OUTCOMES OF MAXIMAL, TYPICAL, AND CONSISTENT PERFORMANCE: A TEAM LEVEL ANALYSIS

by

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ABSTRACT

Performance appraisal research has almost exclusively operationalized performance using average levels of individual employee performance, or typical performance. Other aspects of performance, such as maximal performance and performance variability have emerged as important aspects of the criterion space. This study extends the emerging literature on these three aspects of performance by: a) providing the first evidence for their importance at the team level, b) simultaneously investigating the effects of team-level maximal, typical, and variable performance on objective outcomes, and c) investigating the interaction between typical performance and performance variability in predicting objective outcomes. Strong relationships were found between team typical performance and the measures of organizational effectiveness (team record, bowl game payout, and average home game attendance). Moreover, an investigation was conducted on an interaction term between typical performance and performance variability, such that there would be a stronger relationship between variability and typical performance when typical performance is high.

INDEX WORDS: Performance, Typical, Maximal, Variability, Dynamic, Team
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To Pop, for teaching me to work hard for what you want in life.
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CHAPTER 1

INTRODUCTION

Purpose of the Study

This study seeks to explore the relationship between the individual components of employee performance and organizational effectiveness. Specifically, typical performance, maximal performance, and performance variability have arisen as three separate aspects of individual employee performance, but little research has been conducted to better understand the interrelationship between these three aspects. This study attempts to better understand the relationship between typical performance and performance variability, and how these components relate to organizational effectiveness.

How This Study is Original

Whereas past research has looked at the independent effect of typical and variable performance in isolation, we examine the interaction between typical performance and performance variability in predicting team effectiveness. This study also expands past research by focusing on team level effectiveness (as opposed to individual level effectiveness) and by predicting outcomes related to organizational effectiveness.
CHAPTER 2

OUTCOMES OF MAXIMAL, TYPICAL, AND CONSISTENT PERFORMANCE: A TEAM LEVEL ANALYSIS ¹

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Abstract

Performance appraisal research has almost exclusively operationalized performance using average levels of individual employee performance, or typical performance. Other aspects of performance, such as maximal performance and performance variability have emerged as important aspects of the criterion space. This study extends the emerging literature on these three aspects of performance by: a) providing the first evidence for their importance at the team level, b) simultaneously investigating the effects of team-level maximal, typical, and variable performance on objective outcomes, and c) investigating the interaction between typical performance and performance variability in predicting objective outcomes. Strong relationships were found between team typical performance and the measures of organizational effectiveness (team record, bowl game payout, and average home game attendance). Moreover, support was found for an interaction term between typical performance and performance variability, such that there was a stronger relationship between variability and typical performance when typical performance was high.

Introduction

The accurate measurement of employee performance plays a central role across talent management and human resource functions, including administrative decisions, workforce planning, employee development, training design, and selection system validation (Ployhart, Schneider & Schmitt, 2005). Despite the centrality to management research and practice, the measurement of performance has been problematic, and research has routinely questioned whether current methods of measuring performance adequately capture the relevant criterion
domain (cf., Murphy, 2008). The vast majority of work performance research and practice conceptualizes performance as average levels of performance over a given number of performance episodes (Fisher, 2008). However, the focus on typical performance neglects key components of the criterion domain (Murphy, 2008b).

Maximal performance and performance variability have emerged in recent years as critical, if under researched, components of the criterion space. Maximum performance is conceptualized as a period when an individual is performing at peak motivation (Dubois, Sackett, Zedeck, & Fogli, 1993; Sackett, 2007). Performance variability is conceptualized as consistency in performance across a given number of performance episodes (Barnes & Morgeson, 2007). Although limited, existing research has substantiated the role of maximum performance (Sackett, et. al., 1988; DuBois, et. al., 1993; Ones & Viswesvaren, 2007) and performance variability (Hofman, Jacobs, & Gerras, 1992; Rabbitt, Osman, Moore & Stollery, 2001) in individual effectiveness and success. Despite the central role that typical, maximal, and variability in performance are proposed to play in understanding employee performance, existing research has rarely investigated these three components of performance simultaneously (Sackett, 2007), has not established the influence of these components on organizational effectiveness, and has not evaluated their importance in team settings.

Given the centrality of teams to modern organizations, the failure to integrate this multifaceted view of performance with team settings is a key omission from the extant literature. As noted by Brannick and Prince (1997), “Teams are a fact of life” (p. 3). Furthermore, “there is still little known about the processes that occur within a team that help account for real differences in outcomes” (Brannick & Prince, 1997). This study represents the first investigation of these three aspects of performance at the team level. Also, the principles of isomorphism state
that the three facets of performance might differ in *structure* at the individual and team levels, but they will be similar in their *function* at all levels of analysis (Morgeson & Hofmann, 1999). Consistent with the idea of isomorphism, typical performance, maximal performance and performance variability are proposed to be important indexes of performance at the team level of analysis.

This study contributes to the literature by providing the first examination of the importance of team-level typical performance, maximal performance, and performance variability in predicting objective group outcome variables. Specifically, this study investigates the importance of these three components of performance to the effectiveness of college football teams.

**Study Context**

The current study utilizes NCAA college football team performance data to analyze various aspects of performance and their relationship to objective team level-criteria. The college football setting is ideally suited to evaluating maximal, typical, and variability in team level performance because: a) the availability of objective behavioral criterion variables and b) it is possible to distinguish results-based and behavioral outcomes.

A primary roadblock to research in the area of maximum, typical, and variability in performance has been the lack of available behavioral level performance data (Sackett, 2007). Specifically, “despite the appeal of observing team behavior in realistic settings,” availability, reliability, and time and expense makes collecting such measures challenging (Brannick & Prince, 1997, p. 6). Given that athletics provide hard, objective behavioral information on team performance in the form of team statistics (e.g., yards gained, yards allowed, and touchdowns), the athletic environment is ideally suited to studying distributional performance characteristics of
teams.

Next, common distinction in performance evaluation research is between results-based and behavioral measures of performance (Cardy & Dobbins, 1994; Podsakoff, Whiting, Podsakoff, & Blume, 2009). In the context of team performance, Brannick and Prince (1997) make a similar distinction between attribute and outcome based measures of team performance. For instance, attribute based measures include performance behaviors, such as creativity. On the other hand, “if a global outcome is of interest, what should be measured is performance relative to a goal set for team success” (Brannick, et. al., 1997, p. 7). The current study operationalizes maximal, typical, and variable performance using behavioral performance in the form of unit level statistics (e.g. yards and touchdowns allowed for defense, yards gained and touchdowns scored for offense) and team effectiveness in terms of effectiveness relative to team goals.

Even in circumstances in which objective behavioral performance data are available to allow for investigating these aspects of performance (e.g., supermarket checkers as in Sackett et al., [1988] or sewing machine operators as in Deadrick & Madigan, [1990]), there are rarely additional outcomes that can be used to investigate the relative importance of maximum, typical, and variable performance to group or organization effectiveness. Instead, research on typical, maximal, and performance variability has largely investigated the antecedents (i.e. experience, ability, and personality, Deadric Gardner, 2008; Ones & Viswesvaran, 2007), rather than consequences of these aspects of performance. Despite important contributions, research examining the antecedents of performance components does not give an indication of the relative contribution of typical performance, maximal performance, and performance variability to organizational effectiveness. This study differs from past work by focusing not on the antecedents of typical performance but instead, the influence of typical performance on
objective, independent criterion variables.

The athletic setting of this study allows for the measurement of both objective behavioral performance statistics and objective organizational outcomes. There are three organizational outcomes used as objective criteria in this study. The first is team win percentage, which is a direct measure of a teams’ performance. The second is bowl game quality. At the conclusion of each season, college football teams receive bids to play in bowl games. The quality of bowl game is closely associated with the teams’ performance throughout the season, and the higher the quality of the bowl game, the more revenue the bowl generates for the team. Lastly, social identity theories (Stryker, 1980) show that as teams become more successful, the fans tend to feel more self-esteem, more satisfaction, and ultimately attend more games (Laverie & Arnett, 2000). Accordingly, average home game attendance is used in the present study as an indicator of customer satisfaction.

**Typical Performance**

Typical performance is usually conceptualized as the average level of performance over a given number of performance episodes (Sackett, et. al., 1988; DuBois, et. al., 1993; Sackett, 2007; Barnes & Morgeson, 2007) and has been the dominant conceptualization of performance over the past century (Fisher, 2008). For instance, research investigating the influence of individual differences (Schmidt & Hunter, 1998) and attitudinal variables (Judge, Thoresen, Bono, & Patton, 2001) on performance have almost exclusively operationalized performance using measures of typical performance.

Barnes and Morgeson (2007) provided one of the few investigations of the importance of typical, maximal, and variability in performance in their investigation of the influence of performance on salary in a sample of National Basketball Association players. Of the three
components of performance, typical performance evidenced the strongest influence on player salary. Specifically, typical performance accounted for 50% of the variance in compensation. Although compensation gives information on how managers value the employees, it does not provide an indication of employee or organizational effectiveness. Therefore, although Barnes and Morgeson (2007) provided a useful first step in supporting the validity of typical performance in predicting outcomes, they do not give information as to the relative influence of typical performance on outcome-based measures of effectiveness.

Average levels of team performance are proposed to be positively related to the three performance outcomes, to the degree that the mean level of a team’s performance behaviors (e.g., performance on the field) over the course of a season are above average, we expect the team to have more wins and a higher quality bowl game relative to other teams. In essence, we expect the behavioral measure of typical performance to be related to outcome based measures of team effectiveness. In addition, social identity theory (Stryker, 1980) suggests that as teams become more successful, fans tend to feel more satisfaction with the team, more self-esteem and confidence with the team, and ultimately attend more games (Laverie & Arnett, 2000). Thus, teams that, on average, exhibit effective performance behaviors are expected to have a more supportive fan base, as indicated by fan attendance at games.

*Hypothesis 1: Team typical performance will be positively related to team win percentage, bowl game payout, and fan attendance.*

**Maximal Performance**

Cronbach (1960) was among the first to distinguish between typical and maximum performance, and this distinction was sharpened by Sackett et al. (1988). In contrast to typical performance, maximum performance represents employee performance at maximum motivation.
Maximum performance is conceptualized as what an individual “can do” (as opposed to typical performance which represents what an individual “will do,” p. 205, Dubois, et. al., 1993). In their treatment of maximum performance, Sackett et. al. (1988) suggested that performance will be at maximum motivation when: a) the employee is aware that he/she is being evaluated, b) performance is measured over a relatively brief duration, and c) the context must be one in which the employee can be expected to maximize effort, whether or not they are explicitly told to do so.

Despite the intuitive appeal of the maximum-typical performance distinction, research in this area has been slow to progress, in part because of difficulty in measuring maximum performance in field settings (Sackett, 2007). Maximum performance has been operationalized using performance on measures in a selection context, such as work samples or job knowledge tests (DuBois, et. al., 1993, Ployhart, Lim & Chan, 2001; Sackett, et al., 1988). However, this approach is problematic because oftentimes, the constructs that are used to operationalize maximum performance do not directly correspond to job behaviors (e.g., performance on job knowledge tests). It is very difficult to isolate performance data that meets the requirements for maximal performance in most performance contexts, and researchers have had to devise creative ways to measure maximum performance on the job. For instance, Sackett et al. (1988) measured the speed and accuracy with which cashiers could scan a series of 25 items in a shopping cart in one instance (as opposed to the typical performance information that was collected by measuring items per minute and voids per shift over a 4 week period). Witt and Spitzmuller (2007) administered surveys to managers that focused on maximum levels of employee ability aspects like competence and job knowledge (Example items included: “[Employee name] applies the highest levels of technical skill in completing work requirements”).
Deadrick and Gardner (2008) and Barnes and Morgeson (2007) proposed that an alternative approach to conceptualizing maximum performance is to measure the highest level of performance achieved over a given time period. Deadrick and Gardner (2008) suggested that when maximum performance is operationalized in such a way, it should be referred to as “maximal” performance. For instance, Barnes and Morgeson (2007) operationalized maximal performance as NBA players’ highest scoring game in a season. Similarly, Deadrick and Gardner (2008) analyzed the maximal performance of sewing machine operators by collecting at the highest averaging week of performance over a 24-week period. Consistent with research that has examined maximum performance in the field, we adopt the term maximal performance and operationalize maximal performance as the highest team statistical performance in a given game over the course of a season (Barnes & Morgeson, 2007).

Recent evidence linking maximal performance to motivational antecedents (Kirk & Brown, 2003; Ones & Viswesvaran, 2007; Ployhart et al., 2001) notwithstanding, ability has frequently been supported as the primary antecedent of maximal performance (Marcus, Goffin, Johnston & Rothstein, 2007; Witt & Spitzmuller, 2007). In other words, because performance is at maximum motivation, ability should be the primary determinant of maximal performance. Accordingly, teams with higher levels of ability, as indicated by higher levels of maximal performance, should be more effective. Toward this end, Barnes and Morgeson (2007) found that maximal performance accounted for 37% of the variance in compensation, providing evidence that at the individual level, maximal performance is valued by organizations. However, past work has not linked maximal performance to outcome variables. In other words, organizations appear to assume that high levels of maximal performance are important to effective organizational functioning; however, research has not empirically evaluated this assumption.
Because teams with higher maximal performance are proposed to have higher ability, maximal performance is proposed to be an antecedent of objective measures of team effectiveness (team win percentage and bowl game payout). Organizations benefit not only from the larger contribution but also from the positive visibility to the organization if people outside of the organization witness such episodes (Barnes & Morgeson, 2007). In the case of college football teams, this visibility is particularly likely. Accordingly it is also proposed that maximal performance will be related to fan attendance. A team that has higher potential on the field, as indicated by high levels of maximal performance, will have fans that are more optimistic and excited about their team. This, in turn, increases fan satisfaction and self-esteem, ultimately leading to greater fan attendance.

_Hypothesis 2: Team maximal performance will be positively related to team win percentage, bowl game payout, and fan attendance._

**Performance Variability**

Although intraindividual variability in employee performance was noticed over fifty years ago (i.e., Bass, 1962; Ghiselli & Haire, 1960), its practical and theoretical significance has been controversial (cf. Austin, Humphreys, & Hulin, 1989; Barrett & Alexander, 1989; Barrett, Caldwell, & Alexander, 1985). In the context of Classical Test Theory, inconsistency in performance is interpreted as random measurement error; however, in measuring worker performance, performance variation is proposed to have substantive underpinnings. Deadrick and Madigan (1990) differentiated between competing reasons for observed variability in performance, including: criterion changes due to individual differences (performance consistency), changes due to the organizational context (evaluation consistency), and changes due to the measurement procedure (measurement reliability, Deadrick & Madigan, 1990). They
conclude that the primary source of criterion variability is individual differences in performance consistency. From this perspective, at least a portion of observed intraindividual variability in performance reflects substantively meaningful differences in individual or team performance across performance episodes. Although research investigating variability is sparse, performance variability has recently been proposed to be a key component of performance that is in need of empirical attention (Fisher, 2008; Murphy, 2008b; Reb & Greguras, 2008).

A variety of approaches have been employed to capture individual differences in consistency in performance across performance episodes. For instance, distributional ratings differ from traditional performance appraisal measures in that they ask raters to evaluate the relative or absolute frequency of each behavior (Kane, 1983, 1986). This allows for the estimation of the frequency with which individuals perform behaviors rather than simply the judgment of typical work performance. Others have taken more direct approaches by calculating variability in objective measures of performance collected at multiple points in time (Barnes & Moregeson, 2007; Deadrick & Gardner, 2008).

Although limited, existing research that has investigated the outcomes of performance variability points to the importance of including performance consistency in measures of performance. Barnes and Morgeson (2007) found that performance variability was negatively related to the compensation of NBA players. In other words, players are rewarded for performing more consistently. In addition, Reb and Greguras (2010) found that supervisors take performance consistency into account when providing developmental ratings. Although there is initial evidence that variability is related to outcomes, existing research has not directly investigated the influence of performance variability on indices of effectiveness and has not extended variability research to the team level. Thus, a primary goal of this study is to provide the first evidence of
the influence of variability on team effectiveness.

Performance variability is proposed to be an important aspect of understanding performance for a variety of reasons. First, performance variability makes it difficult to develop effective plans for the team (Marks, Mathieu, & Zacarro, 2001; Ilgen, Hollenbeck, Johnson, & Jundt, 2005). In addition, high levels of variability in performance make it difficult for managers to isolate performance problems and take actions to improve deficiencies. On the other hand, teams that perform at a consistent level are more able to depend on their strengths while taking steps to offset their weaknesses.

In addition, high levels of performance variability can have a negative effect on fan perceptions of performance (DeNisi & Stevens, 1981; Barnes & Morgeson, 2007). For instance, observers routinely attribute fluctuations in performance to effort or unreliability (Fox, Bizman, Hoffman, & Oren, 1995). And, when failure is attributed to effort, repercussions are often more negative (Green & Mitchel, 1979). Thus, as teams display inconsistent performance, fans are more likely to attribute performance deficiencies to a lack of effort and will be less likely to support the team by attending games.

In addition to understanding the main effect of performance variability on effectiveness, it is important to consider the interaction between variability and typical performance. Specifically, although past research has found that variability is negatively related to outcomes, this research has not explored the interaction between typical performance and effectiveness. In other words, low variability may now always be desirable, especially in cases in which typical performance is low. In other words, it is not helpful to perform consistently if the team consistently performs below average. Thus:

*Hypothesis 3: The relationship between performance variability and win percentage,*
bowl game payout, and fan attendance will be moderated by typical performance, such that performance variability will be more strongly related to outcomes when typical performance is high.
CHAPTER 3

METHOD

Participants

The sample consisted of NCAA college football teams from Bowl Championship Series (BCS) conferences. Given the wide differences between teams from BCS and non-BCS conferences in terms of revenue, expenditures, and opposition, this study focused on BCS teams to ensure that the teams were as homogeneous as possible. The authors collected data on the 65 BCS teams from the 2000, 2004, and 2008 seasons, resulting in 195 different teams. Three different seasons separated 4 years apart were chosen to ensure that the players on a given team had cycled out (four years is the maximum amount of eligibility for college athletes), thus maintaining independence of the data.

Procedure

Data were collected from nationally recognized sports Web sites such as ESPN.com, NCAA.com, and CBS.sportsline.com. Offensive and defensive data were collected for every game of the season for each team. For offense, multiple statistical indicators of unit performance were collected, including: passing yards, rushing yards, touchdowns, giveaways (fumbles lost and interceptions). For defense, multiple statistical indicators of unit performance were collected, including: yards allowed, touchdowns allowed, and takeaways (forced fumbles and interceptions). The offensive and defensive statistics for each game were separately transformed into a game level composite index of unit effectiveness using Yahoo! Fantasy Football standard scoring system (Figure 1). These indices were calculated for all games played in the season,
excluding conference championship games and bowl games. The transformations in Figure 1 were used to calculate an index of offensive/defensive performance for each game for each team.

**Figure 1**
*Offensive/Defensive Index Transformations*

Offensive Index:

\[
\left( \frac{\text{Passing Yards} + \text{Rushing Yard}}{15} \right) + [\text{TDs} \times 6] + [-2 \times (\text{Fumbles + Interceptions})]
\]

Defensive Index:

\[
\left( \frac{\text{Total Yards Allowed}}{15} \right) + [\text{TDs Allowed} \times 6] + [-2 \times (\text{Forced Fumbles + Forced Interceptions})]
\]

**Measures**

Typical Performance was operationalized as mean performance over the course of the season. This was calculated by averaging the game level performance composites across all regular season games.

Similar to Barnes and Morgeson (2007), maximal performance was operationalized as the highest composite score for a given game in each season.

Deadrick and Madigan (1990) propose three minimum conditions for the analysis of differences in performance variability. First, the criterion measure should be a specific performance dimension that is deemed to be a primary determinant of job performance (Wernimont & Campbell, 1968). This study utilizes direct measures of objective performance. The second condition is that the task/job should be in a stable and routine task environment in
which the ability requirements for performance are constant (Deadrick & Madigan, 1990). As
detailed below, in order to ensure consistency across the performance episodes, we partial out
opponent quality prior to analyses. Third, the sample should be an intact group of employees
working on the same job under common performance standards and operating procedures.
College football teams meet this requirement because they are an intact group of players who all
perform under the same standards.

Similar to Barnes and Morgeson (2007), performance variability will be operationalized
as the standard deviation of the offensive and defensive indices across the season.

Three group outcomes indicative of team effectiveness were used as criterion variables.
First, winning percentage is calculated as the number of wins divided by the total number of
games played. Next, bowl game payout is the total monetary amount of each bowl game payout
for both competing teams. Teams that did not play in bowl games at the end of the season
received a score of zero for bowl game payout. Third, home game fan attendance was measured
as the average stadium capacity filled across all home games in the season.

Control Variables

Teams in different conferences are afforded varying levels of funding and resources,
which can have an effect on team performance. Conference was controlled for by using dummy
coded variables to represent each of the six conferences (ACC, SEC, Big 12, Big 10, PAC 12
and Big East).

All performance indexes were controlled for opponent quality (denoted as a ranking). All
opponent quality information was gathered from the Colley Matrix (2012) for each game
throughout the season, and at the end of the season. The Colley Matrix is a website that contains
rankings for all BCS teams. The matrix has no bias toward conference, tradition, history, or
prognostication, it is reproducible and the results can be checked, it uses minimum assumptions, it uses no ad hoc adjustments, and it adjusts for strength of schedule (The Colley Matrix, 2012).

Differences in opponent quality were controlled for in both the offensive/defensive performance variables and the outcome variables. To accomplish this, a regression analysis was conducted with the offensive/defensive indices of performance for each game as the dependent variables and opponent quality for each game as the independent variables. Opponent quality is the rank of each team calculated at the end of each game and at the end of the season as per the Colley Matrix. The residuals of this analysis were saved and used as indices of performance for each game, net the effect of quality of opposition.

The same steps were taken to control for opponent quality in the criterion variables. First, an average opponent quality variable was constructed for each team. Next, the average opponent quality variable was regressed onto each dependent outcome variable and the standardized residuals were saved, yielding 3 different outcome variables, net the effect of quality of opposition. To understand the influence of controlling opponent quality, we present the results with and without controls for opponent quality.
CHAPTER 4

RESULTS

Table 1 shows the means, standard deviations, and correlations of the variables without controls for opponent quality. A first look at the uncontrolled variables shows strong correlations between typical performance and the outcomes. Offensive typical performance was found to be positively related to record ($r = .70, p < .01$), bowl game payout ($r = .45, p < .01$) and average home game attendance ($r = .16, p < .05$). Defensive typical performance showed strong positive correlations with record ($r = .55, p < .01$), bowl game payout ($r = .35, p < .01$), and average home game attendance ($r = .30, p < .01$). The positive correlations for the defensive indices are expected as the transformations are designed so that lower values indicate worse defensive performance (e.g., normally the object of defense is to allow fewer yards and points, but the scoring system we used rescales points such that defenses are awarded more points for better play). Maximal performance was also related to the outcome variables. Offensive maximal performance was related to record ($r = .49, p < .01$) and bowl game payout ($r = .28, p < .01$) but not home game attendance ($r = .13, ns$). Defensive maximal performance was related to record ($r = .40, p < .01$) and bowl game payout ($r = .26, p < .01$), but not home game attendance ($r = .14, ns$).

Next, we examined these relationships controlling for opponent quality. Table 2 shows the means, standard deviations, and correlations of the variables controlled for opponent quality. Offensive typical performance was found to be positively related to record ($r = .70, p < .01$), bowl game payout ($r = .44, p < .01$) and average home game attendance ($r = .17, p < .05$);
displaying similar relationships as the variables without controls for opponent quality. Defensive
typical performance was also positively related to team record ($r = .60, p < .01$), bowl game
payout ($r = .39, p < .01$) and average home game attendance ($r = .30, p < .01$).

Controlling for opponent quality, offensive maximal performance was positively related
to record ($r = .56, p < .01$), bowl game payout ($r = .33, p < .01$) and home game attendance ($r = .18, p < .05$). Defensive maximal performance was positively related to record ($r = .47, p < .01$),
bowl game payout ($r = .28, p < .05$) and home game attendance ($r = .26, p < .05$).

Hypothesis 3 proposed an interaction between typical performance and performance
variability in predicting the three outcomes. To test this hypothesis, three separate two-step
hierarchical regression analyses were conducted (one for each criterion variable). Mean centered
defensive typical, maximal, and variable performance were entered as independent variables in
the first step to examine their unique effects on team outcomes. Then, an interaction term that
reflected the product of the mean-centered typical performance and mean-centered performance
variability variables was constructed and added to the second step of the regression analysis
(Cohen, et. al., 2003). These analyses were conducted for both offensive and defensive
performance indices. Results are displayed in Tables 3 and 4.

Although each component of performance was supported when we examined bivariate
relationships, in all but one of the regression analyses, only task performance remained
significant when all three performance components were simultaneously included (defensive
performance variability significantly accounted for variance in average home game attendance, $\beta = .19, p = .05$, in one set of the regression analyses). Specifically, offensive typical performance
accounted for a significant portion of the variance in record ($\beta = .67, p < .01$) and in bowl game
payout ($\beta = .40, p < .01$) but maximal and performance variability did not when controlling for
typical performance. Similarly, defensive typical performance was related to record ($\beta = .66, p < .01$), bowl game payout ($\beta = .47, p < .01$) and home game attendance ($\beta = .27, p = .05$) but maximal and variable defensive performance were not. Thus, Hypothesis 1 was supported for both offensive and defensive typical performance indicators, but Hypothesis 2 was rejected for both offensive and defensive maximal performance indicators. In addition, none of the interaction terms for the interaction between typical performance and variability were significant, indicating that variability does not moderate the relationship between typical performance and team outcomes. Thus, Hypothesis 3 was not supported.
CHAPTER 5

DISCUSSION

Typical performance has been the dominant conceptualization of performance and some have argued that this is at the expense of other important aspects of performance, such as performance variability and maximal performance (Sackett et al., 1988; Deadrick & Gardner, 2008; Fisher, 2008) and urged additional attention to these other aspects of the performance distribution. This study makes two primary contributions to the literature on typical, maximal, and performance variability. First, this study reflects the first application of this performance taxonomy to a team setting. Results reveal that when all three types of performance were considered and opponent quality was controlled, team level typical performance had a significant main effect on team-level outcomes. Interestingly, and in contrast with recent research (Barnes & Morgeson, 2008; Deadrick & Gardner, 2008) neither variability in team performance nor maximal performance explained variance in objective, team level outcomes. Implications for these findings are discussed with respect to the measurement of performance in team settings and the importance of alternative conceptualizations of performance in predicting unit level outcomes, rather than individual success outcomes. Second, this study provides the first attempt at investigating the interaction between variability and typical performance; however, no evidence was found for moderation. Implications for the investigation of performance in team settings are discussed.

Validity of Typical, Maximal and Variable Performance

Since Sackett (1988) and colleagues’ seminal studies, the importance of alternative
manifestations of performance has been frequently referenced. However, because of measurement problems and difficulty of isolating criterion variables (Sackett, 2007), relatively little research has directly established the validity of these components of performance. Consistent with Barnes and Morgeson (2007), team level typical performance predicted outcomes in the expected direction. Thus, this study validates the construct of team level typical performance at the team level and with success outcomes, rather than individual outcomes. In terms of magnitude of effect, not surprisingly, typical team level performance behaviors were strongly related to all three objective indicators of team effectiveness, with the strongest relationships coming with rank relative to competitors, followed by performance-based revenue (bowl game payout), and weakest but still significant associations with a behavioral measure of customer support (fan attendance).

In addition, like Barnes and Morgeson (2007), maximal performance did not account for unique criterion variance above and beyond that of typical performance. Barnes and Morgeson (2007) attribute the lack of support for maximal performance to multicollinearity between their measures of typical and maximal performance (r = .90 in their study). Similarly, in the present study, the typical and maximal performance variables also display high levels of multicollinearity (offensive, r = .75, p < .01; defensive, r = .64, p < .01). These findings coincide with Barnes and Morgeson (2007), and with Deadrick and Gardner (2008), who investigated the validity of typical and maximal performance in predicting sewing machine operators’ production earnings per week and concluded that when using on-the-job performance data, the differences between these two concepts are not as pronounced as when using work sample information. According to Sackett (2007), such on-the-job measures are not true measure of maximal performance (Sackett, 2007), because one cannot guarantee that ratees are at maximal motivation
on the occasion in which they perform the highest. However, until measurement issues can be resolved with measuring the same constructs of maximal and typical performance, such surrogate measures are likely to still be used. In other words, it is difficult to devise measures of maximal performance with psychological and physical fidelity to the criterion domain for many jobs. Nevertheless, it is unclear whether these findings would be the same had we obtained a traditional measure of maximal performance.

The present study did not hypothesize an independent relationship between variability and outcomes. In contrast to studies supporting the influence of performance variability on individual level outcomes (such as salary; Barnes & Morgeson, 2007; Barnes & Reb, 2012), supervisor performance judgments (Reb & Greguras, 2010), rating accuracy (Woehr & Miller, 1997), and sewing machine operator production (Deadrick & Gardner, 2008), our results suggest that variability does not explain unique variance in outcomes beyond mean team level performance in objective outcomes. These findings were surprising given the presumed importance of performance consistency in organizational planning processes (Stout, Cannon-Bowers, Salas, & Milanovich, 1999). One reason for the difference in findings is that past studies have used indicators of success and rewards, such as salary judgments. To our knowledge, the present study is the first to link performance variability to indicators of effectiveness at the individual or team level. The findings indicate that, despite the importance that decision-makers place on consistency in individual performance consistency in determining rewards such as pay (Barnes & Morgeson, 2008; Stout et al. 1999), variability was unrelated to team-level outcomes, win percentage and experts’ ranking of performance relative to competitors, customer satisfaction (attendance), and performance-based revenue (bowl game revenue). If these findings replicate and variability is shown to be unrelated to indicators of effectiveness, findings would
suggest that performance variability potentially reflects a bias in decision-makers evaluations and reward decisions, at least with respect to the contribution of performance variability to indicators organizational effectiveness. In other words, supervisors seem to weigh performance consistency when evaluating followers, but it is unclear whether the value placed on consistency is justified. Teams and possibly individual performers with the same mean of performance but different distributions are potentially of equal value. Both individual and team-level studies are needed replicating this effect using alternative predictor and criterion variables.

Additionally, multicollinearity existed between maximal performance and performance variability (defensive, $r = .37$, offensive, $r = .70 < .01$). Consistent with the explanation of Deadrick and Gardner (2008), teams who have higher levels of maximal performance are also more variable in their typical performance, thus, “the higher the maximal performance, the more ‘room’ there is for performance to vary around typical performance” (Deadrick and Gardner, 2008; p. 140).

Consistent with Barnes and Morgeson’s suggestion, we hypothesized that the main effect of performance variability alone ignores the role of typical performance and that typical performance should be looked at in conjunction with performance variability. Our analyses, however, did not support an interaction between typical performance and performance variability. These findings reinforce the broader implication that mean level performance and not the consistency over time or isolated incidences of very strong performance is the key antecedents to team effectiveness.

**Strengths and Limitations**

Our findings must be viewed in light of a few strengths and limitations. A key strength is that we were able to collect independent measures of team performance and team-level
outcomes. Although a few studies have done so for performance behaviors (Barnes and Morgeson, 2007) and Deadrick and Gardner (2008), we are unaware of any studies using objective indicators of effectiveness (most use salary recommendations or pay.) the components used in this study reflect actual levels of performance that occur under normal working conditions. These on-the-job factors are better at producing motivationally relevant fluctuations in work performance than artificially created work conditions (i.e. Sackett et al., 1988; Deadrick & Gardner, 2008), and they allow for a direct comparison of maximal and typical performance under the exact same constructs, ensuring that the constructs and the situation is the same. Other methods devised to capture maximal performance, even in relatively complex jobs such as job knowledge tests (Witt & Spizmuller, 2007), likely measure completely different constructs to on-the-job measures of typical performance (Dubois, et. al., 1993), and even low to moderate fidelity measures may differ some in context and constructs (Ployhart, Lim & Chan, 2001). Using objective performance statistics to measure maximal and typical performance ensures the direct correspondence between performance context and constructs and thus, provides a strong test of the overlap between maximal and typical performance. Future research comparing on-the-job indexes of maximal performance to traditional measures is needed.

Another strength of this study is that the performance variables are objective measures of team performance and not susceptible to subjective biases. Other measures of employee performance, such as managerial performance appraisal, can be susceptible to biases. Given the reliability concerns with performance ratings, it would be difficult to determine whether fluctuations in performance reflect error, fluctuations in actual performance, or rater bias. On the other hand, when measured on-the-job and calculated from objective performance data, maximal performance and performance variability are proposed to represent natural and meaningful
fluctuations in motivation and in work demands unfettered by rater error or bias (Deadrick & Gardner, 2008; Reb & Greguras, 2010).

Despite these strengths, a few limitations to this study are noteworthy. First, it is unclear whether performance of sports teams will generalize to other contexts. However, according to Barnes & Morgeson (2007), the context of athletics can be generalized to the workplace for several reasons. First, the players report to a direct supervisor who monitors their performance. Second, they are highly motivated to perform better for incentives. Third, they are goal-oriented, have clear standards of performance and receive feedback based on their performance. They also perform in a competitive environment where the primary goal is to maximize profit (Barnes & Morgeson, 2007). Despite these similarities, future research replicating these findings in other contexts is needed.

Despite the value of the current sample, because of the availability of objective data, it is also possible that the current context results in confounding maximal and typical performance. Given that college football teams are constantly aware that their performance is being evaluated and are not being compensated for their play, it is possible that, at least during games, that each player is at maximum motivation. Thus, one might argue that performance in each game reflects maximal performance. The strong correlation between typical and maximal performance reinforces this possibility; however, the magnitude of the correlation revealed here was consistent with the correlation in other contexts (sewing machine operations; Deadrick & Gardner, 2008), supporting the generalizability of our findings.
CHAPTER 6

REFERENCES


Rabbitt, P., Osman, P., Moore, B., & Stollery B. (2001). There are stable individual differences in performance variability, both from moment to moment and from day to day. *The


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** Denotes significance at the .01 level.
* Denotes significance at the .05 level.
Note: Average Team Quality was an average of all team quality rankings for an entire season.
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** Denotes significance at the .01 level.
* Denotes significance at the .05 level.

Note: Average Team Quality was an average of all team quality rankings for an entire season.
Table 3:
Regression Analyses Controlling for Opponent Quality (Offensive)

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Standardized beta values for regression analyses (not controlling for opponent quality): Win Percentage regressed onto defensive typical performance, maximal performance, performance variability (Step 1) and the typical/variability interaction term (Step 2).
Table 4:
Regression Analyses Controlling for Opponent Quality (Defensive)

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Standardized beta values for regression analyses (controlling for opponent quality): Win Percentage regressed onto offensive typical performance, maximal performance, performance variability (Step 1) and the typical/variability interaction term (Step 2).