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Experimentally Analyzing the Impact of Leader Positivity on Follower Positivity and Performance

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Abstract
This field experimental study examined the role that positive leadership plays in producing effective leader and follower outcomes. Specifically, a sample of engineers (N = 106) from a very large aerospace firm were randomly assigned to four experimental conditions. Two conditions involved assigning these engineers to a low and high problem complexity condition. The other two conditions represented high versus low conveyed leader positivity. The results indicated a positive relationship between the leaders' positivity and the followers' positivity and performance, as well as a negative relationship between problem complexity and follower positivity. The study limitations, needed future research, and practical implications of these findings conclude the article.

Keywords: Positive psychological capital, Situational complexity, Efficacy, Hope, Resilience, Optimism

Most would agree that conventional wisdom values positive attributes associated with leadership. For example, during the recent economic crisis, almost everyone expressed a desire for leaders in both the political and business arenas to remain optimistic and focused on creating a more desirable future. Yet, while some leadership theories have investigated positive aspects of the leader's style or behaviors (e.g., high quality leader-member exchanges and transformational leadership), more direct theory and research on the effects of positive leadership characteristics and styles has been far less frequent (Avolio & Luthans, 2006).

In this study, we explore the extent to which constructs associated with the recent focus on positive organizational behavior influences leaders, followers and their effectiveness. In particular, we build on previous research by examining the role of leaders' positive characteristics on their followers' positivity and performance. While recent studies have examined the role of positive leader characteristics on firm performance (e.g., Peterson, Walumbwa, Byron & Myrowitz, 2009) and the role of trust and transparency (Norman, Avolio, & Luthans, in press), we extend this previous research by examining how the leaders' level of conveyed positivity impacts followers positivity and performance. Leader and follower positivity were each comprised of four components that Luthans and his colleagues have called psychological capital (see Luthans, Avolio, Avey & Norman, 2007; Luthans, Youssef & Avolio, 2007), including confidence or efficacy, hope, optimism and resiliency.

In the last few years, there has been greatly expanding theory-building and accumulating research on what is termed positive organizational scholarship (e.g., see Cameron, Dutton & Quinn, 2003; and the special issue of *American Behavioral Scientist* edited by Cameron & Powley, 2008) and positive organizational behavior (e.g., see Luthans & Avolio, 2009; Luthans Impact of Leader Positivity on Followers 4 & Youssef, 2007; Nelson & Cooper, 2007; and two special issues of *Journal of Organizational Behavior* edited by Bakker & Schaufeli, 2008 and Wright & Quick, 2009). Underrepresented constructs in the organizational behavior literature such as hope (Peterson & Byron, 2007); efficacy (Stajkovic & Luthans, 1998); optimism (Youssef & Luthans, 2007)

and resilience (Maddi, 1987) are gaining more attention and have been shown to be empirically related to desired employee attitudes and performance. These four positive psychological resources have been conceptually and empirically combined by Luthans and colleagues into the higher order construct of psychological capital (see Luthans, Avolio et al., 2007). This core construct has been demonstrated to relate to employee attitudes and performance above and beyond each individual component (see Luthans, Avolio et al. , 2007), and have been show to add value beyond traditionally recognized positive constructs (Avey, Luthans & Youssef, in press). To lend support to this conceptualization, Stajkovic (2006) has also proposed a "core confidence" motivation model based on the same four positive psychological resources.

Despite this growing emphasis on positivity in organizational studies, this work to date has received relatively little attention in the study of leadership in organizations. In addition, although there have been a few studies focusing on the application of positivity to the workplace that have considered the role of contextual factors, such as supportive organizational climate (Luthans, Norman, Avolio, & Avey, 2008) or organizational virtuousness (Cameron, Bright & Caza, 2004), the analysis of other important situational factors such as environmental stability, competitive pressures, level of regulation and problem complexity have been absent. The intent of this study is to begin filling some of these gaps.

Theory and Hypotheses

The Meaning of Positive Psychological Capital

As indicated, positivity in this study is represented by what Luthans and colleagues term positive psychological capital. Depicted as going beyond human capital (consisting of employee education, skill and experience), psychological capital has been theoretically and empirically supported as being a core construct comprised of four widely recognized positive psychological states including efficacy, optimism, hope and resilience. Prior research has primarily explored the relationship between psychological capital and desired work attitudes, behaviors and performance (e.g., Avey, Luthans & Jensen, 2009; Luthans, Avolio et al., 2007). In the current field experiment, we set out to examine how the conveyed level of leader positivity or psychological capital causally impacts followers' level of conveyed positivity or psychological capital and problem solving performance. Psychological capital is specifically defined as, "An individual's positive psychological state of development that is characterized by: (1) having confidence (efficacy) to take on and put in the necessary effort to succeed at challenging tasks; (2) making a positive attribution (optimism) about succeeding now and in the future; (3) persevering toward goals and, when necessary, redirecting paths to goals (hope) in order to succeed; and (4) when beset by problems and adversity, sustaining and bouncing back and even beyond (resilience) to attain success" (Luthans, Youssef et al., 2007, p. 3).

While on the surface the four facets of psychological capital appear very similar, they have been empirically demonstrated to have discriminant validity (Luthans, Avolio et al., 2007). Yet, the underlying mechanism common to each can be found in what Bandura (2008) describes as positive agentic motivation or capacity toward individual performance and success. For example, while the hopeful person sets goals, the efficacious person ensures they are setting and accepting challenging goals with an optimistic expectation of success. This in turn contributes to the individual's motivated, increased effort. Moreover, if one is planning multiple pathways (i.e., hope) to resiliently bounce back from setbacks and continues pursuing success by choosing alternate routes when necessary, this may in turn enable continued optimistic expectations. In other words, these synergies among efficacy, hope, optimism and resilience help explain how the core construct of psychological capital has a bigger impact on performance and desired attitudes than each of the components by themselves (Luthans, Avolio et al., 2007). Therefore, in this field experiment, and consistent with previous research, we consider the four positive resources of hope, efficacy, resilience, and optimism to be indicators of the higher order core factor of psychological capital, which we used to assess both the positivity of the leaders and followers.

The Role of Complexity

Focusing on the impact of situational and/or problem complexity on decision-making has been a topic that has demonstrated considerable interest over the last 40 years (Payne, 1976). For example, scholars have examined how decision making and results are different in complex problem situations and consistently note that as complexity in the context and/or problem increases there is a drain on individual and collective psychological resources (Peterson, Owens, Tetlock, Fan & Martorana, 1998, p. 275). Few research domains have made this clearer than the job demands-resources model. In a review of this literature, Bakker and Demerouti (2006) note that there is significant empirical support for the notion that as complexity in the work environment increases, holding job resources constant, there is a drain on psychological resources contributing to strain, psychological exhaustion, sleeping problems, job stress and impaired health. These psychological resources have included optimism, self efficacy and organizational based self esteem (eg., Xanthopoulou, Bakker, Demeroutioi & Schaufeli, 2009). This does not mean that every challenging task or problem will result in a depletion of cognitive resources. Indeed, some complex problems may 'raise an individual's game'. However, considerable empirical research in the job demands-resources model suggests that as tasks become more complex (and we will argue risky, uncertain in the outcome, and higher ambiguity regarding how to accomplish the task) these factors will likely draw on average rather than increase one's positive psychological resources.

Building on this literature, in the current study we have focused on one aspect of situational complexity. In particular, this study analyzes the level of complexity associated with the problem to be solved by participants and the impact complexity may have on the positivity of a leader's followers. In reviewing research on complexity, the characteristics of ambiguity, risk and outcome uncertainty are consistently referred to directly or indirectly. Thus, we generally define complexity here based on level of ambiguity, risk, and outcome uncertainty associated with the problem that participants must address.

Lewin's pioneering research on context and leadership provides important historical precedent for this discussion in terms of the role that both the leader's positivity and context may have on follower performance (Lewin, Lippit & White, 1939). As summed up by Ross and Nisbett (1991, p.9), "The main point of Lewin's situationalism was that social context creates potent forces producing or constraining behavior." The complexity of a particular situation in terms of the degree of risk, outcome uncertainty, and ambiguity is consistent with Lewin's premise in that these complexity factors may create potent forces that can drive performance up or down.

Theoretical Summary and Integration

In sum, we expect that more complex problem situations, as defined by the dimensions of risk, outcome uncertainty, and ambiguity, would negatively influence an individual's positive psychological capital, and, in turn, the ability to solve problems and to perform. Supporting this position, Cohen (1980) notes that all individuals have a finite level of cognitive resources such as span of attention and working memory capacity to monitor stimuli in their environment and their behavioral actions and reactions to those stimuli. When individuals are embedded in complex problem situations, the complex characteristics demand increased cognitive load from participants. This occurs as individuals utilize their cognitive capacities to evaluate and scan their environment to arrive at information that is relevant to focus on, process, and make decisions regarding the problem or decision. As this cognitive energy is consumed by monitoring and evaluating these more complex situations, there are likely to be less cognitive resources available to be applied to performing one's additional responsibilities. Thus, individuals dealing with more complex situations are more likely to experience a negative draw on their psychological capital, which will in turn detract from their performance.

After a review of the complexity research literature, Johnson and Bruce (2001, p. 267) offered a "general conclusion" that psychological performance is reduced as complexity in the situation increases. Coupled with arguments from Bakker and Demerouti (2006) that complexity in the work environment leads to a reduction of psychological resources, we derive the study's first hypothesis.

> **Hypothesis 1:** Problem complexity has a negative relationship with followers' level of positive psychological capital such that the more complex the problem situation, the lower their positive psychological capital will be in facing the problem.

Leader Positivity Conveyed Through Psychological Capital

As indicated, positive psychological capital and problem complexity serve as the conceptual foundation and point of departure for this experimental study. The value of leader positivity has been assumed through the years to have a positive relationship with effort and performance, but has been given only indirect attention in terms of the various positive dimensions in the leadership literature. For example, Bass (1990, p. 155) noted that "successful leaders have revealed a more optimistic view of themselves and the world around them than those who have failed and non-leaders." He goes on to say that, leaders who experience hopelessness "avoid responsibility, procrastinate about major decisions, and become passive and laissez-faire in their leadership style" (p. 158).

These examples do suggest that the leader's efficacy, hope, resilience, and optimism that make up psychological capital would be expected to yield a positive influence on followers' effort and performance. However, this influence would seem to be limited to the extent that a leader's positive capacities are actually conveyed to the follower's performance. For instance, if leaders are optimistic regarding the outcome of a project, but do not convey this optimism, the positive effects on followers may be minimized or non-existent. Furthermore, recent research by Bono and Ilies (2006) has provided beginning evidence that positive displays by the leader may be related to follower positivity and performance.

The context in which this process plays out may also contribute to our understanding of the role of leader positivity. For example, previous research suggests that how leaders communicate to their team, especially in times of crisis or challenge, creates a foundation of trust for future discourse and performance (Kasper-Fuehrer & Ashkanasy, 2001). Waldman and colleagues (2001, p. 136) argued that the confidence expressed by a leader during times of crisis "is a source of psychological comfort for the followers, thus reducing stress." Such leader communications, especially in the very early life cycle of a team, may have significant impact on followers' initial perceptions of success on the task (Hackman & Wageman, 2005). This previously related work leads to our second study hypothesis:

> **Hypothesis 2:** Leaders' conveyed positive psychological capital will be positively related to their followers' reported positive psychological capital.

Impact on Follower Performance

There is beginning evidence that employees who are generally more positive may be better performers than less positive employees (Isen, 2004; Staw & Barsade, 1993; Staw, Sutton & Pelled, 1994; Wright & Staw, 1999). These positive employees may also be more likely to facilitate positive organizational change (Avey, Wernsing & Luthans, 2008). The explanation for these findings may be found in the agentic properties of hope, optimism, efficacy and resilience found in psychological capital. Prior theoretical work (Luthans, Youssef et al., 2007) has suggested employees with high levels of these positive constructs should result in higher performance as they can be expected to put forth extra effort and perseverance (efficacy), have willpower and generate multiple solutions to problems (hope), make internal, stable attributions of successes and have positive expectations about results (optimism), and respond positively to adversity and setbacks (resilience). In other words, this positivity should facilitate the motivation

for intentional, agentic behavior toward the successful accomplishment of goals and tasks. For example, those employees who are more efficacious may expend more effort in solving a task (Bandura, 1997) leading to discovery and practical development of the pathways dimension of hope (Snyder, 2000). When the pathway generation capacity is increased, individuals are more likely to be optimistic they can achieve successful outcomes given they can visualize the success through multiple pathways. Finally, when individuals are optimistic about success outcomes, they will be more resilient to setbacks as they believe success is still achievable. In addition, as indicated earlier, previous empirical work has reported relationships between each of the positive resources of efficacy , hope, resilience, optimism and employee performance, as well as its higher order, core construct of psychological capital and employee performance (Luthans, Avolio et al., 2007). Therefore, based on this previous related research, it is hypothesized that followers' positive psychological capital will be positively related to both the originality and quantity of performance in terms of solutions generated to solve problems.

Hypothesis 3: Followers with higher positive psychological capital will generate more original solutions for problems than their lower psychological capital counterparts.

Hypothesis 4: Followers' positive psychological capital will be positively related with their quantity of problem solutions generated.

In total, the current study goes beyond previous research by examining how the leader's positive psychological capital first impacts their followers' psychological capital and subsequently their performance comparing two levels of problem complexity. This is the first field experiment that tests some of the core theoretical positions put forward in the positive organizational behavior literature with respect to how positive leaders (as defined by their level of psychological capital) can address workplace challenges to enhance followers' performance. With regard to idea originality, while previous research has found leaders may enhance innovation by being champions for it (Howell & Boies, 2004) and providing support (Amabile, Schatzel, Moneta & Kramer, 2004) and autonomy (Krause, 2004) to followers (see Mumford & Licuanan, 2004 or *The Leadership Quarterly* special issue on Leadership for Innovation), this is the first true field experiment, which accounts for leadership and idea originality with working engineers and hopefully can contribute to the internal and external validity of these previous findings.

Methods

Study Participants

Participants for this experiment were engineers (N = 106) from a very large aerospace firm with an average of 13.5 (s.d. = 8.1) years of experience. Specifically, they were electrical systems design engineers assigned to a high priority new product in the company. This was an appropriate sample given the daily responsibilities of the engineers in this study were to provide conceptual and technical solutions to complex problems related to designing and manufacturing a very complex, very expensive product. Thus, having to provide multiple unique, original solutions to problems that varied in complexity was a defining characteristic of the engineers' jobs.

To solicit their participation in the study, these engineers were initially sent an e-mail from the actual division leader that included a brief introduction to the research project and description of time commitments to complete it. In this email it was stated the project was for research but results would be used immediately by both managers and non-managers after the project. Those who volunteered then went to a web link that led them to an informed consent webpage describing the project and the benefits of participating. In the project description it was stated that leadership and performance would be studied. Specifically omitted were references to the manipulated variables (hope, optimism, efficacy, resilience) or associated words (e.g., positivity, psychological capital, positive leadership) in order to avoid priming participants. Participants were randomly assigned to one of the four experimental conditions (high or low problem complexity and high or low conveyed leader positive psychological capital). Study participants thus served as actual followers of a team of leaders charged with addressing the problems in each condition, which was a typical process used to discuss and address problems in this organization.

Manipulations and Variables

High complexity manipulation

Given the challenges inherent in experiments conducted in the workplace, when designing the manipulations for this study, careful attention was given to making them as realistic as possible. Specifically, participants in all conditions were engaged in problem solving that was directly related to their jobs, e.g., taking direction from a team of their respective managers in their actual place of work, not simply the building, but their exact work station. This was done to maximize external validity of the study.

We worked with the aerospace firm's electrical system program's leadership team to define and then construct two problem conditions representing high versus low complexity problems. The high complexity condition involved dealing with a dramatic increase in production. There was no defined method to implement an increase in such production rates, while maintaining the same high level standards for safety and reliability, making the problem situation ambiguous. This meant that this group of participant engineers were charged with creating solutions to a complex problem where there were no agreed upon directions or processes used to determine the appropriate steps for change.

This complex problem situation also involved a high degree of risk in that failure in implementation could amount to millions of dollars in lost revenue because in this industry discounts (also in the millions of dollars) are given on late product deliveries to customers. Thus, if there was a failure in the rate increase that caused late product deliveries, the program platform team would incur millions of dollars in penalty costs to their firm. Finally, the outcome of this problem situation is uncertain in that the engineering staff had no way of estimating the extent to which the product rate production could be increased, or if the current process would allow further increases. Overall, this problem situation was characterized as being ambiguous, associated with considerable risk, and the outcomes were uncertain.

Low problem complexity manipulation

The manipulation for low complexity was also derived from interviews and conversations with the program's engineering leadership team. After understanding the tasks of the engineers, it was determined by the research team with agreement from the senior management team that a task labeled by the company as a production action request (PAR) was indicative of a very low complex problem situation for any engineer. A PAR is best understood as a late change in a design from an upstream internal customer (e.g., other engineering groups), which must be immediately incorporated into the electrical configuration of the aircraft. This typically involves a design change in a short amount of time and a visit "downstairs" (to the factory floor) to guide the building process. There is a documented process well known to this engineering team to deal with PARs in a step by step manner. Thus, the situation of a PAR does not include ambiguity.

In addition to a lack of ambiguity, a PAR presents very little risk to the division. The cost to implement is relatively low, and it is a general part of the job description that team members address on a daily basis. Finally, the outcome of a PAR is quite certain. In each case, the electrical design engineer simply incorporates the change into the electrical configuration of the aircraft. While some PARs may be more technically challenging, they can all be addressed by a more senior engineer if needed. In each case, the change is made and the building process is ensured. Overall, a situation including a PAR problem fits the description as being less complex.

Measure of the complexity manipulations

The complexity manipulations were "checked" using a 9-item scale developed for this study. In addition to a qualitative manipulation check described below, the purpose of this scale was to determine that the high complexity condition was evaluated as being more complex than the low complexity condition. The items were derived after a review of the ambiguity, outcome uncertainty and risk literature and are presented along with facet definitions shown in Appendix A. This scale has questions for each of the facets of situational complexity and demonstrated an adequate level of internal reliability in the current study ($\alpha = .86$).

In addition to internal reliability and given that the three dimensions were designated as a single index of complexity, a principled components exploratory factor analysis was conducted using varimax rotation. There emerged 2 Eigen values greater than 1 explaining 62 percent of the variance. All complexity items loaded significantly on the first factor providing support for the use of a single index of complexity. In addition, items 1 and 4 also loaded significantly on a second factor and thus were double loading items.

Leadership manipulation

Each participant was randomly assigned to a high or low leadership positive psychological capital condition. Given the task the engineers completed was requested by the program's leadership and judged by the program to be important, no cover story to increase psychological realism was used. In sum, it was a real task to be completed for business operations at the request of the employees' real leaders.

To manipulate the leadership behaviors, participants viewed a written excerpt of a focus group of leaders in which their "three senior program engineering leaders" were discussing the particular situations in this study. The presumed relationship between the participants and the leaders was a vertical relationship embedded in the organizational hierarchy. These leaders were called "program engineering leaders" to indicate they were leading at the program level, which was the level of either executive vice president or director of engineering for the entire program. From the participants' perspective this was their managerial leaders in a real reporting relationship (e.g., the program directors) and not hypothetical leaders, positions or organization. This realism was further reinforced as their direct division leader requested their participation in solving these issues for the program through this on-line method. Thus, it was a task to be completed at the request of their manager.

Our reason for choosing this approach in using the three leaders was to avoid having participants think the message was from their direct manager or a particular manager in the company. Moreover, in this organization it is common for managers to work together as a team, so the manipulation would more closely approximate the day to day interactions in this company. Finally, we were mainly interested in examining the impact that leadership's positivity had on followers and were not particularly concerned whether the source was from one leader or multiple leaders.

The content of the script consisted of either high or low levels of positive psychological capital messages conveyed by the two leadership teams. Descriptive words were used that aligned with the four facets of positive psychological capital described earlier. For example, the leaders in the high leader positive situation communicated optimistic expectations, confidence (efficacy), hope, and resilience in the context of the situation (e.g., "the (WORK GROUP) team is world class in terms of its performance" and "Even when they have setbacks, they seem to come back again and again, and nail whatever the challenge is that we throw at them. I'm totally confident in them, they always come up with the solutions we need." In contrast, in the low leader positivity condition the leaders conveyed the opposite (but not overtly pessimistic or hopeless) regarding the situation at hand (e.g., "I guess if you are

asking me my expectations for how and if (WORK GROUP) can drive solutions for us, my answer would be 'I don't know but I sure hope so'. We all know they are going to have to respond faster than they typically do and I'm just not sure this situation will end up the way we all hope…just not sure yet, it seems too early to tell in my opinion." Overall, the leadership manipulation was done by a script using a focus group forum that included "three program engineering leaders" discussing their high (low) positive perceptions of the team's likelihood of success in their assigned projects.

Mediating variable

To measure participants' positivity, the Psychological Capital Questionnaire (PCQ) was used (Luthans, Avolio et al., 2007; Luthans, Youssef & Avolio, 2007). Because scale length was a concern for the organizational leaders, the 12-item version was used that has 4 items representing hope (2 items representing each of the hope mechanisms of pathways thinking and agentic capacity), 3 items representing efficacy, 2 items representing optimism, and 3 items representing resilience. The PCQ items were adapted from published scales on hope (Snyder et al., 1996), efficacy (Parker, 1998), optimism (Scheier & Carver, 1985) and resilience (Wagnild & Young, 1993). The PCQ has both conceptual (Luthans, Youssef & Avolio, 2007) and psychometric support (Luthans, Avolio et al., 2007) and has been used in previous published research (Avey, Wernsing & Luthans, 2008; Luthans, Avolio et al., 2007).

To come up with a total of 12 items, we used the four criteria specified by Stanton, Sinar, Balzer and Smith (2002). First, we selected items based on the confirmatory factor analytic loadings reported in previous research (e.g., Luthans, Avolio et al., 2007). Items that loaded on the corresponding first order factor (e.g., resilience, etc.) stronger (i.e., a higher loading score) than others were selected. Second, items were selected based on their contribution to the scales internal reliability. Third, items were selected in order to maximize construct breadth; that is, to ensure important facets of the construct were not left out of the measurement. Fourth, given the multidimensional nature of the positive psychological resources construct, it was necessary to consider the number of items for each component. By analyzing the scale from previous research (e.g., Luthans, Avolio et al., 2007) and using the four criteria above, it was determined that 3 items emerged as superior for efficacy, 3 for resilience, 2 for optimism and 4 for hope leading to the 12 item scale. Previous published research has also used this 12 item measure (Luthans, Avey, Clapp-Smith & Li, 2008).

The framing for answering the PCQ questions was stated as follows: "considering this situation which you have just read about, please respond to the following statements with the scale provided." Examples of the items are: (1) efficacy – "I am confident presenting information to a group of colleagues regarding this situation."; (2) hope – "If I should find myself in a jam trying to solve this situation, I could think of many ways to get out of it."; (3) resilience – "I take stressful things regarding this situation in stride."; and (4) optimism – "I look on the bright side of things regarding this situation."

Dependent variables

After completing the surveys, participants were provided two open text boxes to enter their recommended solutions to the problems. Participants were prompted to enter as many solutions to the problems as they desired inside an open text box. There was no limit to what they could input into the text box.

As shown in Table 1, the solutions generated were coded in terms of quantity and originality. There were two sets of coders for the qualitative data in this study. First, two experienced research colleagues served in the role of initial coders. These individuals had done extensive coding in prior research projects on leadership. In addition, and as described below, a second set of two coders validated the original coding results. These latter research colleagues again had relevant coding experience in terms of the type of coding being conducted in the current study. Neither of the coding teams was familiar with the study's hypotheses or purpose.

It should be noted that in this study there was no need for the coders to be adept at understanding and solving complex engineering design issues. The scheme was such that the coders were only required to identify counts of variables for quantity and originality of solutions (e.g., number of statements, number of positive statements, number of individual solutions and number of factors considered in a solution) as discussed below. For example, when coding for the originality of solutions, the coders coded the

Table 1. Dependent Variable Coding Examples

Example of:	Follower Entry Excerpt
One entry with 4 unique solutions	"(1) A tiger team to incorporate mc's sqwauks, and efix's allow the rest of the group to focus on completion of basics. (2) offer savings to customers who choose existing configurations without modifications. (3) get systems healthy so our product can be released on time without mistakes. (4) increase factory ECAT group, or move all of (Group X) closer to the (Product) where problems can be solved immediately without 2nd guessing."
Low Original Solution	"All (Company X) commodities (systems, engineering, manufacturing, etc.) must work together in generating one great product (Airplanes)."
Highly Original Solution	"First I think that part of the solution must be that the date for "FREE" changes or updates to an airplane needs to be pushed back along with the hard cutoff date that NO customer requested changes can be made before delivery. Second finding the effectivity for bundle dash number and ADCN through WIRS is difficult, time consuming and at times not accurate using the tools we have available. If there are more tools or training that would make the search faster it would help keep us on track. Third some of the resent "Updates" to the CATIA drafting program have resulted in more delays, both because of problems at rollout and because they take longer to use than the older methods. I know that the changes were made for cost cutting reasons but I think that we are being "penny wise and pound foolish". With time becoming increasingly critical the recent changes any new ones need to be reevaluated to make sure that they do not impact the productivity of the people using them."

number of unique factors explicitly considered in the entry by the participant. As a follow-up check, a sample of the proposed solutions and the associated coding scores were shown to and thoroughly discussed with engineering technical experts from the organization in the study, who in turn agreed with the scoring These engineers had no a priori knowledge of the nature of the experiment.

The coding method used in this study was similar to the coding scheme and variables used by Kahai, Sosik and Avolio (2004). Specifically, quantity of solutions were coded by the raw number of solutions (Valacich, Dennis & Nunamaker, 1992) provided by each participant (Connolly, Jessup & Valacich, 1990). Quantity of solutions is distinct from total number of statements as entries included many statements that were not solutions or part of a single solution. In this case the dependent variable representing quantity of solutions was coded by determining the number of unique proposals provided by each participant. Individual proposals were evident typically by grammatical cues in the text. For example, one sentence (ending with a period) was often a single proposed solution. If the following sentence was clearly a new thought (e.g., being considered from a different domain, different factors and/or a different course of action recommended) and the initial sentence was in fact a proposal for action to solve the problem situation (e.g., a solution), the initial sentence was coded as a single solution. In some cases, participants numbered their solutions (e.g., 1, 2, 3 and so forth) or separated them by way of punctuation. While specific proposals were examined within the same sentence structure, they were typically separated by a grammatical cue by the participant. The quantity of solutions variable specifically included the number of specific proposals and ranged from 0 (participant who wrote text but offered no solutions) to 8 (participant who listed eight solutions for the issue presented) for each entry.

The uniqueness and number of factors considered in solutions proposed have been argued to represent two dimensions important in creative tasks (Diehl & Stroebe, 1987). Thus, originality of solutions was determined by rating the uniqueness of each entry from other entries and overall originality of each entry on a scale from 1 (very low originality) to 5 (very high originality). Those solution proposals that were more unique in their approach (e.g., not proposing solutions common to many participants) and high in overall originality (e.g., a single proposal with multifaceted solutions) were rated higher. Overall, 31 percent of entries were coded 1, 11 percent were coded 2, 24 percent were coded 3, 20 percent were coded 4, and 13 percent were coded 5.

Coder agreement

After the initial coding where the two raters determined examples (e.g., exemplars for each variable) and the coding criteria discussed above, both raters coded the remainder of the data alone. The number of positive statements (93%), number of overall statements (84%) and originality of proposals (82%) all demonstrated high inter-rater agreement. After multiple rounds of training using the coding criteria reported by Kahai et al. (2004), quantity of solutions achieved an 86 percent agreement. As a last check, the two raters reviewed the coding entries that were still different, discussed the entry, and came to consensus on the final rating.

The next step in the coding process included validation from two additional research associates. Specifically, 10 percent of the entries (10 entries total) were randomly selected from all entries and sent to two outside researchers with experience coding for similar studies. Included in this correspondence were the original examples agreed to by the two original coders as well as a description of the criteria for each dependent study variable. The agreement between the two original raters and the two follow-up raters was 70 percent for total number of statements, 70 percent for originality of solutions, 80 percent for quantity of solutions and 100 percent agreement for the total number of positive statements. Discrepancies were again discussed and a consensus solution was used. Through this process, the original coding results were determined to be acceptable.

Demographics and covariates

After the task was completed, demographic and other control variables were measured. Specifically, participants were asked in which area of the program they worked (e.g., wire design, wire installation, manufacturing engineering, form board design, production illustration) and to identify their supervisor. Participants were also asked to identify their work group and supervisor to determine the extent that voluntary participation by participants was adequately distributed among the work groups, which may indicate potential non-response bias. An additional covariate used in this study was situational challenge. While complex problems may be inherently more challenging, given that situational challenge may influence performance, we sought to isolate the effects of complexity. The literature (e.g., Vancouver & Putka, 2000) clearly distinguishes situational challenge from complexity. For example, laying bricks in the heat of the day can be extremely challenging when compared to mild conditions, but not necessarily complex in the sense of being extremely ambiguous, risky or uncertain in terms of the ultimate outcome.

Situational challenge was also used as a covariate to determine the influence of complexity above and beyond the perception of situational challenge. It was measured with a three item scale with the following items: "The situation previously discussed was quite challenging"; "Overall, I would characterize the situation as difficult"; and "I would say this is just a tough situation". These items demonstrated adequate internal reliability ($\alpha = .84$)

Results

All instruments in the study yielded adequate internal reliability ($\alpha > .70$). The demographic variables collected in this study included level within the organization (1-6), tenure with the organization in years, area of specialization within the work unit and name of manager to identify the work group. In order to test for non-response bias and in order to compare the demographics of the work unit to participants in the study, analysis of variance was conducted on the level and tenure variables.

Results indicated no significant difference in the work unit (made available by human resource records) and the participants in the study for both organizational level ($F = 1.93$, $p = .17$) and tenure ($F = .879$, $p = .35$). Participants were similarly distributed throughout each work area within the sample population (e.g., wire installation, wire design) and manager of record (i.e., the

participant's direct manager) within each area (e.g., Manager A in wire design and Manager B in wire design). Variables were examined between the work groups to ensure there were no differences between the groups (separated by each manager). Using the group variable as the predictor, there were no group differences on the variables of rated leadership positivity (F = .54, p = .84), rated complexity (F = .75, p = .66), participant positivity (F = .69, p = .72), rated situational challenge (F = .77, p = .64), quantity of solutions (F = .57, p = .82) and originality of solutions (F = .75, p = .66). Thus, groups were found to be adequately dispersed throughout the various conditions and there were no differences between work groups.

Next, an exploratory factor analysis (EFA) was conducted to better determine convergent and discriminant validity between instruments of complexity, leader and follower positive psychological capital. Given the three instruments included this EFA it was anticipated and observed that 3 dominant factors would emerge. These 3 factors with Eigen values greater than 1 accounted for 56% of the variance explained. Overall, of the 33 items in the EFA, there were no significant cross loading of items. Given the EFA provided overall support for the distinction in instruments, all scales were kept intact for analyses.

Manipulation Checks

In order to confirm the manipulations in this study, both quantitative and qualitative manipulation checks were used. First, after being exposed to the respective leadership conditions, participants then completed the 12 item PsyCap scale by using the team of leaders in the manipulation as the single referent. As seen in Table 2, participants in the high positive leadership condition rated the team of leaders significantly higher (F = 19.39, p <.001) than those in the low positive leadership condition. In addition to the 12 item measure, participants were asked to use 2-3 words that best described the leaders. Coders were instructed to review all the entries in this category and identify words that were either repetitively used or summarized the entries well. Participants in the high positive leadership condition described the team of leaders using words such as "hopeful," "optimistic," "confident," and "positive" whereas participants in the low leadership condition used descriptive words such as "unsure," "untested," "discouraged," and "pretty bleak." These descriptors highlight that likely more than simply confidence or optimism was manipulated, but a more broad based positivity represented by all four facets of psychological capital. Thus, through both quantitative and qualitative reactions, the leadership manipulations appeared to be successful.

The complexity manipulations were also verified through both quantitative and qualitative analyses. Specifically, using the 9 item scale (α = .86, see Appendix A) discussed above to check the complexity manipulation, those assigned to the high complexity condition rated their situation significantly more complex (F = 42.30, p <.001) than those assigned to the low complexity condition. In addition, participants in the high complexity condition frequently used descriptors such as "complex," "too complex," "intricate," and "multi-faceted problem," whereas participants in the low complexity condition provided descriptors such as "solvable," "part of the job description," and "routine." Thus, we reasonably conclude through both quantitative and qualitative analyses that the complexity conditions were successfully manipulated. Overall variance explained, F, p and $\eta 2$ values of the manipulation checks are shown in Table 3.

Hypothesis Testing

Given the instruments demonstrated adequate psychometric properties, and the experimental conditions resulted in successful manipulations, we proceeded to test the study hypotheses. General linear modeling was used to test hypotheses except in cases with all continuous variables where regression was applied. In the test of H2, employee level was a significant predictor of positivity and thus, ANCOVA was used controlling for the effect of level. Given that GLM assumes homogeneity of slopes (i.e., no interaction between the covariates and the independent variables on the dependent variable) we conducted these analyses and found the data met this assumption. As seen in Table 3, we conducted a MANOVA to determine the main and interaction effects of leader positivity and situational complexity on the three outcomes of follower positivity, originality of solutions and quantity of solutions. We then conducted separate univariate ANOVAs; the results of which are shown in Table 3. The multivariate effects of leader positivity (F = 3.03, p < .05, $\eta 2$ = .10) and complexity (F = 2.10, p = .09, $\eta 2$ = .07) (marginally) were significant but not the interaction term (F = .56, p = 64, $\eta 2$ = .02).

Univariate analyses controlling for the effects of level supported Hypothesis 1. Specifically, situational complexity was a significant predictor of follower positivity in the expected negative direction (F = 3.85, p = .05, $\eta 2$ = .05). Hypothesis 2 was also

Table 2. Study Manipulation Checks-Main Effects and Qualitative Descriptors

Dependent Variable	Quotes: Selected Descriptives	Mean	Univariate F	p
Leadership				
High Condition	Hopeful, encouraging, confident, positive, grateful, optimistic, cautiously optimistic, motivated	4.47	19.39	<.001
Low Condition	Uneasy, unsure, untested, concerned, discouraged, stressed, looked, pretty bleak	3.68		
Problem Complexity				
High Condition	Complex, too complex, perplexing, intricate, stressful, critical, imperative, multifaceted problem	4.45	42.30	<.001
Low Condition	Solvable, part of the job description, not extraordinary, routine	3.41		

Table 3. Effects of Experimental Condition on Follower Positivity, Originality and Quantity of Solutions

Variable	*F*	*p*	η^2
Leader Positivity Manipulation Check (R^2 = .18)			
Leader Positivity	19.17	<.01	.18
Complexity	.01	.92	<.01
Leader Positivity × Complexity	.24	.62	.01
Complexity Manipulation Check (R^2 = .34)			
Leader Positivity	1.03	.31	.01
Complexity	45.93	<.01	.32
Leader Positivity × Complexity	3.70	.15	.03
MANOVA			
Leader Positivity	3.03	.03	.10
Complexity	2.10	.09	.07
Leader Positivity × Complexity	.56	.64	.02
ANCOVA (control for follower level)			
Follower Positivity Leader Positivity	6.08	.01	.08
Complexity	3.85	.05	.05
Leader Positivity × Complexity	.36	.55	.01
ANOVA			
Originality of Solutions Leader Positivity	4.26	.04	.04
Complexity	1.47	.23	.01
Leader Positivity × Complexity	.24	.62	.00
Quantity of Solutions Leader Positivity	6.41	.01	.06
Complexity	1.96	.17	.02
Leader Positivity × Complexity	.00	.98	.00

supported such that leader positivity was related to follower positivity in the expected direction (F = 6.08, p < .05, $\eta 2$ = .08). Although not hypothesized, it is interesting to point out that there was no significant interaction between the two experimental conditions on follower positivity, originality or quantity of solutions (see Table 3).

The last two hypotheses included the performance outcomes in this study. A grid of the quantity of solutions for each condition can be seen in Table 4. Given Hypotheses 3 and 4 were all continuous variables, regression based analyses were deemed more appropriate. This regression analysis with follower positivity predicting both originality and quantity simultaneously was conducted. As with Hypotheses 1 and 2, support was also found for Hypothesis 3 (follower positivity was related to originality in solutions, β = .32, p < .01) and Hypothesis 4 (follower positivity was related to quantity of solutions, β = .24, p < .05). Cell means and standard deviations for all of the manipulation checks and dependent variables for each condition are provided in Table 5.

Although not formally hypothesized, follower positivity could be viewed as a mediator in the model being examined. To test this possibility, we examined whether follower positivity did mediate the relationship between leader positivity and follower problem solving performance. Based on previous work using mediation tests in experimental designs (Marta, Leritz & Mumford, 2005), we used MANOVA. In the current study, since situational complexity was not significantly related to either the originality or quantity of solutions, it was excluded from this analysis.

Given there has been criticism of the Baron and Kenny (1986) method for testing mediation using regression (e.g., see Rosopa & Stone-Romero, 2008), it is important to point out much of this criticism has been assuming mediation without experimental designs. Further, while MANOVA is similar to regression in some aspects, it is more appropriate for testing group differences (e.g., predicting continuous outcomes with dummy coded condition variables). Since this study did utilize an experimental design, we conducted a MANOVA with the dummy coded leader positivity variable predicting the three outcomes of follower positivity, originality of solutions and quantity of solutions.

Results reported above indicated that the leader positivity variable was related to follower positivity and follower positivity was related to performance. The MANOVA results indicated that the leader experimental condition simultaneously predicted follower positivity (F = 5.69, p < .05, $\eta 2$ = .06) and the quantity of solutions generated (F = 5.05, p < .05, $\eta 2$ =.06), but the results did

Table 4. Number of Solutions in Each Condition

Conditions	*Number of Solutions*					
	0	1	2	3	4	5 or More
High Leader PsyCap, Low Complexity N = 25	3	13	1	4	1	3
High Leader PsyCap, High Complexity N=29	2	11	7	1	5	3
Low Leader PsyCap, Low Complexity N=27	5	19	0	2	0	1
Low Leader PsyCap, High Complexity N=25	3	16	1	1	2	2

Table 5. Cell Means and Standard Deviations for Study Variables

Variable/Condition	High Leader Positivity /High Complexity	High Leader Positivity /Low Complexity	Low Leader Positivity /High Complexity	Low Leader Positivity /Low Complexity
Situational Complexity Manipulation Check	4.20 (.88)	3.51 (.85)	4.73 (.60)	3.30 (.79)
Leader Positivity Manipulation Check	4.42 (.72)	4.52 (.82)	3.71 (.92)	3.64 (1.01)
Follower Positivity	4.46 (.78)	4.73 (.72)	4.07 (.76)	4.39 (.68)
Originality of Solutions	1.97 (1.04)	1.48 (.98)	1.08 (.91)	.57 (.62)
Quantity of Solutions	2.00 (.93)	1.44 (.66)	1.16 (.80)	.92 (.74)

not reach conventional levels of significance *t* for the originality of solutions ($F = 2.96$, $p = .08$, $\eta 2 = .03$). However, taken together with previous discussed results, these latter results provide some support for follower positivity mediating the relationship between leader positivity and follower performance, at least in terms of the number of solutions generated.

In addition to the dichotomous condition variable, there was also continuous variable measurement in the form of a manipulation check of leader positivity. Given this, acknowledging the previously mentioned limitations of mediation tests with regression, we conducted a second mediation test with the manipulation check (not the condition variable) to further confirm the results of the MANOVA. Baron and Kenny (1986) note that for mediation to be present, the predictor must be related to the criterion. Following these recommendations, the extent to which follower positivity mediated the relationship between leader positivity and quantity and originality of solutions (all of these variables were continuous data) was tested. First, conveyed leader positivity was found to be related to follower positivity ($\beta = .25$, $p < .05$). Next, conveyed leader positivity was found to be related to originality of solutions ($\beta = .19$, $p < .05$) and quantity of solutions ($\beta = .23$, $p < .05$). Further, follower positivity was found to be related to both originality of solutions ($\beta = .32$, $p < .05$) and quantity of solutions ($\beta = .24$, $p < .05$). Finally, when follower positivity was added to the regression models after controlling for the covariates described earlier, the relationship between conveyed leader positivity and originality ($\beta = .13$, $p = .23$) as well as leader positivity and quantity ($\beta = .12$, $p = .31$) of solutions became nonsignificant. A Sobel test offered support for the indirect effect of measured leader positivity on originality ($B = .23$) ($z = 2.20$, $p < .05$) and quantity ($B = .17$) ($z = 1.96$, $p < .05$) of solutions using the manipulation check variables in these analyses.

Discussion

This field study was conducted to better understand the impact of leader positivity and problem complexity on followers' own positive psychological resources and their performance outcomes. Through an experiment including random assignment of high tech engineers to four experimental conditions, the results offer several potential theoretical contributions, while also pointing to future research directions, as well as having practical implications regarding effective leadership and performance management.

Theoretical and Empirical Contributions

A major contribution of this study is that it provides empirical support for the conventional wisdom of the value leaders' positivity has on their followers' positivity and performance. Results indicated a strong main effect of leader positivity on levels of follower reported positivity. Specifically, assignment to the leader condition was a significant predictor of the study participants' positivity. This suggests that in some situations followers' positive psychological capital can be influenced by perceptions of their leaders' positive behaviors as conveyed in the form of psychological capital.

Evidence for the importance of leadership positive psychological capital was also reinforced by its relationship with problem complexity. Specifically, it was hypothesized that in the more complex problem condition, a decline in followers' reported positive psychological capital would result. While this hypothesis was only partially supported with the experimental method including all covariates, it is important to note that problem complexity did have a significant negative relationship with follower levels of positive psychological resources .

In addition to the implications that leadership positivity may have for future research results, the testing of Hypotheses 3 and 4 replicate and extend previous field research on employee positive psychological resources (e.g., see Luthans, Avolio et al., 2007). Specifically, results from this study generally supported the notion that participants' reported level of positive psychological resources was positively related to the originality and quantity of their problemsolving performance. In this case, participants were asked to provide real solutions to complex (and less complex) problems facing their division. In general, those engineers who reported higher levels of positive psychological capital provided more solutions and more original solutions than those who reported lower levels of positive psychological capital.

Another empirical finding not reported in earlier research was that followers' reported levels of positive psychological resources mediated the effects of measured leader positivity on follower performance. As leaders begin to engage with different followers, the results of their efforts to enhance performance may initially be reduced depending on the starting level of followers' positivity. Over time, as the leader consistently conveys higher levels of positivity, we would expect the followers' level of positivity to increase, and in turn to see those increases reflected in enhanced problem solving performance.

Study Strengths, Limitations and Future Research

As with any study, there are several strengths and limitations that should be noted to understand the significance of the conclusions and where to interpret the results with caution. First, the internal validity for this study draws from its field experimental design. Each participant was randomly assigned to the four experimental conditions. This random assignment contributes to initial equivalence of all potentially confounding variables and helps to rule out alternative explanations for the results. For all variables tested (e.g., tenure, level), the random assignment appeared to be successful in attaining initial equivalence. Second, several important covariates were used in this study to determine the extent to which the experimental conditions Impact of Leader Positivity on Followers 30 affected the mediating and dependent variables above and beyond the covariates. Third, in order to maximize external validity, participants were at their actual work stations assigned to a more or less complex problem. Importantly, these problems were both relevant to their respective jobs as opposed to the typical lab environment with fabricated work situations and tasks.

Despite these strengths, there are some potential limitations that need to be noted. First, participation in this study was voluntary. This raises a concern of non-response bias where a certain type of individual may not volunteer to participate. However, it should be noted that ANOVAs on collected demographic variables (level, tenure and work group) compared to those not participating indicated no support for non-response bias.

Further, with the potential for more disruption in the firm, it would have been valuable to ascertain differential effects based on individual follower differences. Future research may examine the extent to which the observed relationships changed over time based on, for example, the extent to which followers personally identified with their leaders. It is possible those highly identified would be more susceptible to their leaders' expressing positive psychological resources. Further, the behavioral plasticity hypothesis suggests those lower in self esteem are more influenced by contextual cues. Thus, those low in esteem may be more influenced by their leaders.

Another potential limitation is the fact that although the engineers in this study were working on real problems, they also knew they were participating in a research project and not directly interacting with their actual manager/leader. Thus, their responses may have varied had they been collected in the context of a typical problem solving session working directly with their respective manager/leader or a specific company leader. Having the participants assume the messages came from a team of managers was typical for this organization, but future research may want to examine how participants would respond to an individual manager conveying higher or lower positive psychological resources. It is important to note, although the respondents were asked to evaluate the team of managers, there was no attempt on our part to differentiate the managers, and as such they were presented in the experiment as a single entity. Also, the coders for this study were not engineers, but were following a protocol that was designed to help reliably code the originality and quantity of solutions. It is possible that others might see the originality of the solutions offered as being different than was coded in the current study. However, as indicated, a follow-up check was done with the engineering managers in this organization to determine if the most and least original solutions were indeed such; and this inquiry did receive affirmation for the accuracy of the coding.

An additional limitation is the complexity manipulation. While in this case the manipulation was designed to influence risk, ambiguity and outcome uncertainty, it may have influenced other factors as well. Specifically, the complexity manipulation could have been contaminated by differing levels of familiarity with the situation. While this may be an extension of a broader form of situational complexity, other possible contamination effects cannot be excluded as a possible influential factor in the results. Further, a limitation of the low situational complexity condition is that in routine operations perhaps only one solution is necessary and multiple proposals are actually counterproductive when compared to significantly complex issues.

Related to the issue of how the leader conveys the level of positivity, future research should attempt to test direct oral versus written manipulations to see if there is a difference. In addition, the effect of the manipulation may likely depend on objective reasons for the leader being positive (e.g., previous successes, necessary resources, advantages over competitors, etc.). Future studies should take into account these contextual variables to ascertain the specific effect the manipulation of leader positivity may have beyond these potential controls. Moreover, future research should take into account the timing of the manipulation in order to address the issue of when in a team's lifecycle positivity is most important. Finally, future research should also seek to tease out differences in the leader conveying positivity toward the work group or to the individual, as well as differences in the leader conveying personal positivity or positivity directed toward others that might be observed by the group.

Practical Implications and Conclusions

Based on the results of the current study and the discussion above, several practical implications are evident. One is that the positivity associated with one's leadership conveyed through electronic means to followers seems to influence followers' positivity and this in turn may have the desired impact on their performance outcomes. Consequently, if leaders convey hope, efficacy, optimism, and resilience (i.e., their psychological capital) in framing important organizational issues, then this may also positively influence their followers' level of psychological capital. Since there is a clearly demonstrated relationship between psychological capital and desired outcomes, this should result in better performance for the individual, group and organization.

Another practical implication from the study is that organizational leaders must be aware of the contextual factors facing their followers, if they want to maintain or build their positivity. While not a strong relationship, results indicated that more complex problem situations may tend to negatively influence employees' motivation and problem solving performance. With the fast pace of technological change and the flattening of the world in terms of ease of working across time, distance, and cultural boundaries in the global economy, organizations and work processes are becoming increasingly more complex, not less. Therefore, the implication from the results of this study is that leaders should take the time and effort to maintain and develop positive resources in

their employees and themselves because the increasingly complex context and problems they deal with may be acting as a natural depressor of their positivity and resulting performance.

Still another implication is the extension of the relationship between positive psychological capital and performance outcomes. Supervisor evaluations of general work performance have been the major dependent variable in previous research in this area. However, in this study, the participants' reported psychological capital was generally related specifically to relevant originality and quantity of solutions proposed to both complex and simple performance issues. These results have very practical implications in environments where the best ideas can be the difference between catastrophic failure and heroic success. Employers in an increasing number of high risk and complex contexts (e.g., health, energy, military, space, and even manufacturing, service, and agribusiness) would seem to benefit from gaining multiple ideas through multiple perspectives and deriving the most original and highest quantity of solutions to performance issues they are facing.

A final implication and conclusion is for effective organizational leadership. Conventional wisdom as well as the academic leadership literature (e.g., Zacarro & Klimoski, 2001) argue that leaders are emulated throughout the organization. This is consistent with results here that leadership positivity is significantly related to the extent that followers are engaged in a positive way. Thus, when leaders are seen as more positive, they tend to have followers who are more positive. Leaders' positivity may have a contagion effect on their followers. The conclusion is that not only should organizational leaders project positivity in written communication and verbally, they should also behaviorally engage in more positive perspectives and approaches with the expectation that such positive leadership is emulated by followers that in turn will have a positive impact on their performance.

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Appendix A: Manipulation Check for Problem Complexity

Ambiguity:
- amount, type and reliability of information
- lack of clarity regarding role expectations

Risk:
- Potential for negative outcomes

Outcome Uncertainty:
- Deficiency of information regarding the outcome
- Unpredictable variation in the outcome

Considering the (problem) situation you just read about, rate the extent to which you agree with the following statements on a scale of 1 (Strongly Disagree) to 6 (Strongly Agree)

1) Failure in this situation includes substantial risk for the (X) program.
2) It is not clear who is responsible for solving this situation.
3) We may not have all of the data that will be required to solve this situation.
4) There could be serious consequences for the future of the (X) program if this situation is not resolved.
5) It is difficult to tell with any certainty if we will be successful here.
6) It is hard to say whether the outcome of this situation will be positive.
7) There is no clear process solution to address this situation.
8) There are many ways to go about solving the situation at hand.
9) Overall, I would characterize this situation as complex.