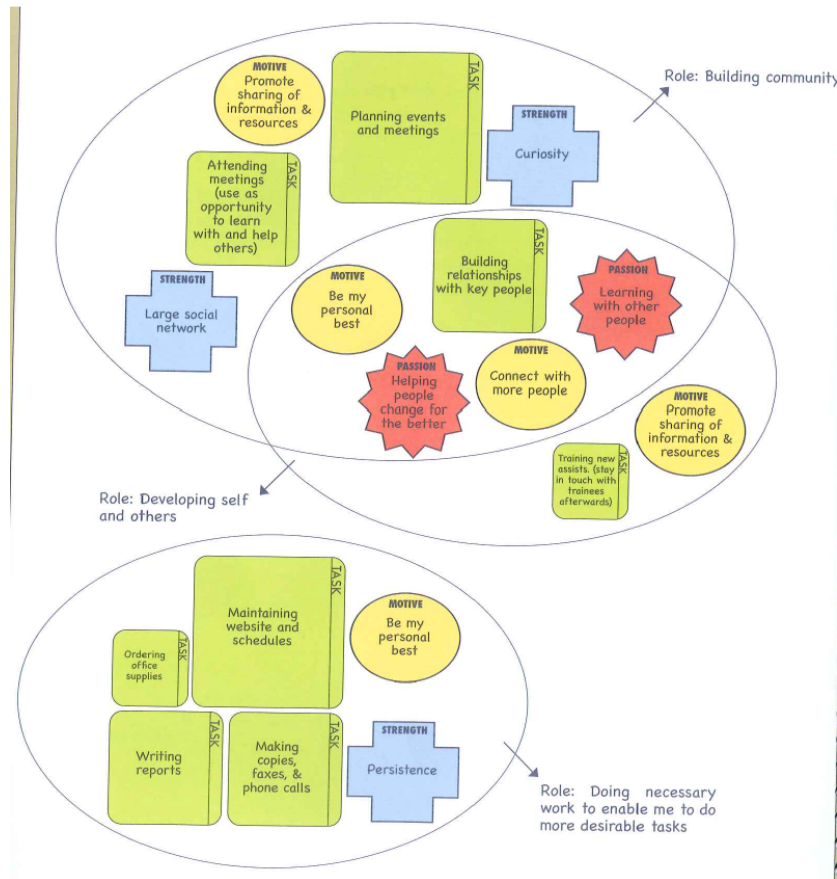
My main motive was to build and explore meaningful relationships; one of my core

signature strengths is social intelligence; and one of my passions is to solve problems. With this

exercise, I was able to design new tasks so that I could fully engage these three aspects. One

task I set for myself was giving positive psychology presentations to different departments in my

organization, as well as offering brown bag lunch seminars open to everyone in the organization.

A second task I designed was creating and teaching an innovation and creativity course through

our training and development department. In order to make room for these tasks, I worked with

my program manager to delegate more of my administrative and project oriented tasks to

younger staff looking for opportunities to try out managerial responsibilities. The result was that

I interacted more and created meaningful relationships with other engineers; that I applied my

social intelligence skills to teach others about positive psychology; and that I offered potential

solutions to different managers at JHU/APL, who are now looking further into using some of the

techniques I proposed.

Using job crafting, I was further able to design new tasks around other motives, strengths,

and passions. In the end, my first stab at job crafting was a huge success. I felt like I gained

control over my destiny (i.e. higher decision latitude) and I was able to engage in more

meaningful tasks again. And now I have a tool that I regularly use to continually enhance and

refine my job. The beauty of this tool is that it is highly flexible and adaptive. As an engineer,

you can engage in job crafting whenever you want. As an organization, you can institutionalize

it by requiring employees to participate in job crafting sessions on a regular basis. Or, as a

manager, you can make it optional by holding periodic voluntary job crafting sessions lead by an

experienced practitioner.   It is important to note job crafting is not a panacea for all the

unwanted job tasks and functions in an organization. Sometimes we all have tasks we may not

want to do. The hope, however, is that job crafting minimizes these tasks and maximizes tasks

that fuel our passions and motives.

3. Appreciative Inquiry

Appreciative Inquiry (AI) is another useful and effective application derived from

positive psychology and positive organizational scholarship (POS) (Cooperrider, In press). This

application is a structured organizational development (OD) process and approach to change

management (Cooperrider, Whitney & Stavros, 2008). In fact, it is considered one of the most

effective approaches to leading transformational change within organizations.

At its core, Appreciative Inquiry is the discovery of the best in people, their organizations, and the relevant world around them (Cooperrider, Whitney & Stavros, 2008). It is the skill and practice of asking the unconditional positive questions that strengthen a system's capacity to capture, anticipate, and heighten its positive potential. Rather than embracing negation, criticism, and spiraling problem solving (i.e. a deficit based approach to change management), AI embraces the best of what is and what can be through four distinct phases: *discovery*, *dreaming*, *designing*, and *creating a destiny*.

Rather than engaging in a potentially dry academic discussion of the mechanics of AI, I think it is more illustrative and instructive to look at a real world implementation plan. What follows is my plan for designing and implementing an Appreciative Inquiry summit with my organization – the Johns Hopkins University Applied Physics Laboratory (JHU/APL). The subtle difference with this example is that we will use the "summit" model as a vehicle to drive the AI process. A traditional summit is a 2.5 to 3 day event, typically consisting of 300 to over 2,000 participants (Cooperrider, Whitney & Stavros, 2008). It can be conducted face to face and also include participants from across the World Wide Web. Most importantly, however, it must include the "whole system" in the room. That is to say, every part of the organization must be included, including external stakeholders.

   i.   Appreciative Inquiry Design and Implementation Plan: Johns Hopkins University
           Applied Physics Laboratory

"We live in worlds our questions create," says David Cooperrider. During a special lecture given to UPenn MAPP students, Cooperrider made this statement as he talked about Appreciative Inquiry and positive organizational scholarship. Although this idea is simple, it is also one of the most powerful insights in management theory and application (Cooperrider, In

press). It also forms the basis for what may be the management innovation of our time – AI. One of the underlying principles of AI is the idea that we do our absolute best only when we amplify our strengths, not when we merely fix our weaknesses. Thus, if we think about Cooperrider's initial statement regarding the role of questions in our worlds, we can start considering how to better craft our questions when it comes to organizational change. After all, the questions we ask inform and determine what we find, and what we find determines how we plan and what we learn. In this paper, I will demonstrate how and why AI can be used in my professional organization, JHU/APL.

The first question is the most obvious one: why conduct an AI at JHU/APL? JHU/APL is a non-profit university affiliated research center that acts as a research lab for the Department of Defense (DoD), NASA, and several other agencies. With the recent economic recession crippling the economy and limiting federal budgets, lawmakers have dramatically reduced funding for the DoD and other federal organizations. In turn, these federal organizations have reduced and even withdrawn funding they typically commit to their client organizations (JHU/APL, among others). Additionally, they have asked their client organizations to provide financial audits and justify how they are using government funding within their respective organizations. The message is clear: Cut costs in your organization, or be at risk to lose funding.

The most severely hit business area within JHU/APL is the space department, although this was certainly not the only affected area. With space funding deemed a luxury, many of the space programs JHU/APL was depending on for the next several years either did not materialize or were reduced dramatically. In response to this altered funding landscape, JHU/APL leadership viewed the organization as a problem to be fixed. They froze all employee salaries in one year and dramatically limited salary increases during subsequent years. They also cut extra

benefits (e.g. eliminating 6 work hours per week that could be used for education) and reduced

other benefits (e.g. medical plans). Anecdotal evidence, such as negative work gossip and

employee complaints, suggests that these changes are increasing employee dissatisfaction. Thus,

there is a clear opportunity for dramatic and sustainable changes in JHU/APL's business culture,

finances, and future work. AI works well in all environments, but thrives especially under

conditions where a big change is needed (Cooperrider, In press).

      ii.   Appreciative Inquiry at JHU/APL: Pre-summit Preparation

One of the most important success factors of an AI is crafting an appropriate summit task

(Cooperrider, In press). Picking an appropriate task - one that creates engagement, high quality

relationships, meaning, and achievement - can mean the difference between dramatic success and

complete failure. One possible summit task for JHU/APL could be, for example, ***to create an***

innovation excellence center that designs and builds sustainable and green technological

solutions for space exploration, bioengineering, and military defense. Because JHU/APL is a

conservative organization run by executives using traditional deficits-based management

techniques, a pre-summit phase consisting of AI education and methodology is necessary. This

pre-summit phase should consist of briefings to the director, executive council and management

team, detailing the logic and research of strengths, AI management methods, and the potential

role of positive psychology in organizations and individuals. Using logic and science will appeal

to their scientific backgrounds and increase the probability of success.

The next phase of the AI summit is forming the right team of individuals. In particular,

an AI summit involves the whole system, because only when the entire system is involved, can

we appreciate more fully, allowing us to unleash our full potential (Lazlo & Cooperrider, 2010).

In JHU/APL's case, this means involving both internal and external stakeholders. Internal

stakeholders include employees from the frontline, middle management, program management,

executive management, security, and even cleaning service personnel. External stakeholders

should include the various JHU/APL sponsoring organizations, such as the Navy, Air Force,

Army, and National Security Agency (including both military and civilian representatives).

Another external stakeholder to include is the JHU/APL customer, primarily the United States

war fighters (e.g. U.S. Marines, Navy Seamen, etc) and federal agency engineers (e.g. NASA).

Finally, the last set of external stakeholders to include is JHU/APL's competitors and partners.

This group consists of organizations like MIT Lincoln Labs, MITRE, Northrop Grumman, and

Lockheed Martin. By involving the whole system with all the relevant stakeholders, we can

ensure a rich and creative summit experience.

> ii.   Appreciative Inquiry at JHU/APL: Summit schedule per day

This AI summit will engage in affirmative topics, such as profitable green engineering,

sustainability-driven innovation, and cross-department creativity bursts. These topic choices are

important because they clearly connect to the summit task and objectives. However, military

leadership rarely addresses them when conceiving and managing new projects. As such, there is

ample opportunity for JHU/APL to positively impact their business as well as the DoD business,

both financially and technologically, as well as environmentally. Additionally, the AI summit

will consist of four phases spread across three days: Discovery takes place on the first day,

Dream and Design on the second day, and Deploy on the third day.

Discovery (Day 1) is the process through which the organization discovers its core

strengths from past and present exemplary experiences (Cooperrider, In press). This is a critical

phase for JHU/APL. It is an opportunity to identify the abundant organizational and individual

strengths, as well as to recognize the numerous high point experiences of employees. This may

help JHU/APL leaders to shift away from the traditional deficits-based thinking. Several key

questions during this phase could be set up with the following prompt:

JHU/APL has designed numerous game changing solutions to previously

intractable problems. For example, we built the first 23 degrees of freedom,

nerve controlled prosthetic arm for disabled veterans. We also built the first

satellite to travel to Jupiter. While the exact experience may be different, please

think of a similar time when you collaborated on a project, bringing about

innovation, transformation, and positive change. This would be a time when you

felt fully engaged, active, impactful, and worked with your colleagues to build a

better organization, product, or experience. Tell us the story. When, where, and

what transpired? How did you contribute and what made this an exemplary

experience? What were the challenges and how did you overcome them? What

were the major strengths of those working the project?

The second full day of the summit will consist of both the *Dream* and *Design* phases.

The Dream phase is where the organization envisions its best possible future (Cooperrider, In

press). In this instance, we might ask JHU/APL employees the following question:

You've just found a time machine and you are able to jump 10 years into

the future and meet your future self. Business is booming again and innovation

has completely changed the world. What role is JHU/APL playing in this world?

How have they (and you) changed the way they do business? How has JHU/APL

changed the way the DoD designs sustainability? What are the major green

engineering innovations and how have they affected the DoD? What business

areas do they compete in? Imagine the best possible future for JHU/APL.

The Design phase is arguably the most important. This is where the organizations explore what is possible after identifying the positive core and best future. Brainstorming and rapid prototyping are the key actions during this phase. A possible group activity for this phase could be to brainstorm as many ideas as possible to form alternative fuels and engines for all military vehicles, ships, and planes. Another task could be to develop as many ideas as possible to combine systems engineering and sustainability practices within U.S. naval ship fleets.

Finally, there is the *Deploy* (Destiny) phase (Day 3), where the organization applies what it has learned and designed during the previous phases (Cooperrider, In press). The Deploy phase is important because it helps build momentum and contributes to continued learning. To ensure momentum, summit groups will take the following actions: selecting the best summit ideas, creating action plans for them, and summarizing high points, insights, and important outcomes. To guarantee continuity, each action plan should assign a Business Area Executive and a Lead Systems Engineer. This ensures the widest possible reach of both business and engineering knowledge for the best ideas. Additionally, to keep the momentum, all of the AI summit groups will present to the entire lab their ideas and progress within one month.

In closing, if the JHU/APL AI summit is successful, then the previous deficits-based thinking should become irrelevant. For example, as of now, reducing overhead costs (e.g. benefits) to maintain a picture of fiscal discipline is very important. If the AI summit is successful in transforming JHU/APL into the leader of sustainable and green DoD engineering,

then the overhead costs become a moot point, as the potential savings for the DoD will greatly outweigh the overhead costs. It is important to note, however, that this benefit may take some time to materialize, though it should be measured in months and not years. In short, if the AI summit is successful, JHU/APL can transform the way they do business, using strengths based leadership and change as the catalyst.

4. Teaching Resilience

The final set of positive psychology interventions I will discuss in this paper can be described as interventions that teach us *resilience*. Resilience is a dynamic process that enables us to overcome and bounce back from stressing events in our lives (Reivich & Shatte, 2002). No matter who you are – an engineer facing a looming design deadline, or a first time mom trying to soothe a colicky baby – resilience is important because we all face challenges and stressful events in our lives. No one is immune. According to Reivich and Shatte (2002), two well-known and respected resilience researchers, there are six elements that allow us to be resilient. You can think of these six elements as resilience capabilities: emotional regulation, impulse control, optimism, causal analysis, empathy, and self-efficacy.

Of these six elements, causal analysis (i.e. the way we explain why good and bad events happen in our lives) is an especially important concept to consider when we design interventions for engineers (Reivich & Shatte, 2002). We can actually view causal analysis as a function of our explanatory style. Thinking back to Part I of this capstone, one of the underlying assertions is that engineers are more likely to embody a pessimistic explanatory style. There were numerous negative outcomes associated with a pessimistic explanatory style, such as poor physical and mental health, and decreased work production, to name a few (Kubzansky, Sparrow, Pantel, & Kawachi, 2001; Peterson & Barrett, 1987; Peterson & Seligman, 1984;

Seligman, 1998; Sweeney, Anderson, & Bailey, 1986). In this context, it is important to note that a pessimistic explanatory style also predicts poor resilience (Reivich & Shatte, 2002; Seligman, 1998). That is to say, if someone demonstrates a pessimistic explanatory style, they are more likely to crumple or wilt under stressing life situations, and be less resilient overall. Conversely, an optimistic explanatory style fuels our resilience.

This is an important finding, because, similar to our explanatory style, there is a host of consequences that result from our resilience ability (i.e. where we naturally fall on the resilience curve) (Reivich & Shatte, 2002). For example, a robust resilience has been found to positively affect performance in school, at work, physical health, mental health, and the quality of our relationships. In short, resilience is a fundamental building block of well-being and success in our lives.

In addition to optimism, several additional critical characteristics predict resilience. Daniel Charney, a well-known resilience researcher, discovered these characteristics by first looking at a select group of Vietnam war veterans (as cited in Rosenbaum & Covino, 2005). In this study, researchers examined the lives of 750 veterans who were held as prisoners of war for 6-8 years, and who did not develop mental disorders (e.g. depression) or post-traumatic stress disorder. In addition to an optimistic outlook, they found that these veterans also displayed a robust sense of humor. They developed a strong mission or meaning in their life. Perhaps most importantly, they possessed a strong social support network. As Christopher Peterson, noted psychologist and positive psychology giant, says, "other people matter" (Peterson, 2008). We crave human contact with others, and in times of adversity, other people can support us as we share difficult thoughts and feelings. These are not the only critical characteristics of resilience, but they do show how we can develop resilience in our lives.

But, what if we did not naturally develop these resilient habits? Or what if our familial upbringing did not instill these resilient behaviors in us? Is it possible for us to learn and increase our resilience? The answer is unequivocally: yes. Below, I will introduce several interventions and models to help anyone – engineers included – boost their resilience. This is not an exhaustive list, but it does comprise the most effective and foundational interventions and models.

i.   <u>Building Resilience with the ABC Model: Learn Your ABC's</u>

Learning our ABC's is considered the necessary foundation for reading. Likewise, learning a different set of ABC's, the ABC Model, is considered the foundation for learning to improve our resilience (Reivich & Shatte, 2002). Specifically, learning the ABC model enables us to perceive and analyze both stressing and positive events more accurately. For the purpose of this intervention, we will only concentrate on the negative or stressful events. The basic idea is that an activating event (**A**), causes an *in the moment* belief (**B**) that describes why it happened or what will happen next as a result of the activating event. This belief (**B**) then causes us to feel one or multiple emotions, which then positively or negatively modulate our behaviors. These are the consequences (**C**) that flow from our belief(s). If we can become more attuned to our **B-C** connections, then we can identify negative trigger points or fallacious reasoning we might be engaging in. The most common B-C connections are listed in Table 2 below:

Table 2

*Most Common **Belief**(s) – Emotional/Behavioral **Consequences** (**B-C**) Connections (Reivich &*

Shatte, 2002)

Beliefs	Emotional Consequences
Loss (I have lost something)	*Sadness/Withdrawal*
Danger (Something bad will happen, and I can't handle it)	*Anxiety/Agitation*
Trespass (I have been harmed)	*Anger/Aggression*
Inflicting Harm (I have caused harm)	*Guilt/Apologizing*
Negative Comparison (I don't measure up)	*Embarrassment/Hiding*

One way we can become more attuned to our B-C connections and fallacious reasoning is

to keep a daily log of our ABC's (Saltzberg-Levick, course lecture, March 2, 2012). Using a

daily log sheet similar to Table 3 is an effective strategy. The basic idea is to record your ABC's

as you experience activating events throughout your day, and over a week. What might this look

like for an engineer facing a common occupational challenge such as a design deadline? Let us

imagine that an engineer – Bob for the sake of this fictional story – leaves his test bench with a

series of tests running while he is away. He comes back to find his test setup dismantled and his

tests no longer running (**Activating Event – A**). This may prevent him from completing his

analysis on time for the upcoming Critical Design Review (CDR). He now thinks, "I will be in

deep trouble for not finishing this work before our CDR." He envisions receiving his two-week

notice from his boss (**Beliefs - B**). And more importantly, he blames his coworker Jim for

dismantling his test setup (**Beliefs – B**). "Jim is always tearing apart other people's test setups, it

must have been him". After a few minutes of internal seething, Bob becomes so angry that he

marches into Jim's office and starts screaming accusations and muttering under his breath with a

red face (**Consequences – C**). He spends the rest of the day being extremely angry and accusing

others of aiding Jim in his deceitful trespass (**Consequences – C**).

Table 3

ABC Log Sheet Sample (Saltzberg-Levick, course lecture, March 2, 2012)

Adversity (Activating Event):	
Beliefs:	**Consequences***:*
Helping or Harming?	

In the example above, Bob's automatic ticker tape beliefs clearly led to several ugly

emotional and behavioral consequences (Reivich & Shatte, 2002). These actions did not help

him in any way. Rather than spending the day screaming accusations and stewing in resentment,

Bob could have rebuilt his test setup and likely completed the set of tests he originally intended

to complete. This demonstrates how the B-C connections work in a real life example: Bob felt a

general belief of **Trespass** and the resulting consequences embodied **Anger** and **Aggression**, as

denoted in Table 2.

The premise behind learning the ABC model is that the process of keeping a daily ABC

log sheet (see Table 3) enables us to become better attuned to our potentially fallacious and

negative reasoning. If Bob had relied on this approach and jotted down his ABCs after this

adverse event, he might have short-circuited his unhelpful beliefs and emotional/behavioral

consequences before they could cause any harm.

This is a critical observation that is found repeatedly throughout empirical studies that

teach resilience practices (Reivich & Shatte, 2002, Seligman, 1998, Seligman, 2011). Several

different resiliency teaching programs have also observed this phenomenon. For example, the

Penn Resilience Program (PRP) teaches resilience boosting interventions and practices to grade

schools using a similar ABC model – albeit in a format that was adapted to be used with

adolescent aged children (Saltzberg-Levick, personal communication, March 6, 2012). In

addition, numerous PRP studies across different countries and schools suggest that teaching

resilience benefits youth in many ways, such as in preventing depressive symptoms (Freres,

Gilham, Reivich, & Shatte, 2002; Gilham et al., 2007).

In another program, the Comprehensive Soldier Fitness (CSF), the United States Army is

also teaching resilience (Seligman, 2011), in order to help develop a more complete soldier. The

US Army needs soldiers that are as psychologically fit as they are physically fit. One of the

ways to accomplish this objective is by teaching resilience through the Master Resilience

Training (MRT) program. MRT teaches soldiers the resiliency and performance enhancing skills

needed to overcome the unique physical and mental challenges that the military life and career

presents every soldier with. In addition, MRT helps to develop the soldier's teaching skills so

that he or she can serve as a resilience trainer in his or her own unit.

According to a recent evaluation (the Tech Report 3) of the program thus far, the results

show good progress (Lester, Harms, Herian, Krasikova, & Beal, 2011). For example, soldiers in

units with a Master Resilience Trainer demonstrated higher scores on resilience and

psychological health than soldier in units without a Master Resilience Trainer. In addition,

soldiers in a unit with a Master Resilience Trainer showed a higher rate of growth on dimensions

such as emotional fitness, coping skills, and character development.

   iii. <u>Thinking Traps</u>

  By learning our ABCs we can become more attuned to our B-C connections (Reivich & Shatte, 2002). We hope to slow down our cognitive processing and think more deliberately and clearly about our automatic beliefs. This is certainly a good start to recognize our potentially fallacious reasoning and negative thinking. However, if we are to further boost our resilience and avoid similar negative thinking in the future, we need to take our intervention a step further. We need to learn about our individual thinking traps.

  Thinking traps are common cognitive shortcuts that we use to process information every day (Saltzberg-Levick, personal communication, March 30, 2012). Cognitive shortcuts are important, because they allow us to simplify the incredible amount of data we take in every second of the day through our different senses (e.g. sight, smell, sound, touch, etc) (Reivich & Shatte, 2002). Thinking traps, however, are dangerous because they cause us to miss critical information as we quickly pair down and select information from the larger data stream that our five senses provide to us (Saltzberg-Levick, personal communication, March 30, 2012). As humans, we constantly use cognitive shortcuts as a way to manage our daily lives, but unfortunately, we also engage in thinking traps along the way. Table 4 highlights seven common thinking traps that negatively affect our resiliency (Reivich & Shatte, 2002).

Table 4

Seven Common Thinking Traps (Reivich & Shatte, 2002)

Thinking Trap	Definition
Jumping to Conclusions	Ignoring or not waiting for evidence. This thinking trap is an umbrella version and can encompass many other traps.
Tunnel Vision	Focusing on unimportant details at the expense of important aspects
Overgeneralization	Settling on global beliefs because of a single experience
Magnification and Minimization	Choosing to focus on the negative while minimizing the positive
Personalization	Attributing negative events to yourself only
Externalizing	Attributing adversity to others only
Mind Reading	Making an assumption about another person's belief(s)

If we think back to our earlier example about Bob and his dismantled test setup, we can now examine this case through the additional lens of thinking traps. Which thinking traps fueled Bob's automatic beliefs, which consequently led to harmful emotions and behaviors? The noticeable thinking trap is *Jumping to Conclusions* (Reivich & Shatte, 2002). Bob did not bother to ask Jim whether or not he had dismantled his test setup. Nor did he ask anyone else. Based on Jim's reputation, he assumed Jim could be the only person responsible for such a deceitful act. The thinking trap of *Magnification and Minimization* also played a role in Bob's automatic beliefs. Instead of focusing on the fact that he had enough time to reset his test and finish his task, Bob decided to concentrate on the negative aspect of his situation (i.e. someone dared to interfere with his test setup). This caused him to miss an opportunity to finish his task.

Once we understand and recognize the potentially perilous effects of thinking traps, we can begin to alter our ABC model intervention to include them (Saltzberg-Levick, personal communication, March 30, 2012). That is, we can now think about our ABCs with thinking

traps placed at the forefront of our cognitive processing. As we identify our B-C connections, we can identify which thinking traps are responsible for our negative beliefs. More importantly, we can begin defusing the potentially explosive emotions and behaviors before they explode. This is critical, because if we successfully dispute our erroneous beliefs, they are less likely to recur again in similar situations (Seligman, 1998).

One way to successfully dispute our faulty beliefs is to challenge our thinking traps (Reivich & Shatte, 2002). Adopting the role of a good detective and asking critical questions of our beliefs is a good way to accomplish this task (Seligman, 1998). For instance, in our example about Bob and Jim, how might Bob play the role of a good detective? After finding his test setup dismantled and his testing halted, Bob originally jumped to the conclusion that Jim was responsible (Reivich & Shatte, 2002). Confronting that automatic belief, Bob might instead ask himself: "What is the evidence that Jim is responsible for tearing apart my test setup?" By slowing down, he can begin to ask more probing questions of himself and others. For example, after short-circuiting his automatic beliefs, Bob remembers that he had seen his other coworker Tom conducting a similar experiment on an adjacent bench. Bob thinks, "Maybe Tom needed to borrow some of my test equipment to complete his test. I will ask him and find out."

Alternatively, even if Bob discovers that Jim was responsible for tearing apart his test setup, he could continue to challenge his *Magnifying and Minimizing* thinking trap by asking himself: "What is the positive in this experience?" (Reivich & Shatte, 2002) Doing that, he might realize there is still enough time to complete his required testing if he reassembles his test setup and starts testing immediately, rather than stewing over the trespass and lashing out at the perpetrator.

Whether playing the role of a good detective, or asking critical questions to challenge the legitimacy of our thinking traps, another technique called disputation is also essential if we wish to boost our resilience and change our pessimistic explanatory style to optimistic.

iv.   Disputation

According to Martin Seligman, renowned psychologist and empirical researcher, disputation is the process of learning how to argue with yourself (Seligman, 1998). We all have this ability because we have a lifetime of experience arguing with others. Just as we observed in the previous example with thinking traps, disputation is an effective way to boost our resilience by short-circuiting our fallacious thinking and helping us to shift from a pessimistic explanatory style to a more optimistic style. According to Seligman, there are four main ways to convincingly dispute or "argue" with ourselves: using evidence, alternatives, implications, and finally, examining the usefulness. These approaches build mostly on Aaron Beck's seminal work in Cognitive Therapy (Saltzberg-Levick, personal communication, March 2, 2012; Seligman, 1998, Reivich & Shatte, 2002). In his groundbreaking work, Beck developed therapy so that his patients could learn to change their fallacious and negative thinking habits.

Following the *evidence* is the method used by good detectives (Seligman, 1998). Trying to find evidence of a negative belief is often an effective disputation technique, because when we follow the evidence, we often can show that our negative belief is factually incorrect. Another way to dispute negative beliefs is to look for *alternatives*. In most events, it is unlikely that our negative belief is the result of one single cause; it is much more likely that multiple causes lie at the basis. Pessimists have a bad habit of latching on to the most destructive of the causes. Instead, one is better served looking for the event's causes that are the most changeable, specific, and non-personal. In the case of Bob and his test setup, he could have attributed the mishap to

the fact that Jim did not see his "Test in Progress" sign because it was situated too far from the test setup.

Yet another way to dispute a harmful belief is to examine the *implications* of the belief. This is also known as *decatastrophizing*. Sometimes, no matter how much we follow the evidence or search for alternatives, the truth may not be on our side. But, just as we can fallaciously engage in a *Magnifying and Minimizing* thinking trap, we can do the same when we try to predict the implications of our negative beliefs. Often, we think that the consequences of our beliefs will be worse than they actually are. In Bob's example, how likely is it that he would be fired for not finishing his tests exactly on time? To be sure, his supervisor may be disappointed and upset if he did not finish his assignment on time. However, unless this had been a recurring problem, it is unlikely that his boss would terminate his employment over such mistake.

Finally, examining the *usefulness* of our damaging beliefs can also be a helpful disputation technique. It may well be true that the evidence confirms your belief, that there are no less destructive alternatives, and that the implications appear harmful. However, if holding this belief is destructive, then why do it? Martin Seligman sums up this sentiment most adequately in his book *Learned Optimism*:

Some people get very upset when the world shows itself not to be fair. We can sympathize with that sentiment, but the belief that the world should be fair may cause more grief than it's worth. What good will it do me to dwell on that? At times it is very useful, instead, to get on with your day, without taking the time to examine the accuracy of your beliefs and then disputing them.

As someone who designs and deploys equipment that protects soldiers from IEDs in multiple war zones, I sometimes ask myself about the usefulness of a negative belief. For example, I once resisted a new change to our equipment based on a potentially new and deadly threat in the field. I complained bitterly that "it was a moot point and the bad guys will just come up with another new device to attack our soldiers with." That may well have been true, there may not have been any less appealing alternatives, and the implications were certainly a matter of life and death. But where did all this examining take me? The answer is: nowhere. I still had a job to do and the soldiers' safety still depended on my work. The longer I waited and the more I complained, the higher would be the probability that a soldier would die because of my inaction. Sometimes it is just better to get on with our day.

IV. CONCLUSION AND FUTURE DIRECTIONS

The scholarly portion of this capstone has built a compelling case for boosting well-being in both engineers and their organizations. I have combined theoretical findings, empirical research results, and real life examples to highlight potential negative outcomes caused by the unique thinking styles and innate characteristics of engineers. In addition, I have proposed several distinctive interventions and applications based on well-known and rigorously validated positive psychology interventions.

While I believe my body of work is strong enough to stand on its own, there are several areas that deserve further exploration, either as future academic efforts or as further research to support my ultimate goal of publishing a book on the subject, using the book proposal contained within this capstone.

Specifically, one future direction is to conduct a large sample survey investigating life satisfaction among engineers. The academic literature regarding engineers and life satisfaction is

virtually non-existent. Through the course of my literature review on the topic, I was not able to find an abundance of empirical evidence covering this area. Conducting life satisfaction surveys on a large and diverse group of engineers could further reveal some of the problems associated with a pessimistic explanatory style as well as a highly left brained thinking style. In addition, conducting an explanatory style survey on a large and diverse group of engineers would further solidify my thesis that engineers are likely to embody a pessimistic explanatory style.

One way to maximize this future life satisfaction survey effort would be to combine this survey with a VIA survey. Using the VIA survey in combination with a life satisfaction survey, I could accomplish two important objectives. The first objective, would be to further support my assertion that engineers are more likely to possess strengths of the head versus strengths of the heart (Park & Peterson, 2006a, 2006b). As I discussed earlier, this is important because strengths of the heart are more predictive of life satisfaction than strengths of the head. The second objective would be to identify which character strengths of engineers predict higher life satisfaction.

The final future effort would be to conduct a longitudinal study on the effectiveness of my proposed positive interventions and applications. These interventions and applications are based on psychometrically valid and rigorously tested real world interventions. However, the weight of a longitudinal study would help strengthen their effectiveness and importance if I can show that they worked with my target population over a sustained period of time.

V. Book Proposal

Well-being at Work: An Engineer Short Circuits Workplace Dysfunction

Overview

According to a Gallup study, only 8 out 100 people indicate that they experience a significantly higher level of well-being because of the employer they work for today. This workplace well-being metric is critically important because people spend more waking hours at work than anywhere else. Perhaps most importantly for CEO's and business owners alike, workplace well-being metrics can accurately forecast a company's bottom line. Here are just a few implications of several workplace well-being metrics:

- According to Gallup research, an estimated $300 billion is lost annually in the US economy due to disengaged employees.

- According to another Gallup study, individual workers with the lowest well-being scores cost their organizations $28,800 in lost productivity due to sick days each year. Those individual workers with the highest well-being scores only cost their organization $840 in lost productivity due to sick days.

- Individual workers who report supervisor recognition of their signature strengths as well as frequent use of their signature strengths at work are more productive, more engaged, and happier overall than workers who do not report using their strengths. In fact, one study suggests that when managers emphasize strengths at work, performance shot up by 36%.

- World class companies consist of over 63% engaged employees versus only 30% engaged employees in average companies. Furthermore, world class companies earn almost 4 times as much as average companies.

Well-being at Work: An Engineer Short Circuits Workplace Dysfunction explores well-being in the engineering industry by examining unique engineering thinking styles and character traits that can negatively impact individual and organizational happiness. *Well-being at Work* weaves together theory, personal anecdotes, and the latest research to include the most important well-being studies from the worlds of positive psychology and positive organizational scholarship. In addition, *Well-being at Work* proposes the most effective and psychometrically validated interventions and applications aimed at boosting individual and workplace well-being. In short, *Well-being at Work* can help individual engineers and managers transform their dysfunctional organizations into thriving ones.

The Book's Structure

The first part of this book introduces positive psychology and leads a discussion of where it intersects with the engineering industry. This portion of the book paints a detailed picture of the unique challenges and requirements that engineers face at work, as well as what drives them to succeed. This includes a discussion of the most important research and illustrative anecdotes regarding:

- Today's engineer

- The unique thinking styles of engineers

- Engineers and pessimism

- Engineers and their character strengths

The second part of the book builds on the theory, research results and personal stories explored in the first part of the book, by developing a specific practical approach to improving individual and organizational well-being in engineers and their organizations. In particular, the second half of the book lays out several well-being interventions, exercises, and models backed

by the latest research in positive psychology and positive organizational scholarship. Although

this book focuses on engineers and technical organizations, this practical approach will benefit

any organization. The interventions, exercises, and models include:

- Character strengths interventions and applications

- Job crafting exercise

- Appreciative Inquiry

- Teaching resilience

- High quality connections interventions

- Prosocial behavior and exercises

The manuscript will contain 16 chapters and fill approximately125 pages including back

matter, and will use several photos and illustrations. The back matter will include footnotes,

endnotes, appendices, a glossary of terms, and a resource directory of positive psychology

journals, events, websites, and organizations.

The footnotes and endnotes will include scholarly resources that will interest positive

psychology academics, practitioners, teachers, and other professionals in positive psychology

and positive organizational scholarship. The appendices will include a detailed Appreciative

Inquiry Summit proposal and a template for the Reciprocity Ring exercise. The manuscript has

more than a third completed and the author will deliver the full work six months after receiving

the advance.

The author will ask Martin Seligman to write the foreword for his book. Martin is a

friend of the author and served as a graduate professor during the author's Master of Applied

Positive Psychology Program at the University of Pennsylvania. Martin is one of the most

recognized and well-respected living psychologists, as well as a best selling author.

Markets

While the first half of the book focuses on the unique thinking styles and innate character traits of engineers, the second half explores interventions and applications that can be used to boost well-being and performance in any technical occupation, organization and industry. Consequently, this book will attract three large groups of readers:

- Individual workers struggling to find meaningful and engaging work in their current jobs.

- Business and organizational managers facing a toxic work atmosphere, a challenging economic environment, or production and innovation challenges.

- Engineering professionals and academics

According to the United States Department of Labor, unemployment currently sits at 8.2% and the economy added just over 80,000 jobs for the month of June 2012. This underscores that jobs are hard to come by and that job mobility is very low for the vast majority of Americans. In addition, Gallup research shows that only 25% of workers worldwide are actively engaged and thriving (i.e. achieving success in 5 essential elements: financial, community, physical, social, and career). Consequently, the remaining unhappy, passive, and actively disengaged workers are faced with the prospect of continuing in a job they tolerate, dislike, or even hate. *Well-being at Work* will help these unhappy workers find meaning and happiness at work, while also helping them to increase their productivity.

For business and non-profit organizations, *Well-being at Work* will help managers navigate the economic effects of the worst recession since the great depression. For example, there are specific interventions aimed at retaining an organization's top talent and helping employees craft meaningful work. This is important in a time when companies' discretionary

spending on salary is virtually nonexistent. According to the U.S. Bureau of Economic Analysis,

the most recent available economic data shows that the average raise in 2010 was the lowest in

the past 10 years for federal workers. And according to an analysis by USA Today, this average

federal raise was still higher than the private sector. In response, positive organizational

applications and exercises such as job crafting can offer struggling organizations a legitimate

vehicle for employee retention and happiness.

Finally, there are over 2 million engineers in the United States, according to the United

States Department of Labor, and millions more worldwide. *Well-being at Work* can be an

important tool for all of these engineers, as they struggle to perform at work, to overcome their

workplace obstacles. Individual engineers can use the information in this book to identify their

own well-being blocks as well as to increase their happiness outside of work. Likewise,

engineering managers can use this information to develop organizational policies and initiatives

aimed at improving performance, creativity, and well-being.

Promotion

To promote the book, the author will:

- Give speeches and interviews to local radio and TV stations and bookstores in the

  following cities: New York, Washington D.C., Seattle, San Francisco, Chicago, Los

  Angeles, and Denver

- Start an e-newsletter based on the book

- Have a webmaster build a dedicated website once the work's title is finalized

- Write a weekly blog dedicated to similar topics and issues discussed in the book

- Build an e-mail listserv based on the blog and website

- Create monthly podcasts discussing new positive business applications and interventions

Endorsements

The author will try to secure quotes from the following people, some of whom he knows personally:

- Martin Seligman, one of the founding fathers of Positive Psychology and considered one of the most influential psychologists of all time. He is the author of numerous best selling books such as *Flourish* and *Learned Optimism.*

- Barbara Fredrickson, a leading psychology researcher and known as the most well-respected expert on positive emotions. She is also the author of the best selling book, *Positivity: Groundbreaking Research Reveals How to Embrace the Hidden Strength of Positive Emotions, Overcome Negativity, and Thrive*.

- Christopher Peterson, one of the world's leading experts on the research of character strengths. He is also the author of *A Primer in Positive Psychology*.

- Tom Rath, the leader of Gallup's research on employee engagement, selection, strengths-based development, leadership, and well-being. He is also a bestselling author of several books, such as *StrengthsFinder 2.0* and *Wellbeing: The Five Essential Elements*.

- Roko Belic, an Oscar nominated director and director of the documentary *Happy*. The Happy documentary explores different constructs of happiness through the world, in places as far away as Okinawa and even the slums of India.

Competing and Complementary Books

Books with overlapping themes include:

- Tom Rath – *StrengthsFinder 2.0* (Gallup Press, 2007, 192 pages). Uses the new science of strengths research, anecdotes, and actionable ideas to build a compelling case for why we should discover and use our strengths/talents every day.

- Sonja Lyubomirsky – *The How of Happiness: A New Approach to Getting the Life You Want* (Penguin Group Inc., 2008, 384). Includes customized and detailed exercises that help individuals overcome well-being blocks and challenges. Based on the author's research as well as the research of other leading psychologists in the field of positive psychology.

- Tom Rath, James K. Harter – *Wellbeing: The Five Essential Elements* (Gallup Press, 2010, 240 pages). Introduces a new well-being model consisting of 5 core elements. Provides compelling research results and creative ideas for improving well-being in each of the 5 core elements, and consequently, our overall well-being.

Books with similar workplace well-being topics and performance enhancing ideas:

- Jessica Pryce-Jones – *Happiness at Work: Maximizing Your Psychological Capital for Success (*Wiley, 2011, 254 pages). Focuses on what happiness really is at work and why it matters to both workers and their organizations. Offers the best tips and strategies to effectively use the approximately 100,000 hours of work most workers will experience in a lifetime.

- Srikumar S. Rao – *Happiness at Work: Be Resilient, Motivated, and Successful – No Matter What* (McGraw-Hill, 2010, 256 pages). Teaches resilience through exercises that shift our explanatory styles.

Well-being at Work is the first book to identify and assess the impact of the unique thinking styles and innate character traits of engineers. Furthermore, *Well-being at Work* builds a compelling case for why individuals and organizations should focus on improving their well-being. The book weaves personal anecdotes from over 10 years of engineering experience with detailed and concrete applications and interventions aimed at increase well-being.

About the Author

Well-being at Work came out of the author's work designing and deploying Improvised Explosive Device (IED) protection systems for US and coalition soldiers in Iraq, Afghanistan, Pakistan, and the United States, as well as his graduate work in Applied Positive Psychology at the University of Pennsylvania with Martin Seligman and other internationally respected psychology professors. As a systems engineer and project manager leading the effort to protect soldiers from IEDs, the author began integrating well-being and performance enhancing initiatives, seminars, and presentations into his organization. This effort is aiding his organization to overcome the unique challenges that engineering thinking styles and innate traits present.

The author graduated from the Pennsylvania State University with a degree in Electrical Engineering. Following his undergraduate education, he then completed his Master's degree in Electrical and Computer Engineering from the Johns Hopkins University. He has worked on numerous Department of Defense programs, such as designing the electronics for the next generation stealth destroyer ships, as well as designing the antenna and radio frequency receivers for military unmanned aerial vehicles (UAVs). Finally, he recently completed his Master's at the University of Pennsylvania, studying Applied Positive Psychology with Martin Seligman and other psychology researchers.

In addition to his technical background, the author also helps design new organizational policies and development initiatives. He has implemented a radically new internal research and development process using appreciative inquiry. Moreover, he has also helped develop a new online social networking approach that leverages the power of storytelling and innovative leaders.

Finally, the author is an avid Toastmasters Club member and competes regularly in local and regional competitions. He finished second place in a recent Toastmasters' district competition.

Outline

Introduction: Positive Psychology

- Introduces positive psychology to the layman by describing key concepts, benefits, and the personal history of how this author came to study and use positive psychology in his life.

Part I

Chapter 1: Positive Psychology and its Position in Engineering Well-being

- Explores positive psychology and its connection to engineering.

- Introduces positive organizational scholarship.

Chapter 2: Today's Engineer

- Describes the job and responsibilities of today's engineers.

- Analyzes the differences between engineers and scientists.

- Tells a humorous story of a coworker's angered response to another coworker while they tried to share an office.

Chapter 3: The Thinking Styles of Engineers

- Describes the well-known thinking style of engineers (i.e. analytical, rational, and linear thinking)

- Introduces the Whole Brain Model theory and the Herman Brain Dominance Instrument survey results of engineers as key support for this thinking style.

- The author tells a personal story highlighting this unique thinking style.

Chapter 4: Engineers and Pessimism: the Pessimistic Explanatory Style

- Describes the difference between a pessimistic explanatory style and the pop culture idea of pessimism.

- The author uses a personal childhood basketball story to illustrate the three main components of our explanatory style (i.e. permanence, pervasiveness, and personal vs. external attribution) – describing both an optimistic and a pessimistic explanatory style.

- Describes some of the most fascinating and impactful benefits of an optimistic explanatory style, such as improved performance in sports and protection from heart disease and other common health ailments.

Chapter 5: Pessimism as a Benefit? A Lawyer's Perspective and its Connection to Engineers

- While pessimism is typically maladaptive, this chapter discusses where pessimism is beneficial, as a thinking style for law students and practicing lawyers.

- Describes the negative impact of a pessimistic explanatory style for lawyers outside of their job function, such as their mental and physical health.

- Identifies a workplace similarity between lawyers and engineers. That is, both occupations require a pessimistic explanatory style to be successful at work.

- Poses tough questions and describes empirical research results that suggest engineers may be susceptible to the same maladies and life outcomes as lawyers.

Chapter 6: Engineers and their Character Strengths

- Introduces the new science of character strengths and explains why they are important to individual happiness.

- Describes the select few character strengths that strongly predict individual happiness and contrasts these against common character strengths of the average engineer.

<u>Part II</u>

Chapter 8: Positive Psychology and Engineering: Practical Application

- Outlines the second part of the book.

- Briefly introduces each of the interventions and applications.

Chapter 9: Character Strengths Interventions and Applications

- Answers the question "why do signature strengths matter to individual workers"

- Explains the most exciting research regarding signature strengths in the workplace and in our personal lives.

- Proposes several signature strengths interventions and applications for individuals and organizations, such as strengths coaching through mentoring partnerships.

Chapter 10: Job Crafting and its Benefits

- Highlights the many benefits in the research literature associated with job crafting.

Chapter 11: Job Crafting and Engineering: A Personal Success Story

- Describes the author's personal success story turning around his career using a job crafting exercise.

Chapter 12: Appreciative Inquiry

- Explains the theory behind appreciative inquiry by detailing the four different phases (i.e. Discover, Dream, Design, and Deploy) and how they benefit individuals and organizations.

Chapter 13: Appreciative Inquiry Design and Implementation Plan

- Details the authors proposed plan for an Appreciative Inquiry summit at his current

  workplace.

Chapter 14: Teaching Resilience

- Uses a common engineering scenario to teach readers the ABC model so they can learn

  to spot their erroneous thinking styles and habits.

- Describes the 7 most common thinking traps.

- Once again, uses a common engineering scenario to teach readers a valuable resiliency

  skill – disputation.

Chapter 15: High Quality Connections

- Explains the latest research on strong and energizing relationships in the workplace.

- Recommends several exercises aimed at increasing the number of high quality

  connections in or workplace.

Chapter 16: Prosocial Motivation

- Discusses the benefits of prosocial motivation at the workplace.

- Distinguishes prosocial motivation from being a yes-man.

- Proposes a simple exercise called the reciprocity ring, which can strengthen workplace

  relationships while also accomplishing important objectives.

Conclusion

- Identifies future research efforts to further the understanding and improvement of

  workplace well-being

- Describes the author's next big research area in innovation and positive psychology.

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