STUDY OF FEEDBACK COMMUNICATION IN A TECHNICAL ORGANIZATIONAL COMPLIANCE SYSTEM

A Dissertation

by

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ABSTRACT

Corporations and other organizations have dedicated considerable funds to developing and maintaining complex systems to ensure their regulatory and contractual compliance. This is especially true in highly regulated technical industries. Because of the large number of potentially relevant and changing regulations, maintaining regulatory compliance is an iterative process that requires effective communication between employers and employees. In order to have effective communication, voluntary feedback communication from employees is required. This study gathered and analyzed data about employees' willingness to voluntarily communicate with compliance officers in their organization by examining the employee's situational communication apprehension. Specifically, the study measured each employee's Situational Communication Apprehension Measure (SCAM) when communicating with these officers and compared that to their perceptions of the compliance officer's credibility (Competence, Caring/Goodwill, and Trustworthiness), other perceptions, work environment factors and demographic information.

Using multivariate statistical analysis, the study found evidence of a statistically significant relationship between changes in SCAM and changes in Caring/Goodwill, Trustworthiness and the employee's perception of the compliance officer's ability to do their job. The results showed that there is a largely negative relationship between SCAM and Caring/Goodwill, which shows an increase in willingness to communicate as the perception of the compliance officer's Caring/Goodwill increases. SCAM was

maximized when Trustworthiness was in a middle range and reduced as Trustworthiness increased or decreased. This showed that employees are least apprehensive about communicating with a compliance officer they absolutely do not trust or trust wholeheartedly. The ability of the compliance officer to do the employee's job had a positive relationship with SCAM, showing that employees were least willing to communicate with compliance officers they absolutely believed could do their job. This study found no statistically significant relationship between the compliance officer's perceived Competence and the employee's willingness to engage in communication.

There were five other predictive factors that were related to marginally statistically significant changes in SCAM: 1. how adversarial is the working relationship; 2. communication frequency; 3. whether the employee and compliance officer are the same gender; 4. perception of position purpose; and 5.years working at the organization. These five factors warrant additional study.

DEDICATION

To Mom who believed in me no matter how outlandish my goals may have seemed, my brothers who taught me the lessons I couldn't learn in books, and in memory of Dad who, in death, taught me the secret to life (1 Cor. 13, NIV).

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Saving the best for last, thanks and praise be to God who has kept and sustained me. He has blessed me with favor and the most wonderful family, friends, and acquaintances that anyone could ask for. I will end with a quote from my mom, Dr. Tanya Dugat-Wickliff, "If it seems as though I owe a lot to a lot, I do! Rest assured, I do understand that to whom much is given much is required!"

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INTRODUCTION

"For want of a nail, the shoe was lost.
For want of a shoe, the horse was lost.
For want of a horse, the rider was lost.
For want of a rider, the message was lost.
For want of a message, the battle was lost.
For want of a battle, the kingdom was lost.
And all for the want of a horseshoe nail."

This proverb has been repeated across countries, cultures and centuries to illustrate how missing one seemingly unimportant aspect of a complex system can lead to a catastrophic result.

The importance of communication is a well-understood concept across numerous disciplines. Whether it was something as simple as two lanterns hanging in a bell tower leading to the first successful victory in a revolutionary war, or something as complex as the network of satellites, broadcast towers, and supercomputers that allowed the world to see a man walk on the moon, communication has shaped the trajectory of industry and history. History shows us numerous examples of how communication systems can help avoid tragedy and how a breakdown in communication systems can cause it.

On September 4th, 1936, the Journal of Pharmacology and Experimental Therapeutics received an article from H.B. Haag and A. M. Ambrose entitled "Studies on the Physiological Effect of Diethylene Glycol II. toxicity and Fate." (Haag and Ambrose 1937) The article was published in the January 1937. This study proved with animal testing that diethylene glycol can cause kidney failure and be fatal when ingested by mammals.

In June 1937 S. E. Massengill Company had an idea to take Sulfanilamide powder, which was widely used to treat sore throats at the time, and dissolve it into a liquid. Their chemist, Harold Watkins, found a solvent that perfectly dissolved the powder, and added a raspberry flavor for taste. This product was marketed as "Elixir Sulfanilamide," 633 shipments were sent out across the country and Elixir Sulfanilamide went on sale in September 1937. Within a month, Massengill, the American Medical Association, and the Food and Drug Administration (FDA) began to receive reports of several deaths of patients taking Elixir Sulfanilamide. Affected patients were hospitalized with similar symptoms characteristic of kidney failure: inability to urinate, severe abdominal pain, nausea, vomiting, near-unconsciousness, and convulsions. Those affected would suffer intense and unrelenting pain for 7-21 days and die, because, at the time, there was no known cure for their condition. (Ballentine 1981, Bren 2001)

A multifaceted response of doctors, radio stations, newspapers, and almost every field agent in the FDA worked tirelessly to recover every ounce of the elixir sold. This entailed sifting through thousands of receipts, numerous interviews, and continuous warnings about the product. The team was able to recover over 97% of the elixir sulfanilamide manufactured and distributed. Yet even with all of that effort, the mobilized response could not prevent the deaths of over 100 people in 15 different states. (Ballentine 1981, Bren 2001)

Had, in 1937, the United States developed an effective communication system that could widely dispense newly conducted studies and newly discovered information, Haag's article on diethylene glycol might have made it to the Tennessee laboratory of

Harold Watkins. If Harold Watkins had read this article he might have reconsidered the use of the diethylene glycol as a solvent for his Sulfanilamide powder. Had he used a different solvent to make the, then respected, S. E. Massengill Company's Elixir Sulfanilamide, doctors and pharmacists across the country would not have recommended a highly toxic recipe of a widely used sore throat medication to their patients. Over 100 people would not have died from treating a simple streptococcal infection.

In the last 50 years, there have been numerous leaps in the availability and access to information. These strides have created numerous communication channels and drastically increased our means of communication. (Lenhart, Purcell et al. 2010) Nevertheless, the willingness of both management and employees to utilize these new communication channels and engage in the communication process within an organization and between other entities is still a problem for organizations. (Morrison and Milliken 2000, Milliken, Morrison et al. 2003) Additionally, organizational projects are becoming increasingly interdisciplinary and often span functional groups. Which means that communication does not just occur between supervisors and their direct reports in the daily course of business; necessary organizational communications occur both continually and sporadically between members of an organization in different functional groups, reporting structures, and locations. (Carlile 2002, Carlile 2004) As such, organizations are unable to solely rely on team building and daily interactions to facilitate all necessary communication, and must foster individual employee willingness to voluntarily participate in the communication process in order to maintain effective communication between employees across functional groups.

Furthermore, whether it is a member of the organization's legal department reporting to manufacturing that a new FDA standard has been released or an operator reporting to the quality assurance group that a standard operating procedure (SOP) needs to be modified, organizations need employees to engage in these kinds of communications outside of their direct reporting structure in order for the organization to function. (US Department of Labor 2001) There are numerous examples in the literature of large losses in organizational profitability when communication across functional groups breaks down. (Maltz and Kohli 1996) Additionally, most government-imposed self-reporting requirements require reports to be submitted by different functional groups (e.g. compliance unit, or executive management) than the groups with access to relevant information (e.g. operators). Thus, without employee willingness to participate in the communication process, organizations would also be unable to meet increasingly more stringent government required self-reporting standards. Therefore, fostering employee willingness to participate in the communication process is necessary for an organization's maintenance of both profitability and compliance.

While there is still much research to be done in communication in complex systems, the basic communication process is well understood and researched by scholars in the business management fields. In the business literature, communication is a foundational mechanism by which management can control the actions of employees. Business scholars have determined that feedback from subordinate levels of a hierarchy is a necessary component of effective communication and the resulting control. (Leavitt and Mueller 1951, Jorgenson and Papciak 1981) Scholars in various engineering

disciplines have also found that feedback from a subordinate system is necessary for effective control of that system. (Maier 1996)

The general communication model utilized in the business literature is as follows: (1) A sender receives or generates a message to be communicated, (2) the sender encodes that message into a transmittable medium, (3) the message is sent through a communication channel to a receiver (4) the receiver decodes the message into a new understanding for the receiver, and (5) the receiver then sends a message back to the sender through a similar mechanism to confirm the receiver's new understanding. During this process, there are various ways by which messages sent between the sender and receiver can be distorted. These distortions are referred to as noise, which is generally caused by barriers to communication. (Robbins and Judge 2013)

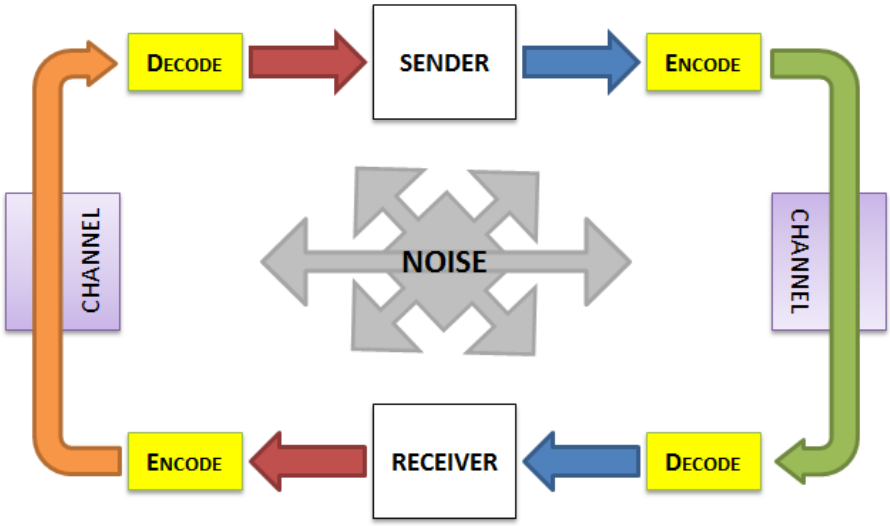

Figure 1: The traditional communication model where a sender encodes a message and sends it through a communication channel, and that message is decoded by the receiver and then the receiver provides feedback to the sender.

While this model can be applied to communications originating from a peer (e.g. lateral communication), or a subordinate (e.g. upward communication), in the context of this study, we focus exclusively on communications originating from higher levels in an organizational hierarchy. As such, in this study, the sender will always be hierarchically higher than the receiver, which is a form of communication referred to as downward communication. (Robbins and Judge 2013)

Scholars have extensively studied the motivations and circumstances that cause noise to be introduced into the communication process. In this study, we focus on a particular cause of noise (e.g. barrier to communication) called communication apprehension. When communication apprehension is present within the receivers of downward communication in an organizational hierarchy, communication apprehension can cause partial omissions in or even a complete breakdown of the feedback communication.

High communication apprehension has been linked to low self-esteem, which in turn has been linked to less successful task performance and lower self-efficacy. (McCroskey, Richmond et al. 1977, Brockner 1979, Gist and Mitchell 1992) Additionally, high communication apprehension has been linked to lower organizational retention and lower individual success. (McCroskey, Booth-Butterfield et al. 1989) Furthermore, group members with high communication apprehension are less likely to effectively integrate into groups and are less likely to be substantive contributors. (Wells 1970, Burgoon 1974, McCroskey 1976, Sorensen and McCroskey 1977) Additionally, people with high communication apprehension have been shown to be less willing to

initiate voluntary disclosure of information and, by definition, are less willing to report information to others. (McCroskey 1976, McCroskey and Richmond 1977)

Conversely, low communication apprehension has been linked to quicker organizational integration. (McCroskey, Booth-Butterfield et al. 1989) Low communication apprehension is linked to increased perceptions by receivers of sender's credibility, likeability, and believability. (1824, McCroskey, Richmond et al. 1977, McCroskey and Young 1981, McCroskey and Teven 1999) One of the most published scholars in the study of communication apprehension is Dr. James C. McCroskey.

Dr. McCroskey was a Scholar in Residence in the Department of Communication Studies at the University of Alabama until his death in 2012. Prior to working at the University of Alabama, he served as chair of the Department of Communication Studies at West Virginia University. His research seeks to answer a central question; what causes some communication to be effective and other communication to be ineffective. In this context, effective communications are communications where (1) the message is properly received by the receiver, (2) the understanding created in the receiver matches the original intended message sent by the sender, and (3) the new understanding fed back to the sender matches the sender's original intended message. This requires that the message is properly sent and received, the message is believed by the receiver when it is received, and the receiver's belief is properly conveyed to the sender. If any of these components are missing, the communication did not effectively convey the desired message.

Dr. McCroskey's body of work has contributed greatly to our understanding of how downward communication can be influenced to increase or decrease the effectiveness of communication. His work has extensively studied the factors that influence a receiver's willingness to believe a message once received. More specifically, a person's perception of another person's credibility has been linked to several aspects of favorable interaction. Source credibility has been linked generally to increased effectiveness of communications. Credibility has been linked to the willingness of a receiver to believe a sender's message. (McCroskey and Teven 1999) This has also been linked to an increased ability of the receiver to effectively retain a sender's message, especially in the context of training. (Teven and McCroskey 1997) Increased perception of the sender's credibility has been linked to perceptions of the sender's likeability as well. (McCroskey and Teven 1999) Dr. McCroskey's research shows that the perceived credibility of a sender corresponds directly to the overall effectiveness of a communication, and specifically corresponds to the perceived believability of the message. Thus credibility is a worthwhile area to further our understanding of communication effectiveness.

Dr. McCroskey breaks credibility into three factors, Trustworthiness, Caring/goodwill, and Competence; he states that these three factors determine a person's perception of another individual's credibility. Dr. McCroskey has shown that these 3 components of credibility can be affected by the sender's decisions in what and how to communication to the receiver (e.g. the encoding process). Additionally, Dr. McCroskey has shown that positively impacting a receiver's perception of the sender

based on these 3 factors can positively impact the effectiveness of that receiver's decoding process. (McCroskey 1976, Teven and McCroskey 1997, McCroskey and Teven 1999, Cole and McCroskey 2003)

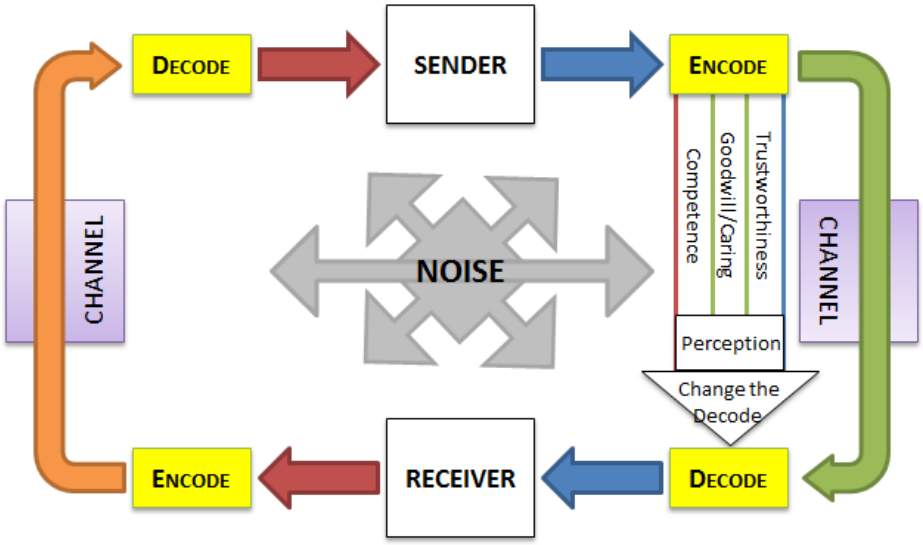

Figure 2: The three factors of perception referenced in Dr. McCroskey's research interacting with traditional communication models. Dr. McCroskey's work showed how perception of the sender can impact how the receiver converts that message into a new understanding

While the relationship between credibility and the effectiveness of the initial forward communication has been extensively researched, the literature reveals a gap in our understanding of feedback communication. (McCroskey 1966, Wells 1970, McCroskey, Richmond et al. 1975, McCroskey 1976, McCroskey and Richmond 1977, McCroskey, Richmond et al. 1977, McCroskey and Sheahan 1978, McCroskey and Young 1981, McCroskey, Booth-Butterfield et al. 1989, Scott and Rockwell 1997, Teven and McCroskey 1997, Beatty, McCroskey et al. 1998, McCroskey and Teven 1999, Cole and McCroskey 2003) Greater exploration is needed into the factors that

influence the receiver's willingness to voluntarily engage in feedback communication (e.g. voluntary verbal/written feedback). Specifically, from a sender's perspective, what factors related to the receiver's perception of the sender can affect the receiver's willingness to engage voluntarily in feedback communication. Voluntary feedback is important because the higher members of an organization's hierarchy are responsible for communicating regulations to and ensuring the regulatory compliance of operators. Thus, even though operators on lower hierarchy levels are responsible for performing regulated tasks, the higher ranking members of a hierarchical organization can be held legally and/or financially responsible for breakdowns in the communication process that result in non-compliance. For example, executive leadership is answerable to shareholders, and possibly to the government, when operators do not properly act on information. As such, there is a need for senders (e.g. executive leadership, management, compliance unit, etc.) to understand what methods may be implemented to increase the receivers' (e.g. the operators) willingness to participate in the communication process (e.g. decrease communication apprehension). There are studies that show evidence of a general relationship between communication apprehension and perception, more specifically perceptions of credibility, but research has generally not been conducted to give specific guidance on how a sender's credibility can foster feedback communication across functional groups.

This research is unique because it will test the relationship between a receiver's perception of a sender's credibility and that receiver's communication apprehension towards that sender. While Dr. McCroskey's research had established that there is a

relationship between a sender's communication apprehension and the receiver's perception of that sender's credibility, there has not been any investigation into how a sender's credibility relates to the receiver's communication apprehension. Thus, Dr. McCroskey has shown the effect of the sender's encoding decisions on the receiver's decoding decisions. However, research has not been done on what, if any, affect the sender's encoding decisions, and the resulting perceptions, will have on the receiver's encoding decisions in feedback communication. As such, the current research, though grounded in Dr. McCroskey's work, is a distinctive and novel expansion of previous research.

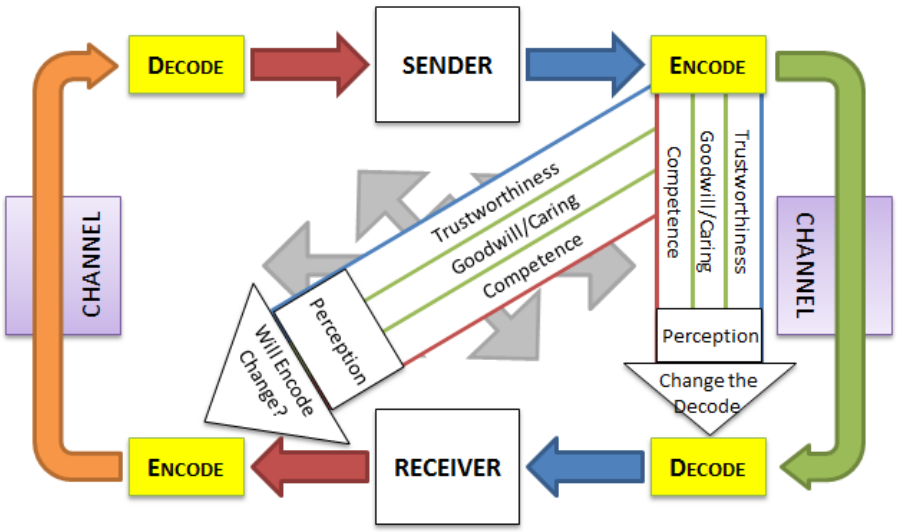

Figure 3: This proposed research interacting with the traditional communication model and Dr. McCroskey's work. This proposed research will show whether the factors of perception can change the willingness of the receiver to engage in feedback communication. (Cortlan J. Wickliff's Hypothesized Model of Basic Communication Loop, 2016)

This research was developed to address the need to understand the relationship between sender credibility and receiver's willingness to engage in feedback

communication. This study will require the analysis of survey data collected using Dr. McCroskey's survey instruments developed for assessing three factors of credibility (e.g. Competence, Trustworthiness, Caring/Goodwill) and situational communication apprehension. This study's primary purposes for examining data are twofold 1) to assess whether a relationship exists between sender credibility and receiver communication apprehension, and 2) to understand the relationship between Competence, Trustworthiness and Caring/Goodwill of a sender, in technical organization with the willingness of a receiver in a hierarchically lower position in that same technical organization to engage in voluntary verbal/written feedback communication.

This study is significant because it will better allow organizations to prevent harm to the public, by allowing them to more quickly respond to internal issues with their standard operating procedures and issues with their products (e.g. recalls, corrective action, etc.). This research further explores how perceptions within the organization can increase or decrease the effectiveness of a communication. Generally, effective communication within an organization is necessary for organizational responsiveness to both external and internal issues. (Leavitt and Mueller 1951, Jorgenson and Papciak 1981, Maltz and Kohli 1996) In situations like the Elixir of Sulfonamide tragedy where a harmful product is released to the public, responsiveness to new information can make the difference between life and death. In this tragedy, employees in the FDA, the American Medical Association, and Massengill, upon receiving reports of the deaths caused by the medication, had to communicate that information to relevant decision

makers in order for a response to be mounted. Had there been delays or breakdowns in that upward communication, more lives could have been lost.

This research is also significant because communication across functional groups is unavoidable in a federally regulated environment. At some point, operators, engineers, and technicians will need to initiate a voluntary verbal/written communicate with compliance units and business leadership on issues ranging from securing intellectual property to replying to FDA audits. If employees are unwilling to engage in this voluntary communication delays will occur within the organization. Using mechanisms like First-to-file patent systems and strict liability statutes, the federal government is increasingly putting the cost of delayed or inefficient communication onto the organizations. As such, creating willingness for individual employees to voluntarily and proactively communicate with decision makers in other functional groups is necessary to maintain governmental compliance, reduce organizational cost, reduce product time-to-market and maintain organizational profitability. As such, this research focuses on the perceptions of organization's compliance units by employees and how that affects their apprehension to communicate with members of said compliance unit.

Purpose

This study's primary purpose is to examine and analyze data in order to better understand the relationship between perceptions of the credibility of a sender of a message and the willingness of the receiver of a message to engage in voluntary feedback communication. Specifically, the study will seek to understand the relationship

between factors that affect a subordinate's perception of their superior (e.g. Trustworthiness, Competence, and Goodwill/Caring), and the subordinate's apprehension about engaging in feedback communication with that superior. The results from this empirical study will be used to determine what factors can increase upward feedback communication within an organization across functional groups.

Significance

This study is significant because it will better allow organizations to prevent harm to the public, by allowing them to more quickly respond to internal issues with standard operating procedures (SOPs) and issues with products (e.g. recalls, corrective action, etc.). The goal of this research is to understand how internal organizational perceptions can affect the effectiveness of communication. Generally, without effective communication, an organization cannot be responsive to either external or internal issues. (Leavitt and Mueller 1951, Jorgenson and Papciak 1981, Maltz and Kohli 1996) Consider the Elixir of Sulfonamide tragedy; in this tragedy, employees in the FDA, the American Medical Association, and Massengill, had to communicate information about customer fatalities to relevant decision makers in order for a recall to be organized. Breakdowns or delays in feedback communication within these organizations could have resulted in greater loss of life.

Additionally, communication across functional groups is inevitable in a compliance environment. Functioning compliance systems will require operators, who are largely technical staff or specialized experts, to initiate a voluntary verbal/written

feedback communication with the compliance unit within an organization. This communication can cover issues ranging from securing intellectual property to replying to FDA audits. Furthermore, with things like the new first-to-file U.S. patent systems and strict liability statutes, the federal government is increasingly putting the cost of delayed or inefficient communication on organizations. Therefore, fostering willingness for individual employees to voluntarily and proactively engage in feedback communication with decision makers in other functional groups is necessary to maintain governmental compliance, reduce organizational cost, reduce product time-to-market and maintain organizational profitability.

As such, the engineering profession is recognizing that the law and legal compliance is necessary to be impactful to the world, and there is a greater push towards including an understanding of legal policies that govern industry in engineering education. (Ashford 2004) Organizations that fail to integrate basic legal understandings in their daily operation will find themselves losing in the competitive marketplace. This fact can be seen in changes in legislation like the America Invents Act, which switched the United States' patent laws scheme from a first to invent to a first to file system. Whereas companies used to be able to proceed through their entire research and development process and then consider legal protections, now companies are rewarded with superior intellectual property protection for more quickly filing legal documents.

The increased necessity of integrating an organization's legal and engineering expertise to remain competitive in the marketplace is just one example of how communication across functional groups is becoming a daily activity in companies.

Additionally, due to economic downturns, technology companies are being forced to run leaner and have employed psychological and business management concepts like emotional intelligence, self-efficacy, and social networks to maximize the output of their workforces. (Wickliff 2005) As such, a better understanding of how the scientists, engineering, and technical personnel who perform research, development, and manufacturing interact amongst other functional groups and with the organization's lawyers, businesspeople, and compliance personnel furthers the growth and development of organizations in technology driven markets.

High communication apprehension has been linked to low self-esteem; this is problematic because self-esteem has been linked to successful task performance and self-efficacy. (McCroskey, Richmond et al. 1977, Brockner 1979, Gist and Mitchell 1992) Additionally, high communication apprehension has been linked to lower organizational retention and lower individual success; conversely, low communication apprehension has been linked to quicker organizational integration. (McCroskey, Booth-Butterfield et al. 1989) Furthermore, group members with high communication apprehension are less likely to effectively integrate into groups and are less likely to be substantive contributors. (Wells 1970, Burgoon 1974, McCroskey 1976, Sorensen and McCroskey 1977) These are all things that directly impact an organization's profitability. Additionally, people with high communication apprehension have been shown to be less willing to voluntary disclose information and, by definition, are less willing to report information to others. (McCroskey 1976, McCroskey and Richmond 1977)

As companies become larger organizations, companies will need to have employees who are willing to communicate within and across departments. An effective communication system is necessary for any organization wanting to increase metrics like safety, legal compliance, efficiency and innovation or decrease product development costs and time to market. (Morrison and Milliken 2000, Milliken, Morrison et al. 2003) This applies to both downward communication of standard operating procedures, as well as feedback upward communication of new discoveries and assessments of the effectiveness of procedures. Failure of communication, either not sending or not receiving a message, can be linked to major losses in profits and, depending on the industry, loss of life. This problem is compounded in companies that operate internationally. (Ballentine 1981, Bratton 2003, Rockness and Rockness 2005, Kim and Scialli 2011) In a legal context, knowledge held in one area of your company is presumptively held by the entire company. As such, a company can be liable for noncompliance with self-reporting statutes or for failure to act based on knowledge held in satellite offices on other continents.

Problem Definition

In a government regulated industry, the responsibility of maintaining compliance with legal and contractual regulations rests on decision makers in leadership positions. The organizational consequences of noncompliance with regulations can be lawsuits, costly recalls, fines, imprisonment, and sanctions. In this manner, noncompliance directly affects the profitability of a company. (Dowdell, Govindaraj et al. 1992, Brown

1998) Additionally, producing noncompliant goods can have the indirect effect of reducing sales by producing an inferior product. Also, when an organization fails to comply with legal regulations applicable to their industry, the liability of these failures can be brought down directly on executive leadership.

In addition to this very tangible cost of noncompliance, there is a more intangible consequence in loss of goodwill with customers. While goodwill is an intangible asset, it is something that can positively affect the value of a company. (Dowdell, Govindaraj et al. 1992, Brown 1998) Companies that produce products that either harm their customers or prove to be ineffective lose public goodwill. This loss of goodwill can have a negative impact on stock prices, trademark values, and company valuations.

For these reasons, company owners and executive leaders are highly incentivized to know and implement applicable legal regulations in their industry and relevant contractual regulations. As such, larger companies create departments like the legal, compliance and environmental health and safety departments (e.g. the compliance unit), which are responsible for knowing and dispensing information to ensure regulatory compliance. However, the actual performance of required task under applicable regulations is typically handled by employees (e.g. operators) rather than the compliance unit of an organization. As such, the compliance unit will draft standard operating procedures (SOPs) to provide employees with detailed instructions on how to do their jobs while remaining compliant with regulations. However, because of the sheer size of some of these organizations when compared with the relatively small size of their

compliance unit, they rely heavily on voluntary operator feedback communications to identify areas where the SOPs need improvement.

Feedback communication by operators is necessary for a functioning internal organizational compliance system. Communication apprehension on the part of employees has been linked to a lack of willingness to self-report and voluntarily disclose information. (McCroskey 1976, McCroskey and Richmond 1977) In other research, reduced communication apprehension of a communication sender has been linked to increases in perception of the credibility of that sender. (Cole and McCroskey 2003) While credibility has been shown to impact the effectiveness of messages sent and interpersonal trust, (Giffin 1967, Teven and McCroskey 1997) no research has been done as to how a receiver's perception of a sender's credibility impacts communication apprehension of the receiver.

Definition of Terms

1. Caring/Goodwill (Caring) – Caring and goodwill are synonymous factors. (McCroskey and Teven 1999) The perceived empathy, understanding, and responsiveness towards an individual indicate the level of caring towards that individual. (Teven and McCroskey 1997)
2. Communication Apprehension - This is when a person experiences excess tension and anxiety when engaging in communication. (Robbins and Judge 2013) Someone experiencing communication apprehension will seek to avoid engaging

in the type of communication creating apprehension or communication with the source of their apprehension. (Robbins and Judge 2013)

3. Competence – The perception that an individual is intelligent, knowledgeable and effective in their field. (McCroskey and Teven 1999)
4. Compliance Officer - Anyone who is a member of the Compliance Unit.
5. Compliance Unit – This term will be used to refer to the collection of individuals, groups, and departments responsible for generating standard operating procedures based on laws, regulations, and rules. This shall include, but will not be limited to an organization's legal department, compliance departments and their environmental health and safety group. Note that a department's quality assurance department may contain people who are also members of the compliance unit to the extent that they generate standard operating procedures based on laws. The quality assurance department as a whole is generally, and in the context of this study, considered a separate department tasked with identifying deficiencies in the standard operating procedures and recommending revisions.
6. Credibility (Source Credibility) – Also known as ethos, credibility is the persuasive influence of an individual's communication as it corresponds to the perceived likeability and believability of that individual. (McCroskey and Teven 1999) There are three factors that will be addressed in this study that contribute to perceptions of credibility: Competence, Caring/Goodwill, and Trustworthiness. (McCroskey and Teven 1999)

7. Downward Communication – Communication where the sender is at a higher hierarchical level in the organization than the receiver. (Robbins and Judge 2013) This would include supervisors developing standard operating procedures (SOPs) for use by subordinates.
8. Emotions (Effect on Communication) – These are the internal factors that change your perceptions of external stimuli. Even though emotions can be sustained over time, they differ from things like character traits or biases because they are also changeable over a relatively short period of time. This relates to communication because the same message can be interpreted differently based on the receiver's emotional state. (Wickliff 2005, Robbins and Judge 2013)
9. Feedback Communication – Communication occurs in a loop where a forward or, in the context of this research, downward communication is sent to convey a message to a receiver. The feedback communication or upward communication is the communication the receiver sends back to the sender conveying that the message was properly received. In the context of this study feedback communication will be upward communication.
10. Filtering – This occurs when senders purposefully manipulate information so that the receiver views it in a more favorable light. Generally, some filtering occurs whenever there is a hierarchy within an organization. People on the lower levels fear conveying bad new or want to be seen more favorably in the eyes of their supervisors. (Robbins and Judge 2013)

11. Forward Communication – Communication occurs in a loop where a message or, in the context of this research, downward communication is sent by the sender to the receiver to convey a message to a receiver. The initial communication from the sender to the receiver is the forward communication.
12. Information Overload – Getting more information communicated than a receiver's cognitive channels can handle. (Robbins and Judge 2013) When this occurs, some or the entire message will not be decoded by the receiver. (Robbins and Judge 2013) This is closely related to cognitive channel overload and is likely to increase the effects of heuristics and biases because the receiver will have to choose what to decode. (Gigerenzer and Todd 1999, Wickens 2002, Wickens, Gordon et al. 2004)
13. Language – Even when the sender and receiver are communicating in the same language, differences in age and context can change the meaning of the message. (Robbins and Judge 2013)
14. Laws – When used throughout this paper, this term will refer to regulations, statutes, and governances passed on the state or federal government level. As well as any contractual clauses, rules, regulation, and codes passed by an association to which the organization is a member.
15. Operators – The members of an organization who actually perform the tasks regulated by the laws. This includes, but is not limited to, manufacturing technicians, packers, and members of quality control.

16. Quality Assurance – This is the department or departments responsible for ensuring that operators comply with SOPs. This is different than quality control, which is incorporated with the definition of operators, because quality assurance reports noncompliance to the compliance unit, and does not interact with the controlled processes of the operators. Whereas, quality control is responsible for removing noncompliant products from the process output stream and is actually part of the steps outlined in the SOPs.
17. Regulations – These are the laws, rules, regulations, and guidelines that apply to an organization's activities. Regulations are the expectations and limitation that are communicated to the organization by an entity with a right to demand compliance from the organization. Regulations can be divided into two large categories: 1) Legal regulations 2) Contractual regulations. Within these large headings are often hundreds, if not thousands of applicable regulations that an organization must follow in research & development, manufacturing, and general daily operations.
    a. Contractual regulations – These are any non-legal regulations that the organization agrees with another organization or group of organizations (association control unit) to be bound by through some direct or indirect agreement.
    b. Legal regulations – These are regulations imposed by a government entity (legal control unit) with jurisdiction over the organization, its employees, or its products.

18. Selective Perception – Selective perception involves the sender choosing which parts of the message to receive and which parts to ignore based on their own needs, motivations, experience, background, and other personal characteristics. (Robbins and Judge 2013) This is closely related to the human factors and systems engineering concepts of biases and heuristics in general and confirmation biases specifically. (Gigerenzer and Todd 1999, Wickens, Gordon et al. 2004) The receiver is more likely to pay attention to information that reinforces what the receiver expects or desires.
19. Silence – The decision not to communicate information. In one survey, more than 85% of managers reported not communicating at least one issue of significant concern. (Robbins and Judge 2013)
20. Standard Operating Procedures (SOPs) – These are collections of best practices, trainings, instructions, and procedures that the compliance unit of an organization generates for the operators. There are two goals of an SOP 1) to communicate expectation in a way that every operator can understand and utilize 2) to be designed such that performance of the SOPs as communicated will make the operators and their outputs compliant with all laws. Standard Operating Procedures are improved through an iterative cycle where 1) the Compliance Unit creates Standard Operating Procedures that are used by the operators; 2) any deficiencies in the SOPs or any noncompliance with the operator output is observed by quality assurance or reported directly to the compliance unit or quality assurance by the operator; 3) from this information quality assurance

recommends modifications to the SOPs so that the operator's output can become more compliant with the laws; 4) the compliance unit makes changes to the SOPs. This iterative process is the organizational control loop which will be discussed in more detail later.

21. Trustworthiness (Trust) – The perception that an individual has integrity and character. (Teven and McCroskey 1997, McCroskey and Teven 1999)
22. Upward Communication – Communication where the sender is at a lower hierarchical level in the organization than the receiver. (Robbins and Judge 2013) This would include operators reporting issues to their supervisors.

Research Questions

Organizations must maintain compliance with regulations set for them by the government and the associations to which the organization is a member. The method that organizations use to maintain compliance requires the organization's compliance unit to collect all relevant regulations. Based on the compliance unit's understanding of the activities of the organization's operators, the compliance unit generates SOPs for the operators. The effectiveness of the communicated SOPs will depend on how well the compliance unit understands their operator's needs and their operator's application of the SOPs. However, typically the compliance unit does not have unfettered access to the operators as they perform their daily tasks, especially in regulated industries, and because the compliance unit is generally much smaller than the total number of operators in the organization, the compliance unit does not have the time to observe every operator

performing their daily tasks. As such, the compliance unit must rely heavily on voluntary feedback communication from the operators to determine whether the communicated SOPs are effective communications of regulations.

Consequently, in order for the compliance unit to effectively communicate regulations through SOPs, they must receive communications from the operators to explain their needs and to inform them of issues that the SOPs fail to address. How can members of the compliance unit increase the likelihood that operators will proactively engage in voluntary feedback communications?

1. Is there a relationship between perception of a compliance officer and the communication apprehension of subordinate receivers towards those supervisors when engaging in feedback communication?
2. What is the relationship between the perception of Competence in a compliance officer and the communication apprehension of subordinate receivers towards those supervisors when engaging in feedback communication?
3. What is the relationship between the perception of Trustworthiness in a compliance officer and the communication apprehension of subordinate receivers towards those supervisors when engaging in feedback communication?
4. What is the relationship between the perception of Caring/Goodwill in a compliance officer and the communication apprehension of subordinate receivers towards those supervisors when engaging in feedback communication?

CHAPTER II

LITERATURE REVIEW

Understanding the Compliance System

In any organization, there are laws, rules, regulations, and guidelines (collectively referred to as "regulations") that apply to and regulate that organization's activities. Regulations are the expectations and limitation that are communicated to the organization by an entity with a right to demand compliance from the organization. When these expectations and limitations are communicated to the organization by such an entity through regulations, the organization must decode the communication into an understanding about metrics the organization must meet during operations. These regulations can be divided into two large categories: 1) Legal regulations and 2) Contractual regulations. Within these large headings are often hundreds, if not thousands, of applicable regulations that an organization must follow in research & development as well as daily operations. This is especially true in technical industries involved in cutting edge development utilizing engineers and scientists.

The compliance system is the interconnected network of government entities (legal control unit), associations (association control units), and organizations (organization control unit) working towards their own self-interest to achieve the combination of regulations and operator control that most effectively meets everyone's goals. The compliance system, as a whole, and its components have been studied by numerous scholars across disciplines. (Trevino, Weaver et al. 1999) This study focuses on one component of the compliance system, the internal compliance systems. Internal

compliance systems are the collection of SOPs, organizational practices, and organizational culture implemented by an organization to ensure that it complies with all relevant regulations by effectively controlling the actions of operators. Since this study exclusively focuses on internal compliance systems, for the purpose of this paper, the term compliance system will refer exclusively to internal compliance systems.

The goal of a compliance system is to root-out regulatory non-compliance at the minimal overall cost to the organization. In a compliance system, the costs being balanced are the cost of detection vs. the cost of correction. (Hughes, Bagust et al. 2001) We could imagine a compliance system where half of an organization's employees were members of the compliance unit and each of them had one employee to monitor. In this scenario, the compliance unit would detect every possible regulatory violation as soon as it was occurring, and the cost of correction could, in most cases, be near zero. However, the cost of that compliance system would be astronomical.

Conversely, imagine a compliance system that was reduced to the most basic form possible, a group that posted links to laws for employees to access, and that received and processed product complaints and government notices. This would reduce the cost of a compliance system to a negligible cost. However, this system would be unable to detect problems until finished products were shipped out. As such the cost of correction (e.g. press releases, recalls, redesigning finished products, redesigning manufacturing lines, etc.), and the cost of the likely lawsuits, could be astronomical. (Hughes, Bagust et al. 2001)

The complexity of this system is compounded by the dynamic and complex nature of regulations. As will be discussed in greater detail in later sections, regulations are not created in a vacuum. Often, regulations are generated for an organization in response to that organization's actions or the actions of other organizations in the same industry. (Ballentine 1981, Bren 2001, Zoon 2002, Bratton 2003, Rockness and Rockness 2005, Kim and Scialli 2011) Regulations have often been generated to prevent future harm to the public in response to an organization's harmful prior actions. This is especially true if the organization harmed the public in a manner that was legal because the then current laws did not provide adequate punishment to deter the action. This interplay of individual organizational action leading to new regulations that multiple organizations must follow illustrates the dynamic and complex nature of regulations. Additionally, the dynamic nature of the system means that a successful compliance system must be able to respond to regulatory changes in order to be effective.

Another area of additional complexity is the internal structure of most organizations. Up until this point in the discussion, we have talked about the organization as if it was a single unit. This is because, under most regulations, organizations are treated as one unit. (1893, 1981, 1981, Lewis and Henderson 1994) Therefore, a signature of the CEO of an organization is treated as every person in that company agreeing to the regulations outlined in that agreement. Additionally, the failure of any operator to abide by the regulations in such an agreement will be viewed as a failure of the entire organization to comply with relevant regulations. However, organizations are not a single continuous unit; organizations are composed of numerous

departments and employees.

Regulations are necessary for an organization's manufacturing, research and development departments and their engineering staff to properly perform their jobs. Yet, few engineers in these departments have the legal training necessary to find, read, and interpret relevant legal regulations. (Friedman, Gordon et al. 1988) Additionally, most contractual regulations are negotiated by teams of lawyers and businessmen instead of the engineers actually performing the tasks. As such, it is often the case that the department that knows and understands the relevant regulation (the compliance unit), is different than the engineers within the organization who must perform the regulated activity (the operators). Therefore, not only is a properly functioning compliance system concerned with receiving and understanding regulations, but they must be concerned with ensuring that that information is effectively conveyed to operators.

As such, the design and function of a compliance system is an engineering problem because the compliance system itself is a complex system and because a compliance system has a direct impact on how engineers within organizations perform engineering tasks.

Legal Regulations

Legal regulations are regulations imposed by a government entity (legal control unit) with jurisdiction over the organization, its employees, or its products. Jurisdiction is the authority to make legal decisions and judgments over the person or entity and the subject matter. We will discuss this in greater detail later, but a government entity with

jurisdiction over an organization has the right to demand the compliance of that organization. Conversely, decisions made by government entities without jurisdiction are neither valid nor enforceable. (1804, 1945, 1985)

In the United States, jurisdiction is broken down into two components: Personal Jurisdiction, and Subject Matter Jurisdiction. Note that the jurisdiction being referred to herein includes, but is not synonymous with, the jurisdiction of courts. In addition to personal and subject matter jurisdiction, determining court jurisdiction also requires a determination that a case is being heard in the proper location within relevant jurisdictions (e.g. venue). (1992) However, a determination of venue is not applicable to all government entities because several government entities only have one location within their jurisdiction.

Personal jurisdiction is the particular government entity having the right to subject a person or entity to its authority. A government body has the general authority to demand compliance from and punish the noncompliance of any person within its territory (ex. if you live in Texas, Texas courts have jurisdiction over you), who conducts significant business within the territory (ex. manufacturing facilities based in other countries can still be tried by Texas courts if they ship large quantities of their product to Texas), or if you voluntarily submit to the authority of that government entity. (1804, 1927, 1945, 1950, 1982, 1985, 1990, 1992)

Subject Matter Jurisdiction is simply whether or not the government entity has authority to make decisions over certain industries, types of regulations, or particular issues. (1804, 1982) Generally, the provisions that establish a particular court, tribunal,

agency, or other government entity limit the scope of their authority to specific areas. A government entity does not have the authority to demand compliance or punish non-compliance for matters outside of that scope. For example, citizens cannot sue for a $100 million in the small claims court of their jurisdiction because the amount of money being sued for exceeds the court's assigned maximum dollar value (e.g. the lawsuit is outside the court's subject matter jurisdiction). Similarly, the FDA could not bring claims against a company for antitrust violations, because this is outside of the assigned subject matter scope of the FDA.

Contractual Regulations

Contractual regulations are any non-legal regulations that the organization agrees with another organization or group of organizations (association control unit) to be bound by through some direct or indirect agreement. The line between contractual regulations and legal regulations can be blurred when organizations agree to be subject to legal regulations from government entities that do not have jurisdiction over the organization. These kinds of agreements are commonly referred to as "Choice of Law provisions." Choice-of-Law provisions are still contractual regulations unless the organization agrees to voluntarily waive personal jurisdiction. (Cavers 1933, Fletcher 1998)

For example, if a provision in an agreement says "this agreement will be governed by the laws of the State of California," the laws of the State of California would be contractual regulations. However, if this agreement also says, "organization

agrees that any dispute arising from this agreement will be tried in the State of California," then the organization has submitted itself to the jurisdiction of California and the laws of California become legal regulations.

In the context of this study, we assume that operators will follow regulations that they know and understand. As such, from an operator perspective, the difference between contractual regulations and legal regulations are not substantial. In fact, for most regulations, operators will not know if the regulation is a contractual regulation or a legal regulation. The difference between contractual regulations and legal regulations primarily affects the compliance unit. Whether a regulation is contractual or legal will affect the method that the compliance unit uses to find, read, understand and track changes to regulations.

As will be discussed in greater detail later, legal regulations are generated by the legal control unit and published publically through numerous sources. The publications are often accompanied by legal interpretations, case law, and scholarly journals to explain how the regulations translate into clear metrics. Conversely, contractual regulations are made through agreements by the association control units. These are far more confidential; in several associations, contractual regulations are only made available to the members of the associations that created them. As such, the primary repository of information related to how contractual regulations translate into metrics will be an organization's internal records.

Communication

Compliance systems seek to control the actions of operators to ensure their compliance with regulations. Communication is necessary to have effective control. This concept will be discussed in greater detail in later sections. However, the basic idea is that, in order to ensure compliance with regulation, those regulations must somehow be communicated to operators.

What is communication? Communication is a sender sending a message to a receiver. The goal of a communication is to create a new understanding in a receiver and have that understanding incorporated into that receiver's actions or beliefs. In the context of an effective compliance system, the new understanding would be all metrics the operator must abide by to comply with relevant regulations while performing their job. Communication occurs when a sender encodes a message, sends the message through a communication channel, to a receiver who then decodes the message, and provides feedback. (Robbins and Judge 2013) The components of a basic communication loop are as follows:

A. Message – The information that needs to be communicated. In the organization control unit, this would be the new metric for an operator to adhere to. These metrics are synthesized from regulations communicated to the organization by the legal control unit and the association control unit.
B. The Sender – The individual or group that generates the message to be sent/communicated. In an organization control unit, this would be the compliance units.

C. Encoding – The sender converts the message into a form that can be transmitted. This conversion could be creating documents, audio-visual files, live trainings, power points, or anything else that can be transmitted to a receiver.

D. Channel – The medium through which a message can be sent. Examples of communication channels include email, websites, vocal performances, distributed papers, mail, and anything else that can be used as a method for distributing encoded messages.

E. Decoding – After the encoded message is received by the receiver, it is then converted into an understanding for the receiver (example: the receiver reading SOPs or watches a training video)

F. Receiver – The person who the sender sends the message to. In the case of an organization control unit, this would be the operators. Not that this also means that the receiver is directly connected to the controlled process that turns process input to process outputs.

G. Noise – Anything that interferes with the transmission of a message between sender and receiver or anything that distorts the message sent. Examples include extraneous information packaged with the message during the encoding process or cultural/linguistic differences that interfere with proper decoding of the received message.

H. Feedback – A communication sent from the receiver to the sender to convey that the message was received. Feedback is the primary subject of this study, and will be addressed in greater detail later in this chapter.

The general communication model utilized in the business literature is as follows: (1) A sender receives or generates a message to be communicated, (2) the sender encodes that message into a transmittable medium, (3) the message is sent through a communication channel to a receiver, and (4) the receiver decodes the message into a new understanding for the receiver; (5) the receiver then sends a feedback message to the sender through a similar mechanism to confirm the receiver's new understanding. (Robbins and Judge 2013) During this process, there are various ways by which messages sent between the sender and receiver can be distorted. This is referred to as noise, which is generally caused by barriers to communication.

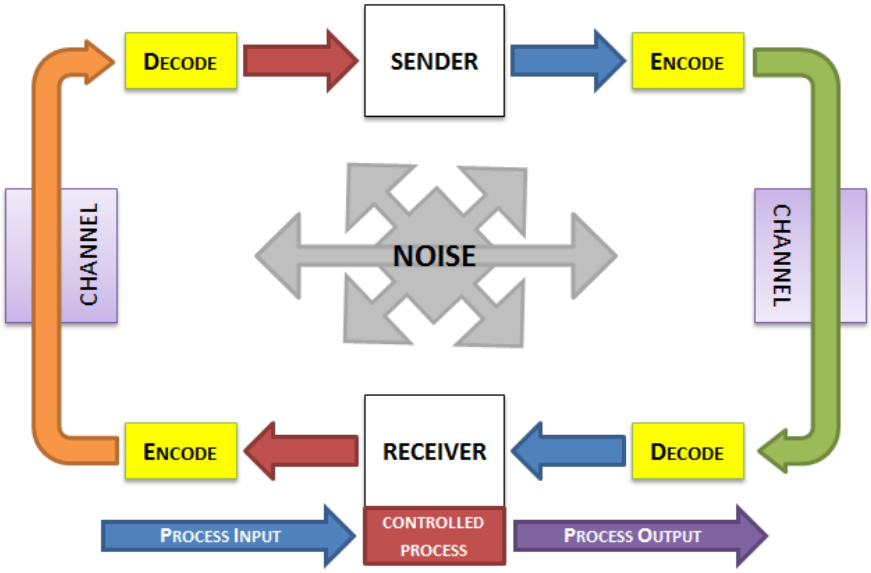

Figure 4: An example of how the communication loop in an organization can interact with the regulated/controlled processes performed by operators

While this model can be applied to communications originating from a peer (e.g. lateral communication), or a subordinate (e.g. upward communication), in the context of this study, we focus exclusively on communications originating from higher levels in an

organizational hierarchy. As such, the sender will always be hierarchically higher than the receiver, which is a form of communication referred to as downward communication. (Robbins and Judge 2013)

In a compliance context, there are two forms of communication essential for the organization to function: 1) communication that forms the compliance message 2) the communication of the compliance message. The formation of the compliance message occurs when the organization receives information about new or existing regulations. These kinds of communications come from one of two sources:

a) The legal control unit, which is composed of the collection of government and regulatory bodies with authority over jurisdictions in which the organization is formed or operates. In general, the legal control unit is the system by which government controls the actions of companies, associations, and other organizations for the benefit of the public by creating legal regulations. In the course of this study, we focus heavily on the federal government. Organizations and associations are compelled, under penalty of law, to abide by the communicated expectations and limitations of the legal control unit.

b) The association control units, which are created by contractual relationships that organizations voluntarily enter into with other organizations or groups of organizations. The association control unit is the system by which groups of organizations control the actions of member organizations for the benefit of total association by creating contractual regulations. Associations provide

their members with benefits, and value; in exchange member organizations agree to abide by guidelines and rules established by the organization. The primary recourse of the association control unit for an organization's failure to abide by the communicated expectations and limitations of the association is to revoke membership in that association. In some cases, organizations can be sued for breach of contract with the association.

Through regulations, the legal and association control units communicate the expectations and limitations each control unit imposes on an organization to that organization's leadership. The message is decoded by leadership into an understanding about the metrics that each operator must follow in order for the organization to maintain compliance. This information is then synthesized into a compliance message by the organization's compliance unit, and communicated to the operators in the organization. This internal communication is performed by the organization control unit. This organization control unit communication is essential because, in most compliance matters, the members of the organization who are held responsible for non-compliance are different than the members of the organization who actually perform the regulated activities.

The Message

All communication begins with having something to communicate (e.g. a message). The message and its formulation is an important aspect of communication

systems that is sometimes overlooked. A message is the new understanding that the sender wishes the receiver to have. However, the text of a message is not synonymous with the message itself. (Robbins and Judge 2013)

For example, in the Texas A&M tradition the term "Gig 'em, Aggies!" is regularly used. The text of this message refers to a practice called gigging, which involves hunters using a multipronged spear to capture small, usually aquatic, animals. The text of the message "Gig 'em, Aggies!" is essentially instructing Texas A&M students and alumni to stab people with a spear. However, the text of the message is not the message here. The message the sender conveys to their receivers when saying "Gig 'em, Aggies!" is for the receiver to "support other Texas A&M students and alumni!"

In an organization that is a corporation, messages conveyed from management to employees can be anything from "refill the coffee if you empty a pot" to "do not exceed 2-parts-per-million of a contaminate in your department's final fill product." Also, within corporations, messages are conveyed from management to employees for any number of reasons. However, in the context of this study, the type of messages we are interested in are messages sent in order to establish, maintain, or ensure a corporation's compliance with relevant regulations (a "compliance message").

The goal of compliance messages is to capture, in the most memorable manner possible, the metrics and steps that, if adhered to by the operators, will make the operators compliant with all applicable regulations governing the organization. (McLuhan and Fiore 1967, Dowdell, Govindaraj et al. 1992, Trevino, Weaver et al. 1999, Hughes, Bagust et al. 2001) As previously discussed, in order for the compliance

unit to create a compliance message they must first receive the metrics the organization must comply with. Metrics are the decoded expectations and limitations communicated in regulations from the legal control unit and the association control units of associations to which the organization is a member. These metrics are created for organizations in an attempt to control the actions of the organization's operators. The primary focus of this study will be communication; however, we will discuss control theory in later sections because it can provide us with some understanding of the motivation and methods behind the formation of metrics.

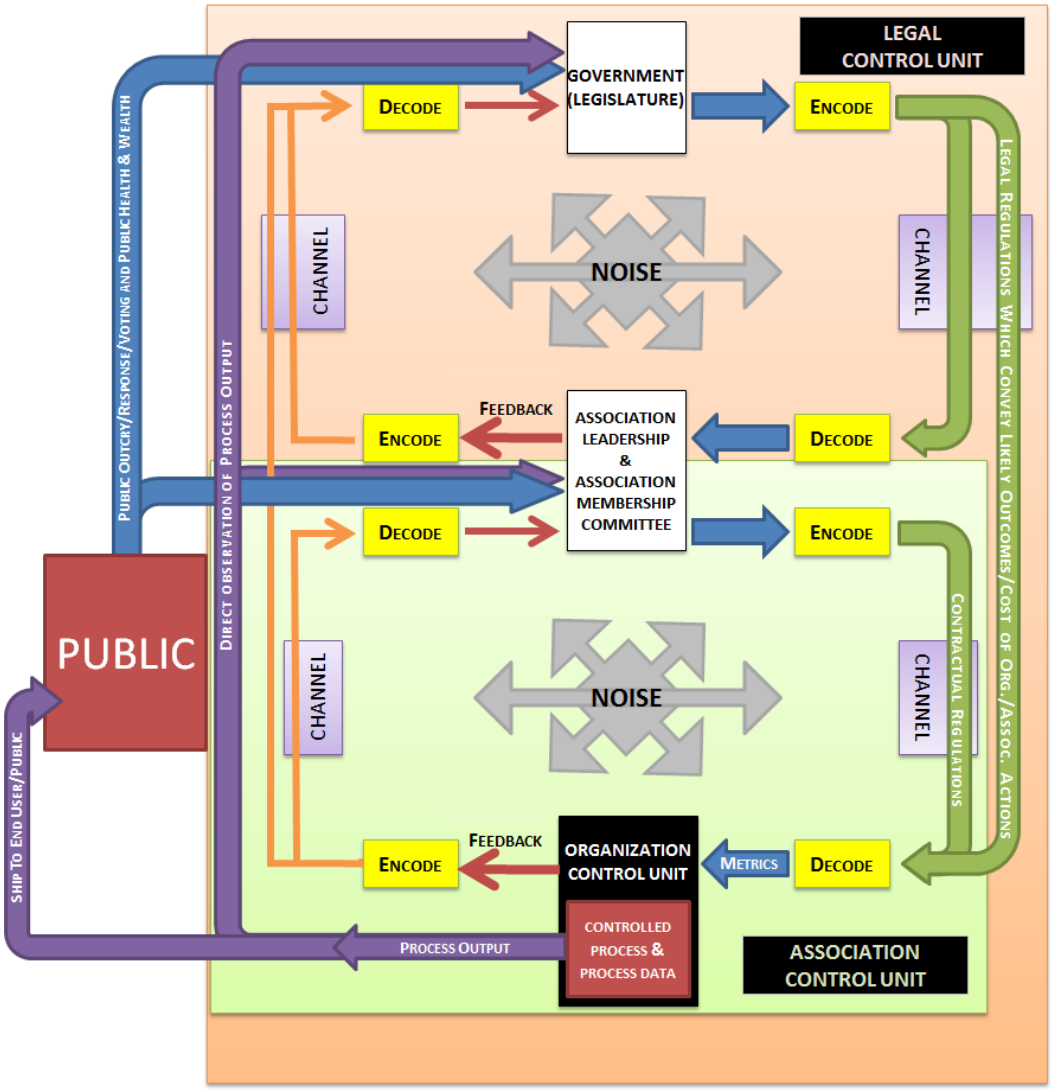

Figure 5: The communication loops of the Association Control Unit and the Legal Control Unit interact with and receive feedback from the Organization Control Unit which performs the regulated/controlled processes. (Cortlan J. Wickliff's Model of Multilevel Compliance Communication and Control Feedback Loops, 2016)

The Legal Control Unit

As previously stated, the legal control unit and the association control units generate regulations that an organization's compliance unit converts into a compliance message for operators in the organization. The legal control unit is, essentially, the

government communicating their expectations to industries (e.g. both associations and organizations operating within a particular area of commerce or field of research). (Polinsky and Shavell 1999, Robbins and Judge 2013)

In the context of the legal control unit, the components of the communication model are as follows:

A. Message – The primary goal of the Legal Control Unit in terms of industry regulation is to achieve an idealized state of maximized public health and wealth by correcting actual or potential market failures through the allocation of liability and direct regulation. As such, the message in a legal control unit's communication in a compliance context is, "the likely outcome and cost of a specific course of action." The government communicates how they intend to allocate liability (e.g. civil and criminal liability) and whether they intend to directly regulate an industrial action. Direct regulation of industry can come in the form of establishing agencies to control regulated areas, creating monetary penalties/fines, or assessing taxes for specified actions. In the context of this paper, the major distinction is "liability" addresses the debt that can be created between yourself and another person/entity; whereas, direct regulation can create debts between an individual and the government. Using the FDA and the law against selling adulterated products as an example, the FDA is an agency that can set rules and best practices (including the rules for purity). Violation of an FDA rule can create debt which will be owed to the U.S. government (e.g. fines,

seizure of product, recalls etc.). If you create an adulterated product and distribute it to the public causing death/harm, there is now a debt owed to those harmed. This debt may just be a monetary debt (e.g. civil liability), or, depending on the circumstances, the debt may become a time/life debt (e.g. criminal liability and prison). We will discuss this in greater detail in later sections when we address the formation of our federally regulated system.

B. The Sender – The sender is the entire government, with a special emphasis on the legislative branch because of their role in generating laws.

C. Encoding – The government primarily encodes the likely outcomes of engaging in a specific action in the form of legal regulations (typically laws), which give the government the right to respond to the actions of organizations and individuals. Laws both allocate liability and codify direct regulation. Because the judicial branch of the government is responsible for interpreting laws, the message in the legal control unit can also be encoded in judicial decisions.

D. Channel – The encoded message is sent out to the entire country in published law books, online notices, and news coverage of major legislation and legal decisions.

E. Decoding – The decoding process is simply the receiver reading, watching, or listening to the communication channel.

F. Receiver – In the context of this study, the receivers of this message are the leaders in relevant association control units and the compliance units of relevant organization control units.

G. Feedback – Communication feedback occurs through one of four primary methods. 1) Government agencies inspect products or audit manufacturing facilities to understand how industries are implementing procedures; 2) Mandatory reporting standards require industry members to generate reports in specific circumstances; 3) Disputes arise and are tried in the court system; or 4) Industry members will voluntarily give feedback about the quality and effectiveness of legal regulations. (Helland 1998, Innes 1999, Short and Toffel 2008) In addition to these communication feedback methods, there is a 5^{th} form of feedback commonly employed by the legal control unit. This feedback occurs when a product is released to the public that diminishes public health or wealth, and both public outcry and public voting (e.g. elections and proposition voting) convey to the government where there has been ineffective communication of the message to industry. This is an important form of feedback, which is why it was included in this literature review, but is not applicable in the context of this study because it exists outside of the communication loop.

Once legislation passes and takes effect, the legal control unit has an incredibly high impact. A change in federal laws transverses industries, the entire country and can even be impactful on an international scale. However, the process by which laws are passed and communicated can take years if not decades. As such the legal control unit is the slowest to effect change in an individual organization's operations.

The Association Control Unit

Associations exist, in the absence of direct legal control unit control in an area, to establish rules for organizational interactions among themselves and with the public. However, associations need organizations to voluntarily seek membership in order to exist. Organizations are generally profit-maximizing entities and will only seek membership to an association when that association can increase the profitability of the organization. As such, an association exclusively concerned with maximizing its membership could set the most minimalistic standards allowable under the law. This would make it easy for organizations to obtain and maintain the benefits of joining the association without requiring any new contractual regulations. However, this would likely result in the legal control unit regulating this industry.

When the legal control unit regulates an industry, it can drastically reduce the power of an association. The reason that associations exist in the absence of legal control unit control is because parties cannot contract to break the law. As such, legal regulations always override contradictory contractual regulations. Additionally, where there are clear legal regulations to govern how organizations interact among themselves and with the public, organizations are less likely to find value in association membership. Thus, the more that the legal control unit regulates an industry, the less authority that association has to regulate that industry.

Thus associations want to prevent legal intervention into an industry. The literature's observations of the Enron scandal and the Sarbanes-Oxley Act, and the literature surrounding system-of-systems in control theory can inform our understanding

of how associations can accomplish this task. (Bratton 2001, 2002, Rockness and Rockness 2005, Coates 2007) In the case of the Sarbanes-Oxley Act, this act was passed in response to egregious actions by lawyers and accountants in cases like Enron which resulted in billions of dollars of lost wealth to the public in the 1990s and 2000s. While this legislation had a significant impact on most of the other industries involved in this scandal, the legal profession was largely unaffected by the legislation. The legal associations were able to reduce the need for new legal regulations by preemptively passing new contractual regulations in response to each of these scandals. Furthermore, the literature related to "system of systems" shows us that subordinate systems (e.g. in this case the association control unit) maintain independent functionality until market failures occur.

Therefore, associations, much like legal associations in response to the financial fraud cases of the 1990s and 2000s, seek to preempt the necessity of the legal control unit to pass laws. (Bratton 2001, 2002, Rockness and Rockness 2005, Coates 2007) However, this preemptive response must be used to create contractual regulations that the organizations can reasonably perform. Consider a medical device association, this association could require its members to provide personal doctors to all patients on a 24/7 basis. This would eliminate the necessity for any legal regulation, but would be a contractual regulation that could completely eliminate profitability associated with selling the device. As previously stated, organizations will not join associations that negatively impact their profitability; thus this association will lose its membership.

As such, when we apply this understanding of the association control unit to our model of communication we get the following:

A. Message – The primary goals of the Association Control Unit are 1) to preempt the legal control unit's need to create legislation, and 2) to make organizations desire membership. As such, the message in an association control unit's communication in a compliance context is also "the likely outcome and cost of a specific course of action." However, associations also communicate "recommended best practices."
B. The Sender – The sender is the leadership of the association.
C. Encoding – The association leadership encodes the message into contractual terms, guidelines, trainings, and standard operating procedures. As part of the contract to grant membership in the association, the organizations will agree to abide by these encoded messages. Thus the encoding process turns "the likely outcome and cost of a specific course of action" and "recommended best practices" into contractual regulations which can be conveyed to the member organizations.
D. Channel – The encoded message is sent out to the association in emails, published books, and online notices.
E. Decoding – The decoding process is simply the receiver reading, watching, or listening to the communication channel.

F. Receiver – In the context of this study, the receivers of this message are the leaders in member organization control units, namely the compliance unit.

G. Feedback – Feedback occurs when association resources are spent to inspect products or audit manufacturing facilities to understand how member organizations are implementing procedures. Some associations also utilize voluntary self-reporting, and peer-to-peer information exchange; however, the most common form of verbal/written feedback is based on mandatory reporting standards. Note that this is communication feedback from member organizations. This does not include feedback received from the public and end-users of the products (e.g. process output) created by the organization. Because this study focuses on internal communication, feedback from the public is not relevant for this study. However, for the completeness of this literature review, this is included in our diagram.

The association control unit is the optimal combination of impact, response speed, and customizability. An association control unit can implement change more impactful and industry wide than an organization, but can implement the change with more fine-tuned adjustments and in more rapid fashion than the legal control unit.

The Organization Control Unit

An organization control unit is an internal system by which an organization's leadership can control the action of the organization's operators. The term organization

encompasses any group of people with a clearly defined internal hierarchy and a structured and defined interconnection that works together towards a common goal. From this definition, everything from schools to hospitals and everything from non-profit corporations to for-profit sole proprietorships are organizations. In the context of this study, the primary form of organization we will be examining is a federally regulated for-profit company/corporation.

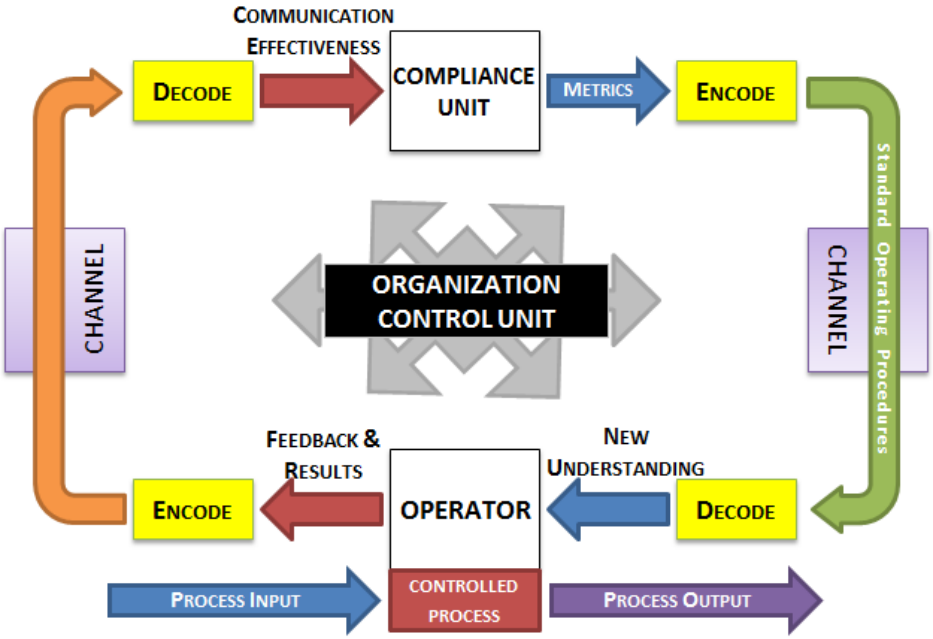

Figure 6: Applies knowledge about the Organization Control Unit to the general communication model. (Cortlan J. Wickliff's Model of Organizational Communication and Control in Compliance Systems, 2016)

When we apply the previously discussed communication model to our understanding of organizational communication and the organization control unit we get the following component definitions:

A. Message – The organization control unit's goal remains to maximize profit for the organization. The other two control units are trying to impact the organizational process outputs. Based on our understanding of complex systems, the legal control unit and the association control unit must align their desired outcomes (e.g. public health and wealth) with the organization's goal (e.g. maximized profit). Hence, why the message communicated to the organization from the other two control units, in the form of regulations, relates to the cost and likely outcome of the organization's actions. The organization's compliance unit decodes these communicated regulations into metrics for the organization's operators. These metrics are then used to synthesize the organization control unit's message. This message contains the metrics that, if adhered to and properly implemented by operators, will ensure that the actions of operators maximize organizational profitability. (Trevino, Weaver et al. 1999, Hughes, Bagust et al. 2001, Robbins and Judge 2013)

   Note that, it is the responsibility of the association and legal control units to ensure that complying with regulations is necessary to maximize organizational profitability. In the context of this study, we will assume that laws have been properly drafted such that the organization cannot maximize profitability without compliance with all relevant regulations. As such, the message in this study will be synonymous with the compliance message.

B. The Sender – The sender in a compliance context is the compliance unit. The compliance unit acts as a filter distilling the massive amount of regulations into

relevant metrics necessary for the operator to perform the controlled/regulated process.

C. Encoding – In the Forward Communication: The compliance unit converts the message into standard operating procedures which instruct operators of expected tasks and dictate the promotion, training, compensation, hiring and firing of operators based on their meeting of expectations. In the Feedback Communication: The Operators will convert the results of whatever regulated process (e.g. controlled process) that they performed and any feedback about the process or SOPs into a transmittable medium like verbally spoken words or a written email.

   During the encoding process, whether forward or feedback encoding, there will be decisions made about what or how to communicate information that will likely remove some of the message's total content. For example, an operator might receive pages of raw data that leads them to conclude that there is a problem with the manufacturing process. When conveying that information in a feedback loop, the operator will likely convert the raw data into a one-page report summarizing the relevant metrics. Thus, the encoding process removes some of the original information.

D. Channel – The encoded message is sent out to the operators via emails, published handbooks, online notices, and maintained document control systems.

E. Decoding – The decoding process is simply the receiver reading, watching, or listening to the communication channel. Similar to the encoding process there

will be a loss of information in the decoding process. Consider an SOP for new manufacturing metrics. This document will likely contain references to statutes, names of agency regulating the area, and background information. However, when the operator decodes this SOP they will likely only retain the new steps they must follow doing their job.

In the context of this study of the forward communication, we are assuming that the receiver will comply with any message received from the hierarchically higher member of the organization. This assumption is predicated on the idea that people who do not comply with the message would not be hired or promoted and may be fired from organizations. However, as previously discussed, the message is not necessarily the text of the message. As such, in the decoding process when SOPs are converted into new understandings, the perception of the sender has an impact on the decoding process. For example, if a perceived untrustworthy source were to tell you a fact, there may be the tendency to believe that the opposite of the fact is true. Think of the fable of the "boy who cried wolf." The text of his message was that "there is a wolf in the village;" however, because of his perceived untrustworthiness, the message conveyed was "there is no wolf in the village." Thus, the villagers who do not react to the cry of "wolf" when a wolf is actually in the village are actually complying with the message they are receiving. However, they have improperly decoded the message sent because they do not believe the sender. This fable can be explained through Dr.

McCroskey's research, he had concluded that perceptions of credibility have a direct relationship to believability.

F. Receiver – In the context of this study, the receivers of this message are the operators in an organization control units.

G. Feedback – Feedback occurs when an organization's quality assurance or compliance unit inspects products or audit manufacturing facilities to understand how operators are implementing procedures, or when operators report issues or concerns to the compliance unit either voluntarily or because of mandatory reporting. In this manner, the operator acts as a filter distilling the massive amount of information related to and resulting from the performance of the controlled/regulated process into relevant information for the sender. This decision of what to report is governed by the SOPs.

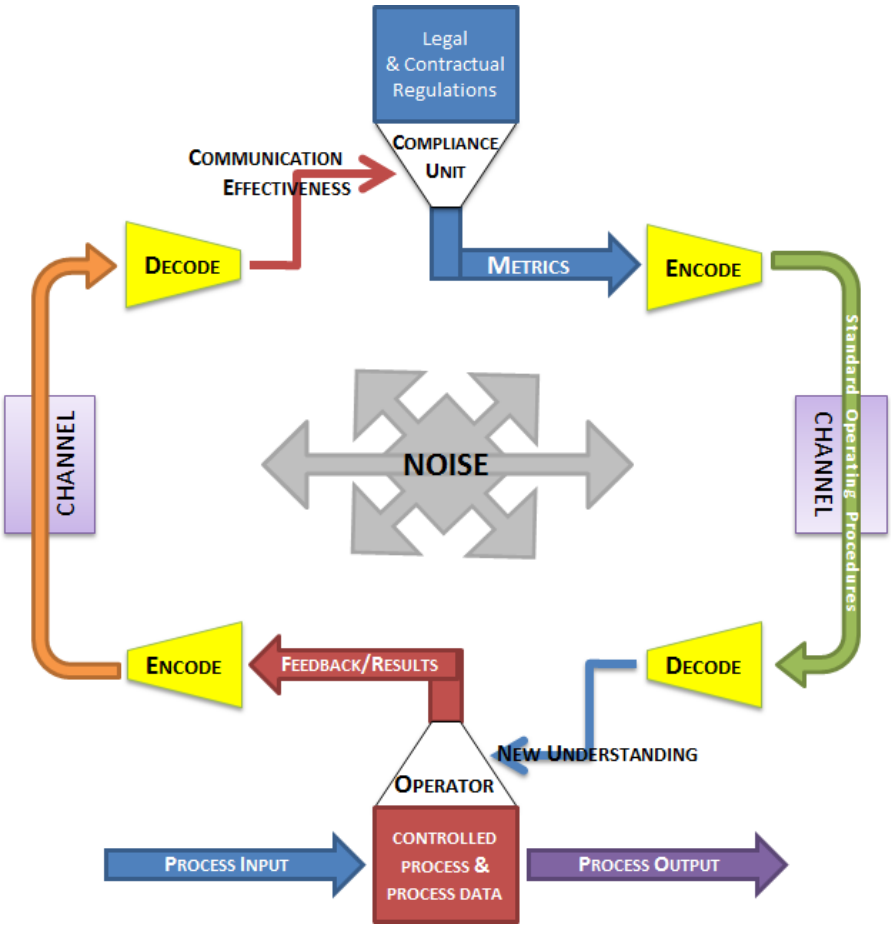

Figure 7: The simple communication loop of the Organization Control Unit can be modified to reflect the real world circumstances of an internal compliance system. (Cortlan J. Wickliff's Expanded Model of a Basic Organizational Communication and Control Loop in a Compliance Systems, 2016)

An organization control unit has highly tunable responses and has almost immediate impact (e.g. measurable in days or weeks) on the operator outputs. However, and organization's control is limited to activities occurring within the organization, which makes the organization control unit have low impact. As such, the organization control unit can be ideal for correcting small problems with its operators. However, sweeping industry-wide change cannot be performed using the organization control unit alone.

Introduction of Complex Control Systems

Now that we understand the control units at work in establishing an organization's compliance, let us look generally at control theory. Generally, there are two pairs of ideas that make up the foundation of systems theory and are present as components of a complex system: (1) Hierarchy and Emergence, and (2) Control and Communication. (Leveson 2011)

Hierarchy is paired with emergence and is simply an organization with different levels that has increasing complexity as you move to higher levels. (Leveson 2011) Let us use the example of a pacemaker manufacturing company. In such a company, there will be a team responsible for manufacturing conductive material, and a team responsible for manufacturing insulating material. At a higher level in the manufacturing hierarchy, there will be a group whose responsibility is to combine the insulating material and the conductive material into a pacemaker lead.

Emergence is closely related to hierarchy because it describes properties that do not exist at lower levels and only become apparent as multiple lower level components combine to form a new level of complexity. (Leveson 2011) For example, the insulating and conductive materials will be combined to form the anchoring mechanism and flexibility to hold the lead in position to deliver therapeutic defibrillation within a beating heart. However, neither the shape nor the functionality can be understood or described exclusively with the information and known features that exist in the lower levels.

Implicit in this understanding of emergent properties is the fact that there are also emergent problems. As such, there are problems that cannot be categorized in the lower levels of a hierarchy. (Leveson 2011) In the example of a pacemaker lead, while there are aspects of the biocompatibility and safety in the material manufacturing process, the safety of the lead is an emergent property, and the lack of safety in the lead could be an emergent problem. For example, consider the situation where the operating temperature of the conducting portion of the lead exceeds the melting point of the insulator. Even if, both the operating temperature of the conducting portion of the lead and the melting temperature of the insulator are within specifications for safe use within a human, the combined lead would not be safe. However, this lack of safety is only something that would be apparent to someone in the hierarchy whom both departments report to. As such, this example is an apt illustration of how emergence also applies to the emergence of problems that cannot always be categorized or understood in lower levels of a hierarchy.

While higher levels of the hierarchy will be better able to understand and identify these kinds of emergent problems, in most organizations they lack firsthand understanding of what occurs in the laboratory or manufacturing floor. (Leveson 2011) Using the example of the conductive material operating temperature vs. the insulating material melting point, it is unlikely that a supervisor over both departments would engage in the experiments necessary to determine these and other relevant material characteristics. This is especially true in technical companies because, as you progress

up the hierarchy, it becomes increasingly unlikely that members of the organizations will have the requisite technical expertise and understanding to conduct such experiments.

As such, in order to identify emergent problems, organizations will need operators to engage in upward communication and give feedback and timely reporting to decision matters that span departments. The people engaging in daily operations will be better equipped to identify abnormal occurrences and synthesize pointed summaries of relevant information. (Leveson 2011)

Control in a complex system is generally the imposition of constraints on one level of the hierarchy by a higher level of the hierarchy. (Leveson 2011) Returning to our pacemaker example, the manager responsible for lead manufacturing may impose the constraint of biocompatibility on the insulating material manufacturer and the constraint of a maximum operating temperature on the conductive material manufacturer. Through this imposition of constraints, the lead manufacturing manager exercises control over the subordinate material manufacturing groups. When compared with the literature regarding business management and organizational communication, Leveson's concept of control can be related to the idea of downward communication. In order for a higher level of a hierarchy to exercise control over a lower level of the hierarchy, they must engage in downward communication to convey the metrics to the lower levels of the hierarchy. (Robbins and Judge 2013) As such, without effective downward communication, control cannot exist. However, although these two concepts are related, downward communication and control are not interchangeable terms. Downward communication can occur perfectly with no noise, interference, or

misinterpretation of the message; yet an employee can still choose to ignore the message. (Robbins and Judge 2013) As such, Leveson's concept of control can only exist when both effective downward communication and effective management/leadership are present. (Robbins and Judge 2013)

Communication, in the context of Leveson's complex system, is analogous to upwards communication. (Robbins and Judge 2013) Leveson's concept of communication is that it is the feedback to the controller in the higher level of the hierarchy. This is essentially upwards communication. This aspect of complex systems is an area of great interest in the system's engineering, business management, and legal fields. Leveson articulates the impact of communication on a complex system; without this feedback loop, a control system will become an open system susceptible to being thrown out of equilibrium by exchanges with the environment. (Leveson 2011)This problem is additionally compounded if there is the possibility for changes in the desired equilibrium state (e.g. the passage of new regulation). In the field of business, upward communication is seen as an integral component of maintaining a productive and profitable work environment. If upward communication is lacking, the organization is likely to eventually develop significant internal issues that can negatively impact the organization's productivity. (Robbins and Judge 2013). Similarly, government agencies concerned with ensuring compliance of a wide array of organizations have implemented self-reporting and internal reporting requirements. (1986, 1986, 2005) When developing these regulations, government agencies have developed prescribed instructions on when an employee is required to communicate upwards and to whom.

Communication Versus Control

Having introduced, both communication theory and control theory, let us compare the two bodies of literature in the context of compliance. Ultimately one of the primary goals of all the major players in an industrial field (e.g. legal control unit, association control units, organization control unit) is to control the outputs and process outcomes of each individual manufacturing operation. Using the context of medical device manufacturing, the government, through the FDA and the issuance of permits and licenses want to control the safety of medical manufacturing process outputs. Primary contractors, medical associations, and other forms of associations use contracts and membership in the association to attempt to control the quality and quantity of medical manufacturing process outputs. Organizations, internally, want to protect profitability by controlling safety, quality and quantity of medical manufacturing process outputs. In order to understand how each of these levels of control interacts to produces a mutually satisfactory manufacturing process, we must first understand some aspects of control theory in complex systems.

What is control? Control exists where a command is sent by a controller and acted upon by the controlled system. (Leveson 2011, Robbins and Judge 2013) As such, control is the combination of effectively communicated expectations and the ability to compel action based on communicated expectation. In this study, we have divided major industry players into three groups: the Legal Control Unit and the Association Control Unit that generate the message and the Organization Control Unit that communicates and acts upon the message. In all three of these units, the ability to compel action is

present. The government can compel action with the threat of criminal and civil liability or through direct regulation. Associations can compel action with the threat of lost membership, and the lost profits and opportunity associated with lost membership. And organizations can compel action with payment incentives, hiring, firing, and promotions.

As such, in the context of this compliance study, effective communication of expectations is analogous to the exercising of control. Furthermore, the process of exercising control is strongly analogous to the process of effective communication. When exercising control over a system, the most basic functional unit of control is a closed loop control system, similar to closed loop communication. There are numerous configurations in the literature, but they all share some basic components: (1) a comparison point or desired real world state, which would be the message in a communication (2) an action or actor that can manipulate the system to get to the desired state, which would be the sender, and (3) a variable or observer to compare the actual outcome with the desired state, which is the feedback communication from the receiver. (Sterman 1994, Butler 2011, Butler and McGovern 2012) Leveson presents a control model that will be the basis of the compliance model introduced in this paper. (Leveson 2011) The components of this model are:

- Set Point – The state to which the control unit is trying to match the Process Output. This would be similar to the Message.

- Controller – The component of the control unit that adjusts the Actuator to manipulate the controlled process. This is analogous to the sender in a communication loop (e.g. the compliance unit).
- Actuator – The component of the control unit that directly manipulates Controlled Variables to adjust the Process Output of the Controlled Process. This would be analogous to the Communication Channel in the forward communication.
- Controlled Process – The component of the unit responsible for converting Process Inputs to Process Outputs. This would be the receiver; in this case the operator.
- Sensor – The component of the control unit that measures output variables from the Controlled Process and provides information related to those outputs to the Controller. This would be analogous to the Communication Channel in the feedback communication.

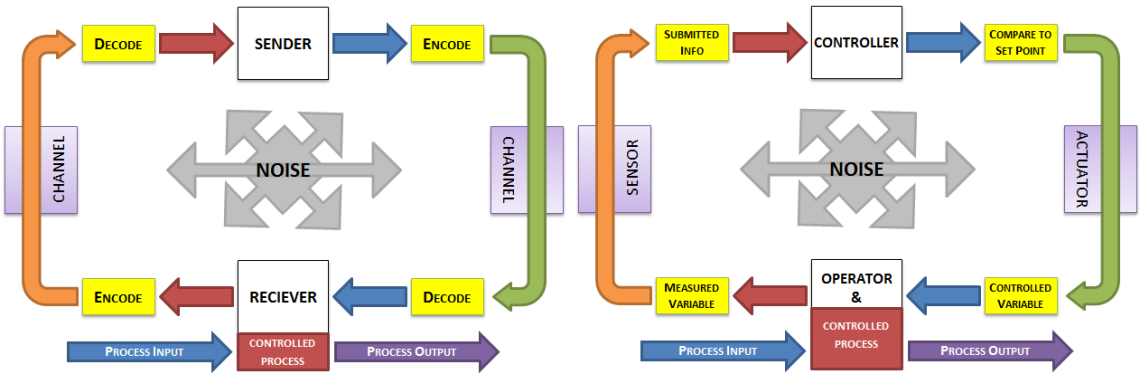

Figure 8: Compare the basic communication loop (the left) and a basic control models (the right).

While communication and control models can be used interchangeably to characterize the same system, they provide different information. Control theory based models have been used to understand the interplay of various components' goals and a likely result of a particular scenario. Whereas communication-based models are used to better understand the direct interaction with two connected components of the system. (Robbins and Judge 2013)

As such, this study, which utilizes a communication-based model, will be able to identify the circumstances under which receivers will be willing to engage in feedback communication. However, this study will not be able to tell us what will be the likely outcome of the system as a whole when the receiver continually engages in feedback communication. This especially holds true if the system is a complex control network of interworking components, as is this case here.

Motivating the Creation of a Federal System for the Regulation of Goods

In this section, we will examine the literature and history related to the formation of a federal system for the regulation of industries and goods. The formation of this federally regulated system was closely related to attempts by organizations to circumvent, then existing, regulatory systems. As such, by understanding the history of the formation of the system, we gain additional understanding as to the expectations associated with regulatory compliance.

Understanding the Purely Self-Interested Organization Control Unit

Before we begin our discussion of the history and formation of the federal regulation of goods, let us have a more general discussion about organizations, namely corporations/companies. We have discussed generally how organizations are primarily profit-maximizing entities, but what does that mean practically? There is a consensus among the legal, engineering, and business literature that a key aspect of organizations' decision making in general and corporations' specifically is their stakeholders. These can be defined as any group or individual who can affect or is affected by the achievements of the organization's objective. (Murman, Allen et al. 2002) This definition encompasses everyone from employees to customers, partners and society as a whole. Each decision that an organization makes can result in negative, positive or neutral reactions from the stakeholders. The model this paper discusses focuses on how external stakeholders can influence the decision making of organizational leadership and how those decisions are implemented within the organization.

Corporate law has well established that the primary goal of a corporation is to maximize profits for their shareholders. (1919) With the understanding that organizations operate solely within their personal self-interest, how are organizations controlled by their associations and prevailing laws? Regulatory compliance is achieved by aligning the interests of the regulated party with the regulators intent (in this case public wealth and health).

The government begins with the default presumption that, in a market economy, the public will reward companies that maximize their health and wealth. As such,

companies with quality products will grow and companies with inferior or dangerous products will eventually be pushed out of the market. However, relying on market self-regulation does not function in circumstances where the overall harm or cost of an organization's action exceeds the value conferred but is (1) so diffuse that it cannot be easily compared to the benefit (e.g. environmental depletion) (2) far removed in time or location from the organizational action (e.g. CFC environmental pollution) (Oye and Maxwell 1994) or (3) too extremely harmful that the cost of trial and error would be too excessive (e.g. significant death by adulterated products). The third circumstance was something we discussed at great length in the introduction. This extreme harm to the public prompted the majority of the laws giving rise to the FDA, federal food and drug regulations, and some internationally imposed research standards.

The circumstances of diffuse harm and far removed harm are something that has been collectively referred to as the tragedy of the commons, or the collective action dilemma. (Klandermans 2002, Ostrom 2014) Put simply, even though the overall harm of an organization's action exceeds the benefit of the action, in these circumstances the cost to the organization does not exceed the expected benefit of the organization's actions. As such the self-interested organization will proceed. (Oye and Maxwell 1994) If the legal or association control unit wants to prevent the organization from proceeding with these courses of action, then they have to increase the personal cost to the organization. For example, in the Grimshaw v. Ford Motor Co., the case of the exploding Pinto gas tanks, Ford moved forward with production and distribution of automobiles with known hazardous components (e.g. gas tanks that would explode in

some rear end collisions). (1981) The rationale behind this decision was essentially that the estimated cost of lawsuits would not exceed the additional organizational profit realized by not fixing the problem. To prevent similar decisions in the future, the government imposed and upheld significantly higher punitive damages, which made the actual cost of lawsuits significantly higher than the profits realized by not fixing the known defect.

Essentially, in order to control a self-interested organization, legal and association control units must find ways to allocate additional cost or reward to the organization to align the organization's self-interest with the public's interests. (Ashford and Heaton 1983) This can be done directly by the imposition of fines or penalties for violating specific constraints. For example, the EPA could issue fines for excess pollution, or the process can be accomplished indirectly by increasing the difficulty of performing certain undesirable tasks while decreasing the difficulty of performing certain desirable tasks. Remaining with the environmental example, there would likely be several more additional requirements when trying to open a new factory next to a wetland or wildlife preserve than when opening that same factory in a desolate uninhabited geographic area. Additionally, these constraints can come in the form of requiring a company to redirect resources, personnel or general efforts.

Government Regulation Protects Public from Organizations

Although most of today's industries that manufacture consumer goods are in some way regulated, there was a period of time were almost no industries were

regulated. The United States has one of the most heavily regulated medical industries in the world, yet for the first century of the United States' existence there was little to no regulation of medicine or medical devices. During this period of time, salesmen were selling untested, ineffective, and sometimes poisonous concoctions under the guise of "Miracle Cures." One of the most famous examples of ineffective miracle cures was the sale of snake oil in the 19th century. (FDA.gov 2011) Also, because there was no regulation of the manufacturing process, drugs that were tested and effective could become contaminated and dangerous. (Ballentine 1981, Zoon 2002)

If we were to follow the development of the United States' federal regulation of medical treatments and the creation of the Food and Drug Administration, the literature shows us that the development of the current system progressed gradually over the course of several decades. Most major developments were in response to major controversy or tragic circumstances, as the United States gradually moved from a market regulated medical industry to a government regulated medical industry. Examples of these cases include the following:

1) 1901 Tetanus Tragedy - Diphtheria is a serious infection of the nose and throat that is easily treated by vaccines today. In 1901, diphtheria patients were treated with antitoxins derived from horse blood. At this time the Food and Drug Administration did not exist, and laboratories that produced this treatment were completely unregulated. One such laboratory in St. Louis harvested a horse's blood for this purpose. However, the horse and the resulting treatments were

untested. And this particular horse was infected with tetanus, a bacterial infection that affects the nervous system causing painful muscle contraction and can lead to death. As a result, 13 children died from tetanus when given the diphtheria antitoxin. This prompted congress to pass the Biologics Control Act in 1902. (Zoon 2002)

2) 1937 Elixir Sulfanilamide Tragedy – As previously discussed the failure to test a new form of a previously utilized medical treatment caused the deaths of 107 people in 1937. (Ballentine 1981, Bren 2001) However, because of the laws of the time, the company could not be prosecuted for these wrongful deaths. This prompted congress to create legislation that would require testing before marketing any treatment to the public, and the Federal Food, Drug, and Cosmetic Act of 1938 was signed into law. (Ballentine 1981)
3) The Thalidomide Birth Defect Cases - In the 1950s and 1960s, pregnant women took Thalidomide to treat nausea. (Kim and Scialli 2011) Thalidomide was tested per then current FDA requirements and passed safety tests in animals. However, the tests were inadequate to determine the effects of the drug on fetuses. (Kim and Scialli 2011)The tests were not performed on pregnant animals. Later court proceedings revealed that the testing was inadequate and in some cases results were falsified. For this reason, it was not discovered that Thalidomide can cause birth defects when taken by pregnant women until between 5,000 and 12,000 babies (and an unknown number of aborted fetuses) were born with birth defects in 46 countries. (Teo, Stirling et al. 2005). From this

> tragedy another piece of legislation, the 1962 Drug Amendment, was passed to increase the integrity of safety studies and require the disclosure of any adverse events that occurred in a trial or with a drug's use. (Bren 2001)

These circumstances and their effect on legal regulations support the notion that the federal government allows industries to self-regulate under the assumption that market forces will cause effective self-regulation until a tragic event or controversy shows that the market forces are not sufficient. These controversies and tragic events that cause significant harm to the health, safety or well-being of the public create public outcry, which demands action by the government. This demand for action normally results in sweeping legislation that either reforms an industry or empowers a government agency to reform an industry.

Correcting Market Failures: The Legislative Goal of Regulating Industries

Throughout this paper, we have talked about FDA and OSHA self-reporting statutes. In those examples, parties were punished for failure to report. Mandatory self-reporting and audits are a typical scheme for government ensuring self-reporting in industry. Most of the areas where this punishment based participation incentive is utilized are where there is proven inability to self-govern (e.g. a tendency of an industry, if unmonitored, to perform actions that will cause significant harm to the public). Based on the organization of compliance systems in the United States, both legal and systems engineering scholars agree that a properly functioning government will only produce

regulation in areas where there would otherwise be market failures. (Maier 1996, Leveson 2011)

A market failure is defined in the literature as "the failure of a more or less idealized system of price-market institutions to sustain 'desirable' activities or to stop 'undesirable activities.'" The desirability of an activity, in turn, is evaluated relative to the solution values of some explicit or implied maximum welfare problem." (Bator 1958) In the idealized state referenced, an organization bears the majority of the cost and the majority of the reward for its actions. In this scenario, an organization in a market economy will only make decisions where the reward exceeds the cost. However, if the organization does not receive the majority of the reward for its action, but still receives the majority of the cost, the organization will likely cease activities that could have a net benefit to society (e.g. desirable activities). Conversely, if the organization does not receive the majority of the cost of its action, but still receives the majority of the reward, the organization will likely continue activities that would have a net harm to society (e.g. undesirable activities). In either of these scenarios, the market economy is failing to incentivize a self-interested person to act in a manner that has an overall benefit of society; thus the term market failure.

From the legal perspective regulations related to industries are generally designed to make companies absorb the costs of the negative externalities of their actions or incentivize desirable behavior. The allocation of negative externalities or positive incentives, more closely correlates the costs and benefits of a company's actions with the cost and benefit to the company, thus correcting market failure. This theory can

be most directly seen at work in antitrust jurisprudence in cases like Spectrum Sports, Inc. V. McQuillan. (1993) In the literature's model of regulatory compliance, the government is a system of systems. The concept of a hierarchically higher system (e.g. the government) acting to correct/fix failing subordinate systems (e.g. the market/associations) is the engineering theory "policy of triage" at work. The policy of triage simply says that the government should only give attention to markets that are failing. (Maier 1996, Leveson 2011)

Implicit in the understanding of government acting to correct market failures, is the understanding that government will leave function markets largely unregulated. The clearest example of this concept at work is a comparison of the regulations relating to the accounting profession and the legal profession as they progressed through the late 1990s and 2000s. During this period of time, both the legal profession and the banking industry were involved in several scandals involving fraud and unethical behavior. In that decade alone there were multiple major corporations found to have engaged in fraud and/or fraudulent financial reporting including: Sunbeam (1996-97), Waste Management (1997), Global Cross (2002), Xerox (1997-2000), WorldCom (2002), Anderson (2002), Healthsouth (2003), Tyco (2002), Adelphia Communications Cable (2001), Imclone Systems Inc. (2002). (Rockness and Rockness 2005) However, Enron (2001) was one of the worst examples of systemic fraud and caused an almost immediate congressional response in the form of the Sarbanes-Oxley Act. (Rockness and Rockness 2005)

While there is significant scholarly debate as to the effectiveness of the Sarbanes-Oxley Act, the act clearly more extensively regulated the accounting profession and

produced a few minor changes to the legal code of ethics. (2002, Bratton 2003, Coates 2007) One possible explanation for this was that, unlike the accounting profession, the legal profession's associations continuously updated their code of ethics to preemptively bar the unscrupulous practices that allowed these financial controversies to occur. This continual and proactive change to contractual regulation in the legal association preempted the need for additional legal regulations, thus showing that the legal industry was still responsive to market needs.

Challenges to Federal Regulation of Goods and Industries

Even in the context where the federal government becomes motivated to regulate industries where market motivation proves insufficient to produce favorable outcomes for the public, there were still legal and practical challenges to establishing this federal regulation.

As previously discussed, organizations seek to maximize profit, and associations seek to maximize their own utility. In both regards, participation is voluntary and there is a clear relationship between an incentive and effective communication/control. Operators participate in communication with the compliance unit within an organization because not doing so will get them fired; organizations participate in communication with association leadership because not doing so will get their membership revoked. However, what about the legal control unit?

Up until this point in our discussion, we have assumed that the legal control unit has the right to compel compliance with legal regulations by the organizations and

associations. In the 21st century, it is well established that the federal government has both the means and right to regulate goods and industries. However, that has not always been a foregone conclusion. In order to establish the federal regulatory system we have today, the federal government had to overcome three major hurdles: 1) Being a government of limited enumerated powers; 2) Dealing with issues of practicality when regulating evolving industries; and 3) Overcoming the sheer volume of companies and industry players needing to be regulated.

Establishing the Federal Government's Right to Regulate

"The powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people." (U.S. Const. amend. X). The Federal government as a whole is limited in authority, power and ability by the text of the constitution. In order for the federal government to have the ability to regulate goods and industries, congress would have had to be given the power to create such legislation in the constitution.

Specifically, congress is limited to the enumerated powers outlined in Article I, Section 8 of the U.S. Constitution. (Constitution 1787)

As such, the first major hurdle to federal regulation of industry and goods was to prove that such regulations would be within the bounds established by the United States Constitution. The constitutional clause that gives the federal government this authority rests in the clause "To regulate commerce with foreign nations, and among the several states, and with the Indian tribes;" This is called the commerce clause. The commerce

clause serves two functions: (1) acts as a source of congressional authority (2) acts implicitly as a limitation on state legislative power. (1824) These two functions were first articulated in Gibbons v. Ogden when the court made it clear that congress could regulate all commercial intercourse occurring between the states, even if the majority of the intercourse occurs within one state. The case further stated that in the federal statutes superseded any inconsistent state legislation. This established a clear right to regulate any commerce occurring between states and internationally. However, the case did not assert the right of the federal government to regulate commerce occurring completely within one state. Without that asserted right, a company could use the fact that they were small and did not ship out of state as a defense against FDA, OSHA, and EPA audits and sanctions.

The expansion of federal regulatory authority to explicitly include purely local actions came over the course of several years, and several cases. Some of the cases that shaped the federal government's right to regulate local behavior are as follows: In Swift & Co. V. U.S. congress asserts the authority to regulate things that will eventually enter the stream of interstate commerce even when they have not. (1905) This case involved regulation related to local cattle sales because those cattle would eventually be sold interstate. This meant that some local sales of goods can be regulated if it is intended for the secondary market to have interstate operations.

In Hipolite Egg Co. v. U.S., congress's passage of the Pure Food and Drug Act was put to the test. (1911) The act prevented the sale of adulterated products and allowed the federal government to seize adulterated products. Under this statute, congress seized

adulterated eggs that were not shipped interstate, once they arrived at their destination. Courts affirmed that congress had the right to regulate purely intrastate activities if it was enforcing bans on interstate transport.

In the Shreveport Rate Case (Houston & Texas Ry. v. United States) the court stated that Commerce Power included the right to regulate "All matters having such a close and substantial relation to interstate traffic that control is essential or appropriate to security of that traffic." (1914) This allowed the government to control intrastate commerce with a substantial economic effect on federally regulated interstate commerce. (1914)

Finally, in Wickard v. Fillburn, the "Cumulative effect theory" was introduced. Under this theory, a class of activities could be federally regulated even when one act alone might not have an interstate impact. (1942) This case is introduced last because it is seen as providing the absolute boundary for the federal government's regulating of local activity. In this case, a limit was set on how much wheat could be raised on each wheat farm that sold interstate and intrastate. Fillburn was a wheat farmer who grew and ate his own wheat. As such, he argued that the regulation could not apply to him because his actions were purely local. However, under the cumulative theory, although his personal growth of wheat could not affect interstate commerce, if numerous people made the same decision this would have a cumulative impact on interstate commerce. As such, this activity could be regulated. With these cases and several cases that affirmed or upheld these holdings, the courts confirmed the federal right to regulate local commerce.

Overcoming Expertise and Practical Limitations

In evolving industries, there are multiple constraints that make a prescriptive approach to regulating industry in congress impractical. First and foremost, Laws can take years to pass, whereas industries can evolve, both literally and figuratively, overnight. Industry pushes the bounds of the current understanding of science and technology. As such, constantly evolving fields cannot be regulated by the congressional passage of law.

Furthermore, congress has numerous enumerated responsibilities and a limited docket with which to operate. If every change to best practices relating to a specific industry required a congressional vote, there would be no time to handle the other affairs of the nation.

Nevertheless, even if congress could find a method for regulating with the frequency necessary to keep up with industry demands, and manage to handle the volume of regulation amendments, congress does not have the technical expertise necessary for the task. (Manning 2014) In order to generate best practices for all federally regulated industries, congress would need scientific knowledge that spans all technical industries. Whereas, of 438 seats in the House of Representatives and 100 seats in the Senate in 2014 (114 congress), congress had only: three physicians in the Senate, 15 physicians in the House, plus three dentists, three veterinarians, three psychologists (all in the House), an optometrist (in the Senate), a pharmacist (in the House), and four nurses (all in the House); (Manning 2014) one physicist, one microbiologist, one chemist, and eight engineers (all in the House, with the exception of one Senator who is

an engineer). (Manning 2014) In total, less than 10 percent of congress worked in the science, technology, engineering or mathematics fields. (Manning 2014)

In response to this issue of practicality, congress delegates authority to agencies. This is done by congress passing acts which create and fund an agency. In those acts, congress will also include legal regulations that make it illegal to perform certain activities. Thirdly the statutes can delegate the authority to enumerate the metrics and impermissible actions that correspond to these, now illegal, activities. This essentially allows the agency to regulate and police specific industries and/or areas of law.

Examples of this process include the formation of the Federal Trade Commission (FTC) and the formation of the Food and Drug Administration (FDA). The Federal Trade Commission was established by the Federal Trade Commission Act of 1914 which gave the commission the authority to prevent unfair trade practices. (Averitt 1979) The Food and Drug Administration was established by the Pure Food and Drugs Act of 1906, which gave the agency the authority to police and prevent the distribution of adulterated or misbranded drugs. (1906, Law and Libecap 2004)

Therefore, by delegating authority to regulate and police certain industries or areas of law to agencies, congress overcomes the issue of practicality. Members of agencies have significant experience in their policed industry and are often former members of that industry. They deal with these issues on a daily basis, which allows them to be more responsive to the needs of the industry. And they are given an area of specificity that removes other possible distractions.

However, agencies are limited by the parameters outlined in the laws that create them. (1906, Averitt 1979, Ballentine 1981, Zoon 2002, Law and Libecap 2004) This means that an agency created to ensure that organizations perform a specified task may create certain rules and understandings about how to perform that task, but cannot make rules about other tasks. If the agency reports or public outcry reveals issues where organizations are being compliant with the letter of the law, but still operating in a manner that harms public good, congress can respond by drafting more laws and/or more prescriptive laws to deal with these issues as they arise.

For example, initially, the FDA was not delegated the authority to review the process by which known safe drugs were manufactured. Thus, it was outside of the FDA's sphere to prevent properly labeled poison from being sold as medicine. As previously discussed, this fact caused significant loss of life in the consuming public. Even in circumstances like the Elixir of Sulfonamide tragedy, where poisonous medication was widely distributed, there was limited recourse for the FDA to punish such malfeasance. In the case of the Elixir of Sulfonamide tragedy, S. E. Massengill Company was only able to be sued for misbranding, which did not adequately address their negligence or the harm caused in this matter. The public's outrage over the incident caused the Federal Food, Drug, and Cosmetic Act of 1938 to be passed. (Ballentine 1981) This act expanded the authority of the FDA in a way that would allow them to prevent situations like the Elixir of Sulfanilamide tragedy from occurring.

Managing the Volume of Regulated Industries

The last major hurdle to federal regulation of evolving industries was the sheer number of companies, industries, and regulated activities. The Food and Drug Administration (FDA) has several departments each responsible for overseeing a particular industry. The medical device industry is overseen by the FDA's Center for Devices and Radiological Health. In 2012 there were reportedly less than 1,500 full-time equivalent employees in the FDA's Center for Devices and Radiological Health, yet there were more than 6,500 medical device companies in the United States. (FDA 2014, USA Select Commerce 2014) The Occupational Safety & Health Administration (OSHA) is tasked with ensuring safe and healthy work conditions for the American worker. This task means that OSHA must ensure the health and safety of over 125 million workers at more than 8 million different worksites across the entire nation. In spite of the daunting size of this task, there are only approximately 2,200 inspectors employed by OSHA. (OSHA 2014) That translates into each inspector being responsible for approximately 59,000 workers on average. (OSHA 2014) There are similar problems facing other agencies both on a state and federal level.

To address the volume of monitoring that must occur, congress and agencies have established self-reporting requirements. These requirements make it a punishable violation of regulations to not report certain information to a regulatory body. And to further incentivize reporting, the failure to report incidents are often times more severe crimes than the incidents themselves.

OSHA, through Title 29 CFR Part 1904 Recording and Reporting Occupational Injury and Illnesses, requires companies to report work-related incidents that result in the death, hospitalizations, and in some cases, injury, of their employees. (2001) Additionally, the company must keep records of any work related, or possible work-related incidents, injuries, hospitalizations, and deaths. In the case of an OSHA audit, these records will be turned over to OSHA agents for examination.

The FDA requires that any serious adverse event resulting from the use of a medical device or drug be reported. An adverse event is essentially any undesirable occurrence the patient experiences, which is associated with a medical product. An adverse event is considered serious if the patient outcome is death, life-threatening, hospitalization (this includes prolonging hospital stays), disability or permanent damage, congenital anomalies, birth defects, the patient requires intervention to prevent permanent impairment or damage, or the patient experiences other serious medical events. The requirement to report serious adverse events extends beyond the manufacturer to the health professionals, distributors, and clinical trial sites. There are numerous statutes related to the reporting of adverse events to a single designee for any given product. This designee must then submit a report to the FDA. (1986, 1986, 2005)

These are two examples of how mandatory self-reporting statutes are used to overcome the volume of regulated industries. By requiring these industries to synthesize and provide agencies with reports detailing relevant information, the agency is not required to sift through irrelevant information and thus can better manage industries significantly larger than themselves.

The self-reporting systems for aviation incidents take a different approach to ensuring public safety. In aviation, the reporting individual and the government share the goal of, not simply improving the individual/individual's organization, but also improving the overall industry. As such, pilots are more willing to disclose information to prevent future crashes for other pilots, than the typical research and development company can or will disclose. The government management of flight incident reports is handled by multiple agencies that use a combination of required and voluntary reporting. (Barach and Small 2000) Based on the type of report submitted, individuals involved may receive immunity and anonymity. This allows the industry as a whole to more quickly identify problems.

In all of the previously mentioned examples, it is clear that organizations are incentivized to self-report. However, reports are submitted by individuals, and especially in circumstances where the organizational leaders have decided to hide information, there can be negative consequences for an individual submitting agency reports. To further encourage self-reporting in these situations where the individual benefit of reporting might be far outweighed by the risk and harm of retaliation, the government has created anti-retaliation statutes and protections for disclosers when necessary. These statutes are commonly referred to as whistleblower statutes. (Callahan and Dworkin 2000, Earle and Madek 2007, Moberly 2007) For example, there are specific provisions that protect employees from being fired or discriminated against by employers when they report OSHA violation. In the context where an employer or another employee violates these statutes, there can be severe liability.

The discussion of the literature would not be complete if it was not noted that the effectiveness of whistleblower statutes is highly debated. Many scholars believe that the burden of proof for a plaintiff in one of these cases is too high and that the reward of returning to a now hostile work environment is not a sufficient incentive to voluntarily disclose. (Callahan and Dworkin 2000, Earle and Madek 2007, Moberly 2007) However, for the purposes of establishing this discussion, we will avoid addressing the effectiveness of laws and focus most directly on the legislative goals. In this case, the goal is clearly to encourage voluntary disclosures that might not otherwise happen.

Importance of Feedback

The importance of feedback is a topic that was already discussed in the previous section on Managing the Volume of Regulated Industries. In that section, we established that legal control units need feedback from regulated industries in order to manage the volume of regulated industries. Without feedback, the legal control unit would not be able to ensure properly received communication. This means that feedback is necessary to maintain effective communication, which is necessary for properly exercised control. While this topic was addressed specifically in relation to communication from government to industry, the necessity of feedback is present in all forms of communication.

The primary function of feedback is for the receiver to communicate back to the sender the understanding that the forward communication has created. (Trevino, Weaver et al. 1999, Hughes, Bagust et al. 2001) In the context being studied here where the

compliance unit communicating expectation to operators within an organization, feedback can come in numerous forms. These forms include both verbal/written communications, and communications through actions.

Communication through actions occurs when the receiver acts upon their understanding and the sender observes the result of their actions. An example of this kind of feedback communication would be if the compliance unit communicates instructions for constructing a circuit design to operators. In this example, operators would use those instructions to construct final products, and the compliance unit exams the process output. If the process output is within specifications and conforms to the communicated compliance metrics, then the communication was effective; if not, then the communication was ineffective.

In several industries, organizations are statutorily required to establish systems for receiving feedback through communication through actions. (1906, Motschman and Moore 1999, US Department of Labor 2001) Additionally, organizations are assessed greater civil and criminal law liability when they fail to establish some system for receiving and assessing communication through actions. This is why most manufacturing facilities have standard operating procedures requiring both quality control and quality assurance to examine process outputs. However, organizations that rely exclusively on communication through actions to receive feedback on the effectiveness of their forward communication are far less likely to be competitive in the marketplace, far more likely to create non-compliant process outputs, and more likely to be subject to lawsuits.

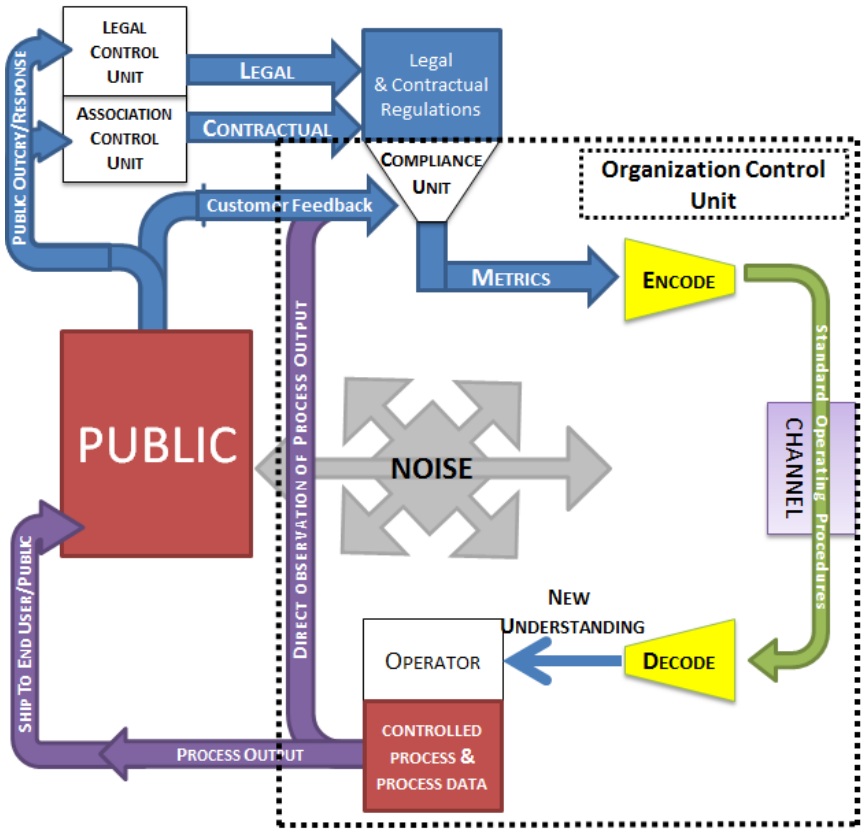

Figure 9: The Organization Control Unit's feedback loop when it is solely based on communication through actions. This drastically slows the communication process between the compliance unit and operators, and is less likely to allow the compliance unit the opportunity to address issues with process outputs before the public is exposed to possible harm. (Cortlan J. Wickliff's Model of Unmonitored Controlled Processes in Organizational Feedback Loops, 2016)

The reason that that communication through action is an ineffective method for communicating overall is because it only examines the effectiveness of forward communication after a completed or stable intermediary process output has been created. This means that either production will have to be stopped in order to examine the process output, or the process output will be shipped out to the public or into the next phase of production before proper assessment has been conducted. In either case, the organization will be losing money while the relatively smaller compliance unit tries to

review the output of operators who vastly outnumber them. (Dowdell, Govindaraj et al. 1992) Additionally, as was observed in the Elixir of Sulfonamide tragedy, you risk significant legal action against you and your industry if you rely exclusively on communication through action for feedback. (Ballentine 1981)

Verbal/written communication feedback is necessary to proactively identify a lack of effectiveness in forward communications within an organization, without the risk of involving the public, legal or association control units as with communication through action. (Morrison and Milliken 2000, Milliken, Morrison et al. 2003) These kinds of feedback communications can be divided into two subparts, voluntary and compulsory/mandatory communication. Examples of verbal/written communication feedback that are mandatory include assessment exams at the end of trainings, required report submissions, requirements to store and submit data, and any other communication that an SOP requires the operator to make. Examples of feedback that is voluntary include informal meetings with supervisors to discuss observed problems, operators asking questions during trainings, proactively sending emails to compliance unit members about possible issues, and any other form of communication that is not required by an SOP and is often initiated by operators. Note that even in mandatory feedback there can, and often should, be questions that allow for voluntary feedback (e.g. “Is there anything else you feel we should know,” “Can you think of anything that wasn’t mentioned,” etc.).

Organizations generally require mandatory verbal/written communication feedback from operators in any context where the organizations may be required to

provide mandatory feedback to the legal or association control unit. (Morrison and Milliken 2000, Milliken, Morrison et al. 2003) For example, most organizations require that any employee who experiences or observes an injury must report that injury to a member of the compliance unit. This is generally required because, in addition to wanting to prevent future injury and wanting to assess/file workers compensation claims, OSHA requires the disclosure of certain work-related injuries. (US Department of Labor 2001) Mandatory feedback information requirements are effective at collecting specific information that the sender knows to expect.

However, mandatory feedback, like communication through actions, has its limitation. Mandatory feedback requires that the sender knows what type of information to solicit. Thus, this kind of feedback removes the benefit of the receiver's experience in determining useful information and relies solely on the sender's expertise. In the case of compliance, the compliance unit is the sender and the operators, often performing technical tasks, are the receivers. In cases like OSHA injury reporting, it is easy to know what type of information the compliance unit should solicit (e.g. did somebody need time off, did they need to go to a doctor, did they need to go to a hospital or did they die). However, compliance units generally lack the scientific expertise and the bandwidth to create an exhaustive list of everything that operators should report as a possible issue in the process output. (Friedman, Gordon et al. 1988) Especially since manufacturers can be held liable for both intended uses as well as unintended but reasonably expected uses of a product. This is exacerbated when organizations create cutting-edge innovative technology.

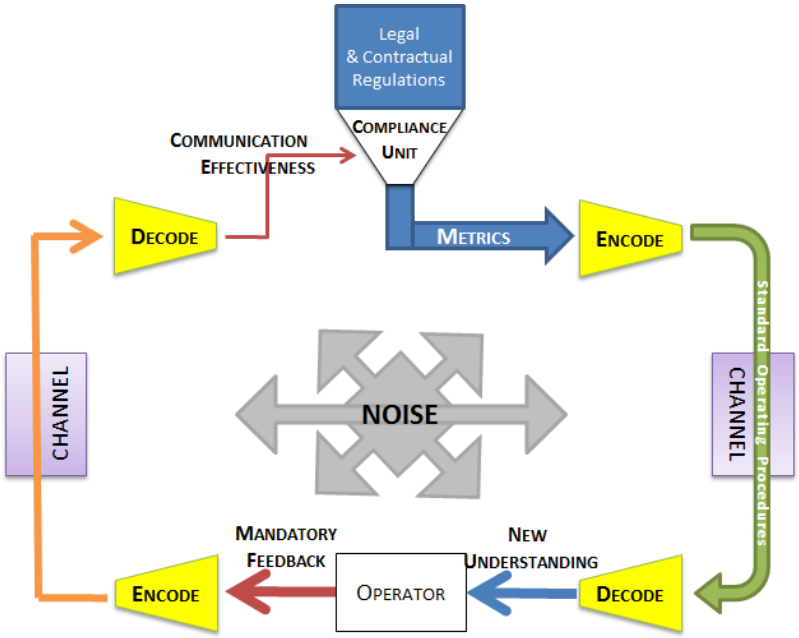

Figure 10: The Organization Control Unit's feedback loop when it is solely based on mandatory verbal/written feedback communication. In these circumstances, your feedback information is limited by the information in the forward communication. Thus, mandatory communication generally results in less feedback communication than a properly functioning voluntary verbal/written feedback communication loop. (Cortlan J. Wickliff's Model of Mandatory Organizational Feedback Loops, 2016)

Furthermore, the more stringent company's SOPs are, the more likely that company is to fail an audit. (Gogtay, Doshi et al. 2011) Thus, even if the compliance had the requisite knowledge to create exhaustive mandatory reporting standards for operator feedback, increasing the mandatory reporting requirements within an organization increases the possible divergences from SOPs. In regulated industries that are required to maintain and/or submit SOPs in order to be compliant (example: medical-related industries, and medical research and development), failure to comply with SOPs can be an offense even if the product output is compliant with all relevant metrics. As such, it can harm an organization to too explicitly articulate requirements in excess of the

regulatory metrics. Organizations may, instead, choose to rely on the expertise of operators and voluntary feedback.

Consider the example of an operator with enough experience in chemical manufacturing to detect possible issues in the manufacturing process based on slight discolorations in the product output. These kinds of detections may even be able to occur before the product output diverges from regulatory metrics. If a company tries to require mandatory disclosure of these kinds of color changes, their SOPs would become unnecessarily complex with colored pictures and diagrams. And, if there was ever a situation where a color change occurred for reasons completely unrelated to product quality (e.g. change in ambient building temperature due to seasonal changes), the operator would violate the SOPs if that operator failed to disclose such information. If such violations became commonplace, the organization risks an FDA warning letter in spite of their compliant product outputs.

Thus mandatory reporting requirements will either provide far less useful information as would be available from voluntary reporting, or it will create extraordinarily difficult SOPs to remember and comply with. Furthermore, with extensive mandatory reporting SOPs, comes the danger of information overload. Consider the mandatory reporting SOP that requires every piece of data collected to be reported to the compliance unit. This would certainly gather all relevant information for assessing the effectiveness of communicated SOPs. However, it would be near impossible for the compliance unit to process the volume of unimportant information that would accompany relevant feedback.

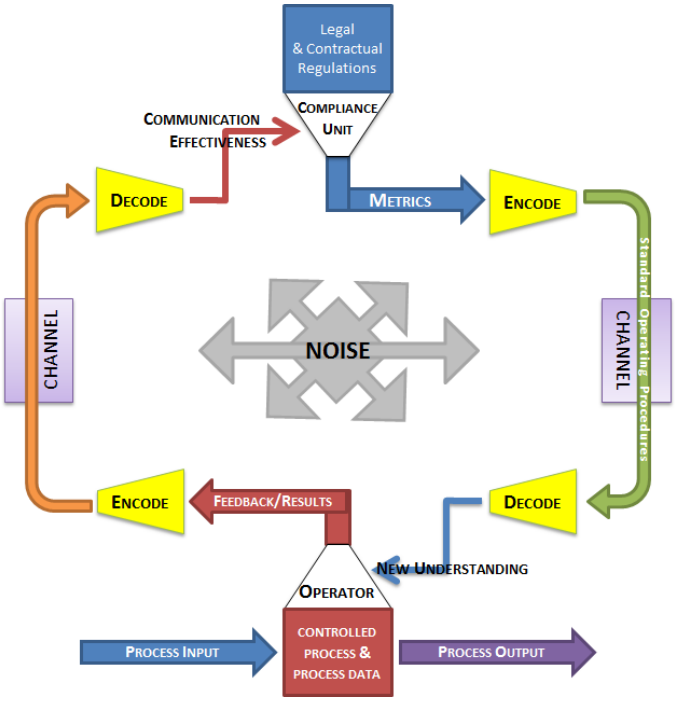

Figure 11: The Organization Control Unit's feedback loop when it is based on voluntary verbal/written feedback communication. In these circumstances, your feedback information is not limited to the information in the forward communication as with mandatory verbal/written feedback and is less costly than communication through actions. (Cortlan J. Wickliff's Expanded Model of Organizational Communication and Control in Voluntary Feedback Compliance Systems, 2016)

Thus, organizations cannot remain profitable and competitive in the marketplace only using communication through action and mandatory written/verbal feedback requirements. (Friedman, Gordon et al. 1988, Dowdell, Govindaraj et al. 1992, Brown 1998, Trevino, Weaver et al. 1999, Hughes, Bagust et al. 2001) Voluntary written/verbal feedback is imperative to maintain an optimally functioning compliance system. Voluntary feedback allows compliance units to utilize the scientific expertise of operators to identify information that threatens compliance, while minimizing the amount of additional procedures operators must comply with. Returning to our example

of the experienced operator who can detect possible issues based on color changes, if there was a mandatory disclosure requirement, it would require disclosures even in circumstances where the operator knew there was nothing wrong. Such disclosures would also probably require investigation, and could drain company resources unnecessarily. However, if voluntary reporting was utilized, the company could get the same benefits of being able to fix problems before products become noncompliant. This would be accomplished without the increased risk associated with mandatory feedback requirements which include and increased risk of non-compliance with SOPs, which is associated with a greater risk of FDA warning letters. Additionally, it is unlikely that an organization's compliance unit would have the technical expertise to draft and maintain an SOP that could properly capture technical judgment calls like changes in product color into a mandatory feedback SOP.

Allowing, often non-technical, compliance unit members to easily access the technical expertise of operators without increasing the complexity of SOPs is the primary benefit of voluntary written/verbal feedback communications. (Friedman, Gordon et al. 1988, Trevino, Weaver et al. 1999) As discussed in previous sections, voluntary communications can also be an effective method for overcoming the volume problem. Because of the relatively small size of an organization's compliance unit relative to the number of operators in that organization, prioritizing the temporal and monetary compliance unit resources can be a daily challenge for an organization. Voluntary communication can provide an effective method of prioritizing issues. For this reason, organizations expend significant resources annually trying to increase

voluntary feedback within the organization. Companies host retreats, team building exercises, and hire consultants to administer surveys all in efforts to create more teamwork and voluntary communication within the organization.

Because of the importance of this voluntary verbal/written feedback and the relatively large amount of money spent in this area, there has been significant research into how to encourage voluntary communication and the factors that stifle communication. Most of these efforts have focused on increasing communication within functional groups, teams, or direct reports. The studies have looked very heavily on how feedback and communication occur between senders and receivers who are one or two levels above or below the sender in an organizational hierarchy. Additionally, these studies have exclusively focused on communication within a single reporting structure of an organization's hierarchy. This study will take the novel vantage point of researching methods for increasing communication across functional groups and between different reporting structures within an organizational hierarchy.

Research into this kind of feedback is important because it is the basis by which compliance units assess whether a compliance method has been properly received by operators. In a compliance context, the sender (e.g. the compliance unit) and receivers (e.g. operators) tend to be from different functional groups, teams, and hierarchical chains. As such, feedback across functional groups and between different reporting structures within an organizational hierarchy is how compliance units ensure effective communication of compliance messages. As stated throughout this chapter, without an effectively communicated compliance message, organizations and organizational

leadership cannot control operator compliance with relevant regulations. Failures of operators to proactively comply with relevant regulations can result in large organizational losses (e.g. lawsuits, recalls, repairs, reorganizing manufacturing, etc.) and significant inefficiency in the engineering process (e.g. manufacturing and research engineers will have to rework designs when non-compliance is communicated through actions).

Understanding the Limits to Communication

The literature related to communication within an organization usually divides communication into upward communication and downward communication. Generally, communication in any direction can be affected by each of the following factors: Communication Apprehension, Selective Perception, Emotions, Language, Silence, and Information Overload. These factors can affect the way that a message is encoded (ex. Communication Apprehension), how a message is decoded (ex. Information Overload) or both the encoding and decoding process (ex. Language). Likewise, the literature shows that the effectiveness of communication can be affected by perceptions of the credibility of the sender. The literature shows that a receiver who has low perceptions of the credibility of a message sender tends to find the sender less believable and less trusted. (Giffin 1967, Teven and McCroskey 1997) As such low perceptions of the credibility of the sender reduces the likelihood that properly communicated information is likely to be acted upon or incorporated into the receiver's understanding. (McCroskey and Teven 1999) Additionally, increased perception of the sender's credibility has been

linked generally to perceptions of the sender's likeability as well. (McCroskey and Teven 1999) In the case of this study, this previous research indicates that the forward communication going from the compliance unit to the operators can have reduced effectiveness if the compliance unit is perceived as having low credibility. This reduced effectiveness is due to the operators being less willing to believe compliance messages when sent from a non-credible source and thus less willing to adopt the metrics into their daily jobs.

Additionally, the literature suggests that upward communication is strongly affected by filtering. This would be a sender intentionally redacting parts of a complete message. In the case of this study, upward communication would be voluntary feedback communication going from the operators to the compliance unit. Thus, previous researchers have shown that operators will, for any number of reasons, fail to voluntarily engage in feedback communication.

Note that not all filtering is negative or counterproductive. In previous sections, we have discussed how management is generally outnumbered by their direct and indirect reports. Without the effective and reasonable use of filtering in upwards communication, management in general and the compliance unit specifically could be inundated with far too much information to process. This problem can be compounded by the fact that there are often knowledge boundaries that run between managers and the people that report to them. Thus a lot of information, if not filtered, could be outside the manager's ability to understand.

Additionally, there are some forms of personal information that would be disruptive if disclosed in a corporate environment. Examples include disclosures that would violate our traditional understanding of workplace etiquette or political correctness. Thus there are forms of filtering that can be positive and productive limitations on upwards communication.

One major cause of filtering that is counterproductive is Communication Apprehension. Communication Apprehension is when a person experiences excess tension and anxiety when engaging in communication. (Robbins and Judge 2013) Someone experiencing communication apprehension will seek to avoid engaging in the type of communication creating apprehension or communication with the source of their apprehension. (Robbins and Judge 2013)

Communication apprehension exists on a continuum. (McCroskey 1983) This continuum goes from Trait like communication apprehension, which is the most general, to situational communication apprehension, which the most narrow. (McCroskey, Daly et al. 1984, McCroskey, Beatty et al. 1985, Beatty, McCroskey et al. 1998)

Trait-like communication apprehension is more of a personality trait that endures and spans a wide array of situations. (McCroskey 1983) A person with high trait-like communication apprehension will generally avoid communication across mediums and situations. Generalized-Context Communication Apprehension is a step away from the trait-like communication apprehension, but it still can be viewed as an enduring personality trait. However, Generalized-Context Communication Apprehension is context specific. (McCroskey 1983) An example of high generalized-context

communication apprehension would be someone who is a highly communicative writer but is deathly afraid of public speaking. Person-Group Communication apprehension is associated with communicating with a specific individual or group. Low person-group communication apprehension would be being abnormally comfortable talking with a specific person, while being generally nervous communicating with others.

Whereas, situational communication apprehension is a form of communication apprehension that is both person/group and context specific. (McCroskey 1983) Thus a person with high situational communication apprehension would be apprehensive about communicating with a person in a specific circumstance. Whereas, communicating with that same person in a different circumstance may not generate a feeling of apprehension. Thus, an employee can be nervous communicating with their supervisor in the context of making a presentation, but comfortable talking to their boss in a casual circumstance. As such, evaluations of situational communication apprehension cannot be presumed to correlate to any form of more general communication apprehension. (McCroskey 1983)

The Link Between Credibility and Communication Apprehension

As previously discussed, credibility and communication apprehension have been independently correlated with aspects of communication effectiveness. Thus the literature shows that credible sources of information are perceived as more believable and trusted. (Giffin 1967, Teven and McCroskey 1997) Credibility has also been linked to improved perception of communication effectiveness.

Additionally, there have been studies to show that increased communication apprehension reduces one's willingness to self-report, which is a reduction in voluntary verbal/written feedback. (McCroskey 1976, McCroskey and Richmond 1977) Also, high communication apprehension has been linked to low self-esteem, which in turn has been linked to less successful task performance and lower self-efficacy. (McCroskey, Richmond et al. 1977, Brockner 1979, Gist and Mitchell 1992) Additionally, high communication apprehension has been linked to lower organizational retention and lower individual success; conversely, low communication apprehension has been linked to quicker organizational integration. (McCroskey, Booth-Butterfield et al. 1989) Furthermore, group members with high communication apprehension are less likely to effectively integrate into groups and are less likely to be substantive contributors. (Wells 1970, Burgoon 1974, McCroskey 1976, Sorensen and McCroskey 1977)

There have even been studies that have correlated perceptions of credibility to communication apprehension. In other research, reduced communication apprehension of a communication sender has been linked to increases in perception of the credibility of that sender. (Cole and McCroskey 2003)

However, research has not been conducted to give specific guidance on how a sender's credibility can foster feedback communication. As such, no research has been done as to how perceptions of the credibility of a sender can affect communication apprehension towards that sender.

This research will be a novel expansion on current literature because it will test the relationship between a receiver's perception of a sender's credibility and that

receiver's communication apprehension towards that sender. As such, the current research, though grounded in the literature, is unique.

This research was developed to address this need to understand the relationship between sender credibility and receiver's willingness to engage in feedback communication. This study will examine three factors of credibility, Competence, Trustworthiness, and Caring/Goodwill, and test their relationship to situational communication apprehension. This study's primary purpose is to increase the literature's understanding of how to maximize compliance in a technical organization. This will be done by examining the relationship between a sender's perceived credibility with the communication apprehension of a receiver engaging in feedback communication from a hierarchically lower position in the same technical organization.

This study is significant because it will better allow organizations to prevent harm to the public, by allowing them to more quickly respond to internal issues with SOPs and issues with products (e.g. recalls, corrective action, etc.). This research will explore the effect that internal organizational perceptions can have on the effectiveness of communication. As previously discussed, effective communication within an organization is necessary for organizational responsiveness to both external and internal issues. (Leavitt and Mueller 1951, Jorgenson and Papciak 1981, Maltz and Kohli 1996) In a technical environment, failure to be responsive to new information can be the difference between life and death, both for your company and for your consumer.

CHAPTER III

METHODOLOGY

This study seeks to determine the relationship between the perceived credibility of a sender (i.e. their perceived Competence, Trustworthiness, and Caring/Goodwill) and the apprehension of a receiver to engage in feedback communication with them. In this study, receivers were surveyed who are in a hierarchically lower position than the sender within an organization and data was collected relating to situations where the receiver had to communicate with the sender.

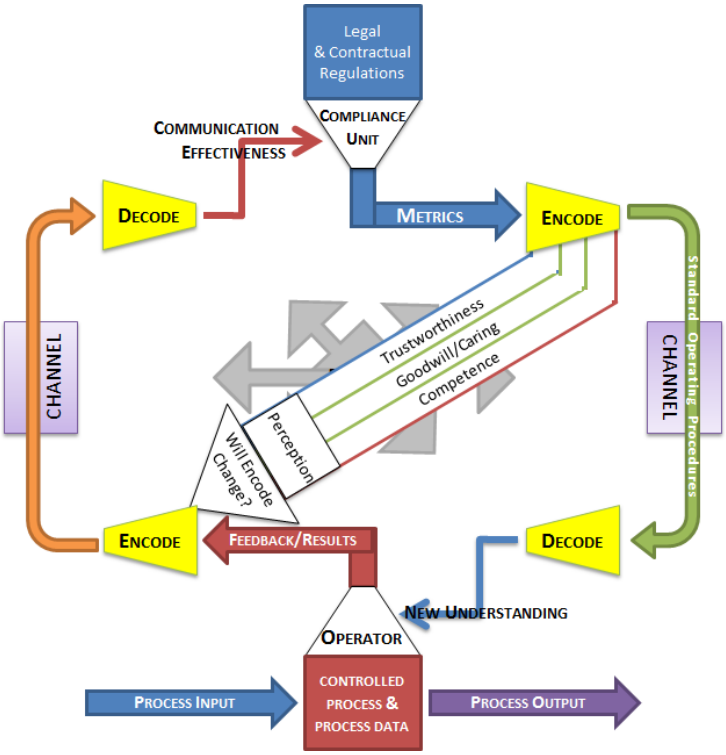

Figure 12: This proposed research interacts with the Organization Control Unit's communication loop by connecting the two encoding modules. This proposed research will show whether the factors of perception can change the willingness of the receiver to engage in feedback communication by understanding their interaction with the receiver's communication apprehension. (Cortlan J. Wickliff's Expanded Hypothesized Model of an Organizational Communication and Control Loop in a Compliance System, 2016)

Hypotheses

1. There is a relationship between the receiver's perceptions of the sender and the communication apprehension of the receiver towards that sender.
2. The Competence of a sender has a positive relationship to the communication apprehension of the receiver towards that sender.
3. The Trustworthiness of a sender has a negative relationship to the communication apprehension of the receiver towards that sender.
4. The Caring/Goodwill of a sender has a negative relationship to the communication apprehension of the receiver towards that sender.

Survey Population

The survey population consisted of operators as defined in this paper. This means that the survey respondents can include any person in an organization performing federally regulated tasks. This included organizational employees from entry level positions up to executive leadership in organizations that ranged in size and depth.

This study focused on organizations in federally regulated and technical industries. Examples of industries considered for this study are medical, food manufacturing, semiconductors, oil & gas, energy, high tech, and other similarly regulated technical industries. The ideal organization was sufficient in size to have a compliance unit that is separate from its operators.

Survey Questions

The survey instrument consists of 3 sets of questions. The first set consisted of demographic questions. The questions relate to the respondent's tenure with the company, years of experience in their field, gender, level of education and their background (e.g. technical, legal, administrative, etc.). In addition to the personal demographic questions, there are also company demographic questions. These questions relate to the size of the company and the industry in which the company operates.

The second set consisted of questions relate to the survey respondent's perception of the credibility of a member of the compliance unit with which they have communicated. These questions were taken from a Credibility Survey instrument used by Dr. McCroskey to assess the 3 factors of credibility (i.e. Competence, Caring/Goodwill, and Trustworthiness). (McCroskey and Teven 1999) These survey questions were used to generate three scores for each of the three factors of perceived credibility. The higher the score, the more positively the receiver perceives the sender in a given credibility factor. These scores cannot be combined because Competence, Caring/Goodwill, and Trustworthiness are independent measures of credibility. This can be seen as an assessment of the perception of a sender's persuasiveness from the perspective of the receiver. These credibility survey questions have been validated (alpha = 0.80 – 0.94), and extensively used.

The final set of questions relates to the receiver's communication apprehension. These questions were taken from a Situational Communication Apprehension Measure (SCAM) Survey instrument. (Richmond 1978) These questions assess a receiver's

communication apprehension when specifically communicating with a member of the compliance unit about a subject matter related to compliance. These survey questions are used to generate a number called a Situational Communication Apprehension Measure (SCAM) number. This SCAM number can be seen as a reflection of the receiver's unwillingness to initiate or participate in conversations with the sender. As such, the higher the SCAM number the less willing the receiver is to engage in voluntary feedback with the sender. These situational communication apprehension survey questions have also been validated (alpha = 0.85 – 0.90), and extensively used.

Survey Administration

The survey administration process was divided into two phases. The first phase consisted of an interview process with a small group of 3-10 members. The goal of this interview process was to identify alternative plausible explanations not currently captured by the demographic survey questions, and any areas where additional clarification could be useful. After receiving IRB approval, the data was captured as a qualitative study.

Prior to the second phase of the survey administration, the anonymous survey instrument was updated with additional questions and edits generated from the first phase. After the survey was updated, it was administered via an anonymous portal as described in this chapter.

Statistical Analysis

There were three sets of statistical analysis performed on the data: 1) Descriptive Statistical Analysis 2) Relationship Analysis and 3) Demographic Relationship Analysis.

The Descriptive Statistical Analysis compared different demographic subsets with communication apprehension measures. This was done to show if there were any subset of the data that had a greater tendency to feel apprehensive about communication in the workplace. This analysis also could possibly show what industries, departments, and positions have a lower tendency towards feeling apprehensive about communicating with the compliance unit.

The next set of statistical analysis tested whether a relationship exists between apprehension of communication towards the compliance unit and perceptions of the credibility of the compliance unit. The analysis was done between the:

a) Situational Communication Apprehension Measure (SCAM) number and the Competence score,

b) SCAM number and the Caring/Goodwill score, and

c) SCAM number and the Trustworthiness score.

These assessed whether a relationship exists between the receiver's communication apprehension and the receiver's perception of the sender's credibility. These relationships were tested using multiple statistical analysis methods including, but is not limited to, analysis of variance, multivariate analyses, and regression analyses.

The final set of statistical analysis that was performed tested for statistically significant changes in SCAM based on demographic subsets. This involved, where statistically possible, dividing the data into demographic subsets and performing to test whether there is a relationship with SCAM. This analysis was done to determine if there were SCAM changes across demographic groups. For example, this analysis may assess whether there is a change in the relationships between SCAM and credibility based on tenure.

This last analysis was accomplished utilizing a multivariate analysis that test for statistically significant changes in the data based on predictive factors in addition to credibility. By analyzing the result of this analysis, there can be a clearer understanding of both the relationship between perceptions of credibility and SCAM, and the relationship between SCAM and demographics and other perceptions.

CHAPTER IV

ANALYSIS AND RESULTS

Phase 1

The purpose of this phase of the study was to identify alternative plausible explanations for variances in data outputs not accounted for in the initial survey instrument questions. Ten subjects (S1, S2, S3[N3], S4[A4], S5, S6[R6], S7[K7], S8, S9[M9], and S10[R10]) from various backgrounds, industries, and experience levels were given the initial survey instrument and asked the following questions.

Q1 – Were the Instructions clear, and easy to understand?

Q2 – Were there any questions you found confusing? Or ambiguous?

Q3 – Was there additional information you wish you would have been asked for so that you could better explain your experience?

Q4 – What improvements, if any, could be made to the survey instrument?

Q5 – What do you think the purpose of this survey instrument was?

Q6 – Is there any other information you want to share about your communication experience?

The initial six questions were combined with observed difficulties that the subject had while taking the survey instrument. The 10 subjects in this phase all identified as Black/African-American. They were asked the following additional questions

Q7 – Was your work environment majority-minority?

Q8a – If not, have you ever worked in a majority-minority environment?

Q8b – If so, have you ever worked in an environment that was not majority-minority?

Q9 – If so, did you feel more comfortable communicating with people in the majority-minority, or the non-majority-minority environment?

Q10 – Why?

Demographics

The demographics of this initial study were a wide cross section of the total potential applicants of the Phase 2 study. The volunteers selected were from varied backgrounds, but all self-identified as "Black or African American." The demographics of this phase of the study were 4 engineers, 3 teachers, 2 nurses and 1 lawyer; survey respondents consisted of 8 females and 2 males. The subjects ranged in work experience from less than a year of work to over 25 years of work experience and ranged in education from some college to doctorates. The industries represented were healthcare, oil/gas/energy, technical consulting, ".com", and education.

Results and Conclusions of Phase 1

Phase 1 data can be found in Appendix F "Phase 1 Data Sheet" and Appendix G "Phase 1 Interview Responses." The primary result of Phase 1 was the identification of several alternative plausible explanations that had not been accounted for in the original survey instruments (e.g. circumstances surrounding the conversation, frequency of communication, etc.). Additionally, several necessary points of clarification were identified in the survey instrument (e.g. several respondents were confused about the

subject of questions based on changes in tenses, clarification of the definition of Compliance Unit, etc.). Additionally, specific to the medical and educational professions, there were several of the demographic questions that were interpreted as not being applicable based on their phrasing of the questions or answer choices (e.g. 'What is your background?' did not list medical as a choice; 'site vs company size' did not specify whether the school was the company or the site). Ultimately, this resulted in the addition of several questions and answer choices; as well as the rewording of several questions. The differences can be seen by comparing changes from Appendix B "Phase 1 Survey Instrument" to Appendix C "Phase 2 Survey Instrument."

As will be discussed in Phase 2, there was one predictive variable in addition to credibility that had statistical significance, as well as 5 other predictive variables with marginal statistical significance. During the pre-interview Alternative-Plausible Explanation analysis, researchers engaged in the process of identifying other possible causes of variation in SCAM besides Credibility. During this process, several questions and answer choices were added, including two of the five questions which were ultimately a source of marginal statistical significance in Phase 2 (Q7 and P3Q6). Additionally, several questions and answer responses were added as a direct result of the interviews conducted in Phase 1. These additional questions accounted for one of three overall predictive variables with statistical significance identified in Phase 2, and the factor with statistical significance that was not credibility (P2Q20). Additionally, one other predictive variable with marginal statistical significance was added based on these interviews (P2Q19).

The answer choices added to existing questions as a result of the Phase 1 interviews had a significant impact on the responses. Of the answers to these questions, between 13% - 37% of the responses were from the new answer choices. Overall, on average, 26% of the answers to modified questions were new answer choices added as a result of Phase 1 interviews.

This phase of the study was too limited to find statistically significant relationships between each subject's SCAM and credibility scores. However, the interview questions provide insight into factors that can affect a subject's willingness to communicate. By choosing subjects who all self-identified as minorities, the study results increased the possibility that the subject would have worked in an environment where they were both part of the cultural majority as well as the minority. Of the ten subjects interviewed, seven of them had worked in both a majority-minority and majority-White/Caucasian environment. Of those seven, five reported feeling more comfortable communicating in the majority-minority environment (one reported feeling more comfortable initially but gradually forcing themselves to become neutral), one reported feeling more comfortable communicating in the majority-White/Caucasian environment and one reported the same comfort level communicating in both environments.

Three of the respondents (S3, S4, and S6) attributed their higher level of comfort communicating in a majority-minority environment to the ability of people in the majority-minority environment to understand their lexicon. The subjects expressed a need to alter their speech and behavior patterns in order to be accepted and/or

understood in a majority-White/Caucasian environment. They juxtaposed this scenario, to feeling like in a majority minority environment they were permitted to communicate in a natural fashion.

One respondent (S9) expressed that they were initially more comfortable in the majority-minority environment, but gradually moved to being equally as comfortable in both environments. In this case, the respondent had initially worked in a majority-minority environment and later in their career transitioned into the majority-White/Caucasian environment. The respondent expressed that they were forced to become more comfortable communicating in the majority-White/Caucasian environment over the course of their career in order to be successful in industry.

One of the respondents (S1) who expressed a greater comfort level with communicating in a majority minority environment attributed this difference in comfort level to the difference in organizational structure. The majority-minority environment was a smaller more intimate company, and the reporting structure was flatter. This respondent attributed their reduced comfort in the majority-White/Caucasian organization to the fact that the organization was much larger, and even though they felt comfortable with their manager, the manager was essentially a middle manager with little authority. Thus the respondent felt, less comfortable communicating in this hierarchy because there was a greater likelihood that their words could be misconstrued or altered when being communicated to the much less compassionate manager's supervisor.

One respondent (S2) expressed that they felt equally as comfortable in both their majority-minority environment as they did in their majority-White/Caucasian environment. They attributed this to the fact that they had good managers throughout their career, and each of their managers (regardless of the ethnicity) had faith in the respondent's work ethic.

There was only one respondent (S5) who expressed that they felt more comfortable in the majority-White/Caucasian environment. The rationale was that this respondent was high-level management in their organization. Thus, the respondent was comparing the difficulty of being a Black or African American and managing other minorities vs. White/Caucasian people. In the majority minority environment, the respondent expressed difficulty dealing with the more relaxed communication of her subordinates. Additionally, they expressed difficulty placing minorities in home healthcare for elderly customers because of increased discrimination towards minorities by their customers. Conversely, the respondent observed less discomfort among elderly customers when having White/Caucasian people in their homes.

A qualitative analysis of these responses supports the conclusion that a person's comfort communicating in a work environment can be impacted by their perception that their communication will: 1. be easily understood, and 2. positively impact their ability to effectively do their job.

Respondents S2, S3, S4, and S6 all determined their comfort in their environment based on their ability to communicate naturally with their coworkers and not be misunderstood. The fact that respondent S2 could be understood effectively in both

majority-minority and majority-White/Caucasian environments resulted in an equal level of comfort between both environments. Whereas, respondents S3, S4, and S6 felt they would be misunderstood if they communicated in a natural fashion within the majority-White/Caucasian environments; thus, they were less comfortable communicating in these environments.

Although there is evidence to suggest that there is a desire to be understood or not misunderstood, there is not enough evidence to clearly state whether this desire is based on the respondents only wanting to communicate when they know the receiver will correctly interpret their message, or if it is a desire for their communication not to result in diminished perception by the receiver of the respondent's Credibility. In the case of the three respondents who were more comfortable in majority-minority environments, their perception of an inability to communicate naturally in majority-White/Caucasian environments could have been the belief that, even if the message was properly interpreted, the receiver would misunderstand their communication style or lexicon as being indicative of negative Credibility traits.

Additionally, respondents S1, S9, and S5 related their comfort communicating to expected outcomes. Each expressed feeling comfortable communicating in an environment when that communication would result in greater overall success. With respondent S1 and S5, they were more reluctant to communicate when they perceived that the communication would not achieve their desired result. Additionally, respondent S9 became more comfortable communicating when it became clear that communication would increase overall task success.

The Phase 2 analysis established a stronger understanding of which factors impact Situational Communication Apprehension. Based on the Phase 1 results, the Phase 2 analysis compared relative communication apprehension with factors that are more likely to result in a shared lexicon (e.g. similar background, years with the company, same department, etc.) and factors that are more indicative of a stable perception of the employee by the supervisor (e.g. frequency of communication, circumstances of communication, nature of relationship, etc.).

Note that there is not enough data collected in this study to suggest that race, ethnicity, or cultural background has a direct effect on willingness to communicate within a work environment. Phase 2 of this study examined, among other factors, whether there was evidence to support that race/ethnicity similarities between managers and employees reduce communication apprehension. However, in order for a model to speak conclusively on diversity's impact on communication within an organization, that model would have to address intersectionality (e.g. the study of how a subject's multiple identities [e.g. gender, ethnicity, background, etc.] interconnect to generate their responses to an environment as well as their environment's response to them) (McCall 2005, Nash 2008).

Additionally, especially in the context of diversity of personal or professional backgrounds, the goal of reducing communication apprehension must also be balanced against the goal of maintaining or increasing innovation and/or production efficiency. For example, the results of Phase 2 may show evidence that employing several employees with different educational backgrounds will result in an increase of

communication apprehension. However, these results could not be interpreted to mean that a company would more efficiently comply with laws if everyone in the company had the same educational background, because a company would have difficulty functioning if every employee had the exact same education.

Phase 2

This phase of the research was a fully anonymous survey instrument. The data collected using this survey instrument is summarized in this section. Additionally, there are descriptions of the respondent demographics, information about how data was encoded and analyzed, and analysis results.

Demographic Raw Data

There were 346 total respondents to the survey instrument. These respondents were from more than 30 different departments in organizations that ranged in size from less than 10 employees to over 10,000 employees. Respondents were members of 18 different industries, with the majority of respondents being from the Education, Government, Healthcare or Legal fields ($n_{Education} = 76$, $n_{Government} = 48$, $n_{Healthcare} = 48$, $n_{Legal} = 22$).

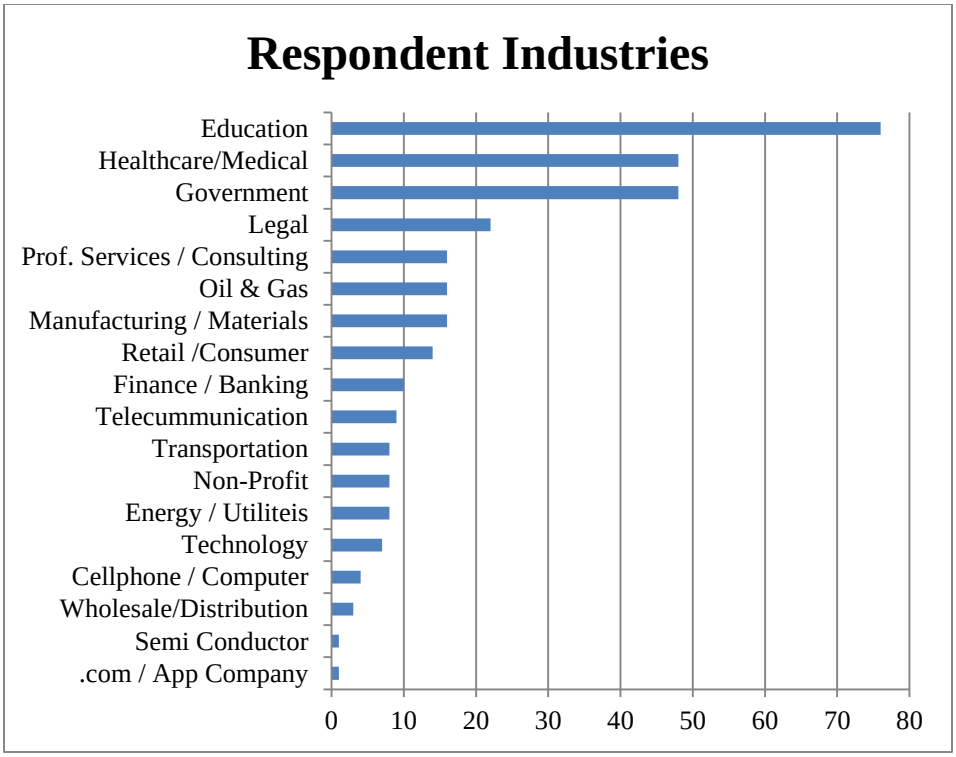

Figure 13: Respondent industry

Of the total respondents, approximately 70.8% were regular full-time employees at the time of their communication with a compliance officer ($n_{fulltime} = 245$) whereas 10.2% were management or executive leadership ($n_{management} = 33$). Only 46 respondents were not full-time employees; 5.9% of total respondents were part-time employees, 3.5% were consultants, 3.1% were interns, and 1.5% was temporary employees. There were 22 respondents that skipped the questions (approx. 6.4%).

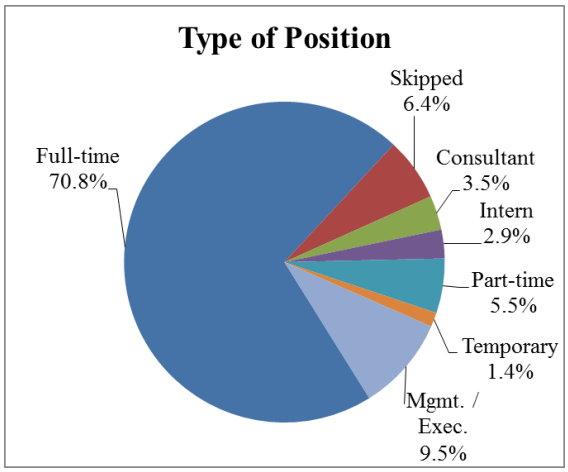

Figure 14: The type of position the respondent had in the organization.

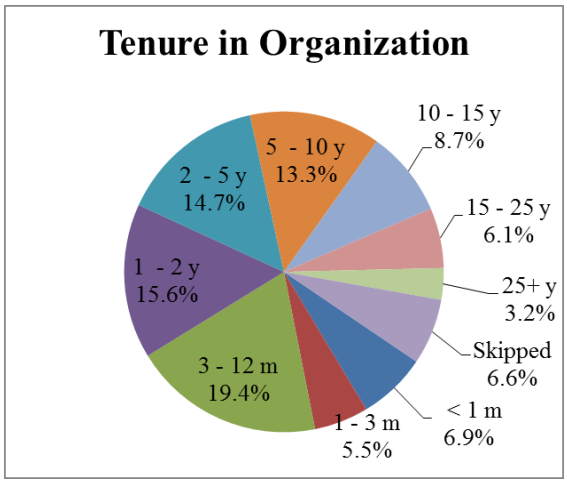

Figure 15: The amount of time the respondent spent working at the organization.

The respondent's tenure in their organization ranged from less than a month to over 25 years. Approximately 31.8% of the respondents had been with their organization for less than one year at the time of the conversation with their compliance officer ($n_{<1m}$ = 24, $n_{1\text{-}3m}$ = 19, $n_{3\text{-}12m}$ = 67). Approximately 43.6% of respondents had been with their organization 1-10 years at the time of their compliance conversation ($n_{1\text{-}2y}$ = 54, $n_{2\text{-}5y}$ = 51, $n_{5\text{-}10y}$ = 51). Whereas, about 15.7% of the respondents reported having been with their organization for 10 -25 years at the time of their compliance conversation ($n_{10\text{-}15y}$ = 30, $n_{15\text{-}25y}$ = 21), only 3.2% were with their organization for more than 25 years (n_{25+y} = 11). There were 23 respondents that skipped the questions (approx. 6.6%).

Related to the tenure is the number of years that a person has worked with the compliance officer they were having a conversation with. Not surprisingly the distribution of respondents' responses moves towards shorter time spans. This is because, generally, employees have not had an opportunity to work with an

organization's compliance officer before starting to work at the organization. Approximately 39.0% of the respondents had worked with their compliance officer for less than one year at the time of their conversation with them ($n_{<1m}$ = 38, $n_{1\text{-}3m}$ = 32, $n_{3\text{-}12m}$ = 65). Approximately 53.8% of respondents had worked with their compliance officer 1-10 years at the time of their compliance conversation ($n_{1\text{-}2y}$ = 74, $n_{2\text{-}5y}$ = 71, $n_{5\text{-}10y}$ = 41). Whereas, about 4.3% of the respondents reported having worked with their compliance officer between 10 -25 years at the time of their compliance conversation ($n_{10\text{-}15y}$ = 9, $n_{15\text{-}25y}$ = 6), and only 1.7% had worked with their compliance officer more than 25 years (n_{25+y} = 6). There were only 4 respondents that skipped the questions (approx. 1.2%).

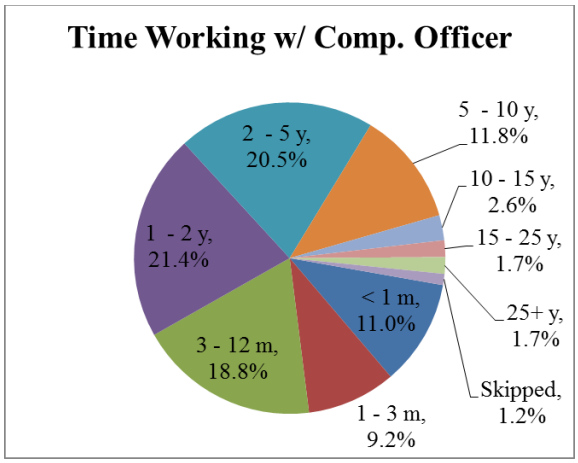

Figure 16: Time the respondent worked with compliance officer.

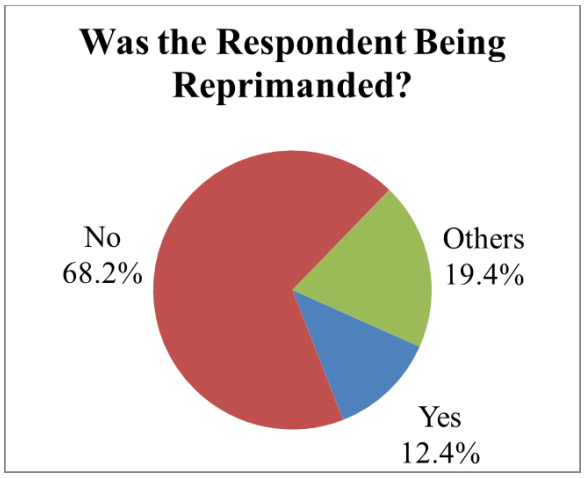

Figure 17: Was this conversation initiated as a result of the respondent or others being suspected of wrongdoing.

Additionally, respondents disclosed information about the nature of the conversation and the type of meeting in which the conversation took place. About 12.4% of respondents stated that the conversation with the compliance officer was because the

compliance officer believed the respondent had done something wrong/improper (n_{yes} = 43). Additionally, approximately 19.4% of respondents reported that the conversation took place because someone else was believed to have done something wrong or improper (n_{others} = 67). Whereas, the majority of respondents stated that the conversation with their compliance officer did not occur as a result of anyone having done something improper or wrong (68.2%, n_{no} = 236). None of the respondents skipped this question (0%).

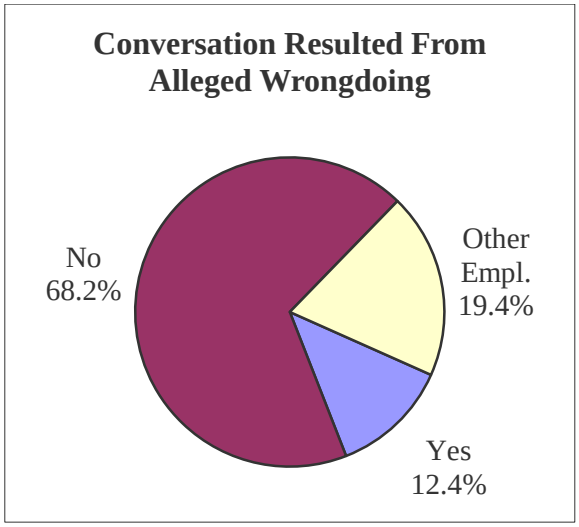

Figure 18: Did this conversation occur because this supervisor/compliance-officer thought you did something wrong/improper?

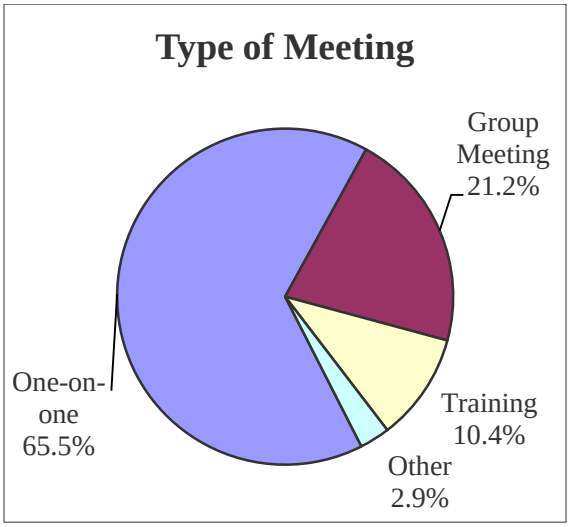

Figure 19: Type of meeting

When asked, in what type of meeting did this conversation occurred, 65.3% of respondents said a one-on-one meeting, 21.1% of respondents said a group meeting, and 10.4% of respondents said a training (n_{1on1} = 226, n_{group} = 73, $n_{training}$ = 36). Ten of the respondents selected other (2.9%), and only one respondent skipped the question.

In addition to the organizational and conversation related demographic questions, the respondents disclosed demographic data about themselves and their compliance officers. Approximately 60.4% of respondents self-identified as female (n_{female} = 209), 30.6% identified as male (n_{male} = 106), 9.0% identified as other, preferred not to disclose or skipped the question (n_{other} = 2, $n_{undisclosed}$ = 6, $n_{skipped}$ = 23). Additionally, approximately 51.7% of respondents reported communicating with a female compliance officer, 46.5% reported communicating with a male compliance officer, and 1.7% did not disclose the gender of their compliance officer.

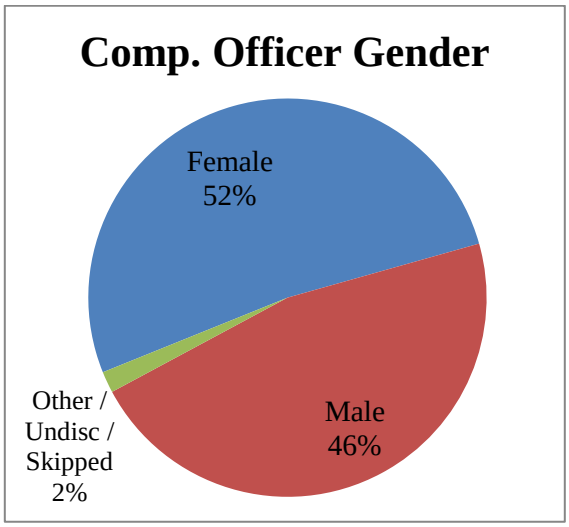

Figure 20: Gender of compliance officer

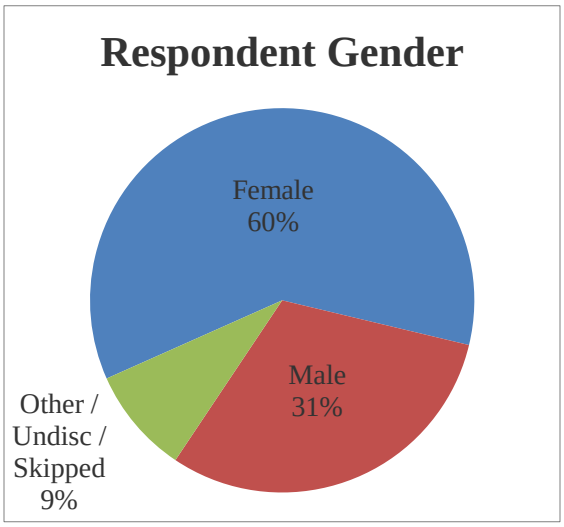

Figure 21: Gender of respondent

Approximately 1.7% of respondents self-identified as American Indian or Alaskan Native, 2.0% identified as Asian or Pacific Islander, 76.9% identified as Black or African American, 2.9% identified as Hispanic or Latino, 0.3% identified as Middle Eastern, 10.4% identified as White / Caucasian, 3.2% preferred not to disclose their ethnicity, 6.4% skipped the question. Approximately 1.2% of respondents reported

communicating with a compliance officer that was American Indian or Alaskan Native, 2.9% communicated with an Asian or Pacific Islander compliance officer, 30.3% communicated with a Black or African American compliance officer, 8.1% communicated with an Hispanic or Latino compliance officer, 55.2% communicated with a White / Caucasian compliance officer, 1.2% preferred not to disclose the compliance officer's ethnicity, 0.9% communicated with a compliance officer of another ethnicity, 2.6% did not know the ethnicity of their compliance officer. None of the respondents skipped this question.

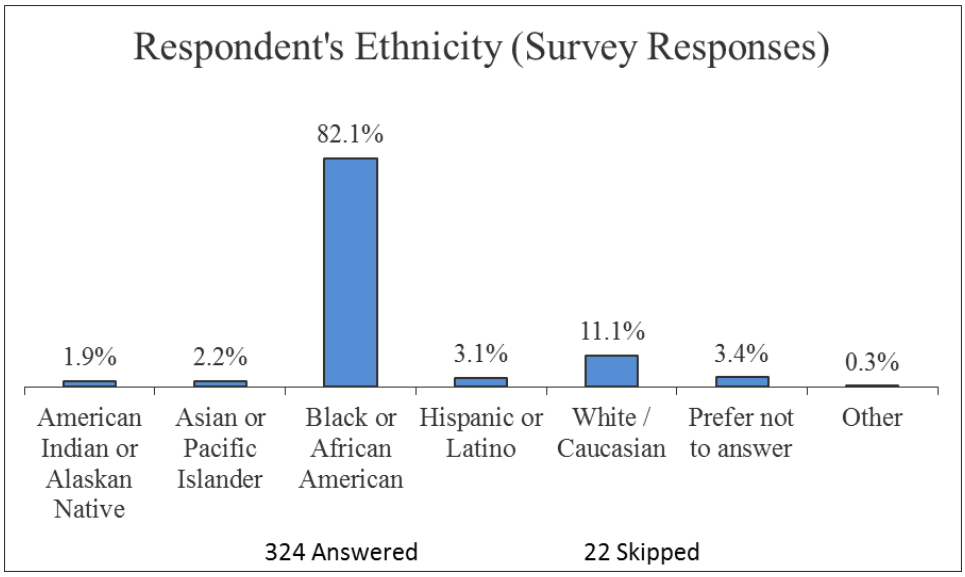

Figure 22: Ethnicity of the respondents as disclosed in their surveys.

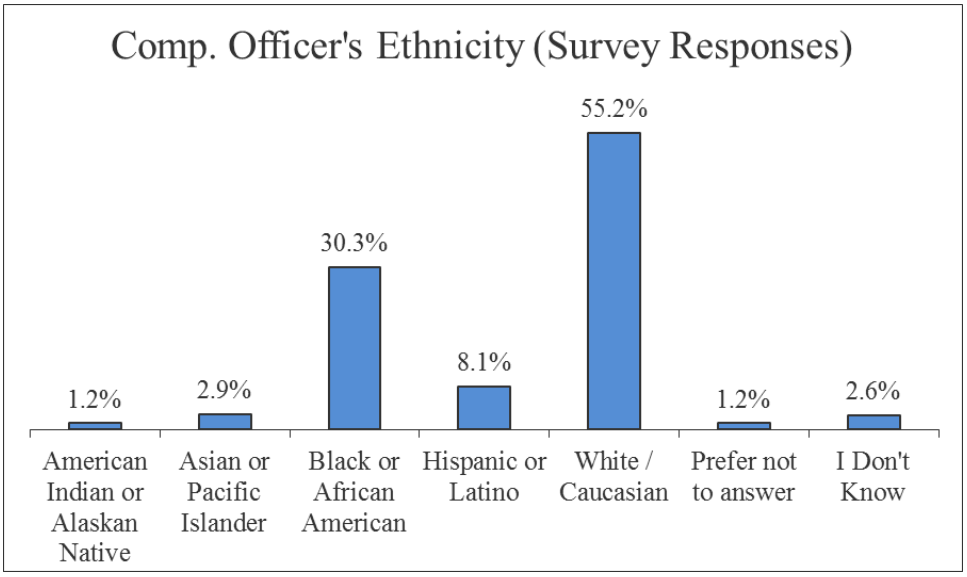

Figure 23: Ethnicity of compliance officer as disclosed in their surveys.

Of the total number of respondents, approximately 17.6% self-identified as someone with an administrative background, 25.7% a business background, 19.9% an education background, 10.4% a legal background, 10.7% a medical background, and 19.4% some other form of technical background (n_{admin} = 61, n_{bus} = 89, n_{ed} = 69, n_{legal} = 36, n_{med} = 37, n_{tech} = 67). 11.0% of the respondents self-identified as someone with a background other than the ones listed (n_{other} = 38). A total of 23 respondents skipped this question (6.6%). Whereas, approximately 39.3% of respondents stated that their compliance officer had an administrative background, 29.5% a business background, 20.8% an educational background, 19.7% a legal background, 8.7% a medical background, and 15.0% another form of technical background (n_{admin} = 136, n_{bus} = 102, n_{ed} = 72, n_{legal} = 68, n_{med} = 30, n_{tech} = 52). There were an additional 4.9% of respondents

who stated that their compliance officer had another background (n_{other} = 17). None of the respondents skipped this question (0%).

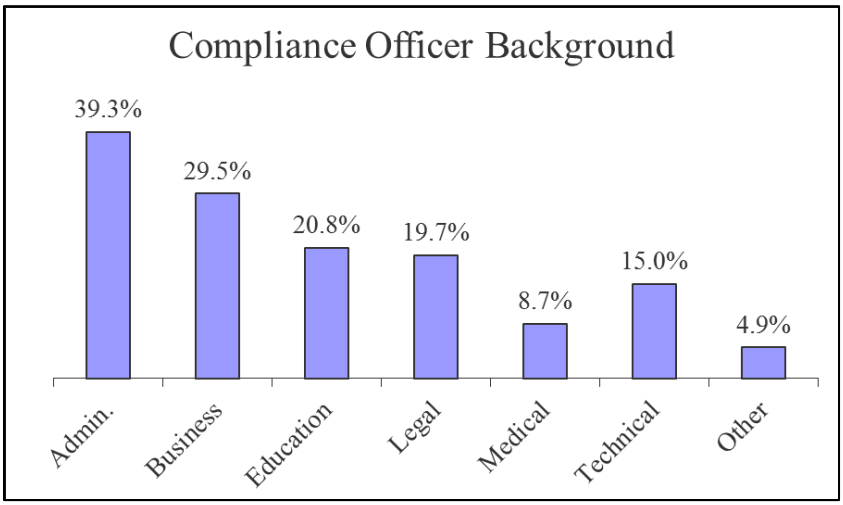

Figure 24: Backgrounds of compliance officers

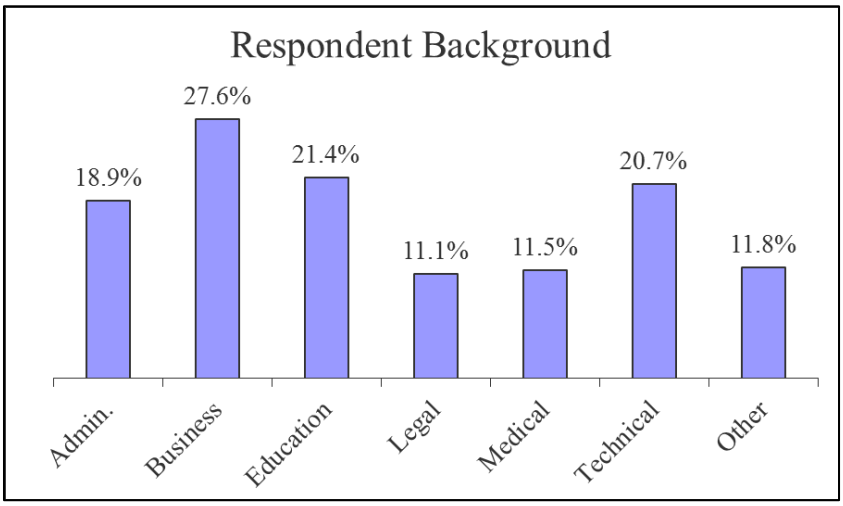

Figure 25: Backgrounds of the respondent.

The educational distribution of respondents ranged from high school graduates to doctorate degrees; none of the respondents who disclosed their level of education had less than a high school degree or equivalent. Approximately 2.9% of respondents had a

highest level of education that was a high school degree or high school equivalent, 17.9% had some college but no degree, 6.1% had an associate degree, 36.4% had a bachelor degree, 18.2% had a Graduate degree and 12.1% had a highest level of education that was a doctorate degree (n_{high} = 10, $n_{somecollege}$ = 62, $n_{associate}$ = 21, n_{bach} = 126, n_{grad} = 63, n_{doc} = 42). Twenty-two of the respondents skipped the question (6.4%)

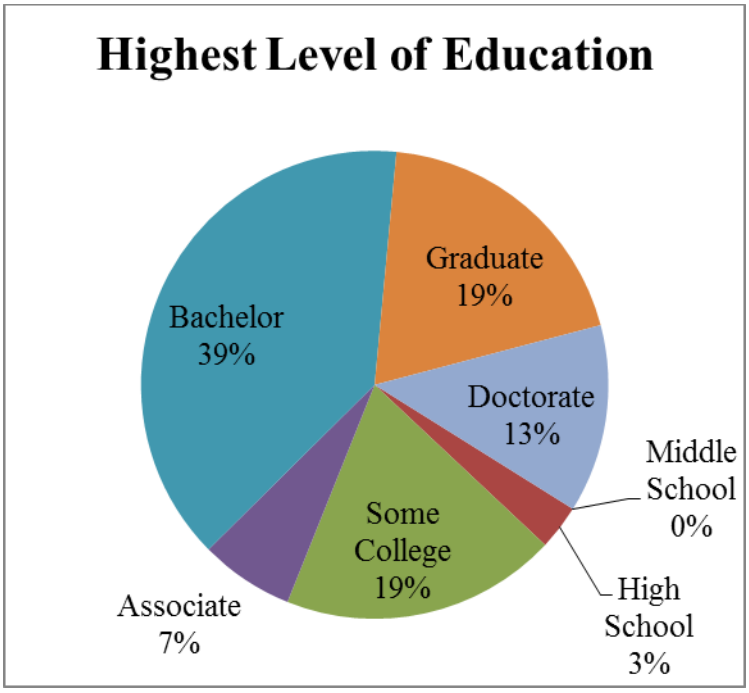

Figure 26: The highest level of education for each respondent.

Demographic Encoding

In order to engage in statistical analysis, the multiple chose selections and text responses that respondents gave in response to the survey instrument questions must be converted into numeric data. The encoding was done with a combination of Survey

Monkey automatic coding and manual recoding in excel. The coding can be found in Appendix E "Answer Encoding."

Data Analysis

The Situational Communication Apprehension Measure (SCAM) is calculated using a 20 question survey instrument. All 346 survey respondents completed all 20 of these questions. In this survey instrument, respondents are given a list of feelings and told to rank the feelings from 1-7 based on how accurately the feeling reflects their emotional state last time that they communicated with their compliance officer. The respondents are asked to mark 7 if the statement extremely accurately reflects how they felt, 6 if moderately accurate, 5 if somewhat accurate, 4 if neither accurate nor inaccurate, 3 if somewhat inaccurate, 2 if moderately inaccurate, or 1 if extremely inaccurate reflects how they felt.

SCAM Survey Questions		Avg.	Std. Dev.
1	I was apprehensive	3.44	1.97
2	I was disturbed	2.50	1.77
3	I felt peaceful	4.86	1.84
4	I was loose	4.21	1.93
5	I felt uneasy	2.71	1.75
6	I was self-assured	5.04	1.72
7	I was fearful	2.12	1.51
8	I was ruffled	2.40	1.66
9	I felt jumpy	2.11	1.45
10	I was composed	5.34	1.72
11	I was bothered	2.67	1.78
12	I felt satisfied	4.87	1.87
13	I felt safe	5.29	1.70
14	I was flustered	2.45	1.69
15	I was cheerful	4.37	1.90
16	I felt happy	4.32	1.91
17	I felt dejected	2.30	1.62
18	I was pleased	4.70	1.91
19	I felt good	4.74	1.85
20	I was unhappy	2.61	1.84

Table 1: List of questions used to calculate SCAM and the respondents' average response and standard deviation.

To calculate SCAM from these responses, the positive feelings, which are indicative of less communication apprehension (e.g. questions 3, 4, 6, 10, 12, 13, 15, 16, 18, and 19), are added together. Similarly, step 2 is to add together all the negative feelings, which are indicative of more communication apprehension (e.g. questions 1, 2, 5, 7, 8, 9, 11, 14, 17, 20). For each respondent, the number from step 1 (e.g. positive feelings) is subtracted from 80, and the number from step 2 is added to that total.

Equation 1

$$SCAM = 80 - (\text{step 1: Q3, 4, 6, 10, 12, 13, 15, 16, 18, and 19}) + (\text{step 2: Q1, 2, 5, 7, 8, 9, 11, 14, 17, 20})$$

The minimum possible SCAM score is 20, which indicates the lowest possible situational communication apprehension measurable by this survey instrument and very high willingness to communicate with the compliance officer in this context. Conversely, the maximum possible SCAM score is 140 which indicates the highest possible situational communication apprehension measurable by this survey instrument and a respondent who with a very low willingness to communicate with the compliance officer in a compliance conversation. Among the respondents, the range of SCAM was from 20-129, with an average score of 57.6 and a standard deviation of 23.8.

SCAM			
Resp. Max	129	Max. Possible	140
Resp. Min	20	Min. Possible	20
Average	57.6	Std. Dev.	23.8

Table 2: The statistics related to SCAM including respondent averages, standard deviation, maximum and minimum values.

Any respondent who did not complete the SCAM segment or the Credibility segment of the survey were removed from further statistical analysis. The SCAM and three Credibility scores are necessary for a data point to be useful in assessing the overall hypotheses. Of the 346 respondents who submitted survey responses, 330 completed both sections in their entirety. There were additional respondents who skipped one or more other questions; such respondents were excluded from the statistical analysis related to the skipped questions. However, these respondents were used in data processing in the questions that they answered.

Credibility Survey Questions										Category	Avg.	Std. Dev.
1	**Intelligent**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Unintelligent**	**Comp.**	5.58	1.53
2	Untrained	1	2	3	4	5	6	7	Trained	Comp.	5.52	1.71
3	**Cares about me**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Doesn't cares about me**	**Car.**	4.75	1.92
4	**Honest**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Dishonest**	**Trust**	5.10	1.86
5	**Has my interests at heart**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Doesn't have my interests at heart**	**Car.**	4.64	1.95
6	Untrustworthy	1	2	3	4	5	6	7	Trustworthy	Trust	4.90	1.80
7	Inexpert	1	2	3	4	5	6	7	Expert	Comp.	5.18	1.59
8	Self-centered	1	2	3	4	5	6	7	Not self-centered	Car.	4.57	2.04
9	**Concerned with me**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Not concerned with me**	**Car.**	4.56	1.87
10	**Honorable**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Dishonorable**	**Trust**	5.02	1.80
11	**Informed**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Uninformed**	**Comp.**	5.50	1.63
12	**Moral**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Immoral**	**Trust**	5.18	1.73
13	Incompetent	1	2	3	4	5	6	7	Competent	Comp.	5.45	1.66
14	Unethical	1	2	3	4	5	6	7	Ethical	Trust	5.43	1.66
15	Insensitive	1	2	3	4	5	6	7	Sensitive	Car.	4.74	1.76
16	**Bright**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Stupid**	**Comp.**	5.55	1.56
17	Phony	1	2	3	4	5	6	7	Genuine	Trust	4.92	1.93
18	Not Understanding	1	2	3	4	5	6	7	Understanding	Car.	4.88	1.77

Table 3: List of questions used to calculate each respondent's three credibility scores and the respondents' average response and standard deviation for each question.

As previously discussed the Credibility scores are divided into 3 factors: Competence, Caring/Goodwill, and Trustworthiness. The scores for these three factors are calculated by asking the respondent to choose which of two opposing adjectives best describes how they feel about their compliance officer. Then they are asked to rate those feelings as very strong, strong, fairly weak, or they can select undecided. Each feeling corresponds to a number 1-7 where 1 and 7 are used for very strong feelings, 2 and 6 are used to indicate a strong feeling, 3 and 5 are indicative of fairly weak feelings, and the

number 4 is used for undecided. There is a total of 18 questions for credibility survey instrument, 6 for each score.

To calculate the scores, identify the positive adjectives, which indicates a higher opinion of the compliance officer's credibility. Any such adjective that is set equal to "1" in the survey must be recoded; these are questions 1, 3, 4, 5, 9, 10, 11, 12, and 16. In order to accomplish this, the respondents answer to the each of these questions were subtracted from 8; thus 1 becomes 7, 2 becomes 6, 3 becomes 5, 4 remains 4 and vice versa. The answers for all other questions remain the same. Then the Competence, Caring/Goodwill, and Trustworthiness scores are calculated by adding the recoded values where applicable and original values where not applicable which correspond to each score. The questions that correspond to the competence score are questions 1, 2, 7, 11, 13, and 16. The questions that correspond to the caring score are questions 3, 5, 8, 9, 15 and 18. The questions that correspond to the trustworthiness score are questions 4, 6, 10, 12, 14, and 17.

Equation 2

$$\text{Competence} = (8 - Q1) + Q2 + Q7 + (8 - Q11) + Q13 + (8 - Q16)$$
$$\text{Caring/Goodwill} = (8 - Q3) + (8 - Q5) + Q8 + (8 - Q9) + Q15 + Q18$$
$$\text{Trustworthiness} = (8 - Q4) + Q6 + (8 - Q10) + (8 - Q12) + Q14 + Q17$$

The minimum possible score for any of the credibility measures is 6, which indicates the lowest opinion of the compliance officer's credibility in the given factor measurable by this survey instrument. Conversely, the maximum possible score for any of the credibility measures is 42, which indicates the highest opinion of the compliance officer's credibility in the given factor measurable by this survey instrument. Among the

respondents, the range of Competence scores was from 8-42, with an average score of 32.8 and a standard deviation of 8.07. The range of Caring/Goodwill scores was from 6-42, with an average score of 28.1 and a standard deviation of 9.68. The range of Trustworthiness scores was from 6-42, with an average score of 30.6 and a standard deviation of 9.62.

Competence			
Respondent Max	42	Max. Possible	42
Respondent Min	8	Min. Possible	6
Average	32.8	Std. Dev.	8.07

Caring/Goodwill			
Respondent Max	42	Max. Possible	42
Respondent Min	6	Min. Possible	6
Average	28.1	Std. Dev.	9.68

Trustworthiness			
Respondent Max	42	Max. Possible	42
Respondent Min	6	Min. Possible	6
Average	30.6	Std. Dev.	9.62

Table 4: The statistics related to credibility scores including respondent averages, standard deviation, maximum and minimum values.

Additionally, there were three questions that looked at factors related to the respondents' perception of their compliance officers and/or willingness to communicate:

Q6 How comfortable did/do you feel initiating a conversation with this person? (page 1, question 6)

Q7 How adversarial was/is your working relationship with this person? (page 1, question 7)

Q30 If necessary, does this supervisor/compliance officer have the skills/knowledge necessary to do your job? (page 2, question 20)

Questions 6 and 7 were scored like the credibility survey. Two opposing statements were placed on opposite ends of a scale, the respondent selected the statement that was most true, and then selected a number that corresponded to the strength of the feeling. Similarly, the number 1 and 7 were used for very strong feelings, 2 and 6 were used to indicate a strong feeling, 3 and 5 were indicative of fairly weak feelings, and the number 4 was used for undecided.

Summary of Survey Instrument Question's 6 and 7										Avg.	St. Dev
6	Very Uncomfortable	1	2	3	4	5	6	7	Very Comfortable	4.98	1.75
7	We are a Team	1	2	3	4	5	6	7	We are Enemies	2.57	1.55

Table 5: Summary of statistics related to question 6 and 7.

For question 6 the average response was 4.98, and the standard deviation was 1.75, which indicates that on average respondents had a weak feeling of comfort initiating conversation with their compliance officer. For question 7 the average response was 2.57 and the standard deviation was 1.55, which indicates that on average respondents had a weak feeling that they and their compliance officer were a team.

Question 30 was set to a 5 point scale where “Definitely, Yes” was set equal to 5, “Probably, Yes” was set equal to 4, “Maybe” was set equal to 3, “Probably, No” was set

equal to 2, and "Definitely, No" was set equal to 1. If the respondent selected "I Don't Know" as a response, that response was set as a non-entry. For question 30, the average was 3.64 with a standard deviation of 1.41. This indicates that on average the respondent had a very weak belief that the compliance officer could do their job.

Additional factors calculated are:

A1 – Whether the respondent and compliance are from the same background

1 = No; 2 = Yes, same background.

A2 – Whether the respondent and compliance are the same gender

1 = No; 2 = Yes, same gender.

A3 – Whether the respondent and compliance are the same ethnicity

1 = No; 2 = Yes same ethnicity.

A4 – Whether minority respondents are working with minority or white compliance officers

1 = White Compliance Officer; 2 = Minority Compliance Officer.

A5 – Whether the respondent with advanced degrees are from the same background as their compliance officers

1 = No; 2 = Yes, same background.

A6 – Whether the respondent is a full-time employee (full-time or management/executive leadership)

1 = No; 2 = Yes, full-time employee.

A7 – Whether the respondent and compliance are from the same department

1 = No; 2 = Yes, same department.

Of the respondents who had applicable data to the analysis questions, there were 226 respondents that were confirmed to have the same background as their compliance officer and 92 that were confirmed to not have the same background as their compliance officer. There were 181 respondents that were confirmed to be the same gender as their compliance officer and 131 that were confirmed to be a different gender. There were 122 respondents who self-identified as minorities that confirmed that their compliance officer was also a minority, and 152 respondents who self-identified as a minority who confirmed that their supervisor was white. There were 105 respondents who confirmed having a graduate degree or a doctorate degree; of those respondents, 82 of them worked in the same department as their supervisor and 23 were in a different department. There were 278 respondents who were full-time employees and 46 who were either temporary or part-time employees, interns, or consultants. There were 136 respondents who confirmed working in the same department as their compliance officer, and 162 who confirmed being in a different department.

Multivariate Statistical Analysis

The goal of this statistical analysis is to establish which of the factors tested in this survey instrument has a statistically significant impact on the SCAM. When dealing with multiple potential predictive variables, there is the possibility of interdependence between the variables. In which case, there can be a statistically significant impact that is mistakenly attributed to a variable that is actually dependent on another variable or multiple variables without statistically significant impacts which can be aggregated to

create statistical significance where none exists. Thus, in order to verify that any factor is having a statistically significant impact on the SCAM, a multivariate analysis is necessary. This multivariate analysis was performed in the software program JMP.

The study addresses the research questions (1.Is there a relationship between perception and SCAM; 2.What is the relationship between Competence and SCAM; 3.What is the relationship between SCAM and Caring/Goodwill; and 4.What is the relationship between Trustworthiness and SCAM) using multivariate analysis. To accomplish this, the data was input into the program JMP, and the respondent's SCAM was compared to the encoded responses to Q2, Q7, Q9, Q10, Competence, Caring (Caring/Goodwill), Trust (Trustworthiness), P2Q19(Q29), P2Q20(Q30), P3Q1(P31), P3Q6(Q36), P3Q8(Q38), P3Q9 (Q39), P3Q10 (Q40), P3Q12 (Q42), A1, A2, A3, and A7. Additionally, because Competence, Caring/Goodwill (Caring), and Trustworthiness (Trust) are continuous values rather than categories, the factors could be treated as quadratic equations rather than linear equations. Thus a $Competence^2$ (Competence*Competence), $Caring^2$ (Caring*Caring), and $Trust^2$ (Trust*Trust) factors were added to the analysis. Note that, if either the squared or linear version of these three factors is found to be statistically significant, that means that the factor is statistically significant. This is true even if the other factor is statistically insignificant. This analysis was done by inputting the variables listed above into a Fit Model multivariate analysis in JMP.

Question 1

Q1: Is there a relationship between the perception of a compliance officer and the communication apprehension of subordinate receivers towards those supervisors when engaging in feedback communication?

The first test performed was an analysis of the factors to determine the factors Variance Inflation Factor (VIF). The VIF table can be found as a column attached to the Parameter Estimates table in Appendix I "Phase 2 Multivariate Analysis Results." This table shows the level of collinearity among the factors tested as predictive variables. All VIF factors in the table are less than 10, with the exception of Trust (VIF = 11.8). After the VIF analysis was performed, a regression analysis and analysis of variance (ANOVA) was performed on the total data set.

Summary of Fit

R^2	0.638372
R^2 Adjusted	0.488222
Root Mean Square Error	17.44681
Mean of Response	55.88477
Observations (or Sum Wgts)	243

Table 6: The summary of fit table summarizes the results of the regression analysis of the multivariate statistical analysis.

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	71	91883.89	1294.14	4.2516
Error	171	52050.89	304.39	**Prob > F**
C. Total	242	143934.77		<.0001*

Table 7: The analysis of variance table shows the existence of statistically significant variance in SCAM.

The results of this regression analysis were that the R^2 of the total data set was 0.638 and the adjusted R^2 was 0.488. The result of the ANOVA was a p-value that is less than 0.0001

As will be discussed later, the R^2 shows that approximately 63.8% of the variance in the SCAM can be explained using the predictive factors selected for this study. However, in order to get a better understanding of how well these factors predict SCAM, the Distribution of Residual values analysis was performed. This analysis shows that over 50% of the SCAM values can be predicted within approximately 10 using these predictive variables. The complete JMP output of this analysis can be found in Appendix J "Phase 2 Distribution of Residuals."

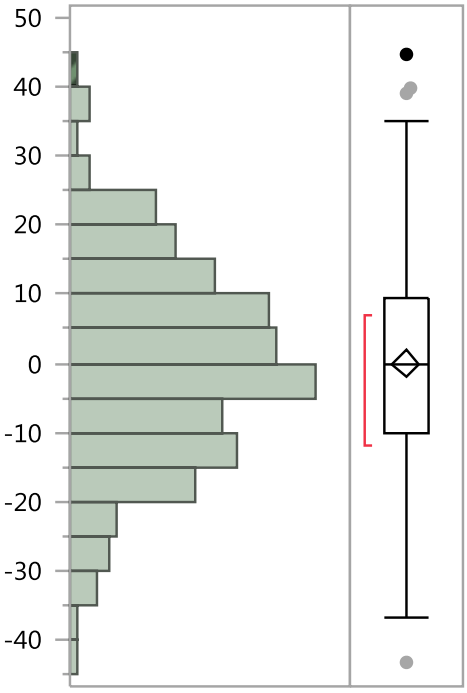

Figure 27: Distribution of residual SCAM values graph.

Quantiles		
100.0%	maximum	44.7
99.5%		43.6
97.5%		29.8
90.0%		18.4
75.0%	quartile	9.3
50.0%	median	-0.220
25.0%	quartile	-10.3
10.0%		-17.9
2.5%		-30.0
0.5%		-41.9
0.0%	minimum	-43.2

Table 8: Quantiles of residual distribution of SCAM values.

Then the factors were individually analyzed using an Effect Test. This combines the statistically significant variation test of an ANOVA with statistical processing that corrects for variations in SCAM caused by other factors in the analysis. This is called an Effects Test, the results of which are below. Factors with a P-Value of less than 0.05 are highlighted red, and factors with a P-Value higher than 0.05 and less than 0.1 are highlighted blue.

Effect Test

Source	Nparm	DF	Sum of Squares	F Ratio	P-Value
Competence	1	1	212.5847	0.6984	0.4045
Caring	1	1	1857.1779	6.1013	0.0145*
Trust	1	1	1057.8804	3.4754	0.0640
Q2WkWithB	8	8	3285.7239	1.3493	0.2224
Q7Adversary	6	6	3768.2201	2.0633	0.0600
Q9Reprimand	2	2	971.6830	1.5961	0.2057
Q10MeetingType	2	2	905.7558	1.4878	0.2288
P2Q19CommFreq	4	4	2583.8619	2.1222	0.0801
P2Q20CanDoUrJob	4	4	4060.3643	3.3348	0.0117*
P3Q1YrsExp	6	6	1600.8903	0.8766	0.5134
P3Q6PosPurp	3	3	1961.4686	2.1480	0.0960
P3Q8PosType	4	4	2347.4857	1.9280	0.1079
P3Q9OrgTyp	5	5	1968.2828	1.2933	0.2690
P3Q10WkAtComp	8	8	4177.1408	1.7154	0.0979
P3Q12SiteSize	9	9	3992.3340	1.4573	0.1675
A1SameBck	1	1	432.2794	1.4201	0.2350
A2SameGender	1	1	906.0500	2.9766	0.0863
A3Same Ethnicity	1	1	728.7362	2.3941	0.1236
A7Same Department	1	1	267.4529	0.8786	0.3499
Competence*Competence	1	1	285.9436	0.9394	0.3338
Caring*Caring	1	1	1212.8325	3.9845	0.0475*
Trust*Trust	1	1	1413.0359	4.6422	0.0326*

Table 9: Effect test table shows the level of statistical significance in SCAM variance associated with each factor. Statistically significant variance to 95% reliability is in red, and statistical significant variance to 90% reliability is in blue.

The results of the Effects Test is summarized and expressed in a hierarchal order in the following table.

Effect Summary			
Source	**LogWorth**		**P-Value**
P2Q20CanDoUrJob	1.933		0.01168
Caring	1.839		0.01449
Trust*Trust	1.487		0.03259
Caring*Caring	1.323		0.04751
Q7Adversary	1.222		0.05998
Trust	1.194		0.06400
P2Q19CommFreq	1.096		0.08012
A2SameGender	1.064		0.08628
P3Q6PosPurp	1.018		0.09603
P3Q10WkAtComp	1.009		0.09791
P3Q8PosType	0.967		0.10793
A3Same Ethnicity	0.908		0.12364
P3Q12SiteSize	0.776		0.16752
Q9Reprimand	0.687		0.20569
Q2WkWithB	0.653		0.22238
Q10MeetingType	0.641		0.22877
A1SameBck	0.629		0.23503
P3Q9OrgTyp	0.570		0.26901
Competence*Competence	0.477		0.33380
A7Same Department	0.456		0.34989
Competence	0.393		0.40449
P3Q1YrsExp	0.290		0.51339

Table 10: Effect summary table showing the relative strength of each factor's impact on SCAM

In this table, the individual strength of each factor's impact on SCAM is measured based on the variable LogWorth. LogWorth is equal to $-\log_{10}$(p-value); the greater the LogWorth the more significant the variation between values of the factor. A p-value of 0.05 corresponds to a LogWorth of 1.30, a p-values of 0.01 corresponds to 2, and 0.1 corresponds to 1.00. The LogWorth of the factors are as follow: Q2 = 0.653, Q7 = 1.22, Q9 = 0.687, Q10 = 0.641, Competence = 0.393, Competence*Competence = 0.477, Caring = 1.84, Caring*Caring = 1.32, Trust = 1.194, Trust*Trust = 1.487, P2Q19(Q29) = 1.10, P2Q20(Q30) = 1.933, P3Q1(P31) = .290, P3Q6(Q36) = 1.02,

P3Q8(Q38) = 0.967, P3Q9 (Q39) = 0.570, P3Q10 (Q40) = 1.01, P3Q12 (Q42) = 0.776, A1 = 0.629, A2 = 1.064, A3 = 0.908, and A7 = 0.456.

No factor had a LogWorth more than 2 (p-value of 0.01 and a reliability of 99%) Factors with a LogWorth more than 1.30 (or a p-value less than 0.05 and a reliability of 95%) are as follows – Caring, Caring*Caring, Trust*Trust, and P2Q20. Factors with a LogWorth of more than 1.00 (or a p-value of less than 0.1 and a reliability of 90%) and less than 1.30 are as follows – Trust, Q7, P2Q19, P3Q6, P3Q10, and A2. All other factors lacked any statistically significant impact on SCAM.

Question 2

Q2: What is the relationship between the perception of Competence in a compliance officer and the communication apprehension of subordinate receivers towards those supervisors when engaging in feedback communication?

The Effects Test component of the multivariate analysis previously discussed shows that the P-Value for Competence and Competence*Competence were 0.405 and 0.334 respectively. The full Effects table is in Appendix I "Phase 2 Multivariate Analysis Results."

Source	Nparm	DF	Sum of Squares	F Ratio	P-Value
Competence	1	1	212.5847	0.6984	0.4045
Competence*Competence	1	1	285.9436	0.9394	0.3338

Table 11: The competence segment of the multivariate effects test table.

Additionally, a regression analysis showed an estimated coefficient for these terms of Competence = 1.15 and Competence*Competence = -0.0233. The full Parameter Estimates table is in Appendix I "Phase 2 Multivariate Analysis Results."

Term	Estimated Coefficient	Std Error	t Ratio	P-Value
Competence	1.1517294	1.378163	0.84	0.4045
Competence*Competence	-0.023345	0.024086	-0.97	0.3338

Table 12: The competence segment of the multivariate expanded estimates table.

This yields an equation SCAM = $-0.0233x^2 + 1.1517x + 28.471$, where x is the Competence score, which can be graphed to give a visual representation of SCAM.

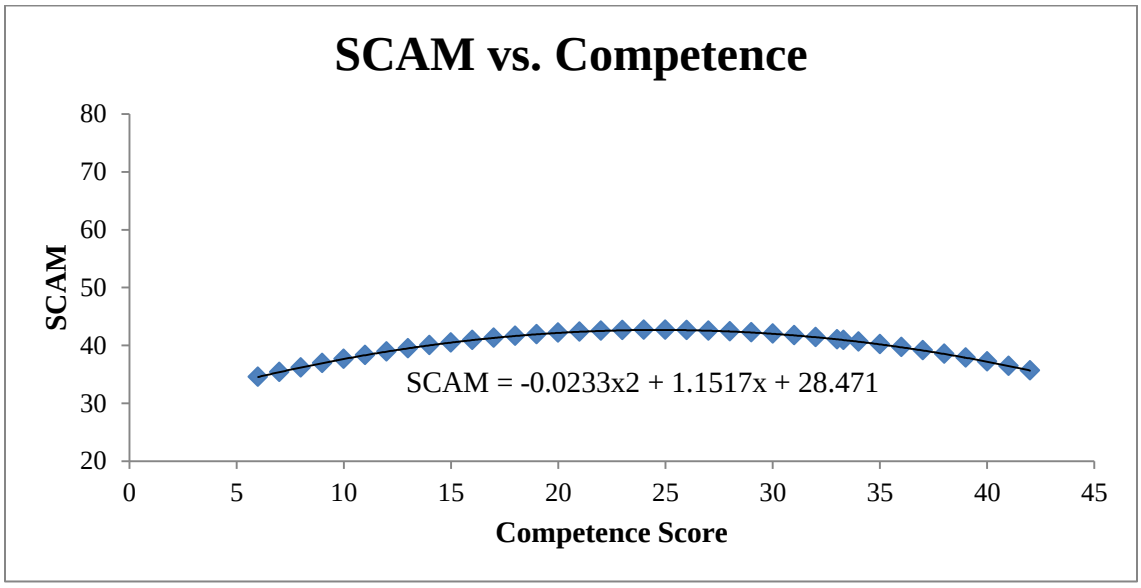

Figure 28: The predicted changes in SCAM as a factor of Competence; this graph corrects for changes in SCAM attributable to other tested factors.

Related to Competence is the P2Q20, which is the perceived ability of the compliance officer to perform the job of the respondent. The Effects Test component of the multivariate analysis previously discussed shows that the overall P-Value for P2Q20

= 0.0117. The full Effects table is in Appendix I "Phase 2 Multivariate Analysis Results."

Source	Nparm	DF	Sum of Squares	F Ratio	P-Value
P2Q20CanDoUrJob	4	4	4060.3643	3.3348	0.0117*

Table 13: The P2Q20 segment of the multivariate effects test table.

Additionally, unlike Competence, P2Q20 is not continuous. This means that the possible responses for P2Q20 (e.g. 1-5) were broken up into distinct categories and a linear regression analysis was done on each of the categories separately. For categories, the output is the difference between the mean SCAM in that category and the mean SCAM for this factor (for P2Q20; mean = 50.3). The estimated difference for each value of P2Q20 are P2Q20(1) = -9.34, P2Q20(2) = 4.55, P2Q20(3) = -4.68, P2Q20(4) = 2.45, and P2Q20(5) = 7.03. Because this analysis looks at P2Q20 as five distinct categories, it is necessary to look at the P-Value of each category to test for statistical significance. The P-Values for P2Q20's five categories are P2Q20(1) = 0.0078, P2Q20(2) = 0.186, P2Q20(3) = 0.206, P2Q20(4) = 0.338, and P2Q20(5) = 0.0106. The full Parameter Estimates table is in Appendix I "Phase 2 Multivariate Analysis Results." Based on the points given by adding the Estimated Difference (e.g. Estimate in the full Expanded Estimates table) for each category to the mean of P2Q20, we can graph the SCAM and get a visual representation of the SCAM.

Term	Estimated Difference	Std Error	t Ratio	P-Value
P2Q20CanDoUrJob[1]	-9.338484	3.46853	-2.69	0.0078*
P2Q20CanDoUrJob[2]	4.5490651	3.42543	1.33	0.1859
P2Q20CanDoUrJob[3]	-4.681797	3.686032	-1.27	0.2058
P2Q20CanDoUrJob[4]	2.4456286	2.544179	0.96	0.3378
P2Q20CanDoUrJob[5]	7.0255869	2.717993	2.58	0.0106*

Table 14: The P2Q20 segment of the multivariate expanded estimate tests.

Based on the points given by adding the Estimated Difference (e.g. Estimate in the full Expanded Estimates table) for each category to the mean of P2Q20, we can graph the SCAM and get a visual representation of the SCAM.

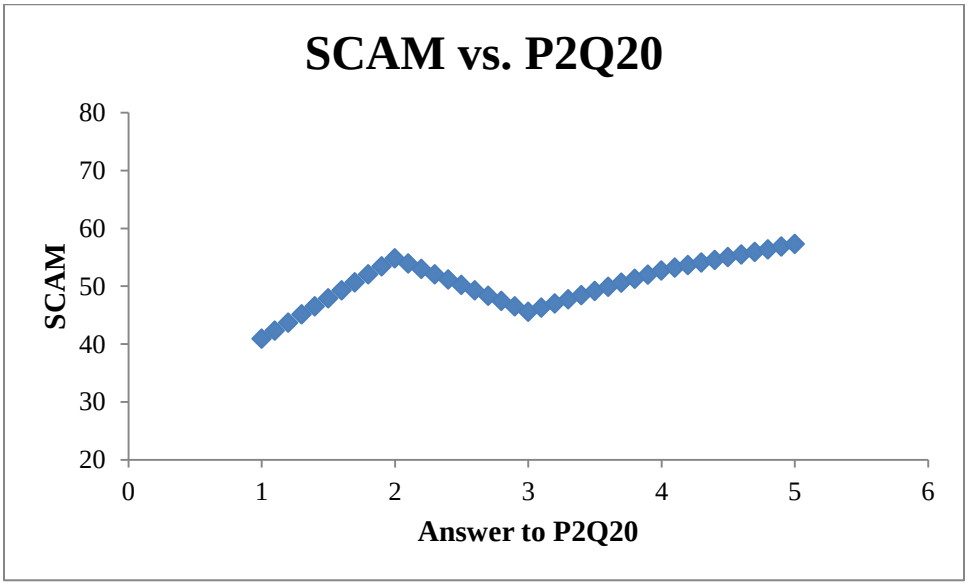

Figure 29: The predicted changes in SCAM as a factor of the perception of the compliance officer's ability to do their job (P2Q20); this graph corrects for changes in SCAM attributable to other tested factors.

Question 3

Q3: What is the relationship between the perception of Trustworthiness in a compliance officer and the communication apprehension of subordinate receivers towards those supervisors when engaging in feedback communication?

The Effects Test component of the multivariate analysis previously discussed shows that the P-Value for Caring and Caring*Caring were 0.0145 and 0.0475 respectively. The full Effects table is in Appendix I "Phase 2 Multivariate Analysis Results."

Source	Nparm	DF	Sum of Squares	F Ratio	P-Value
Caring	1	1	1857.1779	6.1013	0.0145*
Caring*Caring	1	1	1212.8325	3.9845	0.0475*

Table 15: The caring segment of the multivariate effects test table.

Additionally, a regression analysis showed an estimated coefficient for these terms of Caring = -2.98 and Caring*Caring = 0.0420. The full Parameter Estimates table is in Appendix I "Phase 2 Multivariate Analysis Results."

Term	Estimated Coefficient	Std Error	t Ratio	P-Value
Caring	-2.978427	1.205803	-2.47	0.0145*
Caring*Caring	0.0419613	0.021022	2.00	0.0475*

Table 16: The caring segment of the multivariate expanded estimates table.

This yields an equation SCAM = $0.042x^2$ - 2.9784x + 91.917, where x is the Caring score, which can be graphed to give a visual representation of SCAM.

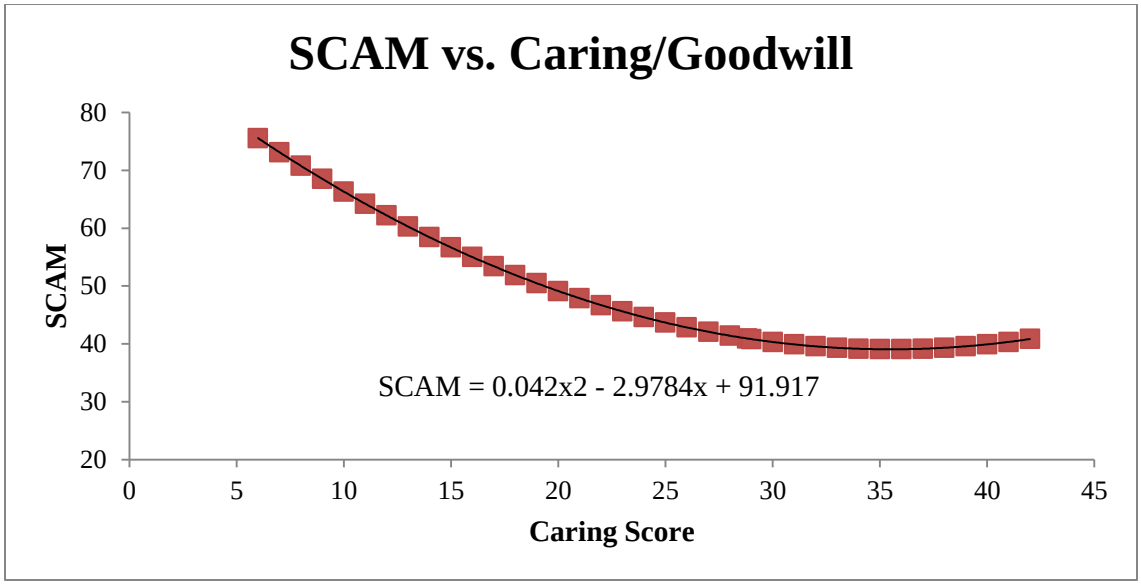

Figure 30: The predicted changes in SCAM as a factor of Caring/Goodwill; this graph corrects for changes in SCAM attributable to other tested factors.

Question 4

Q3: What is the relationship between the perception of Caring/Goodwill in a compliance officer and the communication apprehension of subordinate receivers towards those supervisors when engaging in feedback communication?

The Effects Test component of the multivariate analysis previously discussed shows that the P-Value for Trust and Trust*Trust were 0.0640 and 0.0326 respectively. The full Effects table is in Appendix I "Phase 2 Multivariate Analysis Results."

Source	Nparm	DF	Sum of Squares	F Ratio	P-Value
Trust	1	1	1057.8804	3.4754	0.0640
Trust*Trust	1	1	1413.0359	4.6422	0.0326*

Table 17: The trust segment of the multivariate effects test table.

Additionally, a regression analysis showed an estimated coefficient for these terms of Caring = 2.36 and Caring*Caring = -0.0479. The full Parameter Estimates table is in Appendix I "Phase 2 Multivariate Analysis Results."

Term	Estimated Coefficient	Std Error	t Ratio	P-Value
Trust	2.3559807	1.263774	1.86	0.0640
Trust*Trust	-0.047908	0.022235	-2.15	0.0326*

Table 18: The trust segment of the multivariate expanded estimates table.

This yields an equation SCAM = $-0.0479x^2 + 2.356x + 14.064$, where x is the Trust score, which can be graphed to give a visual representation of SCAM.

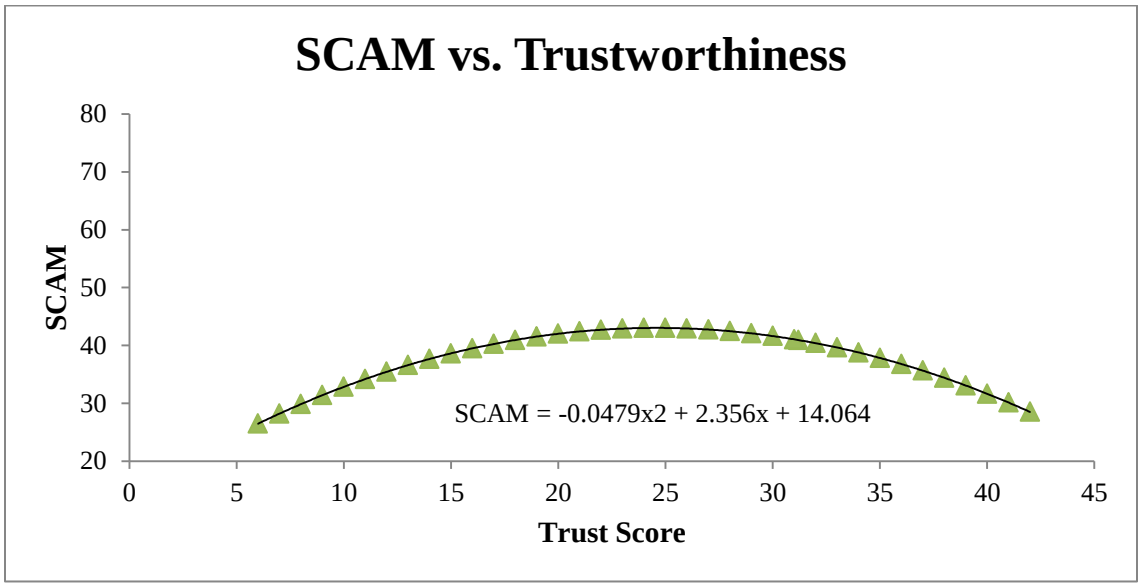

Figure 31: The predicted changes in SCAM as a factor of Trustworthiness; this graph corrects for changes in SCAM attributable to other tested factors.

Other Factors

In addition to the factors specifically related to our research questions, there were several other factors tested for a relationship with SCAM. Of the additional factors tested, five of them had a p-value of less than 0.1 (Q7, P2Q19, P3Q6, P3Q10, A2).

The Effects Test component of the multivariate analysis previously discussed shows that the overall P-Value for Q7 = 0.0600, P2Q19 = 0.0801, P3Q6 = 0.960, P3Q10 = 0.0979, and A2 = 0.0863. The full Effects table is in Appendix I "Phase 2 Multivariate Analysis Results."

Source	Nparm	DF	Sum of Squares	F Ratio	P-Value
Q7Adversary	6	6	3768.2201	2.0633	0.0600
P2Q19CommFreq	4	4	2583.8619	2.1222	0.0801
P3Q6PosPurp	3	3	1961.4686	2.1480	0.0960
P3Q10WkAtComp	8	8	4177.1408	1.7154	0.0979
A2SameGender	1	1	906.0500	2.9766	0.0863

Table 19: Segment of multivariate effects test for factors with p-value < 0.1.

Like P2Q20, all of these factors are categories. This means that the possible responses for each factor were broken up into distinct categories and a linear regression analysis was done on each of the categories separately. For each of these categories the estimate is the difference between the mean SCAM in the given category of a given factor and the mean SCAM for that entire factor across all categories (means: Q7 = 47.9, P2Q19 = 33.6, P3Q6 = 41.1, P3Q10 = 30.6, A2 = 38.5). The estimated difference for each value of Q7 are Q7(1) = -6.98, Q7(2) = 1.76, Q7(3) = -1.19, Q7(4) = 9.09, Q7(5) = 5.92, Q7(6) = -4.71, and Q7(7) = -3.87. The estimated difference for each value of P2Q19 are P2Q19(1) = 7.36, P2Q19(2) = 5.11, P2Q19(3) = -4.50, P2Q19(4) = -2.75, and P2Q19(5) = -5.23. The estimated difference for each value of P3Q6 are P3Q6(1) = -

0.158, P3Q6(2) = 6.28, P3Q6(3) = 0.157, and P3Q6(4) = -6.28. The estimated difference for each value of P3Q10 are P3Q10(0.5) = 10.4, P3Q10(1) = 11.1, P3Q10(3) = 1.83, P3Q10(12) = -8.23, P3Q10(24) = 0.460, P3Q10(60) = 1.69, P3Q10(120) = 0.435, P3Q10(180) = -8.10, and P3Q10(300) = -9.58. The estimated difference for each value of A2 are A2(1) = 2.45, and A2(2) = -2.45.

Because this analysis looks at these factors as their distinct categories, it is necessary to look at the P-Value of each category to test for statistical significance. The P-Values for Q7 are Q7(1) = 0.0839, Q7(2) = 0.654, Q7(3) = 0.760, Q7(4) = 0.0334, Q7(5) = 0.458, Q7(6) = 0.441, and Q7(7) = 0.656. The P-Values for P2Q19 are P2Q19(1) = 0.0715, P2Q19(2) = 0.134, P2Q19(3) = 0.0714, P2Q19(4) = 0.285, and P2Q19(5) = 0.0519. The P-Values for P3Q6 are P3Q6(1) = 0.966, P3Q6(2) = 0.0605, P3Q6(3) = 0.9437, and P3Q6(4) = 0.0252. The P-Values for P3Q10 are P3Q10(0.5) = 0.0797, P3Q10(1) = 0.0581, P3Q10(3) = 0.631, P3Q10(12) = 0.0238, P3Q10(24) = 0.896, P3Q10(60) = 0.678, P3Q10(120) = 0.916, P3Q10(180) = 0.114, and P3Q10(300) = 0.232. The P-Values for A2 are A2(1) = 0.0863, and A2(2) = 0.0863. The full Parameter Estimates table is in Appendix I “Phase 2 Multivariate Analysis Results.”

Term	Estimated Difference	Std Error	t Ratio	P-Value
Q7Adversary[1]	-6.984944	4.017691	-1.74	0.0839
Q7Adversary[2]	1.7588679	3.91524	0.45	0.6538
Q7Adversary[3]	-1.194826	3.902672	-0.31	0.7599
Q7Adversary[4]	9.0861324	4.237075	2.14	0.0334*
Q7Adversary[5]	5.9206981	7.954358	0.74	0.4577
Q7Adversary[6]	-4.711443	6.103567	-0.77	0.4412
Q7Adversary[7]	-3.874485	8.69038	-0.45	0.6563
P2Q19CommFreq[1]	7.3649175	4.060978	1.81	0.0715
P2Q19CommFreq[2]	5.1085462	3.388849	1.51	0.1335
P2Q19CommFreq[3]	-4.499951	2.480613	-1.81	0.0714
P2Q19CommFreq[4]	-2.746325	2.562402	-1.07	0.2853
P2Q19CommFreq[5]	-5.227188	2.670111	-1.96	0.0519
P3Q6PosPurp[1]	-0.158035	3.725824	-0.04	0.9662
P3Q6PosPurp[2]	6.280497	3.323746	1.89	0.0605
P3Q6PosPurp[3]	0.1568553	2.217306	0.07	0.9437
P3Q6PosPurp[4]	-6.279317	2.780665	-2.26	0.0252*
P3Q10WkAtComp[0.5]	10.357038	5.875869	1.76	0.0797
P3Q10WkAtComp[1]	11.14016	5.839311	1.91	0.0581
P3Q10WkAtComp[3]	1.8295325	3.804329	0.48	0.6312
P3Q10WkAtComp[12]	-8.231998	3.610138	-2.28	0.0238*
P3Q10WkAtComp[24]	0.4604558	3.531759	0.13	0.8964
P3Q10WkAtComp[60]	1.6890321	4.057193	0.42	0.6777
P3Q10WkAtComp[120]	0.4345082	4.118586	0.11	0.9161
P3Q10WkAtComp[180]	-8.102698	5.095933	-1.59	0.1137
P3Q10WkAtComp[300]	-9.576029	7.985894	-1.20	0.2321
A2SameGender[1]	2.4470373	1.418341	1.73	0.0863
A2SameGender[2]	-2.447037	1.418341	-1.73	0.0863

Table 20: Segment of multivariate expanded estimates for factors with p-value < 0.1.

Based on the points given by adding the Estimated Difference (e.g. Estimate in the full Expanded Estimates table) for each category to the mean of that category's factor, we can graph the SCAM and get a visual representation of how SCAM changes across categories.

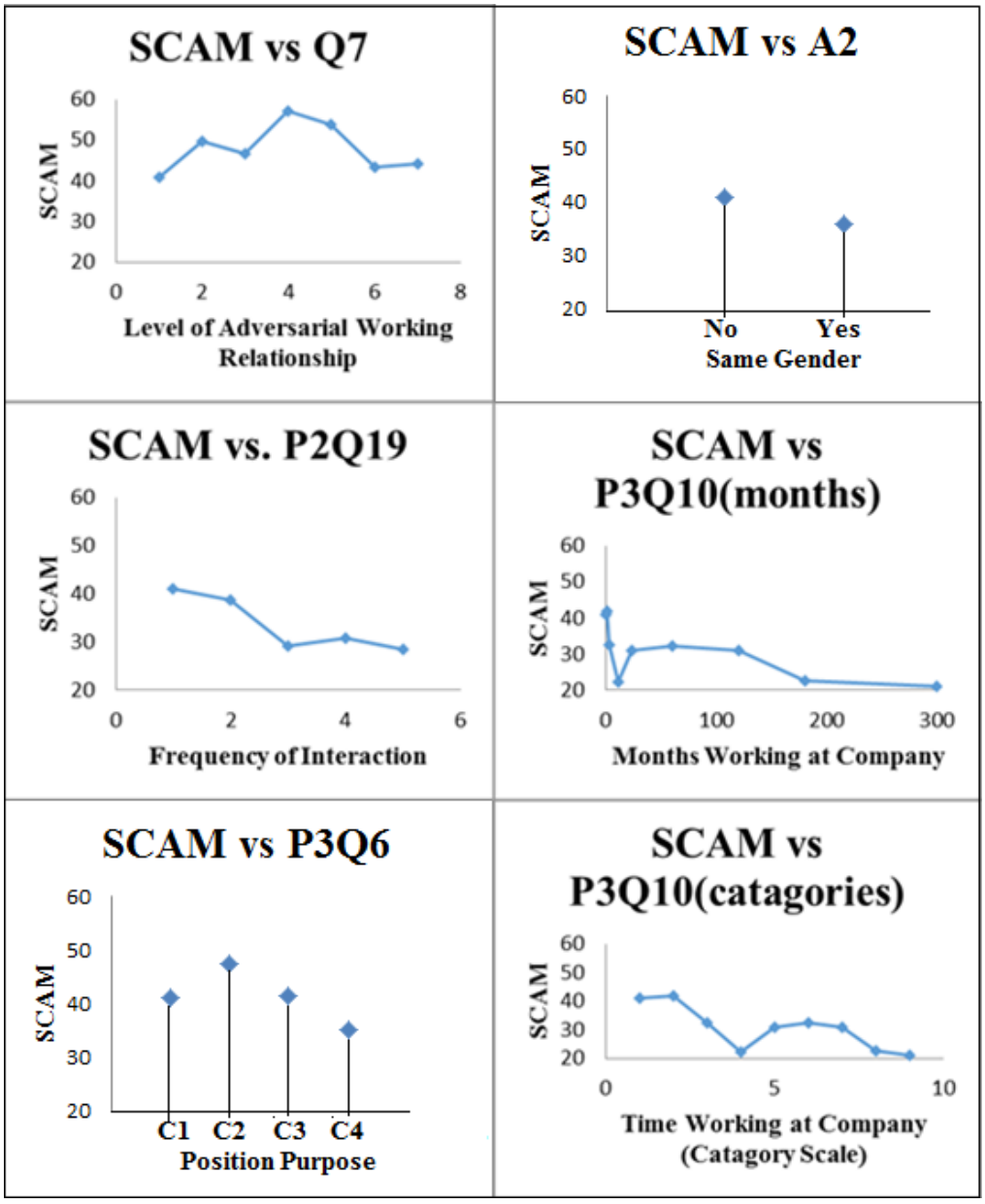

Figure 32: These graphs show the predicted changes in SCAM as a factor of the six factors that had a 0.1 p-value; each graph corrects for changes in SCAM attributable to other tested factors.

CHAPTER V

SUMMARY AND CONCLUSION

The purpose of this study was to establish a theoretical basis by which concrete decisions could be made within an organization to improve the likelihood of timely feedback communication from employees to compliance officers. This research is important to both the public and the private sector because maximizing effective feedback communication within an organization is imperative to optimizing organizational regulatory compliance and necessary for organizations to be responsive to the needs of the public. Furthermore, breakdowns in organizational communication have been, and can be, a source of great harm to the public and can lead to significant loss of profitability for organizations.

Thus organizations need effective internal communication, and as a matter of law, the public requires organizations to maintain systems that allow for effective and timely feedback communication. To understand the framework under which employees are most likely to engage in this necessary feedback communication, this study was created.

On the whole, the respondents to this survey had relatively low communication apprehension, which indicates a fairly strong willingness to voluntarily communicate with their compliance officer. Additionally, the average credibility perceptions were above 24 which shows that the compliance officer was seen as more credible than not. The scores indicated, on average, a fairly weak perception of the compliance officers being trustworthy, caring, and competent.

For question 6 the responses indicated that on average respondents had a weak feeling of comfort initiating conversation with their compliance officer. For question 7 the responses indicated that on average respondents had a weak feeling that they and their compliance officer were a team. For question 30 (P2Q20), the responses indicated that on average the respondent had a very weak belief that the compliance officer could do the operator's job.

The Variance Inflation Factor Table presented in the previous section is used to establish the independence of the factors by measuring their collinearity. This is an assessment to see whether the predictive variables selected have independent effects on SCAM. For this test, the threshold for acceptable collinearity is set to 10. The typically acceptable level of measured collinearity is having every factor with a VIF of less than 10. The only factor that was not less than 10 was Trust, which had a VIF = 11.8. However, because Trust has a polynomial factor, it is expected that it would be a bit higher. As such this is within acceptable levels to still state that the variables are non-collinear and thus exhibit a statistically significant level of independence from one another.

Having verified low enough levels of collinearity between the factors, the next step was to determine which factors, if any, had a statistically significant relationship with SCAM. Multivariate analysis was conducted with 19 independent variables (Q2, Q7, Q9, Q10, Competence, Caring (Caring/Goodwill), Trust (Trustworthiness), P2Q19(Q29), P2Q20(Q30), P3Q1(P31), P3Q6(Q36), P3Q8(Q38), P3Q9 (Q39), P3Q10 (Q40), P3Q12 (Q42), A1, A2, A3, and A7) and SCAM as the dependent variable. The

Summary of Fit regression analysis confirmed that the 19 variables (plus the 3 polynomial variables) account for about 63.8% of the variance in SCAM. This means that the current set of factors is effective at estimating SCAM, but there is still room to refine the factors list to include more statistically significant factors and remove statistically insignificant factors. This was further confirmed by the Distribution of Residuals analysis.

The regression analysis was followed with an overall analysis of variance. This showed that there was statistically significant variance in SCAM across these factors. In order to establish which factors corresponded to a statistically significant variance, there was further statistical analysis to be done. This is where the study begins to answer the research questions.

The study addresses the following questions:

1. Is there a relationship between perception of a compliance officer and the communication apprehension of subordinate receivers towards those supervisors when engaging in feedback communication?
2. What is the relationship between the perception of competence in a compliance officer and the communication apprehension of subordinate receivers towards those supervisors when engaging in feedback communication?
3. What is the relationship between the perception of trustworthiness in a compliance officer and the communication apprehension of subordinate

receivers towards those supervisors when engaging in feedback communication?

4. What is the relationship between the perception of caring/goodwill in a compliance officer and the communication apprehension of subordinate receivers towards those supervisors when engaging in feedback communication?

The previously discussed Effects Test shows which factors corresponded to a statistically significant change in SCAM. Any factor with a p-value (Prob > F) of less than 0.05 is considered statistically significant. Thus, Caring, P2Q20 (Q30), and Trust are statistically significant. Additionally, any factor that has a p-value of less than 0.1 is also worth noting as a factor with evidence that suggests a statistical relationship with SCAM. This would also include Q7, P2Q19 (Q29), P3Q6 (Q36), P3Q10 (Q40), and A2.

Having identified the factors with a statistically significant impact on SCAM the Effect Test Summary of the data output compares the relative effect of each factor on SCAM. The factors with the highest impact on SCAM are at the top. The table shows that P2Q20 (Q30), which asks whether the respondent believes that his compliance officer can do the respondent's job, has the greatest impact on SCAM. This is followed by the Caring score, and then Trustworthiness score.

Let's start our discussion with the most statistically significant factors. P2Q20 has the strongest effect on SCAM. The only values of P2Q20 that have a statistically significant effect are when the response to P2Q20 is 1 (e.g. "Definitely, No," the

compliance officer cannot do the respondents job) or 5 (e.g. "Definitely, Yes," the compliance officer can do the respondents job). In this case, the relationship is positive going from Definitely No to Definitely Yes. This means that when operators are certain that their compliance officer can do their job they have a higher SCAM and are more apprehensive to communicate. This fits within the hypothesis that perceptions of competence would have a positive relationship with communication apprehension. In this case, it is a task specific competence (e.g. whether or not you can do a particular job), but it makes sense that operators would be more apprehensive when communicating with someone who is an expert. An interesting area for further research is whether or not the positive relationship is maintained when it is a different task-specific competence.

Based on this research, it is likely that other task specific competences will not have a statistically significant relationship with SCAM. This study examined competence, which in this case, was measuring perceptions of general competence. The operator's perception of the compliance officer's competence had no statistically significant impact on the data and ranks as a factor with almost the lowest impact on SCAM. Additionally, looking at the predictive charts, there is a near straight horizontal line drawn, which shows almost no estimated impact on the SCAM. When compared with the results of P2Q20, this could mean that operators are more apprehensive when communicating with subject matter experts in their own field of expertise as compared with other fields of expertise.

The Caring/Goodwill factor has a steep negative relationship with SCAM at low values that plateaus after the factor reaches ~30. This is evidence that increases in the operator's perception of compliance officer caring about their wellbeing reduces their communication apprehension and makes them more willing to communicate. This further suggests that there may not be a difference in communication apprehension between a weak belief of caring and a strong belief. Thus these results could mean that there is a point of diminished return on leaders convincing their reports that they care about the reports wellbeing.

Perceptions of trustworthiness caused an interesting effect in the situational communication apprehension. As hypothesized, high levels of perceived trustworthiness reduced communication apprehension. However, there was also reduced communication apprehension when communicating with someone who had extremely low perceived trustworthiness. Thus perception of trustworthiness has a parabolic impact on SCAM. A very low perception of trustworthiness reduces communication apprehension and a very high level of trustworthiness reduces communication, but values in the middle heighten communication apprehension. The cause of this phenomenon should be researched further.

Another area where this parabolic effect on SCAM is observed is in Q7 data. Q7 collected data on how adversarial the relationship between the operator and their compliance officer was. In this case the answer of 1 corresponded to the statement “We are a team” and the answer of 7 corresponded to the answer “We are enemies.” The only answer choice that showed statistically significant changes in the data was the answer

choice 4 which conveyed a neutral standpoint where the relationship was perceived as being neither adversarial nor team-oriented. At this point in the data communication apprehension was maximized. Thus suggesting that willingness to communicate is minimized when there is an ill-defined relationship.

The results of Trust and Q7 could be interpreted together to show evidence that when a relationship is ill-defined it causes communication apprehension and a reduced willingness to communicate. Further research should be done to further test this observation.

The results of this research can be broadly applied to establishing better compliance systems in any organization. The results provide a theoretical basis by which organizations can allocate training, team building, and staffing resources to improve internal communication. Although this reduction in communication apprehension and the resulting improvement in organizational compliance was the expressed purpose of this study, the results can be applied in other areas.

The reduction of communication apprehension is useful in any situation where a person is soliciting the voluntary disclosure of information. Thus the results showing a relationship between communication apprehension and caring, trustworthiness, and task-specific competence, can be applied in areas like interrogations and interviews. Detectives could use the results of this study to establish protocols for reducing a suspect's communications apprehension and getting them to freely share information. Also, psychiatrist, doctors and other professionals who need information from people in order to help them, could use these results to develop techniques for communicating

with traumatized individuals. The breadth of the research can even be applied to mediation, negotiations, and diplomacy to establish methods for opening the channels of communication between opposing parties.

The factors Q7, P2Q19, P3Q6, P3Q10, and A2 were all sources of marginal statistical significance. We have already discussed Q7, P2Q19 corresponded to the next most significant impact on SCAM. This factor asked how often the operator communicated with their compliance officer. Though a weak connection, there is some evidence to suggest that frequent communication reduces communication apprehension.

The A2 factor dealt with whether the operator and respondent were the same gender. This factor showed weak evidence that there is a negative relationship between being the same gender and SCAM. This suggests that operators are slightly less apprehensive when communicating with compliance officers of the same gender. While there is not a basis found in this data to conclude that gender has an impact on SCAM in the workplace, it is definitely a subject to be considered in future research.

The factor P3Q6 addressed the operator's perception of their job's purpose in the organization. These were grouped where 1 was assigned to any monetary purposes, 2 was assigned to productivity purposes, 3 was assigned to purposes related to improving other's productivity and 4 was assigned to purposes that produced high quality good without regards to price. There was evidence to suggest a difference between the SCAM of P3Q6(2) and P3Q6(4). Communication seems to decrease between positions that are productivity/deadline driven versus positions that are quality output driven. This suggests that communication apprehension can be reduced by promoting the importance

of product quality over product quantity, and may be increased when the purpose of a position is deadline driven.

The factor P3Q10 asked how long the person had worked with their company. While only marginally statistically significant, there is evidence that suggests that operator communication apprehension reduces as employees go from working at a company less than 3 months to working there 1-2 years. This evidence also suggests that working for less than 3 months can elevate communication apprehension. There is nothing in the data to suggest that that trend continues past the 2 year mark. More research should be done to understand the cause of this phenomenon, and why communication apprehension does not continue to reduce by statistically significant amounts.

Based on the Phase 1 results, there was an expectation to see some statistical significance between SCAM and A3. The Phase 1 responses suggested that respondents would be more willing to communicate and have a lower SCAM with people of the same ethnicity. However, the Phase 2 results showed no evidence of a relationship between A3 and SCAM. This could mean that in the limited sample size of Phase 1, ethnicity was a proxy for some other more meaningful factor. As previously discussed, this other factor could be the belief that you will be better understood or it could be the fear of "making a bad impression" (e.g. reducing the compliance officer's perception of your credibility).

In order to understand the phenomenon identified in Phase 1, the multivariate analysis was also performed on A1 and A7. Being from the same department and having

the same background, is more likely to result in employees having a similar lexicon. Thus, if understanding is the primary concern, the expectation would be to see some form of statistically significant reduction in SCAM based on being from the same department. However there was no statistical significance observed in either of these factors. This study did not include any metrics to evaluate the fear of making a negative impression or the respondent fearing that someone will have a reduced perception of their credibility. That will be one of my recommendations for future research.

Implications and Recommendations

This research has implications across both private and public industries as well as academia. In academia, this research has the possibility to expand legal, business and engineering literature, by expanding our understanding of industrial communication. By presenting evidence that perception has an impact on how encoding decisions are made in feedback communication, this research provides a new mechanism that can be utilized to improve communication and legal compliance.

For industries, finding that there is evidence of a relationship between willingness to communicate and perceptions of trust, on-the-job ability, and caring provides a new basis to develop leadership training.

More research needs to be done on the relationship between ambiguity and communication apprehension. The parabolic behavior of situational communication apprehension when compared with perceptions of trustworthiness and perceptions of an adversarial relationship, could suggest that ambiguity increases communication

apprehension. The fact that operators were more willing to communicate with compliance officers that they perceived to be enemies or untrustworthy than those that were uncertain or neutral, suggests that ambiguity might be more detrimental to communication than clearly understood negativity.

Also, being that trustworthiness was found to be a factor that causes statistically significant changes in situational communication apprehension, more research should be done on trustworthiness. There are various types of trust discussed in literature; further research should be done to see which types of trust have the greatest impact on situational communication apprehension in the workplace.

Additionally, more research should be done on the effects of demographics like gender, ethnicity, culture and background on one's willingness to communicate. The Phase 1 responses suggested that there may be some increased communication apprehension when communicating across demographic boundaries; however, little evidence of that was found in Phase 2. Therefore a controlled study of the effects demographic diversity has on communication would be a suggested expansion of this research.

As part of the previous recommendation, I noted that the observed difference in comfort level across demographic lines could be a proxy for some other factor. Two factors to be considered are 1) The fear of harming one's own reputation by engaging in communication; and 2) Factors that can more directly measure the likelihood that someone will understand an operator. Comparing these factors with communication apprehension would be an excellent expansion of this study.

Another recommendation for future study is the interplay of competence and P2Q20, the perceived ability of the compliance officer to do the operators job. The research shows that in the workplace, general competence, the metric measured in the credibility survey instrument, may not be as significant a factor as task specific competence (e.g. can you do a job). Future study should compare more perceptions of task specific competence to communication apprehension. This could include controlled studies where work performance evaluations are used as a predictive variable. Or respondents could be asked about their communication apprehension before and after seeing a demonstration of task specific competence or a lack of task specific competence.

Also, future research should precisely look at knowledge boundaries and see how communicating across them affect SCAM. This study presents evidence that suggests that there is more apprehension communicating with a competent person within a knowledge boundary rather than across it. However, since knowledge boundaries were not specifically tested and there was no statistically significant difference between operators communicating with compliance officers from the same background vs communicating with compliance officers from different backgrounds, there needs to be more research on the subject.

Additionally, more research should be done to test the effects of perceived position purpose on outcome variables. This survey instrument asked operators to select the main purpose of their job. While there was only a marginally significant relationship

between those responses and SCAM, this is still evidence to suggest that position purpose may have some impact on SCAM.

Finally, this dissertation presented a unique, original model for how institutions dubbed the organization, association, and legal control units interact with each other to try to maximize success and minimize harm. This research focused specifically on optimizing the organizational control loop. Future research should apply engineering concepts and modeling to attempt to identify factors that may be manipulated to optimize the other control units, or further optimize the organizational control unit.

Specifically, more research is needed into the mechanism that turns public outcry or controversy into new legislation. Although legal literature shows an understanding of the general process, there is a need for a clearer understanding of the factors that affect the process. Any scientific research into the factors that cause the legislature to prioritize certain legislation in response to new controversy would greatly improve our understanding of how organizations can efficiently interact with government.

Any of the recommendations would shed additional light on how best to maximize both compliance and the efficient creation of best practices. In doing so, such research would be useful to prevent public harm, increase organizational profitability, and reduce waste.

Conclusion

An effective communication loop is paramount to maintaining an effective compliance system within an organization and be responsive to changing best practices.

In order for a communication loop to be effective, there must be effective forward and feedback communication. The literature provides several factors that impact the overall effectiveness of communication; one of these factors is situational communication apprehension. Specifically in the context of feedback communication, situational communication apprehension is recognized as a significant hurdle to effective feedback communication. This research found evidence of factors that can be manipulated by organizations and leaders (specifically compliance officers) to allow them to strategically limit the situational communication apprehension of their employees and operators.

The data provided evidence of a relationship between the situational communication apprehension operators and their perception of their compliance officer. The data showed a negative relationship between situational communication apprehension and perceptions of caring/goodwill. Thus showing that the more that an operator believes that their compliance officer has their best interest at heart, the more they are willing to voluntarily engage in the communication loop.

Perceptions of trustworthiness caused an interesting effect in the situational communication apprehension. As hypothesized, high levels of perceived trustworthiness reduced communication apprehension. However, there was also reduced communication apprehension when communicating with someone who had extremely low perceived trustworthiness. The cause of this phenomenon should be researched further.

The measured perceived competence had no statistically significant effect on the operator's situational communication apprehension. This could be because, in a work

context, overall perceptions of a person's competence have less relevance than their ability to properly perform work related tasks. Thus, the research also compared the operator's situational communication apprehension with the operator's perception that the compliance officer could do the operator's job. The operator's communication apprehension increased when they perceived that the compliance officer could do the operator's job. This result should be weighed against the industry practice of promoting the most successful operators to manage their former work groups.

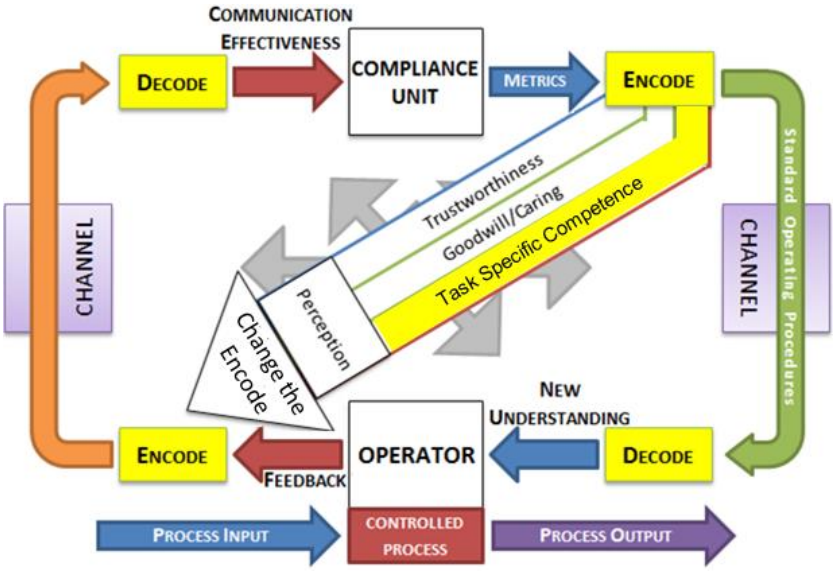

Figure 33: The modified Organizational Control Unit communication loop based on the results and conclusions of this study. (Cortlan J. Wickliff's Expanded Model of an Organizational Communication and Control Loop in a Compliance System, 2016)

Thus, rather than an overall perception of competence having an impact on communication apprehension, this study shows evidence that the operator's perception of a form of task-based or task specific competence affects the operator's communication apprehension and willingness to communicate. Based on these results, the model of the organizational control loop discussed in the first two chapters can be

modified to remove competence and replace it with a “Task Specific Competence” factor.

Additionally, there was evidence that suggested ambiguity about the nature of the operator’s relationship with their compliance officers heightens communication apprehension, and makes them less willing to engage in voluntary communication. Also, the data contained evidence to suggest that perceiving the primary goal of your position as producing high-quality outputs rather than meeting deadlines and following instruction reduces situational communication apprehension.

This research has the potential to act as a foundation for other research by which compliance and the generation of best practices can be approached systematically as an engineering problem. With the input of other scholars and additional study, the results of this research can provide guidance for leadership and compliance training that organizations can use to create a culture of proactive compliance and continuous generation of best practices. Thus, compliance units will be able to more effectively communicate with their operators, and respond in a timely fashion to any changes within the industry or the public.

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APPENDIX A

FIRST DRAFT OF SURVEY INSTRUMENT

This is the initial survey instrument, proposed to be used in this study.

Directions: Please complete the following questionnaire about how you felt the last time you interacted with someone who was giving you instructions related to new or existing laws, contractual provisions, or standard operating procedures. This could include, but is not limited to, members of the legal, environmental health & safety, human resources, quality assurance, or document control departments of your company. Mark 7 if the statement is extremely accurate for how you felt; 6 if moderately accurate; 5 if somewhat accurate; 4 if neither accurate nor inaccurate; 3 if somewhat accurate; 2 if moderately inaccurate; or 1 if extremely inaccurate. There are no right or wrong answers. Just respond to the items quickly to describe as accurately as you can how you felt while interacting with that person.

		7	6	5	4	3	2	1
1	I was apprehensive	7	6	5	4	3	2	1
2	I was disturbed	7	6	5	4	3	2	1
3	I felt peaceful	7	6	5	4	3	2	1
4	I was loose	7	6	5	4	3	2	1
5	I felt uneasy	7	6	5	4	3	2	1
6	I was self-assured	7	6	5	4	3	2	1
7	I was fearful	7	6	5	4	3	2	1
8	I was ruffled	7	6	5	4	3	2	1
9	I felt jumpy	7	6	5	4	3	2	1
10	I was composed	7	6	5	4	3	2	1
11	I was bothered	7	6	5	4	3	2	1
12	I felt satisfied	7	6	5	4	3	2	1
13	I felt safe	7	6	5	4	3	2	1
14	I was flustered	7	6	5	4	3	2	1
15	I was cheerful	7	6	5	4	3	2	1
16	I felt happy	7	6	5	4	3	2	1
17	I felt dejected	7	6	5	4	3	2	1
18	I was pleased	7	6	5	4	3	2	1
19	I felt good	7	6	5	4	3	2	1
20	I was unhappy	7	6	5	4	3	2	1

Directions: Thinking of the same person referenced in the previous section, on the scales below, indicate your feelings about him/her. Numbers 1 and 7 indicate a very strong feeling. Numbers 2 and 6 indicate a strong feeling. Number 4 and 5 indicate a fairly weak feeling. Number 4 indicates you are undecided.

		1	2	3	4	5	6	7	
1	Intelligent	1	2	3	4	5	6	7	Unintelligent
2	Untrained	1	2	3	4	5	6	7	Trained
3	Cares about me	1	2	3	4	5	6	7	Doesn't care about me
4	Honest	1	2	3	4	5	6	7	Dishonest
5	Has my interests at heart	1	2	3	4	5	6	7	Doesn't have my interests at heart
6	Untrustworthy	1	2	3	4	5	6	7	Trustworthy
7	Inexpert	1	2	3	4	5	6	7	Expert
8	Self-centered	1	2	3	4	5	6	7	Not self-centered
9	Concerned with me	1	2	3	4	5	6	7	Not concerned with me
10	Honorable	1	2	3	4	5	6	7	Dishonorable
11	Informed	1	2	3	4	5	6	7	Uninformed
12	Moral	1	2	3	4	5	6	7	Immoral
13	Incompetent	1	2	3	4	5	6	7	Competent
14	Unethical	1	2	3	4	5	6	7	Ethical
15	Insensitive	1	2	3	4	5	6	7	Sensitive
16	Bright	1	2	3	4	5	6	7	Stupid
17	Phony	1	2	3	4	5	6	7	Genuine
18	Not understanding	1	2	3	4	5	6	7	Understanding

What background does this person have? Technical, Legal, Administrative, Business, Other

Directions: Answer the following questions about yourself.

How many years of work experience do you have?

< 1 yr.; 1-2 yrs.; 2-5 yrs.; 5-10yrs; 10-15yrs; 15-25 yrs.; 25+ yrs.

How many years have you been working at your current company

< 1 yr.; 1-2 yrs.; 2-5 yrs.; 5-10yrs; 10-15yrs; 15-25 yrs.; 25+ yrs.

What is your gender? Male, Female, No Answer

What is your background? Technical, Legal, Administrative, Business, Other

What is your highest level of education?

Some High School, High School Grad, Some College, Associates Degree, Four Year Degree, Graduate School, Doctorate/Professional Graduate Degree

Directions: Answer the following questions about the company you work for.

What size is your company?

<50, 50-99, 100-249, 250-500, 501-2499, <2500 employees

What is the size of the site you work at?

<50, 50-99, 100-249, 250-500, 501-2499, <2500 employees

What industry does your company work in?

Medical, Oil/Gas/Energy, Semi-Conductor, Telecommunication, Other Technical Industry, Other Non-Technical Industry

APPENDIX B

PHASE 1 SURVEY INSTRUMENT

This survey instrument was modified based on Alternative Plausible Explanation analysis prior to use in Phase 1. These modifications were part of Phase 1 pre-interview analysis, and the modified instrument was used in the Phase 1 interviews. Changes from First Draft of Survey Instrument are highlighted yellow.

Directions: Please complete the following questionnaire about how you felt the last time you interacted with someone who was giving you instructions related to new or existing laws, contractual provisions, or standard operating procedures. This could include, but is not limited to, members of the legal, environmental health & safety, human resources, quality assurance, or document control departments of your company. Mark 7 if the statement is extremely accurate for how you felt; 6 if moderately accurate; 5 if somewhat accurate; 4 if neither accurate nor inaccurate; 3 if somewhat accurate; 2 if moderately inaccurate; or 1 if extremely inaccurate. There are no right or wrong answers. Just respond to the items quickly to describe as accurately as you can how you felt while interacting with that person.

		7	6	5	4	3	2	1
1	I was apprehensive	7	6	5	4	3	2	1
2	I was disturbed	7	6	5	4	3	2	1
3	I felt peaceful	7	6	5	4	3	2	1
4	I was loose	7	6	5	4	3	2	1
5	I felt uneasy	7	6	5	4	3	2	1
6	I was self-assured	7	6	5	4	3	2	1
7	I was fearful	7	6	5	4	3	2	1
8	I was ruffled	7	6	5	4	3	2	1
9	I felt jumpy	7	6	5	4	3	2	1
10	I was composed	7	6	5	4	3	2	1
11	I was bothered	7	6	5	4	3	2	1
12	I felt satisfied	7	6	5	4	3	2	1
13	I felt safe	7	6	5	4	3	2	1
14	I was flustered	7	6	5	4	3	2	1
15	I was cheerful	7	6	5	4	3	2	1
16	I felt happy	7	6	5	4	3	2	1
17	I felt dejected	7	6	5	4	3	2	1
18	I was pleased	7	6	5	4	3	2	1
19	I felt good	7	6	5	4	3	2	1
20	I was unhappy	7	6	5	4	3	2	1

Directions: Thinking of the same person referenced in the previous section, on the scales below, indicate your feelings about him/her. Numbers 1 and 7 indicate a very strong feeling. Numbers 2 and 6 indicate a strong feeling. Number 4 and 5 indicate a fairly weak feeling. Number 4 indicates you are undecided.

		1	2	3	4	5	6	7	
1	Intelligent	1	2	3	4	5	6	7	Unintelligent
2	Untrained	1	2	3	4	5	6	7	Trained
3	Cares about me	1	2	3	4	5	6	7	Doesn't care about me
4	Honest	1	2	3	4	5	6	7	Dishonest
5	Has my interests at heart	1	2	3	4	5	6	7	Doesn't have my interests at heart
6	Untrustworthy	1	2	3	4	5	6	7	Trustworthy
7	Inexpert	1	2	3	4	5	6	7	Expert
8	Self-centered	1	2	3	4	5	6	7	Not self-centered
9	Concerned with me	1	2	3	4	5	6	7	Not concerned with me
10	Honorable	1	2	3	4	5	6	7	Dishonorable
11	Informed	1	2	3	4	5	6	7	Uninformed
12	Moral	1	2	3	4	5	6	7	Immoral
13	Incompetent	1	2	3	4	5	6	7	Competent
14	Unethical	1	2	3	4	5	6	7	Ethical
15	Insensitive	1	2	3	4	5	6	7	Sensitive
16	Bright	1	2	3	4	5	6	7	Stupid
17	Phony	1	2	3	4	5	6	7	Genuine
18	Not understanding	1	2	3	4	5	6	7	Understanding

What background does this person have? Technical, Legal, Administrative, Business, Other

In what department do they work?

Marketing, Sales, Research & Development, Manufacturing, Human Resources, Quality Control, Quality Assurance, Legal Department, Environmental Health & Safety, Packing/shipping, Executive Leadership, Accounting, Other

How comfortable do you feel initiating a conversation with this person?

Very Uncomfortable	1	2	3	4	5	6	7	Very Comfortable

How adversarial is your relationship with this person?

Not at all Adversarial	1	2	3	4	5	6	7	Very Adversarial

Directions: Answer the following questions about yourself.

How many years of work experience do you have?

< 1 yr.; 1-2 yrs.; 2-5 yrs.; 5-10yrs; 10-15yrs; 15-25 yrs.; 25+ yrs.

How many years have you been working at your current company

< 1 yr.; 1-2 yrs.; 2-5 yrs.; 5-10yrs; 10-15yrs; 15-25 yrs.; 25+ yrs.

What is your gender? Male, Female, No Answer

What is your background? Technical, Legal, Administrative, Business, Other

What is your highest level of education?

Some High School, High School Grad, Some College, Associates Degree, Four Year Degree, Graduate School, Doctorate/Professional Graduate Degree

Which best describes the goal of your position?

Generate Revenue, Minimize cost, Innovation, Follow Instructions, Security/Protect-Customers, Solve Problems, Meet Deadlines

In what department do you work?

Marketing, Sales, Research & Development, Manufacturing, Human Resources, Quality Control, Quality Assurance, Legal Department, Environmental Health & Safety, Packing/shipping, Executive Leadership, Accounting, Other

Directions: Answer the following questions about the company you work for.

What size is your company?

<50, 50-99, 100-249, 250-500, 501-2499, <2500 employees

What is the size of the site you work at?

<50, 50-99, 100-249, 250-500, 501-2499, <2500 employees

What industry does your company work in?

Medical, Oil/Gas/Energy, Semi-Conductor, Telecommunication, Other Technical Industry, Other Non-Technical Industry

".com"/app company, educational/school/university

Where is your company headquartered? (Continent, Country)

Where is your site located? (State, Country)

What is your company's primary product type (ex. Medical devices, calculators, video games, etc.)?

What best describes the goal of your company?

Generate Revenue, Minimize cost, Innovation, Regulatory Compliance, Security/Protect-Customers, Solve Problems, Meet Customer Needs, Timely performance, Delivering Highest Quality Product (Regardless of Price)

APPENDIX C

PHASE 2 SURVEY INSTRUMENT

This survey instrument was modified based on the results of Phase 1 Interviews. These modifications were part of Phase 1 analysis, and the modified instrument was used in the Phase 2 data collection. Changes from Phase 1 Survey Instrument are highlighted yellow.

Think of a supervisor, or member of your company's legal, quality control/assurance, environmental health & safety, or finance departments ("compliance-officer") who you can remember having a verbal conversation with about complying with laws, company policy, contract provisions, etc., you are going to answer questions about them throughout this survey.

What background does this person have? Technical, Legal, Administrative, Business, Other

Medical, Education

In what department do they work?

Educational Staff, Educational Faculty, Medical Staff, Marketing, Sales, Research & Development, Manufacturing, Human Resources, Quality Control, Quality Assurance, Legal Department, Environmental Health & Safety, Packing/shipping, Executive Leadership, Accounting, Other

How comfortable do you feel initiating a conversation with this person?

Very Uncomfortable 1 2 3 4 5 6 7 Very Comfortable

How adversarial is your relationship with this person?

We Are a Team 1 2 3 4 5 6 7 We are Enemies

How long had you worked with this person at the time of the conversation?

What is their Gender? Female, Male, Other, Prefer not to Disclose

What is their Ethnicity? American Indian or Alaskan Native, Asian or Pacific Islander, Black or African American, Hispanic or Latino, White/Caucasian, Prefer not to answer, I don't Know, Other

Did this conversation occur because this supervisor/compliance-officer thought you did something wrong/improper?

What type of meeting was this? One on One, Group Meeting, Training, Other

How often did you interact with this person?

If necessary, could this supervisor/compliance officer do your job?

Directions: Answer the following questions about yourself.

How many years of work experience do you have?

< 1 yr.; 1-2 yrs.; 2-5 yrs.; 5-10yrs; 10-15yrs; 15-25 yrs.; 25+ yrs.
How many years have you been working at your current company
< 1 yr.; 1-2 yrs.; 2-5 yrs.; 5-10yrs; 10-15yrs; 15-25 yrs.; 25+ yrs.
What is your gender? Male, Female, Other, No Answer
What is your background? Technical, Legal, Administrative, Business, Other
Medical, Education
What is your highest level of education?

Some High School, High School Grad, Some College, Associates Degree, Four Year Degree, Graduate School, Doctorate/Professional Graduate Degree

Which best describes the goal of your position?

Follow Instructions, Generate Revenue, Help others achieve their goals, innovation, meet deadlines, minimize cost to Organization, minimize cost to customer, minimize cost to Organization, Produce Highest quality products (regardless of price), Promote health & wellness (regardless of price), Regulatory Compliance, Promote Security/Protect Customer, Serving Clients/Customers, Solve Problems, Other.

In what department do you work?
Educational Staff, Educational Faculty, Medical Staff, Marketing, Sales, Research & Development, Manufacturing, Human Resources, Quality Control, Quality Assurance, Legal Department, Environmental Health & Safety, Packing/shipping, Executive Leadership, Accounting, Other
What is your Ethnicity? American Indian or Alaskan Native, Asian or Pacific Islander, Black or African American, Hispanic or Latino, White/Caucasian, Prefer not to answer, I don't Know, Other

Directions: Answer the following questions about the company you work for.
What size is your company?

<50, 50-99, 100-249, 250-500, 501-2499, <2500 employees

What is the size of the site you work at?
<50, 50-99, 100-249, 250-500, 501-2499, <2500 employees
What industry does your company work in?
Medical, Oil/Gas/Energy, Semi-Conductor, Telecommunication, Other Technical Industry, Other Non-Technical Industry
".com"/app company, educational/school/university, Cellphone/Computer, Education, Energy & Utilities, Finance / banking, Government, Healthcare / Medical, Legal, manufacturing/materials, non-profit, Professional Services/Consultant, Retail/Consumer, Semi-Conductor / Microprocessor, Technology, Telecommunication, Transportation/Delivery, Wholesale/Distribution
Where is your company headquartered? (Continent, Country)
Where is your site located? (State, Country)

What is your company's primary product type (ex. Medical devices, calculators, video games, etc.)?
What best describes the goal of your company?

Generate Revenue, Minimize cost, Innovation, Regulatory Compliance, Security/Protect-Customers, Solve Problems, Meet Customer Needs, Timely performance, Delivering Highest Quality Product (Regardless of Price)

What type of position did you have in this organization? Consultant Intern Full-time Employee, Part time employee, Temporary Employee, Management/executive Leadership

What type of organization was this? Company For-profit, Hospital, Clinic or other Medical Treatment Facility, Law Firm, Non-Profit Company, Public Entity (Government, Agency, Department, etc.) University, College, or School, Other.

How long had you worked at this organization at this organization at the time of the conversation?

What was your organization's primary product type(s) (ex. Medical Devices, Technical Consultations, Circuit Boards, Etc.)

Please complete the following questions about how you felt the last time you communicated verbally with this person about compliance with existing laws, contractual provisions, company policy or standard operating procedures. There are no right or wrong answers. Just respond to the items quickly to describe as accurately as you can how you felt while interacting with that person.

Mark 7 if the statement extremely accurately reflects how you felt; 6 if moderately accurate; 5 if somewhat accurate; 4 if neither accurate nor inaccurate; 3 if somewhat accurate; 2 if moderately inaccurate; or 1 if extremely inaccurate.

		7	6	5	4	3	2	1
1	I was apprehensive	7	6	5	4	3	2	1
2	I was disturbed	7	6	5	4	3	2	1
3	I felt peaceful	7	6	5	4	3	2	1
4	I was loose	7	6	5	4	3	2	1
5	I felt uneasy	7	6	5	4	3	2	1
6	I was self-assured	7	6	5	4	3	2	1
7	I was fearful	7	6	5	4	3	2	1
8	I was ruffled	7	6	5	4	3	2	1
9	I felt jumpy	7	6	5	4	3	2	1
10	I was composed	7	6	5	4	3	2	1
11	I was bothered	7	6	5	4	3	2	1
12	I felt satisfied	7	6	5	4	3	2	1
13	I felt safe	7	6	5	4	3	2	1

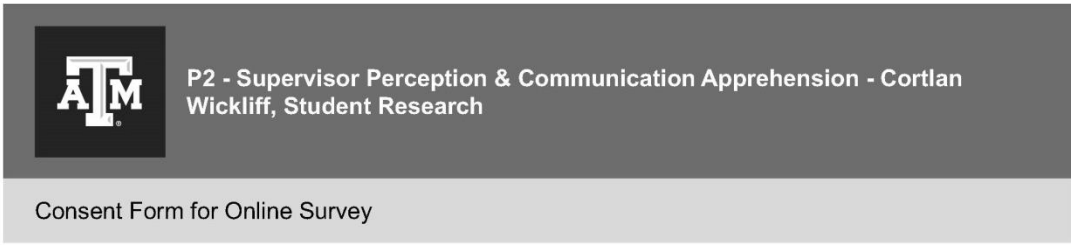
14	I was flustered	7	6	5	4	3	2	1
15	I was cheerful	7	6	5	4	3	2	1
16	I felt happy	7	6	5	4	3	2	1
17	I felt dejected	7	6	5	4	3	2	1
18	I was pleased	7	6	5	4	3	2	1
19	I felt good	7	6	5	4	3	2	1
20	I was unhappy	7	6	5	4	3	2	1

(For the Next 18 questions) Thinking of the same supervisor/compliance-officer referenced in the previous section, on the scales below, indicate your feelings about him/her. Numbers 1 and 7 indicate a very strong feeling. Numbers 2 and 6 indicate a strong feeling. Number 4 and 5 indicate a fairly weak feeling. Number 4 indicates you are undecided.

		1	2	3	4	5	6	7	
1	Intelligent	1	2	3	4	5	6	7	Unintelligent
2	Untrained	1	2	3	4	5	6	7	Trained
3	Cares about me	1	2	3	4	5	6	7	Doesn't care about me
4	Honest	1	2	3	4	5	6	7	Dishonest
5	Has my interests at heart	1	2	3	4	5	6	7	Doesn't have my interests at heart
6	Untrustworthy	1	2	3	4	5	6	7	Trustworthy
7	Inexpert	1	2	3	4	5	6	7	Expert
8	Self-centered	1	2	3	4	5	6	7	Not self-centered
9	Concerned with me	1	2	3	4	5	6	7	Not concerned with me
10	Honorable	1	2	3	4	5	6	7	Dishonorable
11	Informed	1	2	3	4	5	6	7	Uninformed
12	Moral	1	2	3	4	5	6	7	Immoral
13	Incompetent	1	2	3	4	5	6	7	Competent
14	Unethical	1	2	3	4	5	6	7	Ethical
15	Insensitive	1	2	3	4	5	6	7	Sensitive
16	Bright	1	2	3	4	5	6	7	Stupid
17	Phony	1	2	3	4	5	6	7	Genuine
18	Not understanding	1	2	3	4	5	6	7	Understanding

APPENDIX D

PHASE 2 SURVEY INSTRUMENT – ONLINE VIEW



Consent Form for Online Survey
Communication and Compliance within Organizations

You are invited to participate in a web-based online survey on communications within companies that are used to promote compliance. Specifically, this survey seeks to understand what traits members of the legal, environmental health & safety, quality assurance, document control and compliance related departments or supervisors responsible for compliance (individually "Compliance Officers", collectively referred to as the "Compliance Units") can exhibit to promote communication from other employees. This is a research project being conducted by Cortlan J. Wickliff, a Ph.D. candidate at Texas A&M University. It should take approximately 10-20 minutes to complete.

Your participation in this survey is voluntary. You may refuse to take part in the research or exit the survey at any time without penalty. You are free to decline to answer any particular question you do not wish to answer for any reason.

You will receive no direct benefits from participating in this research study. However, your responses may help us learn more about how companies can increase their compliance with the law and increase public health and safety. The possible risks or discomforts of the study are minimal. If you had a negative experience communicating with members of the Compliance Units, you may feel a little uncomfortable answering questions related to that experience.

Your survey answers will be sent to a link at SurveyMonkey.com where data will be stored in a password protected electronic format. Survey Monkey does not collect identifying information such as your name, email address, or IP address. Therefore, your responses will remain anonymous. No one will be able to identify you or your answers, and no one will know whether or not you participated in the study.

If you have questions at any time about the study or the procedures, you may contact my research supervisor, Dr. Cesar Malave via email at malave@tamu.edu. For questions about your rights as a research participant, to provide input regarding research, or if you have questions, complaints, or concerns about the research, you may call the Texas A&M University Human Research Protection Program office by phone at 1-979-458-4067, toll free at 1-855-795-8636, or by email at irb@tamu.edu.

You may print a copy of this consent form for your records. Clicking the "Next" button below indicates that you are 18 years of age or older, you have read the above information, and you

1

voluntarily agree to participate in this survey.

P2 - Supervisor Perception & Communication Apprehension - Cortlan Wickliff, Student Research

Questions About Supervisor

1.

Think of a supervisor, or member of your company's legal, quality control/assurance, environmental health & safety, or finance departments ("compliance-officer") who you can remember having a verbal conversation with about complying with laws, company policy, contract provisions, etc., you are going to answer questions about them throughout this survey. What background does this person have?

- [ ] Administrative
- [ ] Business
- [ ] Education
- [ ] Legal
- [ ] Medical
- [ ] Technical
- [ ] Other (please specify)

2. How long had you worked with this person at the time of the conversation?

3. What department did they work in?

4. What is their gender?

- ◯ Female
- ◯ Male
- ◯ Other
- ◯ Prefer Not to Disclose

5. What is their ethnicity? (Please select all that apply.)

- ☐ American Indian or Alaskan Native
- ☐ Asian or Pacific Islander
- ☐ Black or African American
- ☐ Hispanic or Latino
- ☐ White / Caucasian
- ☐ Prefer not to answer
- ☐ I Don't Know
- ☐ Other (please specify)

6. How comfortable did/do you feel initiating a conversation with this person?

Very Uncomfortable (1)	2	3	4	5	6	Very Comfortable (7)
◯	◯	◯	◯	◯	◯	◯

7. How adversarial was/is your working relationship with this person?

We are a Team (1)	2	3	4	5	6	We are Enemies (7)
◯	◯	◯	◯	◯	◯	◯

* 8.

Please complete the following questions about how you felt the last time you communicated verbally with this person about compliance with existing laws, contractual provisions, company policy or standard operating procedures. There are no right or wrong answers. Just respond to the items quickly to describe as accurately as you can how you felt while interacting with that person.

Mark 7 if the statement extremely accurately reflects how you felt; 6 if moderately accurate; 5 if somewhat accurate; 4 if neither accurate nor inaccurate; 3 if somewhat accurate; 2 if moderately inaccurate; or 1 if extremely inaccurate.

	7	6	5	4	3	2	1
I was apprehensive	○	○	○	○	○	○	○
I was disturbed	○	○	○	○	○	○	○
I felt peaceful	○	○	○	○	○	○	○
I was loose	○	○	○	○	○	○	○
I felt uneasy	○	○	○	○	○	○	○
I was self-assured	○	○	○	○	○	○	○
I was fearful	○	○	○	○	○	○	○
I was ruffled	○	○	○	○	○	○	○
I felt jumpy	○	○	○	○	○	○	○
I was composed	○	○	○	○	○	○	○
I was bothered	○	○	○	○	○	○	○
I felt satisfied	○	○	○	○	○	○	○
I felt safe	○	○	○	○	○	○	○
I was flustered	○	○	○	○	○	○	○
I was cheerful	○	○	○	○	○	○	○
I felt happy	○	○	○	○	○	○	○
I felt dejected	○	○	○	○	○	○	○
I was pleased	○	○	○	○	○	○	○
I felt good	○	○	○	○	○	○	○
I was unhappy	○	○	○	○	○	○	○

9. Did this conversation occur because this supervisor/compliance-officer thought you did something wrong/improper?

- ◯ Yes
- ◯ No
- ◯ No, but someone else violated company policy

10. What type of meeting was this?

- ◯ One-on-one
- ◯ Group Meeting
- ◯ Training
- ◯ Other (please specify)

P2 - Supervisor Perception & Communication Apprehension - Cortlan Wickliff, Student Research

Questions About Supervisor (cont'd)

* 1. For the following questions, think of the same supervisor/compliance-officer referenced in the previous section. On the scales below, indicate your feelings about him/her. Numbers 1 and 7 indicate a very strong feeling. Numbers 2 and 6 indicate a strong feeling. Number 4 and 5 indicate a fairly weak feeling. Number 4 indicates you are undecided.

Intelligent (1)	2	3	4	5	6	Unintelligent (7)
◯	◯	◯	◯	◯	◯	◯

* 2. .

Untrained (1)	2	3	4	5	6	Trained (7)
◯	◯	◯	◯	◯	◯	◯

* 3. .

Cares about me (1)	2	3	4	5	6	Doesn't care about me (7)
◯	◯	◯	◯	◯	◯	◯

5

* 4. .

Honest (1)	2	3	4	5	6	Dishonest (7)
○	○	○	○	○	○	○

* 5. .

Has my interests at heart (1)	2	3	4	5	6	Doesn't have my interests at heart (7)
○	○	○	○	○	○	○

* 6. .

Untrustworthy (1)	2	3	4	5	6	Trustworthy (7)
○	○	○	○	○	○	○

* 7. .

Inexpert (1)	2	3	4	5	6	Expert (7)
○	○	○	○	○	○	○

* 8. .

Self-centered (1)	2	3	4	5	6	Not self-centered (7)
○	○	○	○	○	○	○

* 9. .

Concerned with me (1)	2	3	4	5	6	Not concerned with me (7)
○	○	○	○	○	○	○

* 10. .

Honorable (1)	2	3	4	5	6	Dishonorable (7)
○	○	○	○	○	○	○

* 11. .

Informed (1)	2	3	4	5	6	Uninformed (7)
○	○	○	○	○	○	○

* 12. .

Moral (1)	2	3	4	5	6	Immoral (7)
○	○	○	○	○	○	○

* 13. .

Incompetent (1)	2	3	4	5	6	Competent (7)
○	○	○	○	○	○	○

* 14. .

Unethical (1)	2	3	4	5	6	Ethical (7)
○	○	○	○	○	○	○

* 15. .

Insensitive (1)	2	3	4	5	6	Sensitive (7)
○	○	○	○	○	○	○

* 16. .

Bright (1)	2	3	4	5	6	Stupid (7)
○	○	○	○	○	○	○

* 17. .

Phony (1)	2	3	4	5	6	Genuine (7)
○	○	○	○	○	○	○

* 18. .

Not understanding (1)	2	3	4	5	6	Understanding (7)
○	○	○	○	○	○	○

19. How often did you interact with this person?

- ○ Extremely often
- ○ Very often
- ○ Moderately often
- ○ Slightly often
- ○ Not at all often

20. If necessary, does this supervisor/compliance-officer have the skills/knowledge necessary to do your job?

- ◯ Definitely, Yes
- ◯ Probably, Yes
- ◯ Maybe
- ◯ Probably, No
- ◯ Definitely, No
- ◯ I Don't Know

P2 - Supervisor Perception & Communication Apprehension - Cortlan Wickliff, Student Research

Demographic Questions

Answer the following questions about yourself.

1. How many years of work experience did you have?

2. What is your gender?

- ◯ Female
- ◯ Male
- ◯ Other
- ◯ Prefer Not to Disclose

3. What is your ethnicity? (Please select all that apply.)

- [ ] American Indian or Alaskan Native
- [ ] Asian or Pacific Islander
- [ ] Black or African American
- [ ] Hispanic or Latino
- [ ] White / Caucasian
- [ ] Prefer not to answer
- [ ] Other (please specify)

4. What is your background?

- [ ] Administrative
- [ ] Business
- [ ] Education
- [ ] Legal
- [ ] Medical
- [ ] Technical
- [ ] Other (please specify)

5. What is the highest level of school you have completed or the highest degree you have received?

- ○ Less than high school degree
- ○ High school degree or equivalent (e.g., GED)
- ○ Some college but no degree
- ○ Associate degree
- ○ Bachelor degree
- ○ Graduate degree
- ○ Doctorate Degree (M.D., Ph.D., J.D., etc.)

6. Which best described the goal of your position?

- ◯ Follow Instructions
- ◯ Generate Revenue
- ◯ Help Others Achieve Their Goals
- ◯ Innovation
- ◯ Meet Deadlines
- ◯ Minimize Cost to Customer
- ◯ Minimize Cost to Organization
- ◯ Produce Highest Quality Products (Regardless of Price)
- ◯ Promote Health & Wellness (Regardless of Price)
- ◯ Regulatory Compliance
- ◯ Promote Security / Protect Customer
- ◯ Serving Clients / Customers
- ◯ Solve Problems
- ◯ Other (please specify)

7. What department did you work in?

Answer the following questions about the company, ISD, firm or organization that you work(ed) for when communicating with the previously referenced supervisor/compliance-officer.

8. What type of position did you have in this organization?

- ◯ Consultant
- ◯ Intern
- ◯ Full-time Employee
- ◯ Part-time Employee
- ◯ Temporary Employee
- ◯ Management / Executive Leadership

9. What type of organization was this?

- ◯ Company (For-Profit)
- ◯ Hospital, Clinic or other Medical Treatment Facility
- ◯ Law Firm
- ◯ Non-Profit Company
- ◯ Public Entity (Government, Agency, Departments, etc.)
- ◯ University, College, or School
- ◯ Other (please specify)

10. How long had you worked at this organization at the time of the conversation?

11. What was the size of your company, ISD, firm, or organization?

12. What was the size of your specific job site?

13. In what country was their headquarters located?

- ◯ United States
- ◯ Other (please specify)

14. If the headquarters was located in the United States, in what state or U.S. territory was their headquarter located?

15. At the time, in what state or U.S. territory was your job site located?

16. What industry did your organization belong to?

17. What was your organization's primary product type(s) (ex. Medical devices, Technical consultations, Circuit boards, etc.)

18. What best described the goal of your organization?

- ◯ Generate Revenue
- ◯ Help Others Achieve Their Goals
- ◯ Innovation
- ◯ Serving Clients / Customers
- ◯ Minimize Cost to Customer
- ◯ Minimize Cost to Organization
- ◯ Produce Highest Quality Products (Regardless of Price)
- ◯ Promote Health & Wellness (Regardless of Price)
- ◯ Regulatory Compliance
- ◯ Promote Security / Protect Customer
- ◯ Solve Problems
- ◯ Timely Performance / Delivery
- ◯ Other (please specify)

APPENDIX E

PHASE 2: ANSWER ENCODING

Page 1

Q1: 1-Administrative Education, Human Resources, In house Training, Social Work, Social Science, Customer Service

2-Business, Finance, Real Estate, Advertisement, Retail, Marketing, Supervisor, Global Supply Chain, Sales, Accounting

3-Legal, Claims Mgr, Law Enforcement, Labor Relations, Insurance

4-Medical, technical, Mental Health, Engineering, Architect, Public Health, Manufacturing, Nursing, Health, Psychology, Chemist, Safety & Quality Professional

5-Entertainment, Music, sports, Dance

Undesignated – Military, "Worked his way up the chain," Student of the Universe, Laborer, Class A CDL Driver

Q2: The responses to this section were given as time ranges. These were encoded by selecting the lowest limit of the range (e.g. 2 years for 2-5years) and converting this number from years into months when necessary (e.g. 24 months for 2 year). The number was encoded without the unit (e.g. 24 instead of 24months). The choice "< 1 month" was encoded as "0.5."

Q3: 1-Female

2-Male

3-Other

4-Prefer Not to Disclose

Note that when utilizing gender in other statistical categories, the responses "Other" and "Prefer Not to Disclose" are treated as Undesignated.

Q4 No statistical analysis was performed on the department selection other than to compare it to the response to Q37 (Page 3, Question 7). Accounting/Finance=1, Administrative=2, Customer Service=3, Educational Faculty=4, Educational Staff=5, Engineering=6, Environmental Health & Safety=7, Executive Leadership=8, Human Resources=9, IT=10, Legal Department=11, Manufacturing=12, Marketing=13, Medical Staff=14, Operations=15, Packing/Shipping=16, Project Management=17, Public Relations=18, Public Servant=19, Quality Assurance=20, Quality Control=21, Research & Development=22, Sales=23, Supply Chain=24, and Other=100 or 101

Q5: 1- American Indian or Alaskan Native

2 - Asian Pacific Islander, Middle Eastern, Indian

3 – Black, African American

4- Hispanic, Latino, Cuban American

5- White / Caucasian

6- Middle Eastern/Indian

Q6 1-Very Uncomfortable to 7-Very Comfortable

Q7 1-We are a Team to 7-We are Enemies

Q8 Situational Communication Apprehension Measure (SCAM) segment of survey instrument.

Q9 1-No (2)

2-No, but someone else violated company policy (3)

3-Yes (1)

Q10 1=one-on-one, interview, Passing Conversation

2-Group Meeting, Social Event

3-Training

4-ElectronicMedium

Unassigned = Email, Not Sure

Page 2

Q11- Q28 Credibility segment of survey instrument.

Q29 1=Not at all often

2=slightly often

3-Moderately Often

4-Very Often

5-Extremely Often

Q30 1-Definitely No

2-Probably No

3-Maybe

4-Probably Yes

5-Definiely Yes

Page 3

Q31: The responses to this section were given as time ranges. These were encoded by selecting the lowest limit of the range (e.g. 2 years for 2-5years). The number was encoded without the unit (e.g. 2 instead of 2years). The choice "< 1 year" was encoded as "0.5."

Q32: 1-Female

2-Male

3-Other

4-Prefer Not to Disclose

Note that when utilizing gender in other statistical categories, the responses "Other" and "Prefer Not to Disclose" are treated as Undesignated.

Q33: 1- American Indian or Alaskan Native

2 - Asian Pacific Islander, Middle Eastern, Indian

3 – Black, African American

4- Hispanic, Latino, Cuban American

5- White / Caucasian

6- Middle Eastern/Indian

Q34: 1-Administrative Education, Human Resources, In house Training, Social Work, Social Science, Customer Service

2-Business, Finance, Real Estate, Advertisement, Retail, Marketing, Supervisor, Global Supply Chain, Sales, Accounting

3-Legal, Claims Mgr, Law Enforcement, Labor Relations, Insurance

4-Medical, technical, Mental Health, Engineering, Architect, Public Health, Manufacturing, Nursing, Health, Psychology, Chemist, Safety & Quality Professional

5-Entertainment, Music, sports, Dance

Undesignated – Military, "Worked his way up the chain," Student of the Universe, Laborer, Class A CDL Driver

Q35 1-Less than High School

2-High School or Equivalent

3-Some College but No Degree

4-Associate degree

5-Bachelor Degree

6-Graduate Degree

7-Doctorate Degree

Q36 1-Generate Revenue, Minimize Cost to Organization, Manage Budget

2-Follow Instruction, Meet Deadlines, Put product into production

3-Help Others Achieve Their Goals, Minimize cost to Customer, Serving Clients/Customers, Solve Problems, teaching, Training, Support Faculty

4-Innovation, Produce High Quality Products (Regardless of Price), Promote Health & Wellness (Regardless of Price), Regulatory Compliance, Promote Security/Protect Customer, Technical Engineering, Promote Safety

Undesignated – Office Operations, j, D, All of the above, Hi

Q37 No statistical analysis was performed on the department selection other than to compare it to the response to Q37 (Page 3, Question 7). Accounting/Finance=1, Administrative=2, Customer Service=3, Educational Faculty=4, Educational Staff=5, Engineering=6, Environmental Health & Safety=7, Executive Leadership=8, Human Resources=9, IT=10, Legal Department=11, Manufacturing=12, Marketing=13, Medical Staff=14, Operations=15, Packing/Shipping=16, Project Management=17, Public Relations=18, Public Servant=19, Quality Assurance=20, Quality Control=21, Research & Development=22, Sales=23, Supply Chain=24, and Other=100 or 101

Q38 1-Intern, Temporary Employee

2-Consultant

3-Part-time Employee

4-Full-time Employee

5-Management

Q39 - 1-Company (For-Profit), Employee Benefit Firm, Aerospace/Defense, Design Firm, Insurance, Sales, Pipe Manufacturing

2-Hospital, Clinic, or other Medical Treatment facility, Chiropractic, Long term health care/nursing home

3-Law Firm

4-Non-Profit Company

5-Public Entity (Government, Agency, Departments, Etc.)

6-University, College, or School

Q40 The responses to this section were given as time ranges. These were encoded by selecting the lowest limit of the range (e.g. 2 years for 2-5years) and converting this number from years into months when necessary (e.g. 24 months for 2 year). The number was encoded without the unit (e.g. 24 instead of 24months). The choice "< 1 month" was encoded as "0.5."

Q41 Encoded by the lowest number in the range (e.g. 1 for 1-10)

Q42 Encoded by the lowest number in the range (e.g. 1 for 1-10)

Q43-Q47 Not encoded

Q48 1-Generate Revenue, Minimize Cost to Organization, Manage Budget, Assure Budget Planning and Implementation appropriately

2-Follow Instruction, Meet Deadlines, Put product into production, Timely Performance/Delivery

3-Help Others Achieve Their Goals, Minimize cost to Customer, Serving Clients/Customers, Solve Problems, Teaching, Training, Support Faculty, Graduate Student Athletes, Education

4-Innovation, Produce High Quality Products (Regardless of Price), Promote Health & Wellness (Regardless of Price), Regulatory Compliance, Promote Security/Protect Customer, Technical Engineering, Promote Safety

Undesignated – Office Operations, j, D, All of the above, Hi

APPENDIX F

PHASE 1 DATA SHEET

Suvey Number	Background	Department	C.O. Gender	C.O. Ethnicity	Comfortable Commmunicating	Relationship Adversarial	I was apprehensive
M9	Technical	Supply Chain	Female	Black or African American	4	1	4
r10	Technical	Technical	Male	White / Caucasian	7	2	1
S8	Administrative	Administrative	Female	White / Caucasian	6	1	5
k7	Administrative	Administrative	Female	Hispanic or Latino	4	1	6
R6	Administrative	Administrative	Male	Black or African American	6	1	1
S5	Administrative	Executive Leadership	Male	Black or African American	7	3	1
N3	Technical	Recruiting	Female	Asian or Pacific Islander	4	1	5
A4	Technical	Operations	Female	White / Caucasian	4	1	6
S2	Technical	Administrative	Female	White / Caucasian	7	4	1
s1	Legal	Legal Department	Female	Black or African American	4	3	5

Suvey Number	I was apprehensive	I was disturbed	I felt peaceful	I was loose	I felt uneasy	I was self-assured	I was fearful	I was ruffled	I felt jumpy	I was composed	I wa
M9	4	3	5	3	3	4	1	1	3	5	
r10	1	3	6	6	1	7	1	2	2	7	
S8	5	1	3	3	5	6	2	5	1	5	
k7	6	3	6	4	6	4	3	4	4	4	
R6	1	1	7	7	1	6	1	1	1	7	
S5	1	1	6	6	2	1	1	1	1	7	
N3	5	1	5	4	2	5	2	2	2	2	
A4	6	1	7	4	3	5	4	6	2	6	
S2	1	1	6	1	7	5	1			5	
s1	5	2	3	3	5	4	4	3	5	5	

Suvey Number	I was composed	I was bothered	I felt satisfied	I felt safe	I was flustered	I was cheerful	I felt happy	I felt dejected	I was pleased	I felt good	I was unhapp
M9	5	2	5	5	2	4	4	4	3	4	4
r10	7	2	5	6	2	4	4	3	5	4	4
S8	5	5	4	7	5	1	1	4	1	1	5
k7	4	4	4	4	4	4	4	4	6	6	4
R6	7	5	2	7	1	5	5	2	6	6	2
S5	7	1	7	7	1	2	2	1	7	7	1
N3	2	4	5	6	4	4	4	1	4	4	3
A4	6	1	7	7	4	5	6	1	6	6	1
S2	5	1	5	5	1	3	3	1	5	5	2
s1	5	2	4	4	5	5	2	4	4	4	2

Suvey Number	Step 1	Step 2	SCAM	Competence	Caring	Trust	Years Experience	Years Working With company	Gender	Ethnicity	Back
M9	42	27	65	31	28	30	25+ years	< 1 year.	Prefer Not to Disclose	Black or African American	Te
r10	54	21	47	39	28	35	25+ years	2 - 5 years	Male	Black or African American	Te
S8	32	38	86	36	21	27	2 - 5 years	< 1 year.	Female	Black or African American	Edu
k7	46	42	76	39	32	35	2 - 5 years	1 - 2 years	Female	Black or African American	Edu
R6	58	16	38	41	36	42	2 - 5 years	2 - 5 years	Male	Black or African American	Te
S5	52	11	39	42	33	42	10 - 15 years	2 - 5 years	Female	Black or African American	Ma
N3	43	26	63	31	33	34	< 1 year.	< 1 year.	Female	Black or African American	Te
A4	59	29	50	40	36	36	< 1 year.	< 1 year.	Female	Black or African American	Admi
S2	43	15	52	25	29	15	1 - 2 years	1 - 2 years	Female	Black or African American	Te
s1	38	37	79	25	24	33	2 - 5 years	1 - 2 years	Female	Black or African American	L

Survey Number	Background	Highest Degree	Position Purpose	Department	Org. Size	Site Size	Head
M9	Technical	Graduate degree	Minimize Costs	Supply Chain	5000-9999 employees	100-249 employees	
r1D	Technical	Bachelor degree	Generate Revenue	Manufacturing, Technical	10000+ employees	1000-4999 employees	U
S8	Education	Bachelor degree	Solve Problems	Quality Control	30-49 employees	30-49 employees	U
K7	Education	Bachelor degree	Innovation	Public Servant	10000+ employees	10-29 employees	U
R6	Technical	Bachelor degree	Security/Protect-Customers	Public Service	10000+ employees	50-99 employees	U
S5	Medical	Bachelor degree	Solve Problems	Environmental Health & Safety	10-29 employees	30-49 employees	U
N3	Technical	Some college but no degree	Innovation	IT	10000+ employees	500-999 employees	U
A4	Administrative	Some college but no degree	Solve Problems	Operations	10000+ employees	250-499 employees	U
S2	Technical	Bachelor degree	Security/Protect-Customers	Healthcare	1000-4999 employees	10-29 employees	U
s1	Legal	Graduate degree	Solve Problems	Legal Department	1000-4999 employees	250-499 employees	U

Survey Number	Headquarter Location	Headquarter Location	Site Location	Industry	What is your primary product	Org. Purpose
M9		Not Applicable	Nevada	Oil & Gas	Mined natural resources - AU, AG, CU	Timely Performance / Delivery
r1D	United States	Ohio	Texas	Oil & Gas	gasoline, diesel, and other refined products	Generate Revenue
S8	United States	Texas	Texas	Education	Education - completion of elementary and middle school curriculum and high school ready. Motto - "We are college bound!"	Serving Clients / Customers
K7	United States	Texas	Texas	Education	Primary and Secondary Education	Serving Clients / Customers
R6	United States	Texas	Texas	Education	Primary and Secondary Education	Serving Clients / Customers
S5	United States	Texas	Texas	Healthcare / Medical	Home healthcare services	Serving Clients / Customers
N3	United States	Illinois	Pennsylvania	Professional Services / Consultant	Technical consultations	Innovation
A4	United States	Pennsylvania	Pennsylvania	Professional Services / Consultant	Business and Technical Consultation	Security / Protect Customer
S2	United States	Texas	Texas	Healthcare / Medical	Medical Devices and Pharmaceutics	Serving Clients / Customers
s1	United States	Texas	Texas	".com" / App Company	hosting site.	Serving Clients / Customers

APPENDIX G

PHASE 1 INTERVIEW RESPONSES

S1 – 259pm - 307pm
Page 1 confusion: If you are a lawyer, this would be a supervisor you got instructions from. Less wordy, your boss.
Can be your boss.
Difference between job site and company headquarters
Were the instructions clear, and easy to understand?
Tell people up front that you are going to ask specific questions;

Were there any questions you found confusing? Or ambiguous?
No More
Was there additional information you wish I would have asked for so that you could better explain your experience?
"How often do you interact with them?"
What improvements could be made to the survey instrument?
No More
What do you think the purpose of this survey is?
To figure out if I am reporting to an idiot and to figure out if I am comfortable talking to that idiot.
Is there any other information you want to share about your communication experience?
It is also cognoscente to remember that my interactions with him were heavily regulated by his interactions with his boss. I didn't always want to communicate with him because his boss was a b**** and I knew he would have had to communicate what I said to her. That contributed heavily to my reluctance to communicate with him.
He was cool, it was actually pretty easy to talk to him because he thought he was really smart and he wanted to be my mentor so he would over explain. He assumed I was dumb and anytime I had to come to him with a question I didn't know would confirm his perception of me being stupid, so I would just figure some stuff out on my own.

Was your work environment majority minority?
Not majority minority.
Have you ever worked in a majority minority work environment?
Yes
Did you feel more comfortable communicating with people in your majority minority environment?
Yes but I think it was just easier because of the size, so I don't think it had anything to do with being a minority. (5 people).

S2 – 120PM – 133PM

Tested Mobile version of the application. Clearly define technical to include medical background
clarify compliance unit "(your boss)" Make it clear that they are supposed to pick one person to answer questions about throughout the entire survey.
Make it to where you cannot skip the page without answering questions?
When doing it on a mobile you have to scroll a lot (zoom out)
Should you define some of the words? in SCAM survey
questions 8 last page, typo says "they" should say "What department do you work in"
Add departments for medical personnel, and education personnel.
What is the main purpose of your position?
Safe and Effective Healthcare
Were the instructions clear, and easy to understand?
Yes

Were there any questions you found confusing? Or ambiguous?
Say "ABOUT YOU"
Say "ABOUT YOUR EMPLOYER" at the beginning of each page.

Was there additional information you wish I would have asked for so that you could better explain your experience?
No

What improvements could be made to the survey instrument?
Nothing else

What do you think the purpose of this survey is?
See how well management… to see the relationship with management and employee, how well they communicate, how they make you feel.
What can management do to make sure their employees work at their optimal level?

Is there any other information you want to share about your communication experience?
NO we had a really good relationship; I did hear she was saying some slick stuff, so I don't think I can trust her, but she made sure we got paid for our extra work and I could text her anytime.
She used to be a floor nurse and became our manager. She was kind of unprofessional; we could talk about anything, and was super down to earth and relate-able.
She didn't even have a bachelors, she was somebody who was just promoted by longevity. But you also need to know how to work the floor, she also needs to know how to on an administrative level and communicate well. So they chose the latter, and not the former.

Was your work environment majority minority?
Yes
Have you ever worked in a non-majority minority work environment?

Yes
Did you feel more comfortable communicating with people in your majority minority environment?
It was about the same. They were both really good managers. I get along with all of my managers; it doesn't matter the ethnicity. I believe they had faith in my work ethic.

N3 – 634pm - 647
If you haven't clicked outside of the type info box it will keep scrolling back up to that box,
Were the instructions clear, and easy to understand?
No, "dumbing it down in some parts"

Were there any questions you found confusing? Or ambiguous?
Make the wording clearer.

Was there additional information you wish I would have asked for so that you could better explain your experience?
Position; Intern, part-time, full-time

What improvements could be made to the survey instrument?
1-7 positive alternates from left to right, so I couldn't answer as quickly

What do you think the purpose of this survey is?
See how well businesses relayed information & purposes to employees
Is there any other information you want to share about your communication experience?
Na…

Was your work environment majority minority?
No
Have you ever worked in a majority minority work environment?
Yes
Did you feel more comfortable communicating with people in your majority minority environment?
Majority Minority; because they would better understand what I was saying I felt more comfortable communicating.

A4 – 634pm - 648
Define Technical, Clarify who the person you are answering the questions
Question 8 last time you had a conversation or verbal interaction **with** a"
Were the instructions clear, and easy to understand?
No, The vocabulary (especially the SCAM, Credibility). Loose vs. not-loose sections (SCAM)

Were there any questions you found confusing? Or ambiguous?
SCAM and Credibility confusing
Was there additional information you wish I would have asked for so that you could better explain your experience?
More details about the job; What company, what they actually do.
What improvements could be made to the survey instrument?
Making it more comprehendible, the vocabulary got me.
What do you think the purpose of this survey is?
See how well business supervisors convey their policies.
Is there any other information you want to share about your communication experience?
Instant messaging helps. When you can instant message your supervisor it makes it easier to communicate

Was your work environment majority minority?
no
Have you ever worked in a majority minority work environment?
yes
Did you feel more comfortable communicating with people in your majority minority environment?
Majority Minority; Because I didn't feel like I had to put on a fake persona

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S5 – 509PM – 529pm
Compliance unit member
Use lemans terms, dumb this down
Word to be shorter
Remove some of the 1-7 explanation is unnecessary,
The feelings questions are redundant.
Are you talking about the environment or the person, because I feel safe based on the environment?
Don't explain the scale. Explain the two extremes.
How many years of work experience? Might get too vague of an answer or people who have technically worked since they were kids. Ask about relevant experience
Medical doesn't consider themselves technical.
Goal of your position.
"Wellness", the "Health and safety", "Progression/Promotion of health"
"Environmental health and safety"
Compliance unit member (put in parenthesis what that is).
You say current job but you need to make sure that their "current job"
What is the goal of your company? Add more. Nurses wouldn't consider themselves a service.

Were the instructions clear, and easy to understand?
Aside from what I already mentioned yes.

Were there any questions you found confusing? Or ambiguous?
No additional
Was there additional information you wish I would have asked for so that you could better explain your experience?
No
What improvements could be made to the survey instrument?
No additional improvements
What do you think the purpose of this survey is?

Is there any other information you want to share about your communication experience?
Personal relationship with the compliance unit member. Stay engaged the entire time. Condensing some of your wording, make it short sweet and specific. That will deter me from completing.
Explain why the feelings are important.

Was your work environment majority minority?
Yes
Have you ever worked in a majority minority work environment?
Yes
Did you feel more comfortable communicating with people in your majority minority environment?
White; I have experienced that minorities tend to be lax and a tad bit unprofessional around each other. I schedule my nurses and care providers (minimum wage job), majority minority. The elderly are our customers, and there are a lot of cultural barriers you have to get passed.

R6 – 859pm
Questions 3 "What department do[es] compliance unit member belong to"
What department do they work in?
Size of company (ISD)
Were the instructions clear, and easy to understand?
Yea for the most part
Were there any questions you found confusing? Or ambiguous?
No
Was there additional information you wish I would have asked for so that you could better explain your experience?
You covered everything I was expecting
What improvements could be made to the survey instrument?
Phone, having to scroll over. not a problem on the phone.
What do you think the purpose of this survey is?
To find out my experience dealing with following company policy
Is there any other information you want to share about your communication experience?
He is the best communicator I have worked for in all jobs dating back to high school.

Was your work environment majority minority?
Yes, at my job site. not the whole company
Have you ever worked in a non-majority minority work environment?
Yes
Did you feel more comfortable communicating with people in your majority minority environment?
Oddly enough I felt more comfortable communicating with majority minority. It is so much easier when I do not have to worry about having to code switch in order to communicate.

K7 – 859pm
How long have you worked with that person?
Add to the list "Education/Training" "Public Servant"
Size of company (ISD)
Were the instructions clear, and easy to understand?
Yea I suppose
Were there any questions you found confusing? Or ambiguous?
A couple; the "Loose" (Referencing the SCAM survey)
Was there additional information you wish I would have asked for so that you could better explain your experience?
No nothing I could think of.
What improvements could be made to the survey instrument?
I think it was fine
What do you think the purpose of this survey is?
See the relationship dynamics between employee and compliance unit.
Is there any other information you want to share about your communication experience?
no

Was your work environment majority minority?
Yes
Have you ever worked in a non-majority minority work environment?
No
Did you feel more comfortable communicating with people in your majority minority environment?
N/A

S8 – 637pm
Typo in the preamble page one (Answer this survey about "this a individual")
Ethnicity "Don't know"
Scrolling on SCAM survey is cumbersome. (scrolling vertically to keep descriptions in view)

Ask about “years of working with this person”
Add medical and Educational background
“Department” Quality Control – Education associate teacher. Faculty, Staff.
Educational Faculty
Educational Staff
What is the size of your company or ISD?
The headquarters vs. Job site state might get redundant.
Completion of Curriculum and Getting kids into College.
Was there additional information you wish I would have asked for so that you could better explain your experience?
Expound on education. More about positions. Educational Faculty and Educational Staff.
Combine teachers into one heading.
What improvements could be made to the survey instrument?
Couple of redundant answers, allow people to designate school as a job site option.
“Company” “Law Firm” “School”
What do you think the purpose of this survey is?
At first it seemed like I was talking about one person, then it went into trying to figure out what I do. A lot about that one person
Is there any other information you want to share about your communication experience?
I only had one bad instance and it wasn’t even bad. She was telling me to stop telling stories to the children. I was told by the front office to stop telling you stories.
Note: This was one bad experience I was thinking about.

Was your work environment majority minority?
No
Have you ever worked in a majority minority work environment?
No
Did you feel more comfortable communicating with people in your majority minority environment?
N/A

M9 – 656pm
Put in parenthesis about who the compliance unit is who the compliance unit member is
On a computer answering the questions 8 page two in varying order.
“questions 8 “Where you had a conversation with a compliance unit member”
What improvements could be made to the survey instrument?
“Mark 7 if the statement extremely accurately reflects how you felt.”
Doing editing as she goes.
Page 3
“Indicate a fairly neutral feeling”
“What department do you work in” Last page.
Put an error for not answering questions.
What other improvements?

No additional
What do you think the purpose of this survey is?
Get history on myself and extract some of my perceptions around compliance conversations.
Was there anything you wish I would have asked you about your communication experience to better explain it?
Prescriptive about whether you want to hear about my best my worst or my last.
Was the conversation one-on-one or in a group? What was the context – information or punitive?
Is there any other information you want to share about your communication experience?
no

Was your work environment majority minority?
no
Have you ever worked in a majority minority work environment?
yes
Did you feel more comfortable communicating with people in your majority minority environment?
Initially yes when I was in a group of folks that looked like me, but over time I had to grow comfortable to be more effect. Culturally, had a similar culture; didn't feel like there were as many unknowns when communicating.
Guest showed up so there was a brief break in survey taking

R10 – 656pm – 716pm
Select more than one background?
Put on a separate line compliance unit definition.
Last page
Departments,
Engineering, technical, projects.
Supply chain
Other was missing as an answer
Put an error for not answering questions.
Previous encounters Compare to previous encounters
What improvements could be made to the survey instrument?
Pretty straight forward
What do you think the purpose of this survey is?
Find out how well I trust my supervisor and my ability to talk to him about important or legal issues.
Is there any other information you want to share about your communication experience?
No I think it was
Was your work environment majority minority?
No

Have you ever worked in a majority minority work environment?
No
Did you feel more comfortable communicating with people in your majority minority environment?
N/A
Guest showed up so there was a brief break in survey taking

APPENDIX H

PHASE 2 PROCESSED DATA SHEET

#	Q2	Q3	Q4	Q6	Q7	SCAM	Q9	Q10	Com	Car.	Trust	2Q19	2Q20	3Q1	3Q2	3Q6	3Q8	3Q9	3Q10	3Q11	3Q12	3Q18	A1	A2	A3	A4	A5	A6	A7
1	3	5	1	1	6	**33**	1	1	**8**	**6**	**6**	4	5	10	1	3	4	6	3	250	10	3	2	2	2	2		2	1
2	12	2	2	6	2	**88**	2	1	**11**	**12**	**18**	4	1	1	1	3	4	6	3	1000	50	3	2	1				2	1
3	12	9	1	2	7	**65**	1	1	**11**	**6**	**7**	4	1	10	2	3	4	1	60	100	100	3	1	1	1	2	1	2	1
4	12	14	2	7	2	**74**	1	1	**11**	**18**	**18**	3	1	10	1	4	4	2	120	5000	10	4	1	1	1	1		2	2
5	12	10	1	4	5	**73**	1	1	**11**	**12**	**13**	5	1	15	2	4	4	1	60	10000	1000	3	1	1	1	1		2	2
6	3	2	1	1	7	**81**	1	1	**12**	**8**	**7**	3	1	25	1	2	4	5	3	500	1	4	2	2	1			2	2
7	24	7	1	2	6	**116**	1	2	**12**	**6**	**8**	2	1	2	1	3	4	2	24	1000	10	3	2	2	2	2	2	2	1
8	24	2	2	6	6	**80**	3	1	**12**	**7**	**12**	5		5	2	2	4	1	60	50	50	1		2	1	2		2	2
9	12		2	3	3	**91**	1	1	**13**	**20**	**25**	3	1	1	1	2	4	1	3	30	10	3	2	1	1	1		2	
10	24	11	2	6	2	**89**	1	1	**13**	**21**	**23**	3	2	15	1	3	4	1	24	10000	1000	1	1	1	1	1		2	1
11	12	21	2	6	3	**74**	2	1	**14**	**17**	**20**	5	3	1	1	2	4	4	12	1000	1000	3	2	1	2		2	2	2
12	3	2	2	2	5	**99**	1	1	**14**	**10**	**12**	4	4	25	2	3	4	1	120	10000	1000	1	1	2	1	1		2	1
13	60	2	1	4	6	**85**	3	1	**15**	**9**	**10**	2	2	15	1	3	4	5	60	500		3	2	2	1	1		2	1
14	3	5	2	2	5	**67**	3	1	**16**	**6**	**6**	5	4	2	1	1	5	6	24	500	10	3	2	1	1	1		2	1
15	24	3	2	7	7	**39**	1	1	**18**	**6**	**6**	4	1	25	2	2	4	5	180	1000	1	3	2	2	1	1		2	2
16	1	5	2	7	4	**59**	1	1	**18**	**18**	**20**	3	2																
17	24	5	2	4	3	**75**	1	2	**18**	**30**	**22**	4	2	15	1	3	4	6	60	50	50	3	2	1	2	2	2	2	2
18	120	7	1	6	4	**61**	1	1	**18**	**25**	**27**	2	3	15	1	3	4	6	180	5000	5000	3	2	2	2		2	2	1
19	1		1	1	5	**80**	3	2	**18**	**22**	**23**	3	4	2	1	3	4	2	1	10	1	3	2	2	1	1		2	
20	0.5	3	1	4	4	**105**	3	1	**19**	**11**	**17**	3	1	10	2	1	4	1	3	1000	1000	1	1	1	1	1		2	2
21	0.5	20	2	2	4	**103**	1	1	**19**	**19**	**21**	1		2	2	4	4	5	24	1000	100	2	1	2				2	1
22	12	8	1	6	3	**41**	1	1	**20**	**16**	**21**	3	1	10	2	1	5	1	24	10	1	1	2	1	2			2	1
23	0.5	100	1	7	4	**35**	1	3	**20**	**24**	**25**	2	1	2	2	3	4	1	1	30	30	1	1	1	2			2	1
24	24	2	2	3	3	**60**	1	1	**20**	**18**	**25**	3	2	10	1	3	4	5	24	10000		4	2	1	2	2		2	2
25	24	4	1	6	4	**52**	2	1	**21**	**21**	**23**	4	1	25	1	3	5	1	24	250	10	3	1	2	2			2	1
26	12	4	1	6	3	**40**	3	1	**21**	**18**	**19**	3	2	15	1	3	4	6	180	10000	100	3	2	2	1	1	2	2	2
27	12	14	2	3	2	**119**	3	2	**21**	**17**	**14**	1	2	10	1	3	4	2	60	250	1		2	1	1	1		2	2
28	3	2	1	4	4	**66**	2	1	**21**	**23**	**25**	3	3	10	1	1	4	6	3	30	1	3	2	2	2	2		2	2
29	12	3	1	6	6	**70**	2	1	**21**	**23**	**31**	3	4	5	1	3	4	1	12	10	10	4	1	2	2	2		2	1
30	3	2	1	4	4	**81**	3	1	**22**	**17**	**23**	3	1	0.5	1	4	4	2	1	50	30	3	1	2	1	1	1	2	1
31	12	15	1	6	4	**89**	3	1	**22**	**23**	**29**	2	1	1	2	1	4	1	120	100	30	3	1	1	2	2		2	2
32	24	100		4	3	**81**	2	1	**22**	**18**	**17**	4	2	15	1	3	2	5	24	500	1	4			2	2		1	1
33	24	23	2	3	4	**106**	3	1	**22**	**14**	**15**	5	3	5	2	2	5	1	60		50	3	2	2	1	1	2	2	2
34	24	2	1	4	3	**96**	3	1	**22**	**10**	**15**	4	3	5		3	4	1	60	10000	1000	4	2		2	2		2	2
35	24		2	4	4	**69**	1	1	**22**	**19**	**19**	3	5	2	1	4	4	6	24	1000	30	3	2	1	1	1		2	
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271	60	8	1	6	1	**28**	2	1	**41**	**29**	**36**	5	5	15	2	3	4	1	60	10000	1000	1	2	1				2	1
272	24	8	2	2	4	**80**	1	1	**41**	**13**	**25**	2	5				4	2	24	10	10	1						2	
273	24	6	1	6	4	**66**	3	1	**41**	**42**	**41**	3	5	2	2	3	2	1	0.5	1	1	3	2	1	2	2		1	1
274	3	10	2	5	4	**85**	1	2	**41**	**30**	**35**	2	5	2	1	2	2	1	3	10000	1	2	2	1	1	1		1	2
275	3	3	1	4	6	**75**	2	1	**41**	**11**	**8**	5	5	1	2	3	5	1	3			3	2	1	1	1		2	2
276	3	3	1	6	6	**50**	1	2	**41**	**40**	**41**	5	5	2	1	3	4	2	3	30	10	3	2	2	1	2		2	2
277		4	1	7	1	**35**	1	1	**41**	**34**	**42**	5	5		2	4	4	1	24	5000	500	3	2	1	1	2		2	1
278	3	8	2	6	1	**26**	1	1	**42**	**42**	**42**	5	1	25	1	3	4	4	3	30	30	3	2	1	1	1		2	2
279	60	100	2	7	1	**22**	1	1	**42**	**40**	**42**	5	1	25	1	3	4	5	300	10000	5000	1	2	1	1	2	2	2	1
280	0.5	1	1	7	1	**28**	1	1	**42**	**42**	**42**	2	2	15	1	3	4	6	0.5	30		3	2	2	2	2		2	1
281	24	7	1	7	1	**20**	1	2	**42**	**38**	**42**	3	2	15	2	3	4	1	24	10000	100	1	2	1	1	1		2	1
282	3	2	2	7	1	**34**	1	1	**42**	**42**	**42**	5	2	1	1	3	3	1	3	30	1	3	2	1	1	1		1	1
283	3	2	2	7	1	**39**	1	1	**42**	**41**	**42**	5	2	1	1	3	3	5	3		30	1	2	1	1	1		1	1
284	1	5	1	7	1	**30**	1	2	**42**	**37**	**42**	4	3	5	1	3	4	6	1	500	10	3	2	2	2	2	2	2	2

285	12	5	1	5	4	**50**	2	2	**42**	**37**	**38**	2	3	0.5	1		4	2	0.5	10000	30		2	2	1	2		2	1
286	24	11	2	6	3	**40**	1	1	**42**	**38**	**41**	4	3	10	1	3	5	1	60	250	100	3	1	1	2			2	1
287	60	5	1	5	2	**43**	1	3	**42**	**35**	**42**	5	4	15	1	3	4	6	60	1000	50	3	2	2	2	2	2	2	2
288	12	11	1	6	1	**62**	1	2	**42**	**35**	**40**	1	4	1	1	3	4	3	12	500	250	3	2	2	1	1	2	2	2
289	60	6	2	6	1	**21**	1	1	**42**	**38**	**41**	2	4	5	1	3	1	5	3	250	250	3	2	1	2	2		1	1
290	12	3	2	6	1	**28**	1	1	**42**	**39**	**40**	4	4	15	2	3	4	1	12	1000	100	3	2	2	1	1		2	2
291	3	100	1	4	4	**32**	1	1	**42**	**16**	**11**	5	4	0.5	2	1	5	1	3	500	1	4	2	1	1	1		2	1
292	3	11	2	3	3	**104**	2	1	**42**	**6**	**22**	5	4	2	1	3	4	3	3	10	1	3	2	1	1	1	2	2	2
293	12	9	1	5	2	**32**	1	1	**42**	**38**	**41**	3	4	2	1	3	4	1	12	250	50	4	1	2	1	1		2	2
294	3	10	1	7	7	**32**	1	1	**42**	**42**	**42**	4	4	1	2	4	4	1	3	5000	1000	4	2	1	1	1		2	2
295	1	8	2	6	2	**30**	1	2	**42**	**39**	**42**	4	4	2	2	2	4	1	1	50	10	1		2	1	1		2	1
296	12	13	1	6	2	**30**	1	2	**42**	**41**	**42**	5	4	5	1	3	1	6	3	5000	10	3	1	2	2	2		1	2
297	0.5	14	1	7	1	**32**	1	3	**42**	**42**	**42**	4	5	10	1	2	1	2	3	10000	50	4	2	2	2	2		1	2
298	60	200	2	7	1	**32**	1	1	**42**	**37**	**42**	5	5	10	1		4	6	60	50	10	3	2	1	2	2		2	2
299	60	5	2	7	1	**25**	2	1	**42**	**34**	**41**	5	5	10	1	3	4	6	120	1000	100	3	2	1	2	2	2	2	2
300	24	9	2	1	1	**43**	2	1	**42**	**42**	**42**	4	5	5	1	3	4	6	12	5000	250	3	1	1				2	2
301	0.5	2	1	3	1	**80**	1	2	**42**	**42**	**42**	3	5	15	1	3	4	5	0.5	50	50	3	2	2	1	1	2	2	1
302	1	15	1	7	1	**40**	1	2	**42**	**40**	**42**	5	5	2	2	4	4	5	24	250		4	2	1	2			2	2
303	24	14	1	7	1	**20**	2	1	**42**	**42**	**42**	3	5	5	1	3	4	1	60		50	4	2	2	1	1		2	2
304	12	23	2	7	1	**20**	1	2	**42**	**42**	**42**	3	5	1	2	4	5	1	3	250	50	3	2	2	1	2		2	1
305	300	12	2	7	1	**32**	1	1	**42**	**42**	**42**	5	5	25	2	3	4	1	3	10000	100	1	2	2	2	2		2	2
306	300	12	2	7	1	**38**	1	1	**42**	**36**	**42**	5	5	25	2	3	4	1	120	10000	100	1	2	2	2	2		2	2
307	24	11	2	7	1	**27**	2	1	**42**	**38**	**42**	5	5	25	1	3	5	1	24	100	100	3	2	1	2			2	2
308	60	1	1	7	1	**20**	1	1	**42**	**42**	**42**	3	5	25	2	4	4	6	120	10000	100	3	1	1	2			2	1
309	180	12	2	7	1	**47**	1	1	**42**	**42**	**42**	5	5	25	2	3	4	1	300	100	100	3	2	2	2	2		2	2
310	0.5	11	1	1	1	**34**	2	1	**42**	**35**	**38**	2	5	2	1	3	5	5	24	10000	50	2	1	2				2	1
311	180	4	1	7	1	**20**	1	1	**42**	**42**	**42**	5	5	15	1	3	5	1	180	1	1	3	2	2	1	2	2	2	2
312	0.5	6	2	7	1	**20**	1	1	**42**	**42**	**42**	3	5	0.5	2	4	4	4	120	250	50	4	2	2	2	2		2	1
313	60	9	1	6	1	**40**	2	1	**42**	**36**	**42**	5	5	25	1	4	5	1	120	5000		1	2	2	2	2		2	1
314	1	6	1	7	1	**25**	1	1	**42**	**42**	**42**	3	5	2	2	3	3	6	0.5	250	1	3	2	1	2	2		1	2
315	60	5	1	6	1	**27**	1	3	**42**	**41**	**41**	5	5	15	1	4	4	2	24	1000	250	4	2	2	2	2	2	2	1
316	24	20	2	7	1	**30**	1	1	**42**	**40**	**42**	5	5	5	1	4	4	1	12	100	50	4	2	1	2	2		2	2
317	60	15	1	5	2	**58**	1	2	**42**	**39**	**40**	3	5	5	2	3	4	1	60	10000	100	3	2	1	1	1		2	2
318	3	11	1	5	3	**94**	3	2	**42**	**39**	**41**	1	5	15	2	3	4	6	180	1000		3	2	1	2	2		2	1
319	60	1	1	1	1	**49**	1	1	**42**	**40**	**42**	3	5	25	1	1	5	1	60	10	10	1	1	2	1	1		2	1
320	12	5	1	6	4	**32**	1	1	**42**	**21**	**40**	5	5	10	1	4	4	6	120	10000	10	4	2	2	2	2	2	2	2
321	3	14	2	7	1	**41**	1	1	**42**	**42**	**42**	4	5	5	1	4	4	2	3	30	30	4	2	1	1	2		2	2
322	12	11	2	5	1	**105**	1	1	**42**	**42**	**40**	5	5	2	1	3	4	4	3	10	10	3	2	1	1	1	2	2	2
323	24	4	1	7	1	**20**	1	2	**42**	**33**	**41**	5	5	2	2	3	4	6	24	250	30	3	2	1	1	1		2	2
324	24	23	2	4	2	**80**	1	1	**42**	**30**	**38**	3	5	10	2	1	2	1	24	100	10	1	2	2	2		2	1	2
325	24	2	2	6	1	**29**	1	1	**42**	**40**	**41**	5	5	2	1	3	4	6	24	30		3	2	1	2	2	2	2	1
326	12	9	1	7	1	**56**	1	2	**42**	**42**	**42**	4	5	1	1	2	4	1	12	30	30	4	2	2	1	1		2	1
327	24		2	7	2	**56**	1	2	**42**	**42**	**42**	4	5	0.5	1	3	4	6	3	1000	10	3	2	1	1	1	2	2	
328	3	2	2	7	1	**32**	1	1	**42**	**42**	**42**	5	5	1	2	3	2	5	3	10	10	3	2	2	1	1	2	1	2
329	0.5	9	1	6	1	**30**	1	2	**42**	**41**	**42**	5	5	25	1	3	4	5	180	250	30	3	2	2	1	1		2	1
330	12	20	2	5	3	**48**	1	1	**42**	**28**	**39**	3		1	2	4	4	1	12	10000	250	3	2	2	1	1		2	1

*The cells are highlighted yellow if the changed based on the respondent writing in a response. In some cases, the written response was uncoded and therefore the cell is left blank.

APPENDIX I

PHASE 2 MULTIVARIATE ANALYSIS RESULTS

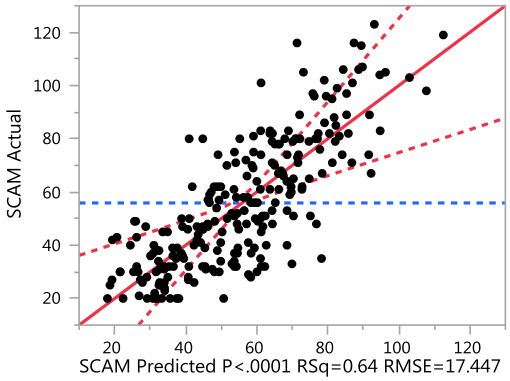
This is the output of the JMP program for the Multivariate analysis

Response SCAM

Effect Summary

Source	LogWorth	P-Value
P2Q20CanDoUrJob	1.933	0.01168
Trust*Trust	1.487	0.03259
Caring*Caring	1.323	0.04751
Q7Adversary	1.222	0.05998
P2Q19CommFreq	1.096	0.08012
A2SameGender	1.064	0.08628
Caring	1.061	0.08693 ^
P3Q6PosPurp	1.018	0.09603
P3Q10WkAtComp	1.009	0.09791
P3Q8PosType	0.967	0.10793
Trust	0.924	0.11906 ^
A3Same Ethnicity	0.908	0.12364
P3Q12SiteSize	0.776	0.16752
Q9Reprimand	0.687	0.20569
Q2WkWithB	0.653	0.22238
Q10MeetingType	0.641	0.22877
A1SameBck	0.629	0.23503
P3Q9OrgTyp	0.570	0.26901
Competence	0.530	0.29522
Competence*Competence	0.477	0.33380
A7Same Department	0.456	0.34989
P3Q1YrsExp	0.290	0.51339

Actual by Predicted Plot



Summary of Fit

RSquare	0.638372
RSquare Adj	0.488222
Root Mean Square Error	17.44681
Mean of Response	55.88477
Observations (or Sum Wgts)	243

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	71	91883.89	1294.14	4.2516
Error	171	52050.89	304.39	Prob > F
C. Total	242	143934.77		<.0001*

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|	VIF
Intercept	108.36353	10.26262	10.56	<.0001*	.
Q2WkWithB[0.5]	-1.338498	5.235728	-0.26	0.7985	2.6683842
Q2WkWithB[1]	-12.41043	5.824635	-2.13	0.0345*	2.1630821
Q2WkWithB[3]	-0.795995	4.296593	-0.19	0.8532	2.7843166
Q2WkWithB[12]	7.4205331	3.727257	1.99	0.0481*	2.2305429
Q2WkWithB[24]	1.8881105	3.599698	0.52	0.6006	1.9280719
Q2WkWithB[60]	-0.65442	4.291058	-0.15	0.8790	1.8884406
Q2WkWithB[120]	-8.249573	9.370283	-0.88	0.3799	2.3076151
Q2WkWithB[180]	9.4657197	9.343744	1.01	0.3125	2.2945622
Q7Adversary[1]	-6.984944	4.017691	-1.74	0.0839	3.376021
Q7Adversary[2]	1.7588679	3.91524	0.45	0.6538	2.5905298
Q7Adversary[3]	-1.194826	3.902672	-0.31	0.7599	2.2386962
Q7Adversary[4]	9.0861324	4.237075	2.14	0.0334*	2.0052993
Q7Adversary[5]	5.9206981	7.954358	0.74	0.4577	2.2856432
Q7Adversary[6]	-4.711443	6.103567	-0.77	0.4412	1.8232143
Q9Reprimand[1]	-2.410091	2.172187	-1.11	0.2688	1.5387553
Q9Reprimand[2]	-3.101966	2.562622	-1.21	0.2278	1.3271311
Q10MeetingType[1]	-0.164191	2.004912	-0.08	0.9348	1.5005496
Q10MeetingType[2]	4.0611265	2.363734	1.72	0.0876	1.3882159
P2Q19CommFreq[1]	7.3649175	4.060978	1.81	0.0715	4.085927
P2Q19CommFreq[2]	5.1085462	3.388849	1.51	0.1335	3.3781978
P2Q19CommFreq[3]	-4.499951	2.480613	-1.81	0.0714	2.6601372
P2Q19CommFreq[4]	-2.746325	2.562402	-1.07	0.2853	2.5661051
P2Q20CanDoUrJob[1]	-9.338484	3.46853	-2.69	0.0078*	4.3538014
P2Q20CanDoUrJob[2]	4.5490651	3.42543	1.33	0.1859	4.0159374
P2Q20CanDoUrJob[3]	-4.681797	3.686032	-1.27	0.2058	4.1693411
P2Q20CanDoUrJob[4]	2.4456286	2.544179	0.96	0.3378	3.3348259
P3Q1YrsExp[0.5]	1.3497718	4.890621	0.28	0.7829	4.0569058
P3Q1YrsExp[1]	0.514203	3.976059	0.13	0.8973	3.2820517
P3Q1YrsExp[2]	5.9507712	3.264948	1.82	0.0701	2.8693628

Term	Estimate	Std Error	t Ratio	Prob>|t|	VIF
P3Q1YrsExp[5]	0.1687986	3.040429	0.06	0.9558	2.4290604
P3Q1YrsExp[10]	0.5007824	3.170123	0.16	0.8747	2.5752222
P3Q1YrsExp[15]	-5.661218	3.478552	-1.63	0.1055	3.1795488
P3Q6PosPurp[1]	-0.158035	3.725824	-0.04	0.9662	3.2298863
P3Q6PosPurp[2]	6.280497	3.323746	1.89	0.0605	2.6133995
P3Q6PosPurp[3]	0.1568553	2.217306	0.07	0.9437	2.4885631
P3Q9OrgTyp[1]	-1.960376	2.43536	-0.80	0.4220	2.554344
P3Q9OrgTyp[2]	3.2945742	3.673423	0.90	0.3711	2.9415515
P3Q9OrgTyp[3]	-1.981963	4.892206	-0.41	0.6859	4.3669298
P3Q9OrgTyp[4]	7.1655776	4.073427	1.76	0.0803	3.2280652
P3Q9OrgTyp[5]	-0.93087	3.204716	-0.29	0.7718	2.9010979
P3Q10WkAtComp[0.5]	10.357038	5.875869	1.76	0.0797	2.675544
P3Q10WkAtComp[1]	11.14016	5.839311	1.91	0.0581	2.2237817
P3Q10WkAtComp[3]	1.8295325	3.804329	0.48	0.6312	2.3789211
P3Q10WkAtComp[12]	-8.231998	3.610138	-2.28	0.0238*	1.8821832
P3Q10WkAtComp[24]	0.4604558	3.531759	0.13	0.8964	1.5888647
P3Q10WkAtComp[60]	1.6890321	4.057193	0.42	0.6777	2.0967954
P3Q10WkAtComp[120]	0.4345082	4.118586	0.11	0.9161	1.7561971
P3Q10WkAtComp[180]	-8.102698	5.095933	-1.59	0.1137	2.0124049
P3Q12SiteSize[1]	-7.711598	4.109842	-1.88	0.0623	1.7734107
P3Q12SiteSize[10]	-0.279093	3.973644	-0.07	0.9441	1.8371348
P3Q12SiteSize[30]	-4.266239	4.276882	-1.00	0.3199	1.7899247
P3Q12SiteSize[50]	-6.752147	3.969672	-1.70	0.0908	1.6174359
P3Q12SiteSize[100]	-5.310824	3.913444	-1.36	0.1765	1.6435809
P3Q12SiteSize[250]	-5.401365	4.428335	-1.22	0.2242	1.3648381
P3Q12SiteSize[500]	2.2949146	6.659923	0.34	0.7308	1.4187795
P3Q12SiteSize[1000]	3.3858627	4.891291	0.69	0.4897	1.7938601
P3Q12SiteSize[5000]	17.290221	8.704098	1.99	0.0486*	1.4769798
A1SameBck[1]	-1.774119	1.488732	-1.19	0.2350	1.4001417
A2SameGender[1]	2.4470373	1.418341	1.73	0.0863	1.550888
A3Same Ethnicity[1]	2.0334219	1.314191	1.55	0.1236	1.3029045
A7Same Department[1]	-1.336146	1.425431	-0.94	0.3499	1.618736
Competence	-0.403065	0.383887	-1.05	0.2952	7.5211967
Caring	-0.560558	0.325577	-1.72	0.0869	7.7877455
Trust	-0.633215	0.404199	-1.57	0.1191	11.812678
(Competence-33.300)*(Competence-33.300)	-0.023345	0.024086	-0.97	0.3338	3.9964321
(Caring-28.8107)*(Caring-28.8107)	0.0419613	0.021022	2.00	0.0475*	4.9020394
(Trust-31.1975)*(Trust-31.1975)	-0.047908	0.022235	-2.15	0.0326*	6.2001392
P3Q8PosType[1]	-8.475344	5.676293	-1.49	0.1373	3.8185004
P3Q8PosType[2]	-2.611722	6.317308	-0.41	0.6798	4.1318177
P3Q8PosType[3]	4.3835185	4.70343	0.93	0.3527	3.1786493
P3Q8PosType[4]	6.6904613	2.799398	2.39	0.0179*	2.783878

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Q2WkWithB	8	8	3285.7239	1.3493	0.2224
Q7Adversary	6	6	3768.2201	2.0633	0.0600
Q9Reprimand	2	2	971.6830	1.5961	0.2057
Q10MeetingType	2	2	905.7558	1.4878	0.2288
P2Q19CommFreq	4	4	2583.8619	2.1222	0.0801
P2Q20CanDoUrJob	4	4	4060.3643	3.3348	0.0117*
P3Q1YrsExp	6	6	1600.8903	0.8766	0.5134
P3Q6PosPurp	3	3	1961.4686	2.1480	0.0960
P3Q9OrgTyp	5	5	1968.2828	1.2933	0.2690
P3Q10WkAtComp	8	8	4177.1408	1.7154	0.0979
P3Q12SiteSize	9	9	3992.3340	1.4573	0.1675
A1SameBck	1	1	432.2794	1.4201	0.2350
A2SameGender	1	1	906.0500	2.9766	0.0863
A3Same Ethnicity	1	1	728.7362	2.3941	0.1236
A7Same Department	1	1	267.4529	0.8786	0.3499
Competence	1	1	335.5653	1.1024	0.2952
Caring	1	1	902.3308	2.9644	0.0869
Trust	1	1	747.0408	2.4542	0.1191
Competence*Competence	1	1	285.9436	0.9394	0.3338
Caring*Caring	1	1	1212.8325	3.9845	0.0475*
Trust*Trust	1	1	1413.0359	4.6422	0.0326*
P3Q8PosType	4	4	2347.4857	1.9280	0.1079

Scaled Estimates

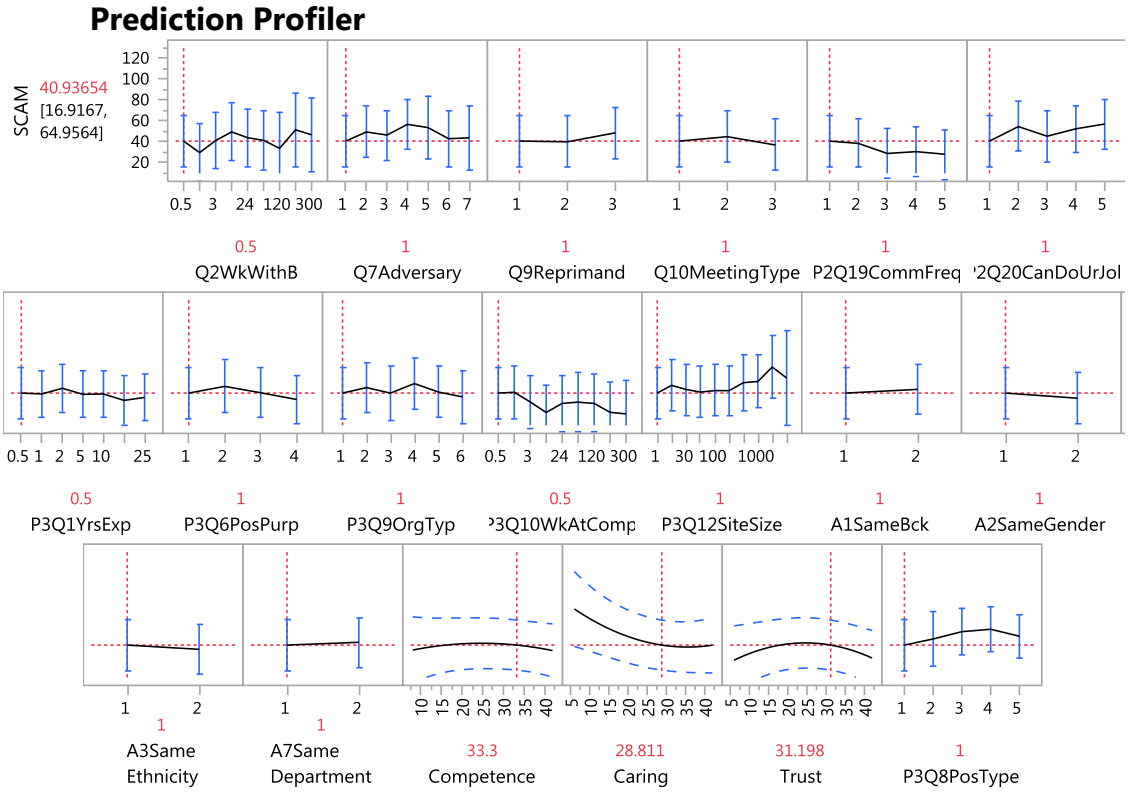
Nominal factors expanded to all levels

Continuous factors centered by mean, scaled by range/2

Term	Scaled Estimate	Std Error	t Ratio	Prob>|t|
Intercept	59.036476	6.212461	9.50	<.0001*
Q2WkWithB[0.5]	-1.338498	5.235728	-0.26	0.7985
Q2WkWithB[1]	-12.41043	5.824635	-2.13	0.0345*
Q2WkWithB[3]	-0.795995	4.296593	-0.19	0.8532
Q2WkWithB[12]	7.4205331	3.727257	1.99	0.0481*
Q2WkWithB[24]	1.8881105	3.599698	0.52	0.6006
Q2WkWithB[60]	-0.65442	4.291058	-0.15	0.8790
Q2WkWithB[120]	-8.249573	9.370283	-0.88	0.3799
Q2WkWithB[180]	9.4657197	9.343744	1.01	0.3125
Q2WkWithB[300]	4.6745531	9.426189	0.50	0.6206
Q7Adversary[1]	-6.984944	4.017691	-1.74	0.0839
Q7Adversary[2]	1.7588679	3.91524	0.45	0.6538
Q7Adversary[3]	-1.194826	3.902672	-0.31	0.7599

Term	Scaled Estimate	Std Error	t Ratio	Prob>|t|
Q7Adversary[4]	9.0861324	4.237075	2.14	0.0334*
Q7Adversary[5]	5.9206981	7.954358	0.74	0.4577
Q7Adversary[6]	-4.711443	6.103567	-0.77	0.4412
Q7Adversary[7]	-3.874485	8.69038	-0.45	0.6563
Q9Reprimand[1]	-2.410091	2.172187	-1.11	0.2688
Q9Reprimand[2]	-3.101966	2.562622	-1.21	0.2278
Q9Reprimand[3]	5.5120578	3.090468	1.78	0.0763
Q10MeetingType[1]	-0.164191	2.004912	-0.08	0.9348
Q10MeetingType[2]	4.0611265	2.363734	1.72	0.0876
Q10MeetingType[3]	-3.896936	2.883153	-1.35	0.1783
P2Q19CommFreq[1]	7.3649175	4.060978	1.81	0.0715
P2Q19CommFreq[2]	5.1085462	3.388849	1.51	0.1335
P2Q19CommFreq[3]	-4.499951	2.480613	-1.81	0.0714
P2Q19CommFreq[4]	-2.746325	2.562402	-1.07	0.2853
P2Q19CommFreq[5]	-5.227188	2.670111	-1.96	0.0519
P2Q20CanDoUrJob[1]	-9.338484	3.46853	-2.69	0.0078*
P2Q20CanDoUrJob[2]	4.5490651	3.42543	1.33	0.1859
P2Q20CanDoUrJob[3]	-4.681797	3.686032	-1.27	0.2058
P2Q20CanDoUrJob[4]	2.4456286	2.544179	0.96	0.3378
P2Q20CanDoUrJob[5]	7.0255869	2.717993	2.58	0.0106*
P3Q1YrsExp[0.5]	1.3497718	4.890621	0.28	0.7829
P3Q1YrsExp[1]	0.514203	3.976059	0.13	0.8973
P3Q1YrsExp[2]	5.9507712	3.264948	1.82	0.0701
P3Q1YrsExp[5]	0.1687986	3.040429	0.06	0.9558
P3Q1YrsExp[10]	0.5007824	3.170123	0.16	0.8747
P3Q1YrsExp[15]	-5.661218	3.478552	-1.63	0.1055
P3Q1YrsExp[25]	-2.823109	3.777192	-0.75	0.4558
P3Q6PosPurp[1]	-0.158035	3.725824	-0.04	0.9662
P3Q6PosPurp[2]	6.280497	3.323746	1.89	0.0605
P3Q6PosPurp[3]	0.1568553	2.217306	0.07	0.9437
P3Q6PosPurp[4]	-6.279317	2.780665	-2.26	0.0252*
P3Q9OrgTyp[1]	-1.960376	2.43536	-0.80	0.4220
P3Q9OrgTyp[2]	3.2945742	3.673423	0.90	0.3711
P3Q9OrgTyp[3]	-1.981963	4.892206	-0.41	0.6859
P3Q9OrgTyp[4]	7.1655776	4.073427	1.76	0.0803
P3Q9OrgTyp[5]	-0.93087	3.204716	-0.29	0.7718
P3Q9OrgTyp[6]	-5.586943	3.088738	-1.81	0.0722
P3Q10WkAtComp[0.5]	10.357038	5.875869	1.76	0.0797
P3Q10WkAtComp[1]	11.14016	5.839311	1.91	0.0581
P3Q10WkAtComp[3]	1.8295325	3.804329	0.48	0.6312
P3Q10WkAtComp[12]	-8.231998	3.610138	-2.28	0.0238*
P3Q10WkAtComp[24]	0.4604558	3.531759	0.13	0.8964
P3Q10WkAtComp[60]	1.6890321	4.057193	0.42	0.6777
P3Q10WkAtComp[120]	0.4345082	4.118586	0.11	0.9161
P3Q10WkAtComp[180]	-8.102698	5.095933	-1.59	0.1137

Term	Scaled Estimate	Std Error	t Ratio	Prob>|t|
P3Q10WkAtComp[300]	-9.576029	7.985894	-1.20	0.2321
P3Q12SiteSize[1]	-7.711598	4.109842	-1.88	0.0623
P3Q12SiteSize[10]	-0.279093	3.973644	-0.07	0.9441
P3Q12SiteSize[30]	-4.266239	4.276882	-1.00	0.3199
P3Q12SiteSize[50]	-6.752147	3.969672	-1.70	0.0908
P3Q12SiteSize[100]	-5.310824	3.913444	-1.36	0.1765
P3Q12SiteSize[250]	-5.401365	4.428335	-1.22	0.2242
P3Q12SiteSize[500]	2.2949146	6.659923	0.34	0.7308
P3Q12SiteSize[1000]	3.3858627	4.891291	0.69	0.4897
P3Q12SiteSize[5000]	17.290221	8.704098	1.99	0.0486*
P3Q12SiteSize[10000]	6.7502681	19.9718	0.34	0.7358
A1SameBck[1]	-1.774119	1.488732	-1.19	0.2350
A1SameBck[2]	1.7741193	1.488732	1.19	0.2350
A2SameGender[1]	2.4470373	1.418341	1.73	0.0863
A2SameGender[2]	-2.447037	1.418341	-1.73	0.0863
A3Same Ethnicity[1]	2.0334219	1.314191	1.55	0.1236
A3Same Ethnicity[2]	-2.033422	1.314191	-1.55	0.1236
A7Same Department[1]	-1.336146	1.425431	-0.94	0.3499
A7Same Department[2]	1.336146	1.425431	0.94	0.3499
Competence	-6.85211	6.526071	-1.05	0.2952
Caring	-10.09005	5.86039	-1.72	0.0869
Trust	-11.39786	7.275574	-1.57	0.1191
(Competence-33.3004)*(Competence-33.3004)	-6.746698	6.960928	-0.97	0.3338
(Caring-28.8107)*(Caring-28.8107)	13.595459	6.810978	2.00	0.0475*
(Trust-31.1975)*(Trust-31.1975)	-15.52205	7.204245	-2.15	0.0326*
P3Q8PosType[1]	-8.475344	5.676293	-1.49	0.1373
P3Q8PosType[2]	-2.611722	6.317308	-0.41	0.6798
P3Q8PosType[3]	4.3835185	4.70343	0.93	0.3527
P3Q8PosType[4]	6.6904613	2.799398	2.39	0.0179*
P3Q8PosType[5]	0.0130857	4.45603	0.00	0.9977


Prediction Profiler
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64.9564]
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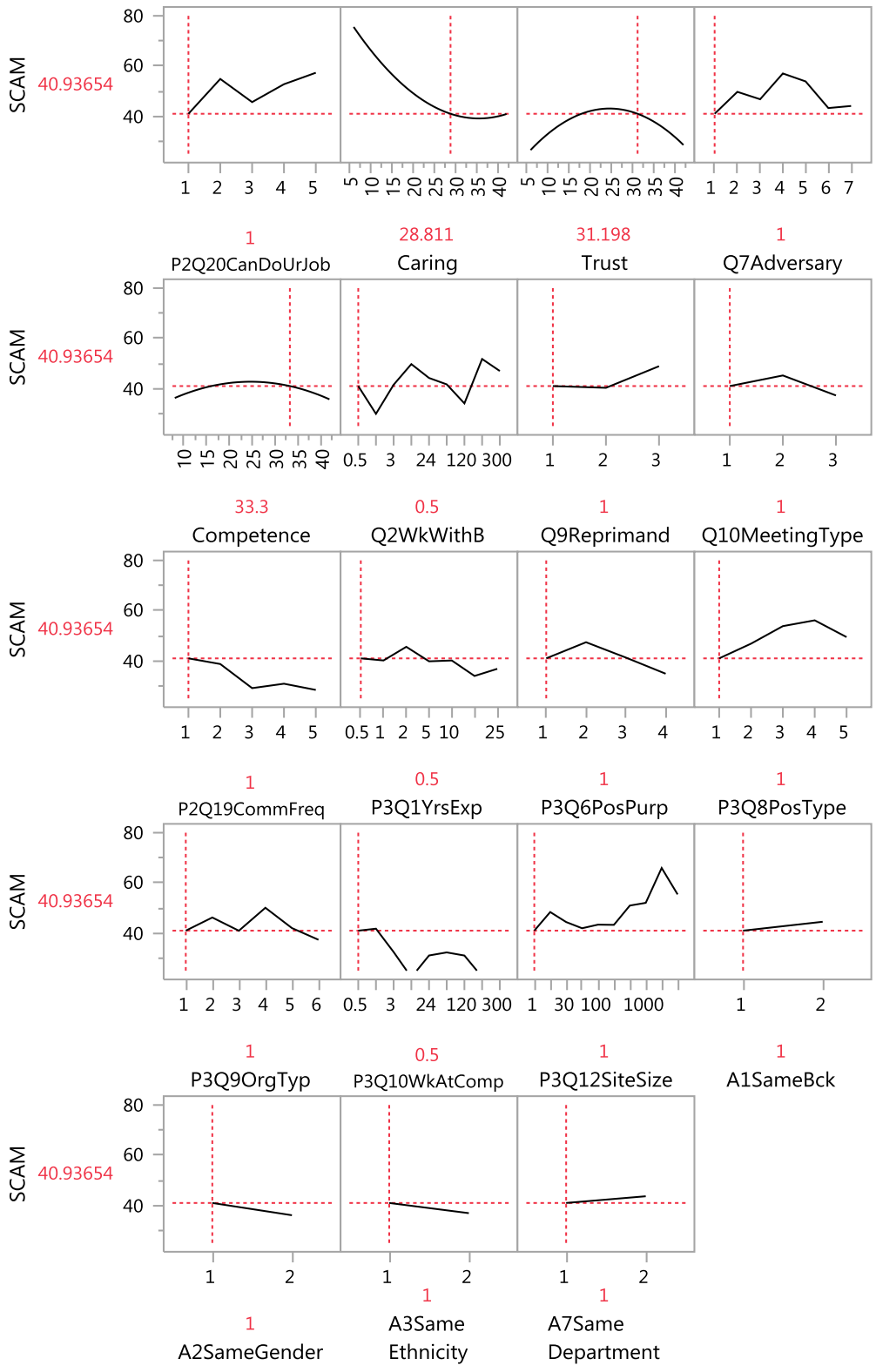
Q7Adversary
Q9Reprimand
Q10MeetingType
P2Q19CommFreq
'2Q20CanDoUrJol
P3Q1YrsExp
P3Q6PosPurp
P3Q9OrgTyp
ᵓ3Q10WkAtComp
P3Q12SiteSize
A1SameBck
A2SameGender
A3Same
Ethnicity
A7Same
Department
Competence
Caring
Trust
P3Q8PosType

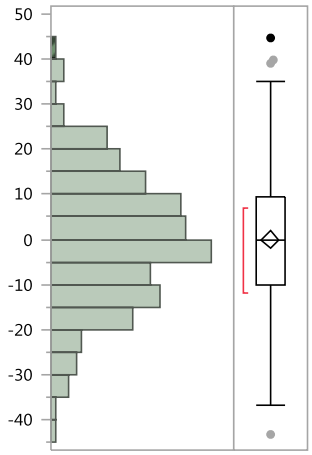

SCAM
40.93654
80
60
40
1 2 3 4 5
5 10 15 20 25 30 35 40
5 10 15 20 25 30 35 40
1 2 3 4 5 6 7
1
P2Q20CanDoUrJob
28.811
Caring
31.198
Trust
1
Q7Adversary
10 15 20 25 30 35 40
0.5 3 24 120 300
1 2 3
1 2 3
33.3
Competence
0.5
Q2WkWithB
1
Q9Reprimand
1
Q10MeetingType
1 2 3 4 5
0.5 1 2 5 10 25
1 2 3 4
1 2 3 4 5
1
P2Q19CommFreq
0.5
P3Q1YrsExp
1
P3Q6PosPurp
1
P3Q8PosType
1 2 3 4 5 6
0.5 3 24 120 300
1 30 100 1000
1 2
1
P3Q9OrgTyp
0.5
P3Q10WkAtComp
1
P3Q12SiteSize
1
A1SameBck
1 2
1 2
1 2
1
A2SameGender
1
A3Same Ethnicity
1
A7Same Department

APPENDIX J

PHASE 2 DISTRIBUTION OF RESIDUALS

Distributions

Residual SCAM



Quantiles

100.0%	maximum	44.655438626
99.5%		43.58340758
97.5%		29.754990127
90.0%		18.353656916
75.0%	quartile	9.3447088836
50.0%	median	-0.219969614
25.0%	quartile	-10.28143705
10.0%		-17.88386696
2.5%		-29.98361342
0.5%		-41.85290852
0.0%	minimum	-43.24536208

Summary Statistics

Mean	-3.02e-14
Std Dev	14.665821
Std Err Mean	0.9408129
Upper 95% Mean	1.8532274
Lower 95% Mean	-1.853227
N	243