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REFLECTING ON THE PAST AND LOOKING TOWARDS THE FUTURE: THE
EFFECTS OF CASE ANALYSIS AND OUTCOME VALENCE ON FORECASTING

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REFLECTING ON THE PAST AND LOOKING TOWARDS THE FUTURE: THE
EFFECTS OF CASE ANALYSIS AND OUTCOME VALENCE ON FORECASTING

A DISSERTATION APPROVED FOR THE
DEPARTMENT OF PSYCHOLOGY

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To Sean for inspiring curiosity and a never-ending sense of adventure.

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Abstract

Prior research has demonstrated the importance of forecasting to creative problem-solving performance. Less is known about how case analysis and outcome valence impact forecasting performance. In this study, 266 participants were asked to assume the role of a Marketing Director of a clothing company and develop a marketing campaign for entering a new market. Prior to developing this final campaign, participants were asked to analyze company cases, develop an outline of their plan, and forecast the implications of this plan. Although manipulations did not impact final problem solutions, analysis of weaknesses of present company operations and generation of positive outcomes were found to contribute to the highest levels of forecasting. In turn, forecasting was found to predict the quality, originality, and elegance of final marketing plans. The implications of these findings for encouraging people to engage in forecasting are discussed.

Introduction

The competitive, turbulent global marketplace of the 21st century has placed a premium on the production of innovative products and services (Dess & Picken, 2000; Mumford, Hester, & Robledo, 2012; Mumford & Hunter, 2005). Even firms once not concerned with creativity have placed increased emphasis on, and found success in, innovative outputs (Mumford, Hemlin, & Mulhearn, 2017). Creativity, the production of novel and useful solutions to complex problems, is ultimately the foundation for innovation, the implementation of these creative solutions (Mumford & Gustafson, 1988).

Although creativity and innovation are highly desired by most, if not all, organizations today, the route to producing innovative solutions appears arduous and undefined. A demanding problem with no clear solution is presented. Where does one start with such a problem? Despite this inherent uncertainty, creative solutions have been found to be influenced by a multitude of factors. For example, expertise (Weisberg & Hass, 2007), creative self-efficacy (Tierney, Farmer, & Graen, 1999), and process execution (Mumford, Medeiros, & Partlow, 2012) have all been shown to influence individual creative output. Alternatively, perceptions of one's working environment (Amabile, Conti, Coon, Lazenby, & Herron, 1996) and group composition (Reiter-Palmon, Wigert, & de Vreede, 2012) have been shown to impact creativity at the team level. Although these variables, among others, clearly impact creative work, one variable receiving increased attention in recent years appears critical to creativity—the planning activities associated with creative efforts.

The argument for the benefit of planning in creative efforts had been disputed for many years. At first glance, creativity, a seemingly ambiguous process, appears incompatible with planning, a seemingly rigid process (Mintzberg, 1991). In reality, planning involves a dynamic process in which one mentally simulates future activities and adapts to environmental contingencies (Mumford, Schultz, & Van Doorn, 2001). In other words, planning provides a basis for starting and refining complex, ambiguous projects requiring creative production (Mumford, Bedell-Avers, & Hunter, 2008).

Planning and Creativity

In a review of the creative problem-solving literature, Mumford, Mobley, Uhlman, Reiter-Palmon, and Doares (1991) suggested that creative problem solving occurs in eight distinct processes including: 1) problem definition, 2) information gathering, 3) information organization, 4) conceptual combination, 5) idea generation, 6) idea evaluation, 7) implementation planning, and 8) solution monitoring. According to this model, the eight processes occur in a relatively linear sequence wherein the problem must first be defined before information can be gathered about a problem (Mumford et al., 1991). Some recent research has suggested people may return to prior processes to improve the creative idea (e.g., Basadur, 1995). In addition, this model proposes that the basis of creative problem solving is information and knowledge, which is combined, reworked, and evaluated into the form of a viable plan for executing creative work (Mumford et al., 2012). That is to say, once a viable idea has been generated and evaluated, the creative problem solver must consider how the idea will be placed within the context of one's work environment. To envision how an idea might work in context, one must forecast the potential outcomes of implementing the idea.

Indeed, past studies have shown forecasting to be a strong predictor of creative problem solutions (e.g., Byrne, Shipman, & Mumford, 2010). Given the positive effects of forecasting on creative problem solving, the purpose of the present study was to examine the influence of situational factors on forecasting activities in the implementation planning stage of the creative process.

Forecasting

Forecasting involves the projection of future outcomes based on actions taken (Mumford, Schultz, & Osburn, 2002; Mumford et al., 2001). Forecasting is inherently dynamic and requires constant environmental monitoring where forecasted outcomes may be revised as events unfold (Mumford, Steele, McIntosh, & Mulhearn, 2015). This real-time updating enables forecasts to be realistic and tied to environmental markers. As a result, forecasting increases the identification of contingencies and restrictions in the environment and prevents potential problems before they occur (Mumford et al., 2002). Moreover, a greater range of situations or outcomes can be envisioned vis-à-vis forecasting. Thus, forecasting enables a consideration of a broad range of causes impacting outcome success and an opportunity to select the course of action tied to the desired outcome of interest (Mumford et al., 2015).

The value of forecasting has been demonstrated in two prior studies by Byrne et al. (2010) and Shipman, Byrne, and Mumford (2010). In both studies, participants were asked to assume the role of a leader and formulate a vision for leading their organization. While working on the vision formation task, participants were presented with a series of emails in which they were asked to forecast the implications of their

ideas. The forecasts produced by participants were subsequently rated by a panel of trained judges.

More specifically, in the Byrne et al. (2010) study, 27 forecasting attributes were rated by trained judges and three forecasting factors emerged: forecasting extensiveness, forecasting negative outcomes, and forecasting constraints. In the Shipman et al. (2010) study, meanwhile, a factoring of 21 rated forecasting attributes resulted in four forecasting dimensions: forecasting resources, forecasting extensiveness, forecasting time frame, and forecasting negative outcomes. In both studies, forecasting was found to be strongly, positively related to quality, originality, and elegance of solutions to marketing problems. However, two factors in particular, forecasting extensiveness and time frame, were found to correlate in the 0.20s to 0.40s with the quality, originality, and elegance of problem solutions (Shipman et al., 2010). Other studies have also demonstrated the positive impact of forecasting on problem-solving performance (Marta, Leritz, & Mumford, 2005; McIntosh, Mulhearn, & Mumford, under review; Osburn & Mumford, 2006). Given the powerful influence of forecasting on problem solutions, further study of the influence of forecasting on creative problem solving is warranted. Specifically, the replication of previous forecasting findings on a separate creative-problem solving task is worthy of investigation.

Hypothesis 1: Forecasting extensiveness and time frame will be positively related to creative problem-solving performance on a distinct problem-solving task.

Influences on Forecasting

Assuming these findings with respect to forecasting and problem-solving performance still hold, a new question comes to the fore: What factors motivate people to engage in forecasting? The preceding discussion demonstrates the complexity and cognitive demand of forecasting when working on creative tasks. As a result, individuals may not opt to engage in forecasting on their own. Rather, situational factors may provoke them to consider the long-term implications of their proposed plans. And, given that forecasting is a developable skill contributing strongly to performance, identification of factors leading to forecasting may have implications for training and development efforts (Mumford, Todd, Higgs, & McIntosh, 2017). Past studies have examined the factors leading to greater levels of forecasting. For example, taking an objective rather than personalized perspective, perceptions of autonomy, and greater levels of expertise have all been shown to increase forecasting activities (Bagdasarov et al., 2013; Caughron et al., 2011; Dailey & Mumford, 2006). However, little research has examined the impact of case analysis and outcome valence on forecasting activities.

In one study along these lines, Scott, Lonergan, and Mumford (2005) provided participants, serving as leaders of secondary schools, with one of two methods for combining educational principles in a conceptual combination task. Participants were presented with either a schematic or case-based approach for solving the educational problem at their school. In the case-based approach, participants were asked to identify goals and causes of educational cases, identify strengths and weaknesses of cases, and develop an initial template plan. Participants were then asked to predict the outcomes of

their plan outline and write a final plan for educational success. It was found that both approaches, schematic and case-based, predicted the creativity of problem solutions. However, the use of a case-based approach improved performance when fewer, as opposed to more cases, were presented, suggesting that analysis of a limited number of cases are beneficial in forecasting. Recent findings by Partlow, Medeiros, and Mumford (2015) further confirm the utility of “boiling things down” to their key points when engaging in complex performance tasks.

The findings of Scott et al. (2005) appear particularly relevant given the type of knowledge used in forecasting. Forecasts are based on prior experiences that may inform events occurring in the local environment (Mumford et al., 2015). Thus, forecasting requires experiential, or case-based, knowledge to make projections about the future. These cases provide information regarding causes, outcomes, restrictions, contingencies, and systems (Hammond, 1990; Mumford et al., 2002). Thus, active analysis of such factors in cases provides a basis for and contributes to the quality of forecasting (Osburn & Mumford, 2006). And, based on the findings of Scott et al. (2005), the analysis of a limited number of cases, rather than many, appear to contribute to better forecasts.

Goals and Causes. As mentioned earlier, cases are indexed with respect to causes and goals, as well as linkages between causes and goals (Mumford et al., 2001). Thus, it would stand to reason that analysis of causes and goals in retrieved cases would improve the quality of forecasting. Initial evidence supporting cause and goal analysis was provided in a study by Strange and Mumford (2005). In this study, it was found that performance on a leadership task improved when participants analyzed good cases with

respect to causes and bad cases with respect to goals. Thus, analysis of causes and goals, potentially depending on the quality of the case, appears critical to problem solving performance.

A series of studies by Marcy and Mumford (2007, 2010) point to the value of training in causal analysis. In these studies, participants either completed or did not complete a training program in causal analysis in which they were provided with strategies for analyzing causes. It was found that better problem solutions were produced by the participants who complete the causal analysis training in comparison to those who did not. In a follow-up study, Hester, Robledo, Barrett, Peterson, Hougen, Day, and Mumford (2012) found that participants exposed to causal analysis training not only produced better solutions but also articulated stronger mental models in relation to the task at hand. More directly relevant, Stenmark, Antes, Wang, Caughron, Thiel, and Mumford (2010) provided evidence suggesting analysis of causes is strongly, positively related to better forecasting.

The studies discussed above point to the value of analyzing causes but provide no information regarding analysis of goals. In fact, little direct evidence has been provided with respect to the utility of analyzing goals (Mumford et al., 2017). Byrne et al. (2010) manipulated goal and causal analysis jointly and found that participants who *did not* analyze goals or causes forecasted more extensively compared to those in the goal and causal analysis condition. However, an interaction between goal and causal analysis and number of cases was found, such that more extensive forecasts resulted when analyzing causes and goals in fewer, as opposed to more, cases. In the Shipman et al. (2010) study, it was found that final solutions improved when participants analyzed

causes with respect to implications and goals with respect to facts. Thus, taking the findings of Byrne et al. (2010) and Shipman et al. (2010) together, it would appear that goal/causal analysis may not have a direct effect on forecasting. Rather, it appears that the effects of goal/causal analysis depend on multiple contingencies such as the number of cases presented and what information is considered. Furthermore, we still know relatively little about the effects of goal analysis on forecasting or performance more generally.

Research Question 1: What is the impact of goal and causal analysis on forecasting activities?

Strengths and Weaknesses. In addition to specific key features of the cases, analysis of the cases on a more global level may improve the quality of forecasting. More specifically, analyzing strengths and weaknesses of cases might provide information regarding opportunities to exploit or obstacles to avoid (Dörner & Schaub, 1994). In other words, identification of strong and weak case characteristics provokes consideration of what to pursue and what to avoid or remedy. One illustration of this may be found in Antes, Thiel, Martin, Stenmark, Connelly, Devenport, and Mumford (2012). In this study, participants were asked to reflect on a prior personal experience, successful or unsuccessful, and to reflect on processes, outcomes, or both processes and outcomes. It was found that participants produced stronger problem solutions when they reflected on a positive personal experience and considered processes of that experience. This may be because individuals feel threatened when reflecting on negative personal experiences (Levin, Schneider, & Gaeth, 1998; Sedikides & Green, 2004) whereas positive experiences are less threatening. However, it must be borne in mind that

participants reflected on *personal* cases in this study, which can impact how one perceives positive and negative events (D'Argembeau & der Linden, 2003; Denny & Hunt, 1992).

In a similar vein, Antes and Mumford (2012) examined the effects of strategic orientation, promotion or prevention, and outcome framing, positive or negative, on leader problem solving. It was found that a balanced approach, either promotion focus and negative outcome framing or prevention focus and positive outcome framing, resulted in the strongest problem solutions. These results would suggest there may be value in the consideration of both positive and negative factors during planning. Thinking about positive aspects might encourage risk-taking and consideration of opportunities whereas thinking about negative aspects might promote consideration of tangible factors such as resources and constraints (Vessey, Barrett, & Mumford, 2011).

Research Question 2: What is the impact of strength and weakness analysis on forecasting activities?

Outcome Valence. Although forecasting has been shown to be a powerful influence on performance, little is stated about the valence of forecasting. That is to say, forecasting unto itself, so long as a wide range of situations and a considerable time frame is considered, will generally result in better performance (Shipman et al., 2010). However, relatively little empirical and theoretical work suggests the extent to which forecasts should be positive or negative in nature. Should the forecaster consider the potential gains resulting from their plan or the mistakes or errors that may occur? Evidence from the Antes and Mumford (2012) study would suggest the outcome framing itself does not matter. Rather, the outcome framing should be paired with a

complementary strategic approach. In another study along these lines, Martin, Stenmark, Thiel, Antes, Mumford, Connelly, and Devenport (2011) examined the influence of temporal orientation and affective frame. It was found that the most forecasting resulted from a consideration of positive future outcomes. Similar to self-reflection, thinking about positive outcomes might improve forecasting due to the threatening nature of deliberating on failures (D'Argembeau & Van der Linden, 2003). Moreover, positive outcome framing allows one to consider opportunities to be exploited.

Although positive outcomes may improve forecasting under certain contexts, one must bear in mind the findings with respect to constraints and forecasting. Prior studies by Caughron and Mumford (2008) and Byrne et al. (2010) found that consideration of constraints during forecasting improved planning and creative problem-solving performance. Analyzing constraints during implementation planning may improve problem solving as it compels evaluation of the solution in a relevant context. The planner must consider potential resources, contingencies, and restrictions impinging on outcome attainment to arrive at a viable solution (Mumford et al., 2001). A failure to consider relevant constraints in context may result in a plan that is misguided and overly optimistic in nature.

Research Question 3: What is the impact of outcome valence on forecasting?

Method

Sample

The sample used to test the hypothesis and answer the research questions consisted of 266 undergraduate students attending a large southwestern university. The

101 males and 162 females (3 did not report gender) were recruited from an introductory psychology course offering credit for participation in experimental studies. Participants reviewed one-paragraph descriptions of the potential study options and selected their study of interest. The average age of the participants in the present study was 19 years old. The average ACT score of participants was 25.8, roughly a standard deviation above the national mean, while the average overall GPA of participants was 3.4.

Procedure

Students were recruited to participate in a study of creative problem solving in an organizational setting. Upon arriving to the study, participants were randomly assigned to one of 12 experimental conditions (3 x 2 x 2 design) and provided with corresponding packets. During the first half hour of the study, participants completed two timed covariate measures intended to assess intelligence and divergent thinking. During the next hour of the study, participants completed a low-fidelity simulation exercise in which they assumed the role of a Marketing Director for a clothing company entering a new market. Participants were asked to work through the experimental material on their own, which culminated in a final marketing plan for entering the new market. Manipulations were presented in the form of “emails” from coworkers at the clothing company, prompting participants to consider various aspects of the companies or their own plans. Following the completion of the experimental task, participants completed a battery of untimed covariate measures and demographic information form.

Control Measures

Due to the cognitive demands of the creative problem-solving task, participants were asked to complete the Employee Aptitude Survey (EAS), a short omnibus measure of intelligence. The measure includes 30 items which present four or five factual statements. Participants are asked to indicate the conclusion they believe to be true or false based on the factual statements. This measure commonly exhibits internal consistency coefficients exceeding 0.70. Grimsley, Ruch, Warren, and Ford (1985) and Ruch and Ruch (1980) have demonstrated the construct validity of this measure.

Given the focus on creative problem solving in this study, participants were asked to complete Merrifield, Guilford, Christensen, and Frick's (1962) Consequences Test. This measure assesses divergent thinking, a critical component of creative problem solving. The measure presents five improbable scenarios, and participants must generate as many responses, or consequences, to these scenarios as possible in the allotted time. Examples of these scenarios include: What would happen if the surface of the earth was covered in water, or what would be the results if human life continued without death? Scoring for fluency, the number of unique ideas, results in internal consistency coefficients exceeding 0.70. Evidence for the construct validity of this measure has been provided by Guilford (1966) and Mumford, Marks, Connelly, Zaccaro, and Johnson (1998).

To assess participants' motivation to solve complex problems, Cacioppo, Petty, and Kao's (1984) Need for Cognition Scale was used. This scale consists of 18 statements assessing cognitive motivation such as "I find satisfaction in deliberating hard and for long hours" or "I prefer my life to be filled with puzzles I must solve."

Participants express their level of agreement on a five-point scale for each statement. The internal consistency coefficient for this scale was 0.89. Evidence for the criterion-related validity of this scale in relation to creative problem solving has been provided by Watts, Steele, and Song (2017). In addition, Cacioppo, Petty, Feinstein, and Jarvis (1996) have provided evidence for the construct validity of this measure.

Personality was assessed using Costa and McCrae's (1992) NEO-FFI scale. This 60-item measure assesses the Big Five personality characteristics (i.e. openness, conscientiousness, extraversion, agreeableness, and emotional stability). The internal consistency coefficients for each of the personality characteristics exceeded 0.70. Evidence for the construct validity of this measure has been provided by Scandell (2000) and McCrae and Costa (2004).

Given the positive and negative focus of multiple manipulations in the present study, regulatory focus was assessed using Higgins, Friedman, Harlow, Idson, Ayduk, and Taylor's (2001) Regulatory Focus Questionnaire. The theory of regulatory focus suggests that people approach goals from either a promotion focus, seeking positive outcomes, or prevention focus, avoiding negative outcomes (Higgins, 1997; 1998). This measure consists of 11 questions such as "Compared to most people, are you typically unable to get what you want out of life?" or "How often have you accomplished things that got you 'psyched' to work even harder?" The measure provides subscale scores for promotion focus and prevention focus. The internal consistency coefficients for promotion focus and prevention focus were 0.54 and 0.72. Evidence for the construct validity of this measure has been provided by Haws, Dholakia, and Bearden (2010).

Expertise in three domains relevant to the experimental task was also assessed using background data measures (Mumford, Barrett, & Hester, 2012). All three measures were rated on a 5-point scale. The first such measure was an advertising expertise measure adapted from Mecca and Mumford (2014) and Byrne et al. (2010). This measure asked six questions such as “How often do you discuss current advertisements with your friends?” and “How often do you think about the strategies used in advertising?” The two additional background data measures were developed to assess one’s background in the two relevant product domains—clothing and music. The clothing background measure included questions such as “How often do you think about clothing including current trends or styles” and “How often do you browse social media to get ideas for clothing styles?” Similarly, the music background measure asked questions such as “How often do you think about music including current trends or music genres?” and “How often do you search for new music?” All three background data measures exhibited internal consistency coefficients exceeding 0.80. Evidence for the construct validity of such measures has been provided by Scott, Lonergan, and Mumford (2005).

Experimental Task

The experimental task employed in this study was adapted from Gibson and Mumford (2013). In this task, participants are asked to assume the role of a Marketing Director for Charamousse Clothing Company. The experimental prompt states that the clothing company, based out of Chicago, aims to enter the southern market in the near future. The participant, acting as the Marketing Director, must decide how the company will do so successfully. After reading through the background information on

Charamousse Clothing Company, participants are introduced to a music company called Roots Music based out of Charleston, South Carolina. A representative from Roots Music suggests the two companies team up to develop a joint marketing plan given their overlapping visions and interests. Participants are then asked to read the background information on Roots Music, which was drawn from Mecca (2014).

This secondary scenario involving Roots Music was selected for several reasons. First, given the company's location in the Southeast, participants can draw upon this information to develop a plan for entering the southern market for Charamousse Clothing Company. Second, both companies appeal to niche target demographics who appreciate high-quality products not intended for mass audiences. Third, the current primary goal of Roots Music is to start appealing to younger demographics, which Charamousse already caters to effectively. Thus, both companies can benefit from exploiting the other's strengths while still targeting an alternative customer base desiring a quality, distinctive product.

After reading the background material on Roots Music, participants were introduced to the first two manipulations, which involved analyzing the two companies. A variation on the Scott et al. (2005) procedure was employed in the present study. While Scott et al. (2005) used a "package manipulation" for the case-based approach, the present study isolated the analysis of goals and causes, strengths and weaknesses, and outcome valence to determine their unique effects on forecasting. Thus, the first manipulation involved the identification of goals and/or causes of Charamousse Clothing Company and Roots Music. The second manipulation involved the identification of strengths or weaknesses of the two companies. After working through

the two manipulations, participants were asked to develop their initial outline of their marketing plan for Charamousse Clothing Company. Participants then completed the third and final manipulation, the generation of positive or negative outcomes of their proposed outline. Finally, participants completed their final marketing plan for Charamousse Clothing Company to successfully enter the southern market.

Goals and Causes

After reading through both company descriptions, participants were asked to identify the goals and/or causes of Charamousse Clothing Company and Roots Music. This manipulation was adapted from Byrne et al. (2010) and Shipman et al. (2010) in which goals are defined as “things to aim for that would allow the company to get good results” and causes are defined as “things that would make a difference in achieving results.” Prior to working on this manipulation, participants were presented with examples of goals and causes to further illustrate the nature of these constructs. The examples used in both cases were related to the problem of selecting a career path, a common concern for undergraduate students. Following these examples, participants were given a full page to identify a given set of goals or causes.

Strengths and Weaknesses

The second manipulation occurred after the goals/causes manipulations and required participants to once again compare the two companies. The basis of this comparison was the identification of either strengths or weaknesses of the two companies. Strengths were defined as “what [the] company is doing particularly well” while weaknesses were defined as “what [the] company is doing particularly poorly.”

Participants were provided with a full page to identify a given set of strengths or weaknesses.

Outcome Valence

The third manipulation occurred after participants developed their initial outline of the marketing plan. This manipulation involved the generation of positive or negative outcomes of the developed outline. To facilitate understanding of how to forecast outcomes prior to working on the task, participants were once again presented with examples tied to the problem of selecting a career path. After reading through these examples, participants were provided with a full page to generate potential outcomes of their proposed marketing plan outline.

Forecasting Variables

The forecasts provided by participants in response to the third manipulation, either positive or negative outcomes of the outline, served as the basis for the two forecasting variables in this study—forecasting extensiveness and time frame. Forecasting extensiveness was defined as the extent to which forecasted outcomes consider a wide range of situations and outcomes whereas forecasting time frame was defined as the extent to which forecasted outcomes emphasize short-term versus long-term consequences of idea implementation. These two variables were selected due to the criterion-related validity previously found in Shipman et al. (2010). Namely, of the four forecasting variables assessed in this study, extensiveness and time frame were found to be most predictive of final problem solutions. These two forecasting variables were appraised by three trained judges, all undergraduate psychology students. Judges were asked to read through the generated outcomes and rate forecasting extensiveness

and time frame on 5-point benchmark rating scales. Judges completed a 5-hour training program in which they were provided with the variable definitions and opportunity to practice applying the rating scales. Following an initial rating of a sample of responses, judges met to resolve discrepancies and clarify the nature of the variables. After completing the ratings, the interrater agreement coefficients for extensiveness and time frame were 0.81 and 0.73, respectively. Figure one presents the forecasting extensiveness and time frame benchmark rating scales.

Dependent Variables

The final marketing plan produced by participants served as the basis for the dependent variables of this study. These final plans were appraised in terms of quality, originality, and elegance (Besemer & O'Quin, 1999; Christiaans, 2002). Quality was defined as a complete and coherent plan. Originality was defined as an unexpected and novel plan. Elegance was defined as a refined and flowing plan. Benchmark rating scales were once again used to indicate low, medium, and high levels of each variable. Three judges, all doctoral students in Industrial/Organizational Psychology, applied the benchmark rating scales to rate the variables on a 5-point scale. These judges also underwent a 5-hour training program in which they were introduced to the variables and given opportunities to practice using the rating scales. After reaching consensus, the resulting interrater agreement coefficients for plan quality, originality, and elegance were 0.77, 0.77, and 0.74, respectively. Figure two presents the benchmark rating scales for plan quality, originality, and elegance.

Analyses

Analyses of covariance tests were conducted to assess the impact of the manipulations on the dependent variables. In addition, analyses of covariance tests were conducted to examine the influence of the manipulations on forecasting variables to determine what facilitates effective forecasting. Controls were only retained at the 0.05 significance level.

Results

Table one presents the correlations among the significant covariates, forecasting variables, and dependent variables. As may be seen, forecasting extensiveness was found to strongly relate to final plan quality, originality, and elegance with correlations in the 0.20 to 0.35 range. The magnitude of the relationships for forecasting time frame, while weaker, still demonstrate nontrivial results exceeding 0.20. The replication of past findings demonstrating the positive impact of forecasting extensiveness and time frame on problem solutions provides support for the first hypothesis.

Insert Table 1 About Here

Table two presents the ANCOVA results obtained for the quality of the marketing plan produced by participants. Not surprisingly, ACT score ($F(1, 223) = 10.95, p \leq 0.05$) was a significant covariate, proving to be positively related to the quality of plans. However, no other significant effects emerged for plan quality.

Insert Table 2 About Here

Table three presents the ANCOVA results obtained for the originality of the marketing plan. Scores on the clothing background measure ($F(1, 252) = 5.64, p \leq 0.05$) and advertising background measure ($F(1, 252) = 6.73, p \leq 0.05$) were significant covariates, contributing to more original marketing plans. However, plan originality was not found to be significantly impacted by any manipulations.

Insert Table 3 About Here

Table four presents the ANCOVA results obtained for the elegance of the marketing plan. As might be expected, ACT score ($F(1, 222) = 4.61, p \leq 0.05$) and EAS score ($F(1, 222) = 4.29, p \leq 0.05$) were significant covariates, proving positively related to the elegance of plans. However, no additional significant effects emerged for plan elegance.

Insert Table 4 About Here

Table five presents the effects of the manipulations on forecasting extensiveness. Once again, ACT score ($F(1, 223) = 5.92, p \leq 0.05$) was found to be a significant covariate, contributing to more extensive forecasts. A significant ($F(1, 223) = 4.22, p \leq 0.05$) main effect was observed for the strengths/weaknesses manipulation. It was found that participants who deliberated on the weaknesses of both companies ($M = 2.85, SE = 0.09$) forecasted more extensively compared to those who deliberated on

the company strengths ($M = 2.59, SE = 0.09$). A near significant ($F(1, 223) = 3.47, p \leq 0.10$) main effect was observed for the outcome valence manipulation. Although this main effect did not reach conventional levels of statistical significance, it was found that participants that generated positive outcomes of their outlines ($M = 2.84, SE = 0.09$) forecasted more extensively in comparison to participants generating negative outcomes ($M = 2.60, SE = 0.09$). Thus, more forecasting results from a focus on current deficiencies and a consideration of potential areas to exploit in the future.

Insert Table 5 About Here

Table six presents the ANCOVA results for forecasting time frame. No significant covariates were obtained. A significant ($F(1, 254) = 6.29, p \leq 0.05$) main effect was found for the strengths/weaknesses manipulations. Once again, it was found that participants who identified weaknesses of both companies ($M = 2.92, SE = 0.06$) forecasted over a longer time frame compared to participants identifying company strengths ($M = 2.69, SE = 0.06$). A significant ($F(1, 254) = 17.61, p \leq 0.05$) main effect was observed for the outcome valence manipulation. Once again, the results showed that participants who generated positive outcomes of their own outline ($M = 2.99, SE = 0.06$) forecasted over a longer time frame compared to participants generating negative outcomes ($M = 2.61, SE = 0.06$). However, these main effects should be interpreted in the context of the near significant interaction found between strength/weakness analysis and outcome valence ($F(2, 254) = 2.81, p \leq 0.10$). Although this interaction did not reach conventional levels of statistical significance, examination of the cell means

suggests that participants who analyzed weaknesses and generated positive outcomes forecasted over the longest time frame ($M = 3.03, SE = 0.69$). In contrast, those participants who analyzed strengths and generated negative outcomes forecasted over the shortest time frame ($M = 2.42, SE = 0.74$). In answer to research questions 1-3, it appears that greater levels of forecasting occur when participants consider how to improve upon current operations and foresee potential opportunities evident in the environment.

Insert Table 6 About Here

Discussion

Before proceeding to the implications of the present effort, several limitations should be noted. First, this study was based on the classic experimental paradigm with undergraduate students, which may engender concern regarding the generalizability of the results to real-world settings. One may question the value of forecasting in applied settings for this reason. However, leadership studies have demonstrated the importance of considering long-term implications and multiple contingencies in a dynamic environment (Howell & Boies, 2004; Hunt, Boal, & Dodge, 1999; Jacques, 1976). Thus, forecasting as a skill appears critical in real-world settings as well.

Second, manipulations were presented in a fixed order, such that goals and causes preceded strengths and weaknesses and outcome valence. However, the findings may differ if the manipulations were presented in a different order. For example, if causes and goals were presented immediately before the development of the plan

outline, these effects may have been stronger. Furthermore, it is noteworthy to consider that presentation of strengths or weaknesses immediately prior to the outline may have provoked a macro rather than micro mindset of the presented cases.

Third, along related lines, the nature of the strengths and weaknesses manipulation was unspecified, such that participants were not asked to consider specific features of each case. As a result, participants were unconstrained in their responses to this manipulation. Instead, this manipulation could have prompted analysis of benefits and drawbacks of each company's marketing strategy, climate and culture, or organizational structure. All of these analyses may have resulted in alternative responses for this manipulation. In the case of the present study, however, I was interested in participants' global analyses of each case to extract key themes.

Fourth, in a similar vein, both the strength/weakness manipulation and outcome valence manipulation only asked participants to deliberate on positive or negative aspects. However, given the present results and results found in prior studies (e.g., Antes & Mumford, 2012; McIntosh et al., under review), forecasts and final plans may have improved if participants considered both positive and negative characteristics of each case or their own outline. It appears that a combination of positive and negative aspects may prompt more extensive forecasting by encouraging a more thorough analysis of the opportunities and threats arising in the situation (Caughron et al., 2011).

Fifth, each of the manipulations were presented independently in this study. However, the individual components may not be entirely mutually exclusive, such that causes may also act as strengths of the company. Similarly, the pursuit of an improper goal may be considered a weakness of the company. Given the unconstrained nature of

the strength/weakness analysis, participants may have borrowed themes identified in their cause/goal analysis.

Sixth, the present study involved the presentation of two, rather than one, company cases. This was intended to allow participants to extract information from multiple sources to develop their own unique plan for successfully entering a new market. However, the inclusion of multiple cases may have proved too cognitively demanding for participants considering that the manipulations themselves had little effects on the final outcomes. Indeed, cognitive fatigue has been shown to negatively impact problem-solving performance (Antes & Mumford, 2012; Fiedler & Garcia, 1987).

Even bearing these limitations in mind, the present study still sheds new light on the nature of forecasting. Prior studies by Mumford and his colleagues (Byrne et al., 2010; Dailey & Mumford, 2006; Marta et al., 2005; Osburn & Mumford, 2006; Shipman et al., 2010) have shown the importance of forecasting in complex problem-solving tasks. Indeed, these studies have demonstrated that forecasting can greatly contribute to performance by providing a basis for appraising actions, exploiting potential opportunities, and formulating plans (Mumford et al., 2015). In support of our first hypothesis, the findings obtained in the present study indicate that forecasting during implementation planning strongly predicts final problem solutions. More specifically, forecasting extensiveness and time frame demonstrated strong, positive relationships with performance, providing a replication of the results found in the Shipman et al. (2010) study.

These findings are particularly noteworthy in the context of the manipulations presented. That is, forecasting activities unto themselves predicted performance to a far greater extent than any manipulation presented. In other words, the valence of forecasting, positive or negative, does not appear to impact performance nearly as much as the forecasting activities themselves. Similarly, analysis of causes, goals, strengths, and weaknesses did not contribute to the quality, originality, or elegance of problem solutions. Given previous findings, these results likely point more so to the value of forecasting as a skill than the lack of findings with respect to the manipulations.

Indeed, in answer to the three research questions, the manipulations presented must be considered in the context of forecasting activities. Broadly, considering that forecasting activities greatly contribute to problem-solving performance, what situational factors may lead an individual to engage in forecasting? Regarding research question 1 specifically, the results obtained in the present study suggest that goal and causal analysis have little bearing on forecasting activities. At one level, these results are surprising considering the close association between goals, causes, and forecasting. Forecasting necessarily involves the manipulation of causes in relation to desired outcomes or goals. Indeed, prior studies have demonstrated that better analysis of causes is related to better forecasting (Stenmark et al., 2010). However, other studies suggest that the relationship between causes and forecasting, or goals and forecasting, may not be a simple direct one (Shipman et al., 2010; Strange & Mumford, 2005). That is, the effects of goal and causal analysis on forecasting may depend on multiple contingencies given the complicated relationship between goals, causes, and forecasting.

The results obtained in the present study indicate that analysis of global weaknesses of company cases contributes to greater levels of forecasting. This finding may represent an attempt to critically evaluate extant company operations and a willingness to revise or refine certain characteristics. In other words, idea evaluation must precede implementation planning, such that the idea is appraised with respect to a set of standards prior to formulating a plan (Lonergan, Scott, & Mumford, 2004; Mumford, Lonergan, & Scott, 2002; Watts, Mulhearn, Todd, & Mumford, 2017). Mumford, Connelly, and Gaddis (2003) proposed a model of leaders' creative thought in which one key standard for evaluating ideas is the mission of the organization. Leaders must ensure that ideas generated by followers align with the strategic objectives of the organization (Hounshell, 1992). Thus, in the present study, consideration of deficiencies in current operations prompted greater levels of forecasting, wherein individuals reflected on how these deficiencies fit into the broader company mission.

After formulating an initial plan template, the individual must consider the implications of implementing such a plan. In this respect, the findings obtained in this study indicate that forecasting of positive outcomes provokes greater levels of forecasting. Although this finding may initially seem at odds with the previous finding, it is noteworthy to consider that forecasting of positive outcomes involves the consideration of one's own plan. As mentioned earlier, reflection on negative personal experiences may be self-threatening and deter one from deliberating on such an experience (Levin, Schneider, & Gaeth, 1998; Sedikides & Green, 2004). By contrast, generation of positive outcomes may stimulate pursuit of opportunities to exploit and outcomes to be attained (Blair & Mumford, 2007).

Viewing these findings together, one key conclusion can be drawn regarding forecasting. That is, a balanced consideration of negative and positive aspects appears to contribute to better forecasting. These findings become even more apparent when viewed in the context of previous findings (Antes & Mumford, 2012; Caughron et al., 2011; McIntosh et al., under review). In each of these studies, a balanced or more objective perspective contributed to more forecasting or better performance. In the present study, a focus on deficiencies of the past and positive outcomes to be attained contributed to more forecasting. Thus, it may be the case that individuals did not want to consider the negative outcomes that may result from their plans but willingly considered the flaws in extant policies. In this regard, the interaction on forecasting time frame is noteworthy given that individuals forecasted the least when asked to consider strengths of the presented cases and negative aspects of their own template plan.

To encourage individuals to engage in forecasting, based on the obtained findings, it appears that a balanced perspective of the situation is warranted (Vessey et al., 2011). In particular, a consideration of past deficiencies and potential opportunities to exploit in the future may prompt greater levels of forecasting. Evaluating the ideas of others may prove to be less cognitively taxing than evaluating one's own ideas (Watts, Steele, Medeiros, & Mumford, in press). Thus, one potential strategy involves presenting an individual with a colleague's idea for critical evaluation prior to formulating a plan for this idea (Runco & Smith, 1992). By contrast, one may envision the positive outcomes of their own plan to further elaborate on the intricacies of the "seed plan" (Martin et al., 2011). Regardless, viewing the present findings in a broader context, it appears that an overreliance on positivity or negativity results in a more

limited analysis of the situation. A balanced perspective is more likely to take into account all of the factors contributing to outcome success (Antes & Mumford, 2012; Caughron et al., 2011).

In conclusion, this study aimed to replicate previous findings on forecasting and identify factors contributing to forecasting. Indeed, forecasting was found to contribute to problem-solving performance in a similar fashion to previous studies. In addition, it was found that a balanced approach of considering flaws in extant operations and positive avenues to be pursued contributed to more forecasting. Thus, forecasting may be stimulated by a revision of current processes and pursuit of opportunities. I hope this study promotes similar research along these lines.

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Appendix

Table 1. Means, standard deviations, and intercorrelations for study variables.

	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9
1 ACT	25.84	3.44	-								
2 CBM	2.84	.97	-.12	(.88)							
3 ABM	2.34	1.00	.12	.25**	(.89)						
4 EAS Score	25.20	5.92	.33**	-.16**	-.06	-					
5 Forecasting Ext	2.69	.98	.16*	.00	.05	.10	(.81)				
6 Forecasting TF	2.80	.76	.14*	-.10	-.07	.10	.67**	(.73)			
7 Plan Quality	3.24	.80	.22**	-.04	.07	.15*	.35**	.21**	(.77)		
8 Plan Originality	3.32	.89	.13*	-.12*	.12	.13*	.20**	.07	.69**	(.77)	
9 Plan Elegance	3.21	.82	.22**	-.11	.01	.19**	.30**	.23**	.85**	.68**	(.74)

Note. $N = 236$. Dependent variables and significant covariates included. ACT = ACT score, CBM = Clothing Background Measure, ABM = Advertising Background Measure, EAS Score = Employee Aptitude Survey score, Forecasting Ext = Forecasting Extensiveness, Forecasting TF = Forecasting Time Frame. Reliability estimates and agreement coefficients included on the diagonal in parentheses. **significant at .01 level, *significant at .05 level.

Table 2. ANCOVA results for Plan Quality

Source	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>	η_p^2
<i>Significant</i>						
<i>Covariates</i>						
ACT	7.02	1	7.02	10.95	.00	.05
<i>Main Effects</i>						
CG	.57	2	.29	.45	.64	.00
SW	.71	1	.71	1.11	.29	.00
OV	.19	1	.19	.30	.59	.00
<i>Interactions</i>						
CG*SW	.35	2	.17	.27	.76	.00
CG*OV	.75	2	.38	.59	.56	.01
SW*OV	.21	1	.21	.33	.57	.00
CG*SW*OV	.76	2	.38	.59	.55	.01

Note. ACT = ACT score, CG= causes/goals manipulation, SW= strengths/weaknesses manipulation, OV= outcome valence.

Table 3. ANCOVA results for Plan Originality

Source	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>	η_p^2
<i>Significant</i>						
<i>Covariates</i>						
CBM	4.47	1	4.47	5.64	.02	.02
ABM	5.34	1	5.34	6.73	.01	.03
<i>Main Effects</i>						
CG	.13	2	.06	.08	.92	.00
SW	.00	1	.00	.00	.98	.00
OV	.01	1	.01	.02	.89	.00
<i>Interactions</i>						
CG*SW	.13	2	.06	.08	.92	.00
CG*OV	.25	2	.13	.16	.85	.00
SW*OV	.24	1	.24	.30	.58	.00
CG*SW*OV	1.72	2	.86	1.09	.34	.01

Note. CBM = Clothing background measure, ABM = advertising background measure, CG= causes/goals manipulation, SW= strengths/weaknesses manipulation, OV= outcome valence.

Table 4. ANCOVA results for Plan Elegance

Source	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>	η_p^2
<i>Significant Covariates</i>						
ACT	3.03	1	3.03	4.61	.03	.02
EAS	2.81	1	2.81	4.29	.04	.02
<i>Main Effects</i>						
CG	.70	2	.35	.53	.59	.00
SW	.35	1	.35	.53	.47	.00
OV	.56	1	.56	.86	.35	.00
<i>Interactions</i>						
CG*SW	.27	2	.14	.21	.81	.00
CG*OV	1.64	2	.82	1.25	.29	.01
SW*OV	.04	1	.04	.05	.82	.00
CG*SW*OV	.88	2	.44	.67	.51	.01

Note. ACT = ACT score, EAS = Employee Aptitude Survey score, CG= causes/goals manipulation, SW= strengths/weaknesses manipulation, OV= outcome valence.

Table 5. ANCOVA results for forecasting extensiveness

Source	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>	η_p^2
<i>Significant Covariates</i>						
ACT	5.59	1.00	5.59	5.92	.02	.03
<i>Main Effects</i>						
CG	.66	2.00	.33	.35	.70	.00
SW	3.98	1.00	3.98	4.22	.04	.02
OV	3.27	1.00	3.27	3.47	.06	.02
<i>Interactions</i>						
CG*SW	1.22	2.00	.61	.65	.52	.01
CG*OV	1.33	2.00	.66	.70	.50	.01
SW*OV	.66	1.00	.66	.70	.40	.00
CG*SW*OV	1.20	2.00	.60	.64	.53	.01

Note. ACT= ACT score, CG= causes/goals manipulation, SW= strengths/weaknesses manipulation, OV= outcome valence.

Table 6. ANCOVA results for forecasting time frame

Source	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>	η_p^2
<i>Main Effects</i>						
CG	.41	2	.21	.38	.68	.00
SW	3.39	1	3.39	6.29	.01	.02
OV	9.49	1	9.49	17.61	.00	.06
<i>Interactions</i>						
CG*SW	.27	2	.13	.25	.78	.00
CG*OV	2.11	2	1.05	1.95	.14	.02
SW*OV	1.52	1	1.52	2.81	.09	.01
CG*SW*OV	.58	2	.29	.54	.59	.00

Note. CG= causes/goals manipulation, SW= strengths/weaknesses manipulation, OV= outcome valence.

Scale	Forecasting Extensiveness Anchors	Forecasting Time Frame Anchors
5	<p><i>Positive outcomes:</i></p> <ul style="list-style-type: none"> - <i>People love store experience</i> - <i>They come back frequently</i> - <i>They tell their friends</i> - <i>They advertise by wearing items</i> - <i>Some money donated to charity</i> - <i>You become wealthy</i> - <i>Employees love their job</i> - <i>Other people want to work for you.</i> 	<ul style="list-style-type: none"> • <i>Southern people may reject the clothes</i> • <i>Ad's may not be seen in the newspaper or online</i> • <i>Waste of advertising money</i> • <i>Stores may do poorly</i> • <i>Possible bancruptcy at the store</i> • <i>Possible foreclosure of the stores</i> • <i>Net loss more than net gain</i> • <i>Company stock price drops</i>
3	<p><i>Negative outcomes include:</i></p> <ul style="list-style-type: none"> • <i>More thing selling than others</i> • <i>Split in company profit shares.</i> • <i>One brand might loose value to other</i> • <i>Overstock in merchandise causing dead weight in stores which lower business tremendously</i> 	<p><i>Name recognition increases. Brand Awareness increases. People get curious + see what Charamousse is all about More of our clothes would be worn around and into more Southern Market</i></p>
1	<p><i>More exposure More people are noticing + talking about us. More opprutinities for new customers.</i></p>	<p><i>1.) By making a customers request + giving them a price for it might cause a problem.</i></p> <p><i>2.) Parents might be mad about the shorts at that young age or the distressed clothes.</i></p>

Figure 1. Rating Scales for Forecasting Extensiveness and Forecasting Time Frame

Scale	Quality Anchors	Originality Anchors	Elegance Anchors
5	<p>I. Increase in social media output</p> <p>a. Better photos relevant to the items being sold (ex. Outdoors, in yoga class, at whole foods)</p> <p>b. Post captions focused on the brands commitment to environmentalism to educate followers</p> <p>c. Like/follow people to raise awareness</p> <p>II. Celebrity sponsorships or coupon codes</p> <p>a. Send celebrities who are environmental activates products to wear and be photographed in</p> <p>b. Give successful social media people sponsorships of coupon codes to promote brand</p> <p>III. Improve men's designs/create a few children's pieces</p> <p>a. Men's designs will help balance customer ratio</p> <p>b. Children's designs will promote mothers</p>	<p>Charamousse is #headedsouth #southbound</p> <p>by using these 3-prong marketing plan, the company will increase social reach, sustain the environment, make the brand more accessible. To the everyday consumer and achieve sizable increase in revenue and brand recognition.</p> <p>1. Social-partner with local/everyday people that are familiar with the brand, ask them why they live where they live/why they moved there and why they're glad that Charamousse is #headedsouth. Celebrities like Miley Cyrus and Leonard DiCaprio as partnered brand advocates will do the same, share on social, be the faces of the brand.</p> <p>2. Physical-use large sustainably built billboards to showcase the brand advocates in major southern cities. This drives Charamousse to own social media and gives brand awareness before we</p>	<p>1st step</p> <ul style="list-style-type: none"> • Advertise uniqueness and exclusivity of clothing & music • Project a broad lifestyle image • Split store into young and middle age sections • Hire young and middle aged women and men <p>2nd step</p> <ul style="list-style-type: none"> • Hire local women and men to model in local fashion show • Advertise fashion show with fliers and using social media • Contact influential fashion idol in south • Get idols to post about clothing • Have fashion show w/ grass roots music

	<p><i>to buy their kids clothes theme</i></p> <p>IV. <i>Pop-up shops in southern Metropolitan areas</i></p> <p>a. <i>Places like Dallas, Atlanta, Tucson, etc.</i></p> <p>b. <i>Do this to get an idea of how good the market would be there</i></p> <p>V. <i>Create wider range of branded accessories</i></p> <p>a. <i>Beanies, bracelets, etc.</i></p> <p>b. <i>Phone cases, laptop sleeves (all branded by CCC logo)</i></p>	<p><i>have even relocated. Basic recognition and familiarity is the first step to becoming a more accessible brand.</i></p> <p>3. <i>LOCAL-use local advocates in their own hometowns as ambassadors/social media informers to show how Charamousse is an everyday brand for the everyday person. Grassroots campaign appeals to locals, better reception, more real people buying the brand, to stay “on trend.”</i></p>	<p><i>3rd step</i></p> <ul style="list-style-type: none"> • <i>Make a catalog using local women</i> • <i>Put in public areas</i> • <i>Advertise on billboards & busses</i> <p><i>4th step</i></p> <ul style="list-style-type: none"> • <i>Interview on a well known T.V. show in South mention grass roots</i> • <i>Give samples to well known people in South to wear</i> <p><i>5th step</i></p> <ul style="list-style-type: none"> • <i>Have grand opening</i> • <i>Have special discounts</i> • <i>Have famous guest</i> • <i>Have Roots Music playing in store</i>
<p>3</p>	<ul style="list-style-type: none"> - <i>Choose a historic location in a trendy/high end area to open location</i> - <i>Market at high end yoga/bar/spin classes</i> - <i>Offer coupon for grand opening at whole foods</i> - <i>Create a clothing selection more conducive to southern clientele and climate</i> 	<ul style="list-style-type: none"> - <i>Partner w/ roots music</i> - <i>Make clothing more southern friendly</i> - <i>Advertise w/ southern celebs</i> - <i>Accurate prices</i> - <i>Partner w/ roots music</i> - <i>Make roots music clothing (T-shirts)</i> - <i>Friendly customer service</i> 	<p><i>Take partnership with Roots Music to help ensure a successful transition into the South. Allow Roots Music to feed input on how they can incorporate their products and store layout with Caramousse’s products and store layout. Develop new</i></p>

		<ul style="list-style-type: none"> - <i>Advertise locally (radio, etc.)</i> - <i>Create new image but keep old</i> 	<i>cheaper products that could expand the companies financial spectrum of customers. Advertise/market the companies new location possibly with celebrities and the uniqueness that store has to offer. Maintain the friendly staff.</i>
1	<i>The Charamousse Clothing Company has unique clothes. They are environmentally friendly, and have clothes for all genders.</i>	<ul style="list-style-type: none"> • <i>Pair up with root music</i> • <i>Decrease prices</i> • <i>Increase variety</i> 	<i>The Charamousse Clothing Company has unique clothes. They are environmentally friendly, and have clothes for all genders.</i>

Figure 2. Rating Scales for Plan Quality, Originality, and Elegance