

Maximizing Leader Performance in the Context of Workplace Stress:
Modeling the Influence of Expertise and Problem Solving

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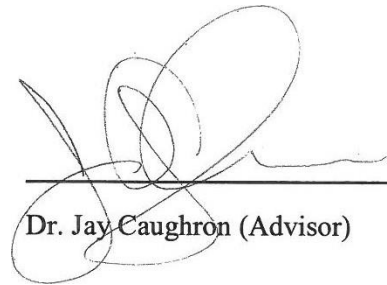
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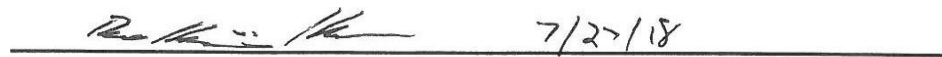
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Abstract

This paper presents a model of moderated mediation for the relationship between stress and project outcomes of leaders. Based on theories in industrial/organizational psychology on leader problem solving and leadership expertise, stress was hypothesized to negatively influence project outcomes through the leaders' problem-solving abilities. The mediation model of stress-problem solving-project outcomes was proposed to be conditional on the leadership expertise of the leader, such that the relationship between stress and problem solving would be strongest for leaders with more expertise at being in a position of leadership. Thus, the proposed moderated-mediation model for stress experienced by a leader was tested utilizing a sample of 103 individuals recruited via snowball sampling and sent a Qualtrics survey online. The participants were promoted to remember a time they were a leader in a team project and created a team project outcome. The current study will strictly focus on the individual level of analysis, however. Results were inconsistent with the hypothesized model, in that leadership expertise did not moderate the relationship between stress and problem solving. Additionally, problem solving did not mediate the stress-project outcomes relationship. Furthermore, the negative relationship between stress and project outcomes relationship was not found in the current study. Therefore, the current findings suggest that there are no individual differences in the stress experienced by leaders and their problem-solving abilities between highly experienced leaders and minimally experienced leaders working under conditions of varying levels of stress. However, additional findings, limitations of the study, and future research directions are discussed.

Keywords: Stress, Problem Solving, Project Outcomes, Expertise, Leadership

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Introduction

Regardless of field or discipline, organizations will consistently face problems during their daily operations. These inevitable problems typically result in employees experiencing stress (Bliese, Edwards, & Sonnentag, 2017). The more involved in the problem an employee is, the more stress he or she can be expected to experience. To this point, leaders within the organization should be the ones most involved in the problem, and thus experience the most stress (Sharma & Pearsall, 2016). The stress experienced by an employee has been shown to have a negative impact on his/her individual outcomes. It can then be assumed that the case would be the same with leaders, who experience arguably more stress. However, there is limited research specifically on how stress experienced in the context of an organization impacts a leader and his/her outcomes.

This stress experienced can have a negative impact on the leader's problem-solving ability (Mumford & Connelly, 1991). A leader's problem-solving ability is an essential contributing factor to organizational success. Thus, it becomes necessary for an organization to understand how leaders function when faced with this adversity in order to prevent diminished project outcomes, as well as look at what kind of leaders problem solve more effectively when faced with adversity. Understanding this process will allow organizations to provide resources and support those in the leadership role in an effective and calculated way. This paper proposes a model of leadership and workplace variables that specify the adversities leaders face and what organizations can do to make them more or less effective in working through them. Specifically, it considers the variables of leader stress, their problem-solving processes, and their domain expertise in order to predict project outcomes of their group.

Stress

Stress is a pervasive experience in the workplace. Every employee, especially leaders, experiences stress in the workplace (Sharma & Pearsall, 2016). It is arguable that for leaders, it is an even more pervasive experience because there are typically higher stakes at risk. While studies on stress are mostly in the domain of employee health and wellness and the development of those programs, it is rarely looked at in the context of leadership. This is surprising given that most people think of being in a leadership role as having added responsibility and thus, stressors. Much of the health and wellness stress literature focuses on stress as an outcome variable. However, in the case of leaders, stress is an antecedent, not an outcome. That is, leaders must cope with stress to meet their objectives.

Just recently has stress started to be incorporated in the leadership literature. In Harms et al. (2017), a meta-analysis of stress and leadership was conducted. Despite the fact that it is a meta-analysis, there is only a total k-size of 41 total studies incorporated that define stress in ways relevant to the proposed model. In this study, stress was operationalized, in terms of its effect on leadership behaviors and its effect on subordinates and their stress. This meta-analysis found that stress is associated with negative leadership behaviors as well as subordinate stress. Both these have been previously found to lead to negative organizational outcomes (Pyc et al., 2017). Additional proof of the relationship between stress and negative organizational outcomes comes from the individual level relationship found in Sullivan and Bhagat's (1992) study on organizational stress and job performance. They summarized previous literature to theorize the negative relationship of organizational stress on individual job performance. It can then be assumed that this would function the same for leaders.

These negative organizational outcomes can be attributed to the leader-member exchange theory (LMX). LMX stems from the concept that the supervisor-subordinate relationship is based on an exchange of both material and social resources (Herdman et al., 2017), specifically, the aspect of LMX that focuses on affective change at the group level through the exchange of social resources. It explains how leaders experiencing and showing stress will induce subordinates to experience stress, which will then also further the leader's stress. Stress can be conceptualized as having multiple dimensions. Given the nature of leadership positions, the two dimensions most applicable to leaders are job demands stress, or aspects of the job or workplace that cause stress and interpersonal stress, or conflict between individuals that causes stress (Decoster et al., 2014).

Project Outcomes

When looking at organizational success, leadership effectiveness has been consistently pinpointed as a main contributor (Madanchian et al., 2017). To that point, it seems clear that an organization should focus on facilitating leaders' effectiveness, especially when they are faced with significant stress in the workplace. There are several outcomes that are used to assess a leader's effectiveness; therefore, an organization must decide which most directly relate to success or profit. Because the current study was not able to use participants from the same organizations, project success proves to be a better measure of outcomes than profit. Specifically, the current study is aimed at gaining insight into leaders' own judgement of the project based on relevant criteria for project outcomes. Team performance criteria was conceptualized in terms of a similar self-report from a study on project outcomes in a capstone course (Karagozolu, 2017). In this study, team performance outcomes were measured in terms of a self-report based on criteria such as team process effectiveness, learning, preparedness, and project goal achievement.

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While it can be contested that the group level would not actually show how effective their leader is, it is actually a commonly used measure (Mandanchian et al., 2017). This is because “leadership is considered crucial for enabling team effectiveness” (Carson et al., 2007). Thus, several items of self-reported project outcome success were created. These created measures are relevant because of the vital nature project outcomes play in contributing to overall organizational success, and are facilitated by the leader of the group. Because of team performance criteria being contingent on the leader’s success, it is imperative that when the leader experiences either job demands stress or interpersonal stress, it will lead to diminished quality of group project outcomes, as it will also lead to subordinate stress (Herdman et al., 2017). This research lead to the proposal of the following hypothesis.

Hypothesis 1. Stress, both interpersonal and job, will be negatively associated with project outcomes.

Problem Solving

Given the pervasive effect of stress on leaders, it is important to understand not only that is has a generally negative impact, but more specifically, how stress has this influence. Organizations that are able to intervene to reduce stress might help leaders become more effective, but this is not always a realistic possibility. Thus, it would be useful to understand how stress reduces leader effectiveness and intervene to prevent that effect when stress itself cannot be reduced. To this point, a more pertinent question to the organization looking to minimize that effect would be “what do leaders do when they experience stress?” Mumford et al. (2007) suggests that when bridging the gap between the stressor and project outcomes, cognitive resources from the leader are necessary to problem solve in order to find a solution to the problem, but those cognitive resources are impeded by stress from the problem.

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Specifically, a problem will occur in the work environment that will lead to leader stress. Then the leader will need to begin problem solving to solve that problem in order to maintain successful project outcomes (Mumford & Connelly, 1991). However, during this leader problem-solving process, the stress they experience caused by the problem interferes with their problem solving. This leader problem solving is a large part of what is labeled as leader cognition. Leader cognition is explored at a theoretical level in Mumford et al. (2003). The essential processes for leader cognition follow a model of creative thinking in order to effectively problem solve (Mumford et al., 2003). This model proposed by Mumford (2003) follows a continuous process of thinking starting with idea evaluation, idea generation, a step of integrating the ideas, and then the process of facilitating the idea to come to fruition. This process requires cognitive resources that are diminished when stress is introduced into the equation.

From the perspective of the organization, having the ability to minimize the effect of stress on project outcomes by promoting leader problem solving is beneficial to company success. Verifying the negative impact of stress on project outcomes is important, hence hypothesis 1. Hypothesis 2 suggests that stress's negative impact is realized when the leader engages in problem solving and that this is why stress negatively impacts project outcomes. Understanding the influence of stress on problem solving can help organizations intervene when leaders are working to solve problems to mitigate the negative impact of stress on project outcomes when they cannot directly intervene to reduce stress itself. The following research led to the second hypothesis, modeling the proposed mediation (see Figure 1).

Hypothesis 2. Problem solving will mediate the relationship between stress, both interpersonal and job, and problem solving. Specifically, leaders who experience self-

reported stress will report lower levels of problem-solving activities, and consequently, will report lower satisfaction with their project outcomes.

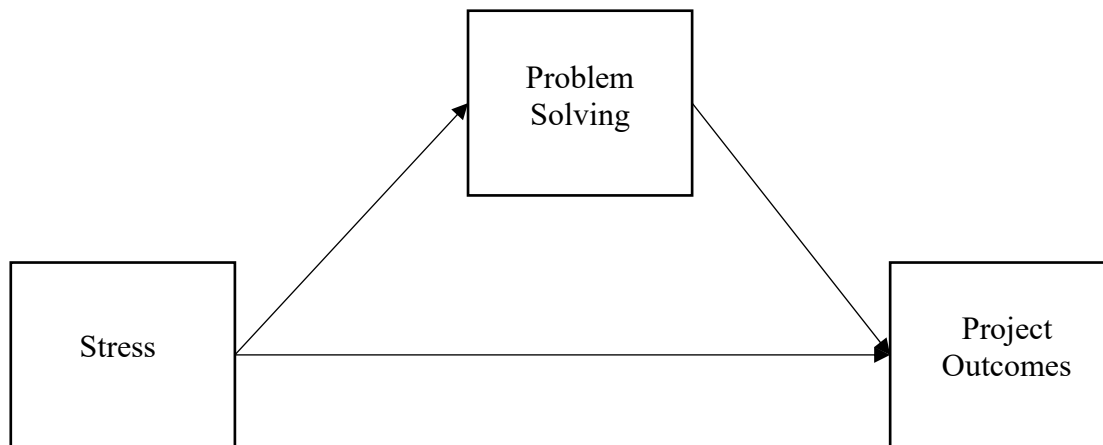


Figure 1. Proposed mediation model

Expertise

While it is important for organizations to investigate leaders' problem-solving behavior in order to predict the success of project outcomes, they will also need to be able to have some control over those leaders' ability to improve project outcomes. To determine what variables and traits lead to leaders being better problem solvers, the current study looked towards some of the more recent collective leadership literature. Within the Friedrich et al. (2009) article describing the proposed framework of collective leadership model, it shows that experts in a certain domain positively influence their team outcomes. Additionally, expert leaders have been found to be associated with organizational success (Goodall & Pogrebna, 2015). This expertise is most commonly seen as a domain specific expertise, where leaders are well versed in a topic is most relevant. In order to be an expert leader, they require technical education as well as domain specific knowledge and experience (Goodall & Pogrebna, 2015). While it may be relevant to

consider the leaders' expertise not just in terms of domain or topical expertise on a specific topic, but also in terms of their leadership experience knowledge, it has shown to provide less significant improvements in project outcomes (Goodall & Pogrebna, 2015). This tends to be the effect of a failed training transfer in leadership skills, while technical knowledge can apply to that same topic over and over, leadership can look different in different settings. Therefore, being a leader previously may not help you in another leadership setting (Goodall & Pogrebna, 2015).

With the focus on expert leaders in the sense of their domain knowledge, it is still important to understand why they have better project outcomes. Thus, it can be assumed that these project outcomes are improved by their relationship to problem solving and thus the expert leaders' improved problem-solving skills (Friedrich et al., 2009). This improvement occurs because of their case-based knowledge. Case-based knowledge is the more time the leaders spend in their area of expertise developing a breadth of knowledge of different situations where they have had to apply that knowledge. These cases are stored and leaders can then quickly access them in similar situations based on what has and has not worked in the past (Friedrich et al., 2009). Understanding how expertise in leaders' domain knowledge effects their problem solving leads to an additional hypothesis. Essentially, when leaders with expertise in a specific area of knowledge face a problem, they still partake in problem solving; however, less cognitive resources are used because of their case-based knowledge, and they therefore experience less stress, and thus see more successful project outcomes. The above research has led to the proposal of the third hypothesis, proposing a moderated mediation model (see Figure 2).

Hypothesis 3. Expertise will moderate the relationship between both interpersonal and job stress and problem solving. Specifically, the negative relationship between stress and

problem solving will be stronger when the leader is a non-expert than when the leader is an expert.

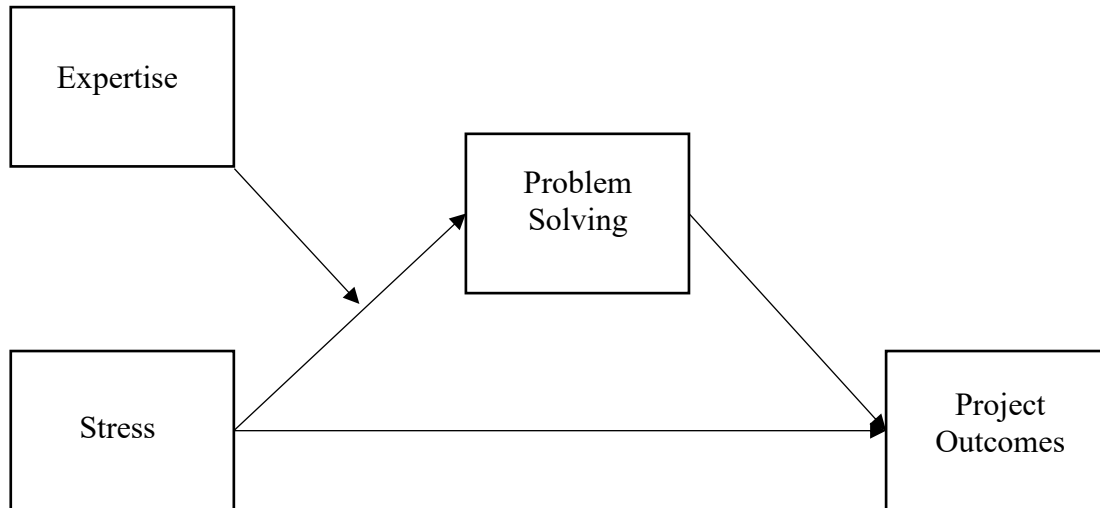


Figure 2. Proposed moderated mediation model

Method

Participants

In order to test the proposed model and hypotheses, 158 snowball sampled participants were asked to complete a survey distributed via Qualtrics. To participate in the survey, participants had to have worked in a group while completing a project in either a work or school setting and be at least 18 years of age. Participants were excluded from data analysis if they failed to answer more than 35% of the survey. A total of 103 participants were then included in the final data analysis. Participants' ages ranged from 18 to 55+, with the majority being 18-24 (38.8%). Additionally, the age ranges with percentages of participants in each are as follows: 25-34 (27.2%), 35-44 (6.8%), 45-54 (6.8%), and 55+ (4.9%). Fifteen and a half percent of

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participants failed to answer the demographic question for age. The gender distribution was 48% female, 39% male, and 15.5% other. The distribution of ethnicity included 71.8% White, 8.7% Hispanic or Latino, 1% Black or African American, 1% Asian, 1.9% Other, and 15.5% of participants failed to answer the ethnicity demographic survey item.

Procedure

Participants were recruited through snowball sampling via the researcher's social media sites (Facebook, Reddit, and Twitter) as well as through email. The survey was administered online via Qualtrics. When participants clicked on the Qualtrics link, they were directed to an informed consent page where they could consent and continue to the survey or deny consent and be thanked for their time. Participants could additionally opt out of the survey at any time without any repercussions. After giving informed consent, they were given a statement priming them to think about a time they were assigned as the leader of a group for a team project (Appendix A). After clicking that they had read the statement, participants were then directed to begin the survey items (Appendix B). At the end of the survey, demographic data on age, gender, and ethnicity was collected from each participant. Finally, the participants were thanked for their time and given the researchers' contact information.

Measures

Stress. Stress was measured used two pre-existing scales, one for job stress and one for interpersonal stress. Job stress was measured with an 8-item instrument called the NIOSH Generic Job Stress Scale (Hurrell & McLaney, 1988). Specifically, the "job requirements" section of the scale was used in order to eliminate non-relevant items to the variable of interest. Interpersonal stress was measured using four items from the Interpersonal Conflict at Work Scale (Spector & Jex, 1998). The Interpersonal Conflict at Work Scale was adapted in order to

reflect the group project outcome aspect of the proposed model. For both these scales, responses were provided on a 5-point Likert-type scale with anchors ranging from 1 (“*very often*”) to 5 (“*never*”). The Cronbach alphas were .861 for the job stress scale and .657 for the interpersonal stress scale. Upon running a bivariate correlation for both stress scales ($r = .411$), it was decided to combine these scales for an overall stress measure to prevent redundancy. The overall stress measure had a Cronbach alpha of .845.

Problem solving. Problem solving was measured using a 12-item adaption of the Contributions to Group Success Scale created by Colbert et al. (2012). The scale was adapted in order to utilize it for self-report, as it was originally intended for multi-level feedback. For this scale, responses were provided on a 7-point Likert-type scale with anchors ranging from 1 (“*strongly agree*”) to 7 (“*strongly disagree*”). Based on the literature review of previous problem-solving theories in the context of leadership, this scale was broken up into three parts corresponding to different steps of the problem-solving process as described by Mumford et al. (2003). Specifically, the original Contributions to Group Success Scale was divided into a 3-item idea generation measure, a 5-item idea integration measure, and a 4-item process facilitation measure. The Cronbach alpha for the idea generation measure was .723, .798 for idea integration, and .736 for the process facilitation measure. Upon running a bivariate correlation for the three different measures divided into different phases of the problem-solving process (see Table 1), it was decided to combine these scales for an overall problem solving measure to prevent redundancy. The overall problem solving measure had a Cronbach alpha of .855.

Table 1.

Correlations of Problem Solving Measures and Reliabilities

	IG	II	PF
1. Idea Generation	(.72)	.56**	.48**
2. Idea Integration		(.8)	.46**
3. Process Facilitation			(.74)

Note. IG = Idea Generation. II = Idea Integration. PF = Process Facilitation. Cronbach’s alpha is reported along the diagonal in parentheses.

** indicates significance at the $p < .01$ level. * indicates significance at the $p < .05$ level.

Leader expertise. Leader expertise was measured using a 6-item adapted pre-existing scale, the Rahim Leader Power Inventory (Rahim, 1988), and specifically, the expert power section of the scale, which was adapted to pertain to the group project setting of the study. Responses were provided on a 7-point Likert-type scale with anchors ranging from 1 (“*strongly agree*”) to 7 (“*strongly disagree*”). The Cronbach alpha for the leader expertise measure was .6.

Project outcomes. Project outcomes was measured using a 6-item scale that was self-generated based off of team performance outcome criteria from Karagozolu (2017). Responses were provided on a 7-point Likert-type scale ranging from 1 (“*strongly agree*”) to 7 (“*strongly disagree*”). The Cronbach alpha for the project outcome measure was .786.

Outlier detection for leadership participation. Previous research on leadership has shown that the role of a leader can span a variety of different tasks (Mumford, 2000.). Therefore, it is expected that each person, having leadership experiences from different settings, would create unwanted variance. To try and anchor these individual leadership experiences to how

leadership is conceptualized in this study, a leader outlier detection measure was included in the survey. Additionally, this outlier detection measure was used to ensure the manipulation using the priming paragraph (Appendix A) was effective. Therefore, it would make sense to eliminate any cases that were outliers on the manipulation check. However, there were no outliers found, and no participants were eliminated from final data analysis because of the outlier detection check. The outlier check consisted of an 8-item scale we created based off of Mumford's article describing different leadership skills and their relevance in training and leadership experience (2000). Responses were provided on a 7-point Likert-type scale ranging from 1 ("*to a very great extent*") to 7 ("*not at all*"). The Cronbach alpha for the generated measure was .84.

Analyses

In order to analyze the data, SPSS data analysis program was used. Before testing the hypotheses, the data was first renamed for the variables involved for organizational purposes. Next, participants who completed below 35% of the survey were omitted from the final data analysis; this resulted in a drop in participants of 158 to 103. Necessary items were reverse scored and measures were scale scored as appropriate. Then, descriptive statistics were run for the measures, including means and standard deviations (see Table 2). Additionally, frequencies were run on demographic information including gender, age, and ethnicity. Finally, a correlation table was run for all of the measures involved in the study.

After cleaning the data, the hypotheses were tested in three steps, also in SPSS. The direct effects hypothesis (Hypothesis 1), which predicted a direct association between stress and project outcomes, was tested through a regression analysis. For the second step, we tested Hypothesis 2 through a mediation analysis using the PROCESS macro in SPSS. This allowed for the testing of the model of stress-problem solving-project outcomes. In the third step of data

analysis, a moderated mediation was run using PROCESS to determine if the model of stress-problem solving depended on expertise of the leader (Hypothesis 3).

Results

Descriptive Statistics

Mean, standard deviations, and bivariate correlations for the measures are presented in Table 1. Of particular interest were the following correlations: the correlations between subsets of the two-stress measure (job stress and workplace stress were positively and highly correlated, $r = .411$). It was then decided to combine the stress items into an overall item. Additionally, the correlation between the subsets of the problem solving measure, including idea generation, idea integration, and process facilitation, was of concern. After seeing how highly correlated they were (see Table 2), it was then decided to create one problem solving measure.

Table 2.

Means, Standard Deviations, Reliabilities, and Intercorrelations of Study Variables

	<i>M</i>	<i>SD</i>	Stress	Prob. S	Expert	Pro. O	MC
1. Overall Stress	2.94	0.53	(.85)	.20*	.28**	.04	.26*
2. Problem Solving	5.47	0.76		(.86)	.52**	.64**	.68**
3. Leader Expertise	4.65	0.80			(.60)	.36**	.52**
4. Project Outcomes	5.23	0.99				(.79)	.53**
5. Manipulation Control	5.06	0.97					(.84)

Note. Prob. S = Problem Solving. Expert = Leader Expertise. Pro. O = Project Outcomes. MC = Manipulation Control. Cronbach’s alpha is reported along the diagonal in parentheses.

** indicates significance at the $p < .01$ level. * indicates significance at the $p < .05$ level.

Test of Direct Effects Hypothesis

Hypothesis 1, which predicted a negative relationship between stress and project outcomes, was tested through both a Pearson bivariate correlation and a regression analysis. The correlation showed a relationship between stress and project outcomes of $r = .038$, indicating a non-significant relationship between the independent and dependent variables. Next, after running the regression analysis, results showed the same conclusion as the correlation in that there was no significant relationship between stress and project outcomes ($\beta = .07$, $F = .12$, $p = .726$). Both the Pearson bivariate correlation and regression analysis showed the same conclusion of a non-significant relationship between stress and project outcomes. Therefore, Hypothesis 1 was not supported; there was no direct effect between the independent and dependent variables in the proposed model. Despite finding a non-significant direct effect, we ran continued analysis to test the remaining variables and complete the proposed model. Contrary to Barron and Kenny (1986), the rest of the model was tested based on the methodology proposed by Hayes (2009), as a more updated approach to testing mediation (see Table 3).

Table 3.

Regression Testing the Direct Effect of Stress on Project Outcomes

Predictor	Criterion	<i>b</i>	<i>SE</i>	<i>t</i>	<i>F</i>	<i>Adj R²</i>
Stress	Project Outcomes	.07	.20	.352	.124	-.01

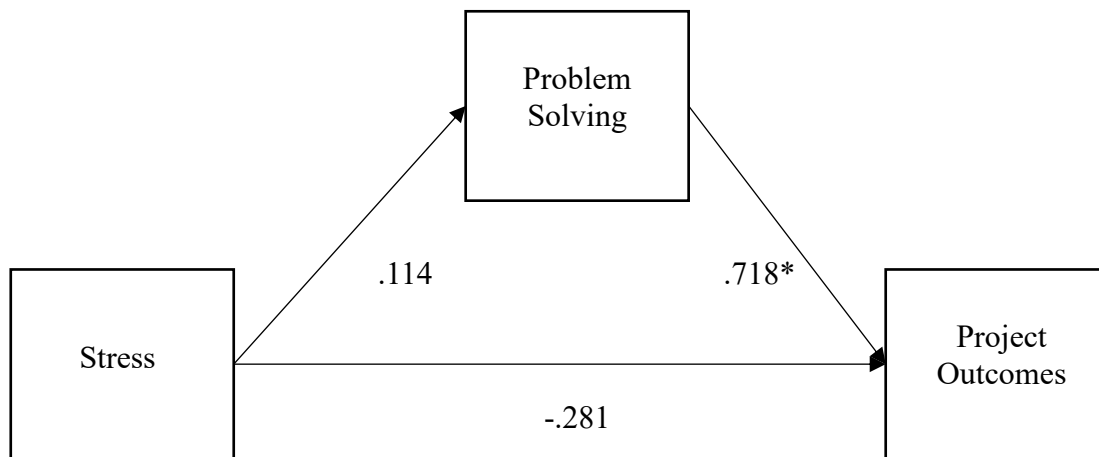
Note. ** indicates significance at the $p < .01$ level. * indicates significance at the $p < .05$ level.

Test of Simple Mediation

Hypothesis 2 predicted the mediated model of stress and project outcomes mediated by problem solving. This hypothesis was tested through a mediation analysis using the PROCESS macro in SPSS; additionally, the relevant correlations were analyzed (see Figure 3). The

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correlation between stress and problem solving was $r = .20^*$ (significant at the $p < .05$ level); additionally, the correlation between problem solving and project outcomes was $.64^{**}$ (significant at the $p < .01$ level). These correlations indicate that both our A and B paths are significant. Next, the regression analysis was run. The direct effect between stress and project outcomes was already found to be non-significant ($-.28, p = .08$). The direct effect between stress and problem solving was non-significant ($.11, p = .33$). However, the direct effect between problem solving and project outcomes was significant ($.72, p = .00$). When tested as a whole, the model itself was non-significant ($R = .67, [-.1177, .3458]$) (see Table 4). The non-significant model, despite the significant correlations and direct effects, was in part due to the fact that our relationship between stress and problem solving was not significant.



Note: $ab = .082 [-.0763, .3149]$. Significant effects are marked with an * ($p < .05$)

Figure 3. Proposed mediation model with coefficients

Table 4.

Test of Mediation

Model	Problem Solving	Project Outcomes
Stress	.11	
Problem Solving		.72**
Direct Effect		-.28 [-.60, .04]
Indirect Effect	.08 [-.08, .31]	
R ²		.67**

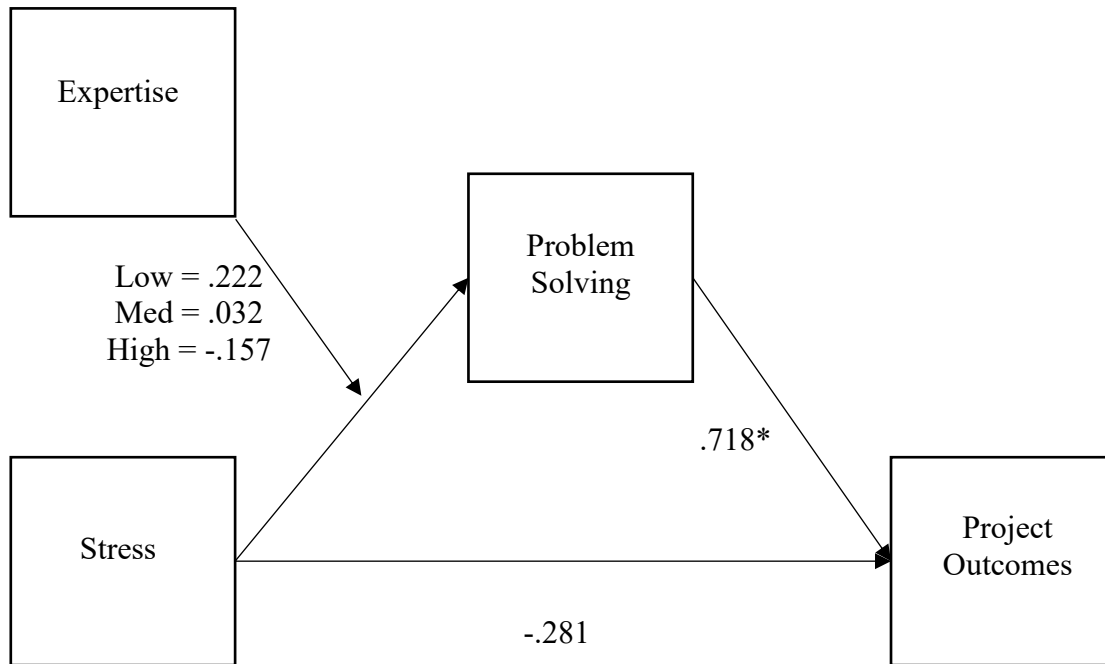
Note. ** indicates significance at the $p < .01$ level. * indicates significance at the $p < .05$ level.

Test of Moderated Mediation

Hypothesis 3 states that the mediated relationship between stress-problem solving-project outcomes depends on expertise. The proposed moderated mediation was tested through the PROCESS MACRO on SPSS (see Figure 4). Additionally, relevant correlations were analyzed. Expertise was positively related to all other variables in the model. Expertise and stress were related at $r = .28^{**}$ (significant at the $p < .01$ level). Expertise and problem solving were related at $r = .52^{**}$ (significant at the $p < .01$ level). Expertise and project outcomes were related at $r = .36^{**}$ (significant at the $p < .01$ level). The direct effect between expertise and problem solving was significant (1.12, $p = .00$), as well as the direct effect between stress and problem solving (1.56, $p = .00$) (see Figure 5). Additionally, the direct effect between problem solving and project outcomes was significant (.71, $p = .00$). However, when the overall model was run, it was not significant ($R = .76$, [-3.6798, .3949]) (see Table 5). Seeing as how both direct effects were significant, but the overall model was not, it could be concluded that it is possible problem solving is not the mediator through which the proposed model is functioning. Additionally, looking at how expertise was highly correlated to all other variables, it could be assumed that it

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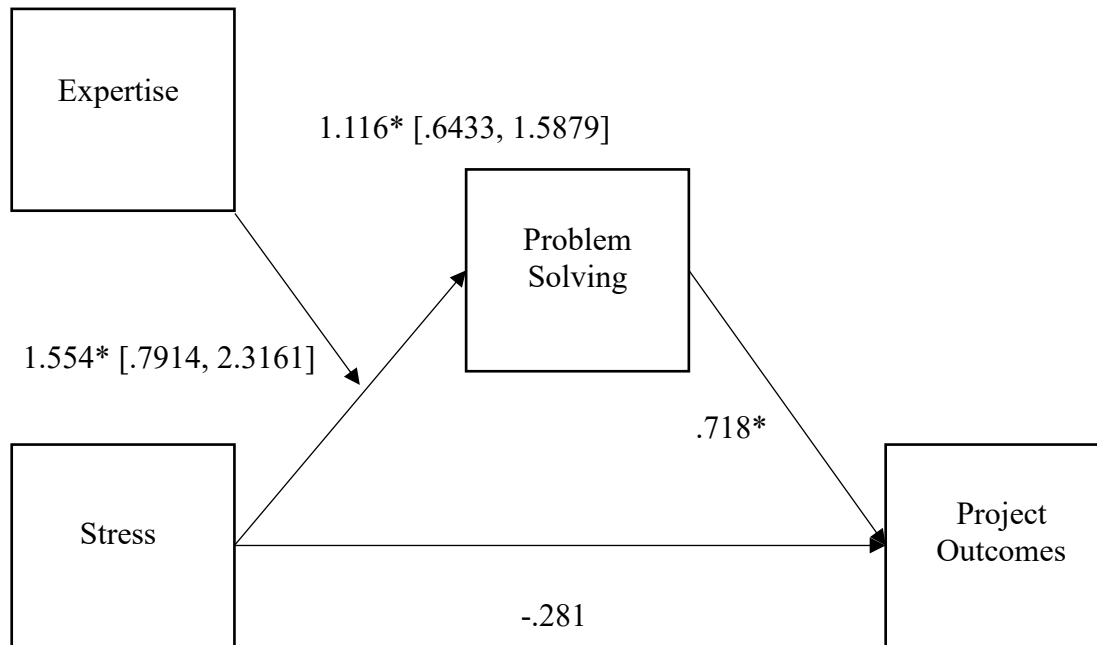
is a relevant factor in the model. However, expertise may make more sense as a predictor variable, instead of stress, seeing as how the direct effect in Hypothesis 1 was not significant. Additionally, the conditional indirect effect of expertise is modeled (see Figure 6).



Note: Significant effects are marked with an * ($p < .05$)

Figure 4. Proposed moderated mediation model with coefficients

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Note: Significant effects are marked with an * ($p < .05$)

Figure 5. Proposed moderated mediation model with additional coefficients

Table 5.

Tests of moderated mediation

Model	Problem Solving	Project Outcomes
Stress	1.55**	
Expertise	1.12**	
Problem Solving		.72**
Direct Effect		-.28
Index of moderated mediation		-.23 [-.44, .06]
Conditional Indirect Effects		
At -1 S.D. of Expertise	.22 [-.08, -.51]	
At 0 S.D. of Expertise	.03 [-.09, -.22]	
At +1 S.D. of Expertise	-.16 [-.47, -.01]	
R ²		.76**

Note. ** indicates significance at the $p < .01$ level. * indicates significance at the $p < .05$ level.

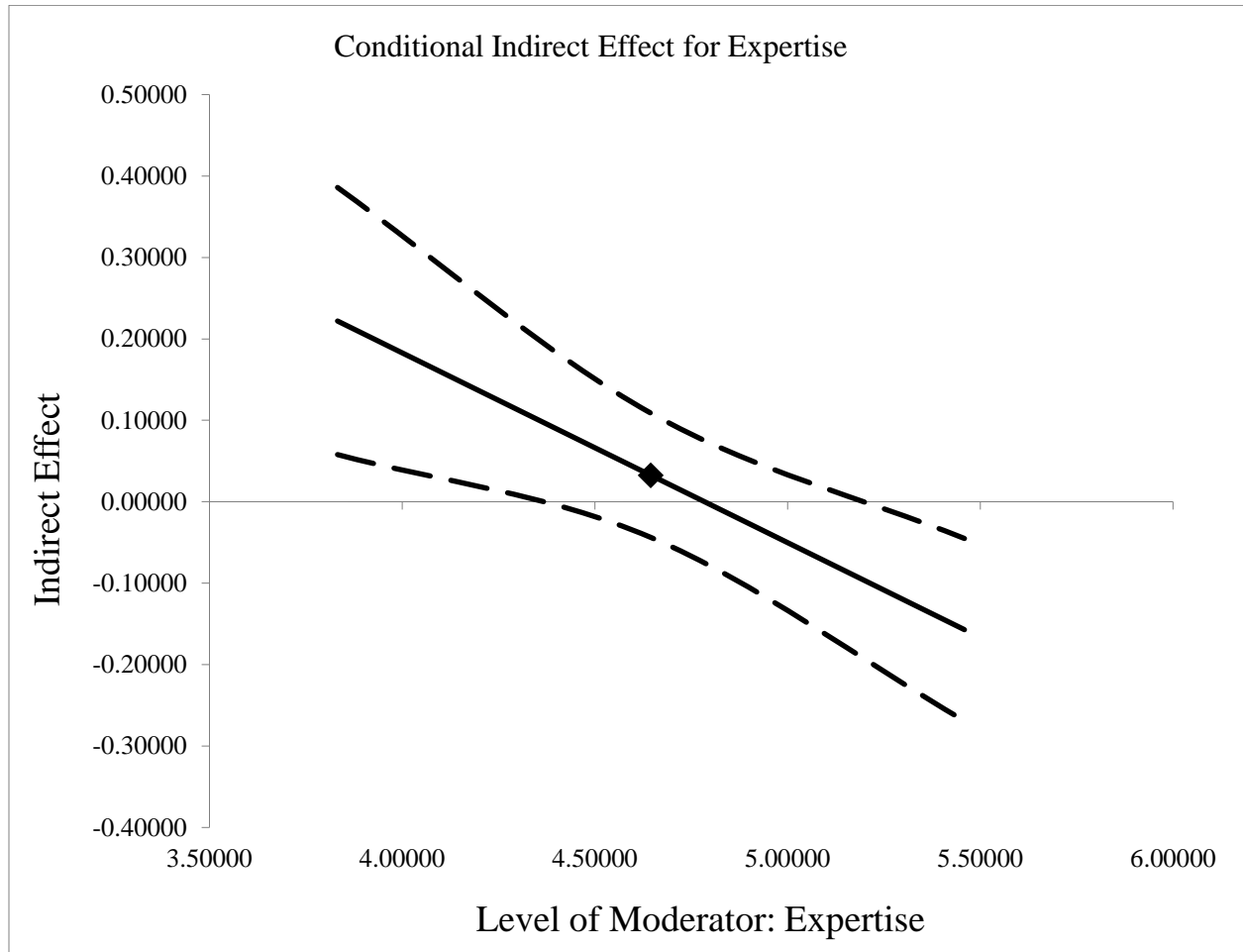


Figure 6. Graphical representation of the standardized conditional indirect effects

Conclusion of Results

While several significant relationships were found among the variables, when the proposed model was run as a whole, it was found to be non-significant. Overall, the pattern of significant results found suggests that stress and expertise are both related to problem solving, and separately, problem solving is related to project outcomes. However, when run as a moderated mediation model, the significance drops out. This may be because project outcomes is not the mediator through which these variables function. Additionally, the overall model may not be significant because the direct effect between stress and project outcomes was not significant.

This opens up an opportunity for a study 2, where expertise replaces stress as the predictor in the model in order to try and establish a significant direct effect between the predictor and outcome variable.

Discussion

Limitations

There are several limitations to the proposed study. One limitation is that all measures used were adapted to pertain to self-report. Most of the measures used were intended for subordinate feedback of their supervisor. The multilevel nature of the measures was not replicable in the current study and thus the measures were adapted for self-report. This may have led to measures that are not validated as thoroughly as the pre-established ones. Also, it was found that most of the measures were highly correlated and that may be because of this adaptation. Additionally, the current study only looks at high levels of stress in this model; however, in reality, stress is typically seen as a curvilinear relationship. By viewing stress in a linear regression, the current study is unable to correctly address the true nature of the effect of stress in the model. Another limitation to the current study is that the sample size was small for the moderated mediation model that was proposed. The sample also consisted of individuals from a variety of job settings and groups; therefore, the inconsistency may have led to unnecessary variance in people's perceptions of the measures in the survey. The framing statement used in the survey also may have been a limitation. The statement used to induce participants to think about a leadership experience referenced a past instance and the participants may not have been able to remember enough details to correctly answer the survey items.

Implications

Despite these limitations, the analysis run did provide several relevant findings. First, problem solving was found to be related to project outcomes via analyses run. This indicates that much of previous literature on problem solving is relevant. Additionally, organizations can use this information to better understand how project outcomes can be maximized. Therefore, organizations can work towards helping leaders become more effective problem solvers in order to create more effective project outcomes.

The current study also found a relationship between expertise and stress to problem solving. This can suggest a leader who is either an expert or under stress will experience problem solving differently than a non-expert leader or a leader who is not stressed. The implication for organizations based on this relationship is that leaders who have a lot of problem-solving tasks should be supported by the organization to reduce their stress as much as possible and to make sure they are experts.

However, the non-significant direct effect relationship that was found between stress and project outcomes was surprising compared to the previous literature. This may have been because of the ineffective stress measure as previously discussed. Additionally, this non-significant finding may be because of our failure to take into account the curvilinear nature of the stress variable used in the proposed model. Finally, this relationship may have been non-significant because project outcomes is affected by a multitude of other variables outside of stress and cognitive-based variables. Using stress as a predictor may not have been sufficient enough to directly affect the project outcomes in our study. As a whole, the analyses run indicated that expertise may have been a more successful predictor of project outcomes, which would lead to an additional study being done after the current initial study.

Future Directions

Taking into account the limitations discussed, there are several future directions that are suggested. In a continuation of this study, new measures should be used that are intended for a self-report study, in order to maintain validity in pre-existing measures. The measure used for expertise should especially be changed considering its low reliability found in analyzing the Cronbach alphas (.6). Additionally, the stress measure was not able to capture the curvilinear nature of the variable. Stress should also be modeled as curvilinear in the analyses, using a polynomial regression to correctly reflect the nature of its relationship to other variables in the model. Next, a continuation of this study should focus on obtaining a larger sample size. However, an ideal sample would be composed of groups within the same organization, working on similar projects in order to move past self-report and have ratings from both subordinates and their leaders. This would allow for a more accurate representation of leadership in using a multi-level analysis of the group. In addition, continuing this study, a consideration into a more effective framing statement should be done. Finally, a secondary study is proposed where the model is recreated to acknowledge our initial non-significant direct effect between stress and project outcomes. It is proposed that study 2 look at the mediated model of expertise-problem solving-project outcomes. Because of the non-significant relationship between stress and project outcomes in the current study, this proposed mediated model is relevant to continued research. This will allow for a potential significant direct relationship off which to base future models.

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APPENDIX A
Leader Priming Paragraph

For this study, think of a time that you remember most clearly, when you were the designated or assigned leader for a team or group project in either school or work.

Appendix B
Original and Adapted Measure

Stress

Original:

Interpersonal- Spector & Jex Interpersonal conflict at work scale

1	2	3	4	5
Never	Rarely	Sometimes	Quite often	Very often

How often do you get into arguments with others at work?

How often do other people yell at you at work?

How often are people rude to you at work?

How often do other people do nasty things to you at work?

Adapted:

Interpersonal-adapted from Spector & Jex Interpersonal conflict at work scale

Please indicate the frequency of each situation during the group or team project you imagined.

1	2	3	4	5
Never	Rarely	Sometimes	Quite often	Very often

How often did you get into arguments with others while working on the project?

How often did other people yell at you while working on the project?

How often were people rude to you while working on the project?

How often did other people do unproductive things while working on the project?

MODERATED MEDIATION OF LEADER PERFORMANCE

Original:

Job Stress- NIOSH Generic Job Stress- Job requirements

Now we would like you to indicate how often certain things happen at your job. Please write the number for your response in the space provided at the end of each question.

1 2 3 4 5
Rarely Occasionally Sometimes Fairly Often Very Often

- How often does your job require you to work *very fast*?
- How often does your job require you to work *very hard*?
- How often does your job leave you with *little* time to get things done?
- How often is there a *great deal* to be done?
- How often is there a marked increase in the work load?
- How often is there a marked increase in the amount of concentration required on your job?
- How often is there a marked increase in *how fast* you have to think?
- How often does your job let you use the skills and knowledge you learned in school?
- How often are you given a chance to do the things you do the best?
- How often can you use the skills from your previous experience and training?

Adapted:

Job Stress-adapted from NIOSH Generic job stress questionnaire

Please indicate the frequency of each situation during the group or team project you imagined.

1 2 3 4 5
Never Rarely Sometimes Quite often Very often

- How often were you required to work very fast?
- How often were you required to work very hard?
- How often were you left with little time to get things done?
- How often did was there a great deal to be done?
- How often was there a marked increase in work load?
- How often was there a marked increase in the amount of concentration required?
- How often was there a marked increase in how fast you had to think?
- How often did you use the skills and knowledge you've previously learned? ®

MODERATED MEDIATION OF LEADER PERFORMANCE

Problem Solving- Contributions to group success scale

Original:

Problem solving- contributions to group success scale- also broken down into three parts

1	2	3	4	5
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

Idea Generation

- This individual generated a large number of ideas
- This individual's ideas were unique
- This individual's ideas were practical for solving the problem

Idea Integration

- This individual attempted to incorporate the suggestions of all parties into the solution
- This individual contributed by clarifying ideas and evaluating potential solutions
- This individual searched for mutually acceptable solutions
- This individual solicited ideas from other team members
- This individual was interested in hearing what others had to say

Process Facilitation

- This individual kept the group focused on the task
- This individual took notes to track the group's discussion

Adapted:

Please indicate to what degree you identify with the following statements in relation to the group or team project you imagined.

1	2	3	4	5	6	7
Strongly disagree	disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

Idea Generation

- I generated a large number of ideas.
- My ideas were unique.
- My ideas were practical for solving problems.

Idea Integration

- I attempted to incorporate the suggestions of all parties into the solution.

MODERATED MEDIATION OF LEADER PERFORMANCE

I contributed by clarifying ideas and evaluating potential solutions.

I searched for mutually agreed upon solutions.

I used ideas from other team members.

I was interested in hearing what others had to say.

Process Facilitation

I kept the group focused.

I monitored the group discussions.

I reminded the group of the amount of time left to complete the project.

I summarized our progress and determined what needed to be done to finish the project.

MODERATED MEDIATION OF LEADER PERFORMANCE

No Change:

Expertise- Rahim leader power inventory- expert power

Please indicate to what degree you identify with the following statements in relation to the group or team project you imagined.

1	2	3	4	5	6	7
Strongly disagree	disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

I was approached for advice related to my knowledge on the topic of the project.

I felt that I had the technical skills and “know how” in terms of the project.

I had prior knowledge about the topic of the project.

I felt that I didn't have the prior knowledge needed to get the project done well. ®

My suggestions were listened to because of my expertise on the project topic.

I had considerable prior knowledge to draw from before starting the project.

Generated:

Project Outcomes

Please indicate to what degree you identify with the following statements in relation to the group or team project you imagined.

1	2	3	4	5	6	7
Strongly disagree	disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

I am satisfied with the outcome of the project.

The group met all the requirements for the final result of the project.

I am satisfied with what I learned while working on the project.

I am satisfied with any products or deliverables of the project.

The team changed from the original project plan. ®

I am satisfied with the process went through to complete the project.

Leader Outlier Detection Scale

Please indicate to what degree each statement is applicable in relation to the group or team project you imagined.

1	2	3	4	5	6	7
Not at all	To a low extent	To a minimal extent	To a moderate extent	To a fair extent	To a great extent	To a very great extent

- To what extent were you involved in scheduling during the project?
- To what extent were you involved in reviewing group members' work during the project?
- To what extent were you involved in setting deadlines for the project?
- To what extent were you involved in helping others during the project?
- To what extent were you involved in completing work during the project?
- To what extent were you involved in setting group goals for the project?
- To what extent did others come to you for guidance?
- To what extent do you feel like you were a leader during your group or team project?