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Optimism and Female Volleyball Players' Perceptions of Psychological Momentum

Brian Foster
Florida State University

Selen Razon
Ball State University

Lindsey C. Blom
Ball State University

Jocelyn Holden
Ball State University

Abstract

Many athletes and spectators believe that experiencing and controlling psychological momentum is a critical component to achieving success in sport (Perreault, Vallerand, Montgomery, & Provencher, 1998; Stanimirovic & Hanrahan, 2004). Nevertheless, little is known regarding why some individuals perceive psychological momentum differently than others. This study was designed to determine if optimistic thinking has a relationship with psychological momentum perceptions in sport. Female Division I NCAA volleyball players (N = 68) completed the Life Orientation Test – Revised (Scheier, Carver, & Bridges, 1994), the Sport Attributional Style Scale - Short (Hanrahan & Grove, 1990b), and a psychological momentum assessment. The results indicated that the attributional style constructs of intentionality and globality were significant predictors of psychological momentum perceptions. Also, participants had greater disagreement regarding the momentum value of early and late points in a set than those in between. Future attempts to measure psychological momentum perceptions should consider a mixed methods approach along with more ecologically valid assessment protocols.

In sport, athletes and spectators believe that obtaining and controlling psychological momentum (PM) is a critical factor to achieve success (Perreault, Vallerand, Montgomery, & Provencher, 1998; Stanimirovic & Hanrahan, 2004). PM is defined as "a positive or negative change in cognition, affect, physiology, and behavior caused by an event or series of events that will result in a commensurate shift in performance and competitive outcome" (Taylor & Demick, 1994, p. 54). It is closely related to the "hot hand" phenomenon whereby "a streak of previous successes increases an athlete's odds for success on future attempts above the athlete's base rate" (Koehler & Conley, 2003, p. 253).

Evidence from social psychology suggests that an individual's perception of an event influences their behavior to match that perception. This is termed the perception-behavior link (Dijksterhuis & Bargh, 2001), and it can occur consciously or unconsciously (Ferguson & Bargh, 2004). Drawing upon the perception-behavior link, the study of PM can prove beneficial because athletes' perception of PM may influence their subsequent performance (Jones & Harwood, 2008). The present study sought to examine how minimal exposure to match scores influence perception of PM in athletes. This is important because even minimal exposure to an event can influence affect and perceptions (Zajonc, 1980) and perceptions can impact outcome performance.

There have been three theories regarding the development of PM and its effect on the performance of athletes. According to the Antecedents-Consequences Psychological Momentum Model (Vallerand, Colavecchio, & Pelletier, 1988) PM is a combination of personal and situational factors. The theory stipulates that the perception of an increased likelihood of goal attainment facilitates a positive change in performance through an increase in motivation and positive emotions. The opposite is true, however, in situations of decreased perceived likelihood of goal attainment. Additionally, based on the model, the degree to which performance is mediated by PM depends on both the context and one's personal beliefs. Given that PM is an exclusively perceptual phenomenon, only the individual's subjective frame of reference impacts PM development. This model of PM was the first to consider that PM is both a cause and an effect. This said, it arguably lacked a detailed explanation of the PM-performance relationship.

A second model of PM is the Projected Performance Model (Cornelius, Silva, Conroy, & Petersen, 1997). According to the model positive or negative PM is associated with a shift away from mean performance. Inhibitory or facilitative forces, such as an error or a successful shot, naturally bring performance back to normal levels. PM is considered to be an explanation of performance level after it has occurred (Moesch & Apitzsch, 2012). This model raised concerns that PM was simply a label of enhanced or depressed performance and in fact not a tangible psychological event. To test such concerns various

research attempts were made to assess PM from a statistical perspective known as the hot hand phenomenon. Gilovich, Vallone, and Tversky (1985) were the first to dispute conventional sports wisdom when they analyzed data from the Philadelphia 76ers' 1980-1981 season and found no evidence of shooting streaks that would be greater than expected by chance. Subsequent studies found similar results in sports such as golf (Clark, 2004), volleyball (Miller & Weinberg, 1991), and tennis (Silva, Hardy, & Crace, 1988). There have been studies, however, that have identified hot hand in billiards (Adams, 1995) and bowling (Dorsey-Palmateer & Smith, 2004). Also, athletes have self-reported that they feel the influence of PM while they play (Jones & Harwood, 2008). Hales (1999) had also initially proposed that the relationships among PM, hot hand phenomenon, and performance should be studied together. Therefore the model could be criticized for not considering athletes' subjective frame of reference during sport performance.

A third model of PM is the Multidimensional Model of Momentum (Taylor & Demick, 1994). This model posits that PM is the result of a chain of events. Specifically, PM is a five-step process: 1) a precipitating event; 2) a change in cognition, affect, and physiology; 3) a change in behavior; 4) an increase or decrease in performance; and 5) an immediate change in outcome. A strength of the model is that it emphasizes subjective interpretation of an event. This is important because Perreault et al. (1998) have shown that a negative precipitating event does not necessarily have to hinder performance.

PM research has been equivocal in nature. A major reason for this is that two individuals can perceive the PM of a sport event very differently (Burke, Aoyagi, Joyner, & Burke, 2003). There is currently limited research on the underlying mechanisms that influence PM perceptions (Alter & Oppenheimer, 2006). As a result, there is a need for research that identifies the psychological variables that may affect individuals' subjective perception of PM.

One such variable that could possibly cause individuals to perceive PM differently is optimism. Positive thought processes have been demonstrated to enhance performance (Tod, Hardy, & Oliver, 2011). These thought processes change cognition and affect and are therefore critical antecedents of PM per the Multidimensional Model of Momentum.

Optimism can be manifested as dispositional optimism, where optimism is a stable disposition and the individual has subjective beliefs that future outcomes are bound to be positive (Scheier & Carver, 1985). Alternatively, optimism can be manifested as an attributional style, which is termed as the manner in which individuals explain their successes and failures to themselves or others (Alloy, Peterson, Abramson, & Seligman, 1984). As such, optimistic individuals prefer stable, global, and internal explanations for their successes, and unstable, specific, and external explanations for their failures (Seligman, Nolen-Hoeksema,

Thornton, & Thornton, 1990). In sport environments, optimism has been shown to be a predictor of future success because it is correlated with positive affect (Sanjuán, Pérez, Rueda, & Ruiz, 2008), psychological resilience (Davis & Asliturk, 2011), and proactive coping (Aspinwall, Sechrist, & Jones, 2005; Sohl & Moyer, 2009). Additionally, optimistic individuals have been shown to achieve better psychological adjustment during sport participation (Armata & Baldwin, 2008).

Consistent with previous assertions, research into the common qualities of high achieving Olympic athletes revealed twelve common characteristics among which optimism and psychological resilience were two (Gould, Dieffenbach, & Moffett, 2002). Optimistic individuals tend to view adversity as a challenge that can be overcome with effort and persistence (Schulman, 1999). Research has indicated a link between optimistic thinking and improved performance outcomes in swimming (Seligman et al., 1990). Specifically, at competitive meets those swimmers with pessimistic explanatory style were most likely to perform below expectations throughout the season. Also, relative to swimmers with more optimistic styles, pessimistic swimmers' subsequent performances were more negatively affected following a poor meet.

The purpose of this study was to assess the relationship between PM perceptions and optimism in collegiate female volleyball players. It was hypothesized that both dispositional optimism and optimistic attributional style would have positive relationships with perceptions of PM. In addition, it was hypothesized that dimensions constituting optimistic attributional style (i.e., internality, stability, globality, controllability, and intentionality) would be significant predictors of PM perceptions. Establishing a relationship between optimism and PM perceptions could have applied ramifications for designing performance-enhancement interventions targeting optimism in athletes because experiencing PM has been long demonstrated to improve performance (Perreault et al., 1998).

Methods

Participants

A purposeful sample of 68 female NCAA Division I volleyball players from 17 athletic conferences were recruited for the study. Specifically the purposeful sample was geared towards maximizing the number of participants within one sport category, in season at the time when the data was collected. Only female players were tested because there were substantially more female NCAA Division I volleyball teams than male teams to send the questionnaires to. Participants were 18-21 years of age with a mean age of 19.53 years. Participants' mean years of competitive volleyball experience was 7.87 years. To recruit the participants for the study, Division I volleyball coaches were initially contacted

and asked to forward the study's link to their players. The link included the informed consent for participation as well as the questionnaires for the study. A repeat email was sent to the same coaches two weeks following this initial attempt. Finally, to best maximize the sample size, three weeks following the second attempt, 200 assistant coaches were personally emailed by the researcher. Prior to any data collection, approval to conduct this study was obtained from the researchers' university Institutional Review Board (IRB).

Instruments

Participants were asked to complete a demographic questionnaire, the Life Orientation Test - Revised (Scheier, Carver, & Bridges, 1994), the Sport Attributional Style Scale - Short (Hanrahan & Grove, 1990b), and the Psychological Momentum Assessment (PMA).

Demographics Questionnaire. The questionnaire included items gauging participants' age, class, race, athletic conference, and years of competitive volleyball experience.

Life Orientation Test - Revised (LOT-R; Scheier et al., 1994). LOT-R measured dispositional optimism. The items included ten statements rated from 0 (*strongly disagree*) to 4 (*strongly agree*). Example statements were "in uncertain times, I usually expect the best", and "I'm always optimistic about my future". A final dispositional optimism score of 0-24 corresponded to the summations of ratings from six of the statements that measured dispositional optimism. The correlation between the original LOT scale and the LOT-R is .95. LOT-R possesses a stronger focus on positive expectations (Scheier et al., 1994), hence its use for the purposes of the study. For the current study, a Cronbach's alpha coefficient of .823 was computed for the six items of the scale measuring dispositional optimism.

Sport Attributional Style Scale - Short. (SASS-S; Hanrahan & Grove, 1990b). The scale measured sport-related attributional style along the five dimensions of internality, stability, globality, controllability, and intentionality for both positive and negative events" (Hanrahan & Grove, 1990a, p. 183). Of the ten items, five included positive events and five included negative events. An example positive item was "your teammates claim that you are a very good volleyball player". An example negative item was "you are not selected for the starting line-up in an important match". For each item of the scale, participants identified the single most likely cause of that event and responded to five prompts, each corresponding to one of the five dimensions of attributional style. The total score for the scale ranged 10-70. Higher scores indicated that the participant attributed the cause of the events to internal, stable, global, uncontrollable, and unintentional factors. To compute an optimistic attributional style score, the total dimension scores for internality, stability, and globality were

summed. The optimistic attributional style score ranged 30-210, with a higher score representing a greater optimistic attributional style.

SASS-S is valid and correlated with the original SASS at $r = .92$ (Hanrahan & Grove, 1990b). The instrument has good construct validity (Hanrahan, Grove, & Hattie, 1989) and was used in similar investigations to measure optimism in athletes (Parkes & Mallett, 2011). For the purposes of the current study, the SASS-S was slightly modified to increase fit to volleyball. For example, Item 6 was changed from "your teammates claim that you are not a good performer" to "your teammates claim that you are not a good volleyball player". It should also be noted that the original SASS-S included seven questions for each item. In the present study, the questions specific to importance and image clarity were eliminated because they were not of interest.

Psychological Momentum Assessment (PMA). The PMA assessed PM perceptions. The scale was adapted from a previous PM scale used to identify tennis players' perceived match momentum following each game (Vallerand et al., 1988). Using this scale, participants rated the momentum from 1 (*Player A definitely has the momentum*) to 7 (*Player B definitely has the momentum*) with a neutral midpoint of 4 (*neither player has the momentum*). For the purposes of this study, participants used the PMA to rate the momentum following each point of the fifth set of a hypothetical championship volleyball match where they imagined themselves as a player on Team "A".

Specifically herein, the score of the match was presented to the participant after each point. After viewing which team had scored participants were asked to rate the current PM of the match from 1 (*Team A definitely has the momentum*) to 7 (*Team B definitely has the momentum*) with a neutral midpoint of 4. The final score of the set was 15-13 for Team B. The pattern of scores was presented in manner that the largest disparity in score at any time was 8-5 for Team B. Neither team scored more than two consecutive points in the set. Each participant's PM score was derived from the sum of all scores provided. Means and standard deviations were also analyzed for each point.

Both in tennis and volleyball, analyzing the dynamics of the game per the players' mind involve similar processes (Notarnicola et al., 2014) hence the effective adjustment of the original scale to the purposes of the present study. Also, in line with the notion of immediate retrospective verbal recall (North, Ward, Ericsson, & Williams, 2011), in psychology research, hypothetical scenarios are commonly used (Dubuc, Schinke, Eys, Battochio, & Zaichkowsky 2010; FeldmanHall et al., 2012) to prompt thoughts and attitudes, thereby the use of a hypothetical approach in the present framework.

Procedure

The study included one online session of survey administration via the Qualtrics online survey system. Upon proceeding to the link for the study, participants viewed and signed the informed consent from. Subsequently, participants completed the demographics form. Finally, the LOT-R, SASS-S, and PMA were administered in random order. Counterbalancing the administration order of the instruments was necessary in order to control for testing effects. The mean data collection time per participant was approximately 15 minutes.

Research Design and Analysis

The study used a correlational design. Descriptive statistics were run for mean age and competitive volleyball experience of the participants, as well as means for the LOT-R, SASS-S, and PMA. For the first hypothesis a Pearson's correlation was run between LOT-R total scores and PM total scores to determine if dispositional optimism had a significantly positive relationship with PM perceptions. The second hypothesis was tested using a Pearson's correlation between optimistic attributional style scores (i.e., sum of internality, stability, and globality subscales) and PM total scores to determine if there was a significantly positive relationship between optimistic attributional style and PM perceptions. The third hypothesis was tested with a standard multiple linear regression run on PM scores and the five SASS-S subscales. All alpha levels were established at .05, and statistical analyses were run using the Statistical Package for the Social Sciences (SPSS) 20.0 software.

Results

Of the 176 participants who initially signed up, 68 completed all the measures. Therefore the analyses were run on the data provided by these 68 participants. Descriptive statistics were run to determine means and standard deviations for age, competitive volleyball experience, dispositional optimism score, sport-related optimistic attributional style and its five subscales, and PM perceptions (see Table 1). The mean age of the participants was 19.53 years and their mean competitive volleyball experience was 7.87 years. Caucasians represented 80.6% of the sample, African Americans or blacks 7.5%, and Hispanics 5.9%. In addition to the final score derived from the PMA, descriptive statistics were run for each point of the PMA.

Table 1
Participant Age, Experience, LOT-R, SASS-S, Internality, Stability, Globality, Controllability, Intentionality, and PM Means, Standard Deviations, and Range

	Mean	Standard Deviation	Range
Age	19.53	1.17	18-21
Experience	7.87	2.79	2-18
LOT-R	16.19	4.23	2-23
SASS-S	128.00	12.39	98-163
Internality	40.44	5.19	27-52
Stability	44.74	5.50	34-62
Globality	42.62	5.93	23-60
Controllability	37.60	6.00	18-49
Intentionality	29.43	9.36	10-47
PM	115.64	10.98	57-142

Note: LOT-R possible range 0-24, SASS-S 30-210, Internality, Stability, Globality, Controllability, and Intentionality all 10-70, PM 27-189

In regard to the first research question addressing the relationship between dispositional optimism and PM perceptions, no correlation was found, $r = .000$, $p = .999$. Thus descriptively speaking, the results indicated no relationship between dispositional optimism and PM perceptions.

For the second research question addressing optimistic attributional style and PM perceptions, no correlation was found, $r = -.020$, $p = .872$. Thus, results indicated no correlation between sport-specific optimistic attributional style and PM perceptions. Among subscales, internality and stability revealed a non-significant, weak, positive correlation, $r = .223$, $p = .068$, internality and globality revealed a significant, weak to moderate, positive correlation, $r = .341$, $p = .004$, and stability and globality revealed a significant, moderate, positive correlation, $r = .553$, $p < .001$.

A Pearson's correlation was also run between dispositional optimism and sport-specific optimistic attributional style as measured by the LOT-R and SASS-S respectively. A significant, weak to moderate, positive correlation was found, $r = .300$, $p = .013$. Thus, individuals with higher dispositional optimism also scored higher on sport-specific attributional style.

Finally, for the third research question addressing attributional style subscales and PM perceptions, a standard multiple linear regression was run with scores from the five SASS-S subscales and PMA scores (see Table 2). Among the five SPSS-S subscales, intentionality, $b = .315$, $p = .048$, and globality, $b = -.678$, $p = .019$, were found to significantly predict PM perceptions. Thus, the stronger the belief an athlete had that sport successes are caused by intentional action, the more likely they were to perceive PM in their favor. Also, the stronger the belief an athlete had that the cause of a sport-related success had only sport-specific relevance, the more likely they were to perceive PM in their favor. However, altogether the five SASS-S subscales did not explain a significant proportion of variance in PM perceptions, $R^2 = .166$, $F(5, 63) = 2.31$, $p = .055$.

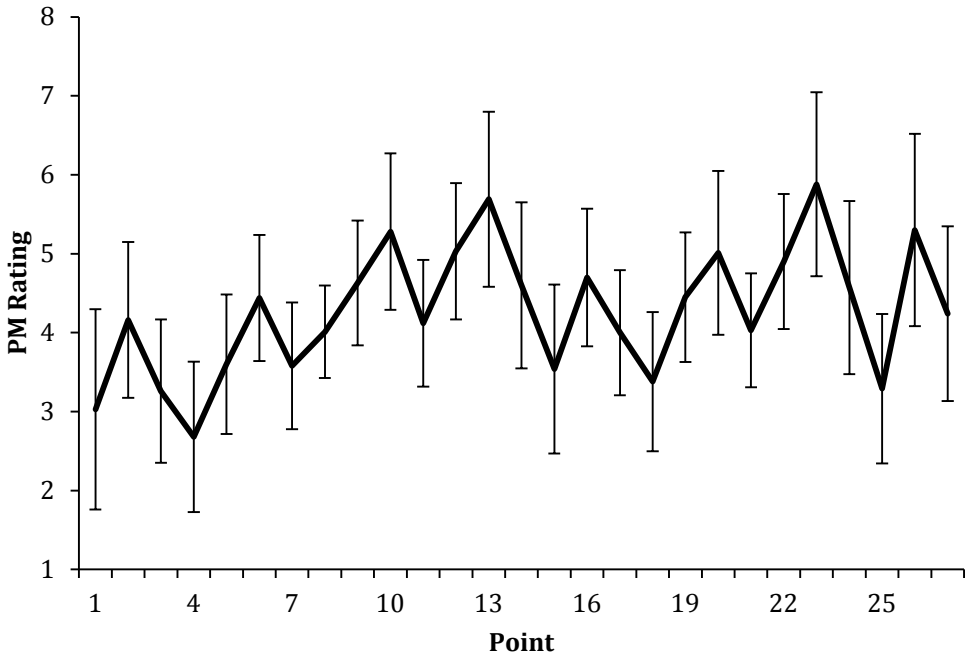
Table 2
Simple Linear Regression of SASS-S Subscales and PM Scores

Variable	Unstandardized Beta Coefficients	Standardized Beta Coefficients	Significance
(Constant)	128.261		.000
Internality	.047	.023	.861
Stability	.577	.269	.059
Globality	-.678	-.350	.019
Controllability	.057	.031	.814
Intentionality	.315	,268	.048

$R^2 = .166$, $F(5, 63) = 2.31$, $p = .055$

Post-hoc findings to consider herein include some of the descriptive data associated with the PMA (see Figure 1). Each participant rated the current PM of the match after each point. Noteworthy is that the largest standard deviation value corresponded to the first point. Essentially, some participants were convinced that winning the first point of the set was critically important, whereas other participants deemed the point to have little effect on PM. In addition, the standard deviations of the PM ratings of the last five points were higher than most points that came earlier. These findings suggest that there may be less agreement among volleyball players regarding the PM value of early and late points in a set or match.

Figure 1. Psychological Momentum assessment data displaying participants' mean PM ratings for each point and standard deviations of those ratings.



Discussion

The purpose of this study was to determine if optimistic thinking is associated with PM perceptions. Attributional style constructs intentionality and globality were found to be significant predictors of PM perceptions. Additionally, it was found that volleyball players tend to have greater disagreement regarding the PM value of points early and late in a set than those points in between.

For the first research question it was hypothesized that dispositional optimism would be related to PM perceptions. The results did not support this hypothesis.

Dispositional optimism did not correlate with PM perceptions. In an effort to explain the unexpected results, a reexamination of PM theory and the PMA is necessary. Specifically, the Antecedents-Consequences Psychological Momentum Model (Vallerand et al., 1988) proposes that PM is a product of context and personal beliefs. As such, the model purports that emotions and feelings of control, confidence, motivation, and energy precede PM perceptions in individuals.

Providing that contextual cues (i.e. spectators, officials, and playing conditions) were not inherent in the present study, it may well be that the PMA herein failed to elicit the emotions and feelings that are otherwise necessary for true PM perceptions to occur. Further adding to these perspectives, in their Multidimensional Model of Momentum Taylor and Demick (1994) conceptualized PM as unfolding in a five-step sequence: 1) a precipitating event; 2) a change in cognition, affect, and physiology; 3) a change in behavior; 4) an increase or decrease in performance; and 5) an immediate change in outcome. Arguably due to the written nature of the present assessment format, the participants in this study may not have fully experienced this process. Similar to the importance of affect to PM perceptions, the importance of positive affect associated with dispositional optimism has also been stressed (Sanjuán et al., 2008). Altogether, a possible explanation for the lack of significant findings may still lie in the lack of affect derived in participants during the study. In fact, from a methodological standpoint, it is well known that surveys and assessments may present ecological shortcomings in regards to eliciting and measuring psychological states (Cicourel, 2007).

Alternatively, dispositional optimism and PM perceptions may not be related constructs. Kerick et al. (2000) have for instance suggested that the role of affect and physiology on perceptions of PM may be overstated. PM perceptions may in fact have more to do with sport-specific knowledge than any dispositional quality.

For the second research question the findings revealed no correlation between sport-specific optimistic attributional style and PM perceptions. While research has shown that more optimistic individuals prefer stable, global, and internal explanations for their successes, and unstable, specific, and external explanations for their failures (Seligman, 1990), these findings were not replicated in the current study. It may be that the participants in this study did not take ownership of “winning” or “losing” despite the instructions to do so. More recently, Gernignon, Briki, and Eykens (2010) stressed that PM perceptions were more likely to develop when an athlete is pursuing a goal he/she perceives as important. No measurement in the current study was used to assess the inherent value that participants placed upon the goal of “winning” in the experimental script. The current study’s general problem in ecological validity may have been remedied by asking the respondents to image the particular scenario in order to best elicit the emotional responses preceding PM perceptions. Alternatively, a more natural and ecologically valid environment could have been simulated by using props, showing a previously recorded game, or administering commitment and manipulation checks to gauge participants’ imagery ability before and during the assessment.

For the third research question, a simple linear regression with the SASS-S subscales PM scores revealed that intentionality and globality were significant predictors of PM perceptions. Intentionality was determined to be a significant predictor of PM perceptions, $b = .315$, $p = .048$. This finding suggests that to the extent that an individual associates intentional action with sport success, they will perceive PM to be in their favor. This finding is consistent with previous literature that indicates that individuals believe PM and hot streaks may be contingent upon one's intentional actions (Roney & Trick, 2009). Essentially, PM is thought to be a quality that can be forcefully developed with the correct skills and strategy. Globality was also found to be a significant predictor of PM perceptions, $b = -.678$, $p = .019$. This finding suggests that the stronger the belief an athlete has that the cause of a sport-related success has only sport-specific relevance, the more likely they are to perceive PM in their favor. A possible explanation for this finding could be that competitive female athletes tend to make fewer global attributions than recreational female athletes (Hanrahan & Cerin, 2009). Through experience competitive athletes may develop an understanding that their athletic self-concept is separate from their self-concept in other aspects of life.

In contrast to intentionality and globality, the subscales of stability, controllability, and internality were determined not to be significant predictors of PM perceptions. Stability was close to being a significant predictor, $b = .577$, $p = .059$. This is understandable given the fact that globality and stability are highly correlated with one another. A relatively surprising finding was that controllability was not a significant predictor of PM perceptions, $b = .057$, $p = .814$. Controllability has been argued to be similar to intentionality (Russell, 1982; Weiner, 1985). The inconsistency of this finding may be attributable to the lack of a natural sport environment while measuring PM. The study design may not have elicited feelings of control to the extent necessary to influence PM perceptions. Consequently from a methodological perspective, future studies ought to investigate the ecological validity of the PM instruments used herein. Given that PM is among the most elusive concepts to capture (Moesch & Apitzch, 2012), improvement of its measurement tools would benefit the field. Finally, internality was also not found to be a significant predictor of PM perceptions either, $b = .047$, $p = .861$. This finding is not as surprising given that previous research has shown that internality has very little impact on expectations, which in turn may mediate PM perceptions (Peterson & Vaidya, 2001).

Beyond the previously discussed research questions, post-hoc analyses revealed moments of particular interest where there was greater discrepancy among participants with their PM ratings. Noteworthy is that the largest standard deviation value corresponded to the first point. Essentially, some participants were convinced that winning the first point of the set was critically important, whereas other participants deemed the point to have little effect on PM. Previous

research has also indicated some dissension among observers regarding momentum points in basketball (Burke et al., 2003) and tennis (Burke, Edwards, Weigand, & Weinberg, 1997). Future studies should address this observation and determine if this is indeed the case.

While some of the findings of this study were not as expected, they may still lead to practical implications. Intentionality was for instance found to be a significant predictor of PM perceptions. To the extent that an individual associates intentional action with sport success, they will perceive PM to be in their favor. Practitioners may then educate athletes that cognitions, affect, behaviors, and perceived goal progression are factors that can be optimized through intentional effort. That is, athletes may get to perceive that they aren't merely at the whim of their environment because they are capable of changing their cognitions, affect, and behaviors through their own will for their own benefit. Second, PM perceptions at times can be unclear and all athletes may not perceive PM similarly. Traditional sport psychology consulting wisdom emphasizes maintaining focus only on the point at hand and to value each point similarly (Mack & Casstevens, 2001). Sport psychology consultants may benefit from emphasizing this point-by-point awareness especially to render PM perceptions more clear to the athletes.

For all of the findings presented herein, the lack of ecological validity has been highlighted as an important shortcoming. Two additional limitations must be considered. First, the sample size was smaller than desired for correlation and regression research and may have contributed to the lack of significant findings. Second, the sample was sport-specific and gender-specific, which limits the generalization of present observations across alternative sports and populations.

To reiterate an important point from the previous discussion, a major obstacle that has prevented PM from being studied more effectively is that it remains a difficult concept to capture quantitatively due to its abstract nature (Moesch & Apitzch, 2012). Therefore, future research is warranted to develop more ecologically valid measurement protocols for best capturing PM. To that end, adding a qualitative perspective to the PM measurement framework may prove beneficial (Crust & Nesti, 2006). Consequently, practical implications drawn from more in-depth findings may help shape psychological skills training programs to promote positive PM perceptions in athletes.

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Appendix A
Volleyball Match Score Transcript

Team A	Score	Team B
Team A	1-0	Team B
Team A	1-1	Team B
Team A	2-1	Team B
Team A	3-1	Team B
Team A	3-2	Team B
Team A	3-3	Team B
Team A	4-3	Team B
Team A	4-4	Team B
Team A	4-5	Team B
Team A	4-6	Team B
Team A	5-6	Team B
Team A	5-7	Team B
Team A	5-8	Team B
Team A	6-8	Team B
Team A	7-8	Team B
Team A	7-9	Team B
Team A	8-9	Team B
Team A	9-9	Team B
Team A	9-10	Team B
Team A	9-11	Team B
Team A	10-11	Team B
Team A	10-12	Team B
Team A	10-13	Team B
Team A	11-13	Team B
Team A	12-13	Team B
Team A	12-14	Team B
Team A	13-14	Team B
Team A	13-15	Team B

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Shaping Policy and Practice in Intercollegiate Athletics: A Study of Student Perceptions of Resource Allocation for Athletics and its Effect on Affordability of Higher Education.

B. David Ridpath
Ohio University

Jeff Smith
University of South Carolina Upstate

Daniel Garrett
Center for College Affordability and Productivity

Jonathan Robe
Center for College Affordability and Productivity

Abstract

Intercollegiate athletics is an increasingly expensive venture in American higher education. Noted athletic powers have budgets exceeding $100 million, and schools with lesser reputations increase athletic budgets despite lacking the ability to generate large sums of revenue through ticket sales and other sources. Higher education is faced with declining amounts of non-student support for academic and non-academic programs (Vedder & Denhart, 2010). Public institutions increasingly rely on funds provided by institutional subsidies and student activity fees (Vedder & Denhart, 2010; Chapman, Ridpath, & Denhart, 2014). This mixed-methods study addresses, using Asymmetrical Information Theory (Akerlof, 1970), student perceptions of student activity fees. The population is represented by students (*n*=3,282) enrolled during the 2012-13 academic year at institutions in the Mid-American Conference (MAC). Findings suggest students are aware of the fees, but not aware of the amount or purpose. Many expressed concern about transparency and affordability of education because of the amount of subsidies to fund athletic programs.

Higher education access and affordability has become the focus of policymakers as costs have climbed in recent years. The attainment of a college degree is often considered paramount to achieving gainful employment, and earning much more over a lifetime than one otherwise would (NCPSI, 1998). In recent years, the funding of institutions of higher learning has been discussed on a more frequent basis (McClendon, Hearn, & Mokher, 2009; Tandberg, 2010a, 2010b). Budget cuts are occurring on campuses throughout the United States despite the rising costs associated with attending college (U.S. Department of Education, 2010). That has sparked many discussions as to how universities can maintain academic standing and primacy without placing a large financial burden on students.

The long-standing debate over college costs and access to higher education by the American population without regard to race, sex, or socioeconomic background has reached a crescendo in American political rhetoric. President Barack Obama spoke about rising tuition costs during his 2012 State of the Union address and put colleges and universities "on notice" by stating in 2012 that federal funding for higher education would decrease if tuition continued to rise (Thomas, 2012). For the past 25 years, tuition and fees have increased greatly, growing in 2012 to 5.6% beyond the rate of inflation (Page, 2011). General student fees at public institutions are rising even quicker at a rate of 13% or higher over a similar time frame (Vedder & Denhart, 2010).

While state governments have discussed limiting tuition increases, little focus has been placed on the additional fees that students must pay in addition or as part of their tuition. Although there have been some notable studies on this subject including Chapman, Ridpath and Denhart (2014), Ott (2009), Kent State University (2011), Smith and Caldwell (2013), and Vedder & Denhart (2010). This topic should be examined further, given the increased focus on higher education costs and the inability of many to pursue a college degree in the current unstable world economic climate (Vedder & Denhart, 2010). One such discussion revolves around athletic department fee subsidies students must pay as part of tuition and general fees to attend.

Literature Review

Institutional Subsidies for Intercollegiate Athletics

The often prevailing notion that athletic departments operate self-sufficiently like other campus auxiliaries such as housing and dining services remains widespread (Weaver, 2011). However, according to a 2010 *USA Today* study of the then-119 NCAA Division I-A schools, on average, 60% of athletic department income came from student fees and institutional subsidies. That represented an increase of over 20% on average over four years. In 2011-12, subsidies for all of Division I athletics rose another 10% by nearly $200 million compared to 2010-11, reaching a total of $2.3 billion. (Berkowitz, 2013; Berkowitz, Upton, & Brady, 2013; Berkowitz, Upton, McCarthy, & Gillum, 2010; Weaver, 2011). University athletics subsidization takes three forms: (1) Direct subsidy

from a general fund; (2) Indirect facility and administrative support, and; (3) mandatory fees students pay as a part of their tuition and fee bill (Chapman et al., 2014).

Student general fees, separate from course related and laboratory fees, are generally considered a revenue source to fund extracurricular activities that students desire (Denhart & Ridpath, 2011). In choosing a university to attend, high-school students consider many factors and place emphasis on university perception ("The Image of Ohio University," 2007). Such factors include the price differential of two specific universities (Bergerson, 2009), the academic programs/majors offered, social activities, and extra-curricular activities, among others. As athletic fees continue to rise, more research is needed into whether the importance universities place on athletics coincides with the importance students place on athletics, specifically with regard to college choice, affordability, willingness to pay and knowledge of these fees.

How Public Institutions of Higher Learning Expend Budget Dollars

Funding sources for public four-year institutions vary; according to the National Center for Education Statistics, the main sources include tuition and fees, federal and state grants and contracts, sales and services of auxiliary enterprises, independent operations, and state and local appropriations (Chapman et al., 2014; U.S. Department of Education, 2010). The general fee generates revenue for various activities that provide a better college experience for the student population, but receive little-to-no money through tuition.

Universities struggled throughout the 1800s to raise money for providing higher education to students with academic potential (Rudolph, 1962). Initially, due to benevolence and Christian beliefs foundational to the creation of American colleges, administrations felt it necessary to put student needs above tuition collection. DePauw University tried to skirt problems imposed by free tuition; in 1873, they gave all students free tuition, and charged mandatory fees (Rudolph, 1962). However, it wasn't until the early 1900s when the idea of student fees took a firm hold. Students began collecting voluntary student fees to provide a well-rounded experience in activities beyond the classroom for all students (Chapman, et al., 2014; Lorence, 2003). Those fees met a certain level of scorn as students felt they funded activities tangential to the aims of institutions of higher learning. After World War I, institutions of higher learning were thought to now have the responsibility of building character and well-roundedness as well as providing a comprehensive social and educational experience (Chapman et al., 2014; Rudolph, 1962). It wasn't until the 1960s that student fees again faced controversy. Students began to use student fees to fight for rights and freedoms as campus activism took root (Meabon, Alexander, & Hunter, 1979).

Public Interest Research Groups (PIRGs) were formed on college campuses across the nation by Ralph Nader during the 1970s. On the basis of advocacy for the benefit of college students, PIRGs staked a claim to a portion of the student fee money (Jaschik, 2007). Other groups followed suit, some considered more controversial than

PIRGs, such as religious and other political advocacy groups. Students questioned the legality of being forced to pay student fees to support groups with viewpoints that differed from their own, and filed lawsuits for the right to opt out of certain fees (Lorence, 2003). The rising operating costs of a NCAA Division I intercollegiate athletic department, and how it is primarily funded, have also come under scrutiny, but for largely different reasons. Students attending universities often face financial challenges post-college when student loans need to be repaid. Student loan default, huge debt amounts, and repayment challenges for college graduates are just some of the reasons Obama spoke out about rising tuition at American colleges and universities (Thomas, 2012). The total cost of college, including the payment of fees, has increased the level of interest in the growth of this higher education expense (Chapman et al., 2014; Vedder & Denhart, 2010).

A contributing factor to the closer examination is the growing phenomenon of the intercollegiate athletics "arms race," driven by a consistent justification for the increasing costs of intercollegiate athletics commonly called the "Front Porch Theory." The belief in this theory drives many monetary decisions in college sports as university presidents and trustees view athletics as the window that shapes university perception (Suggs, 2003). If that window is broken or dirty like the front porch of a house, it damages the reputation of other institutional aspects (Chapman, et al., 2014; Denhart & Ridpath, 2011; Frank, 2004; Litan, Orszag & Orszag, 2003; Vedder & Denhart, 2010). Many university presidents and athletic directors often claim, specifically in mid-major conferences like the Mid-American Conference, that students greatly value a strong intercollegiate athletics program as part of their collegiate experience. In addition it is suggested that a successful athletic program significantly influences college choice, fundraising, increases the numbers and quality of applicants, and provide a window to the institution that by extension can enhance research and academic activities (Rate & Karr, 2011; Suggs, 2003). Supporters also cite connections with alumni, donors, and government officials ("2011-12 Comprehensive Fee Report-Athletic Fee," 2012; Berkowitz, et al., 2013; Weaver, 2011). However, little empirical research exists to support those assertions. In most situations where there are measurable returns, such as higher application rates and fundraising, it is typically a short-term, unsustainable spike that doesn't create long-term benefits (Chapman, et al., 2014; Denhart & Ridpath, 2011; Frank, 2004; Litan, et al., 2003; Vedder & Denhart, 2010).

To keep the front porch in order, institutions often feel compelled to participate in a "winner-take-all market" (Frank & Cook, 1995). The "winner-take-all market" is an economic theory that suggests institutions face powerful incentives, fueled by the success of direct competitors, to increase expenditures for a competitive edge, even though revenues generated directly by college athletic programs fall far short of covering their costs in the overwhelming majority of cases (Chapman et al., 2014; Frank & Cook, 1995; Berkowitz, 2010). Since generated revenue fails to cover athletic operating expenses at nearly all institutions, the athletic budget gaps are almost always filled by subsidies from

other institutional resources and, most substantially, student fees to cover the increased costs and deficit (Vedder & Denhart, 2010). Discussion often revolves around the morality of university subsidies for athletic departments while state government support for higher education is dwindling (Chapman, et al., 2014; Denhart & Ridpath, 2011; Smith & Caldwell, 2013; Vedder & Denhart, 2010).

Each university and state allocates its student fees differently, but several areas listed below are consistent among public institutions in the United States and allocation to these primary areas has remained virtually unchanged for 60 years (Vedder & Denhart, 2010). State legislatures provide public colleges and universities guidelines for eight general areas that are permitted to receive funds from student fees, although they vary by state:

- Student health services
- Student social centers
- Debt service on student personnel facility
- Student government or student publications
- Student recreational programs
- Student cultural programs
- Debt service on general social facilities
- Intercollegiate athletics (Chapman et al., 2014; Millet, 1969).

Other areas noted in the survey for this study that student fees fund include club sports, university outreach/community service, and other student groups and organizations.

Student Fees Allocated to Intercollegiate Athletics

Notably, in the Mid-American Conference (MAC), intercollegiate athletics receive some of the highest funding from student fees (Berkowitz, Upton, McCarthy, & Gillum, 2010) and is an ideal population to address the theorized research questions and support research-based conclusions due to being one of the highest student fee subsidized athletic conferences. The subsidy has become more much expensive over time as athletic costs have soared at rates beyond growth in generated revenues (Vedder & Denhart, 2010). Most relevant to this study is the specific "student athletic fees" subsidy. Student athletic fees often provide benefits or at least a perceived quid pro quo for the students. The most common example of a benefit is what is advertised as reduced or free admission to institutional athletic events, even though the cost of admission is paid up front via the fee allocation whether the student attends the games or not (Berkowitz et al., 2010; Chapman, Ridpath, & Denhart; Denhart & Ridpath, 2011).

Several major Bowl Championship Series (BCS) institutions such as the University of Texas, The Ohio State University, and the University of Alabama do not charge fees to support their athletic departments and students pay for tickets to attend many athletic events, but others such as the University of Virginia do charge the subsidy,

while schools like Clemson University are considering it (McGranahan, 2014). Many institutions charge more than $1,000 as an athletic subsidy per academic year, including Longwood, Norfolk State, VMI, and William and Mary (Table 1). However, a small sample has been built in other studies to question whether students, parents, and faculty feel athletics are as important as the administration feels they are and worth the amount of subsidy assessed (Berkowitz et al., 2010; Chapman et al., 2014; Vedder & Denhart, 2010).

It can be debated that inconsistencies exist in the accuracy and transparency of the presentation of student athletic fees within National Collegiate Athletic Association (NCAA) Division I public institutions since the presentation of costs to the consumer is not standardized. Utilizing data from annual athletic department revenue/expense report submissions to the NCAA, specifically the Equity in Athletics Disclosure (EADA) Report, and publically available online information concerning enrollment at those public institutions, athletic subsidies per full-time equivalent (FTE) student can be derived, but it can be challenging to find the exact amounts charged. The subsidy per FTE measure in the EADA report is a total allocation of university resources and is more reflective of the cost of athletics per full-time student. Some institutions, such as the Michigan based institutions in the MAC have their student fees for athletics included in a total tuition amount rather than a separate fee (Vedder & Denhart, 2010). Coastal Carolina University (CCU) in Conway, South Carolina, states on the university website that student athletic fees (in-state) are $175 per semester, $350 annually. In CCU's 2010-11 filing with the NCAA, they indicated that athletic fee revenues were $3,720,622, while "other school funds" utilized to subsidize athletics were $12,898,882, for a total subsidy of $15,619,504. When contacted about the source of the "other school funds," a university official stated the funds come from tuition, but as stated prior some tuition amounts already include the fee for athletics. At Coastal Carolina, the subsidy from tuition is likely at least $1,935 annually per FTE, and not the published $350 (Smith & Caldwell, 2013). Data compiled for the 227 public Division I institutions revealed that total subsides in the academic year 2010-11 were $2,178,569,185, while educating 4,186,050 FTEs, or $520 per student. In many cases this amount was higher than the published student fee costs. The data in Table 2 exhibits the 10 states with the highest total subsidies to athletics within Division I public institutions in 2010-11.

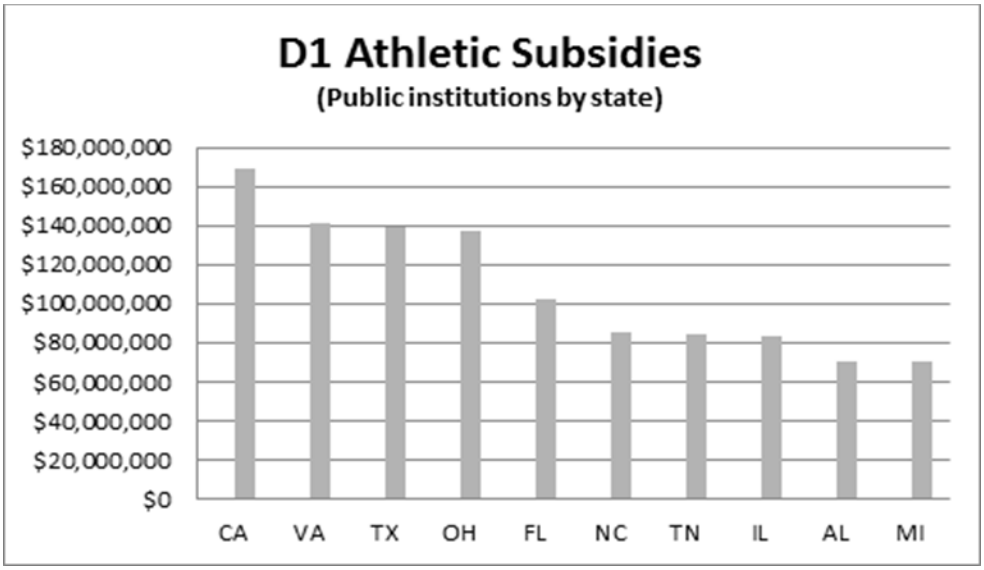
Table 1

Total of Athletic Subsidies based on FTE/Enrollment 2010-11 (USA Today, 2010)

School	Conference	Athletic Subsidies	FTEs	per FTE
Air Force	Mt. West	$25,736,400	4,619	$5,572
Delaware State	MEAC	$10,522,067	3,512	$2,996
Citadel	Southern	$8,394,216	2,832	$2,964
Army	Patriot	$11,760,014	4,686	$2,510
VMI	Big South	$3,083,712	1,569	$1,965
Coastal Carolina	Big South	$15,619,504	8,071	$1,935
South Carolina State	MEAC	$7,472,312	3,989	$1,873
Winthrop	Big South	$8,804,646	5,263	$1,673
Norfolk State	MEAC	$10,063,010	6,081	$1,655
Alabama State	SWAC	$8,084,904	5,164	$1,566
Longwood	Big South	$6,633,814	4,302	$1,542
Delaware	CAA	$28,535,457	19,613	$1,455
Nevada-Las Vegas	Mt. West	$32,292,436	22,663	$1,425
William & Mary	CAA	$10,796,203	7,690	$1,404
Savannah State	Ind.	$5,221,562	3,738	$1,397
James Madison	CAA	$25,704,568	18,471	$1,392
Arkansas-Pine Bluff	SWAC	$4,326,279	3,196	$1,354
New Jersey Tech	Great West	$9,934,161	7,496	$1,325
New Hampshire	Am East	$18,348,442	13,946	$1,316
Montana State	Big Sky	$14,534,373	11,213	$1,296
Alcorn State	SWAC	$4,160,650	3,247	$1,281
Eastern Michigan	MAC	$22,764,471	17,828	$1,277
Jacksonville State	Ohio Valley	$9,721,336	7,616	$1,276
Wyoming	Mt. West	$13,981,364	11,089	$1,261
South Carolina Upstate	Atlantic Sun	$5,880,819	4,763	$1,235

Table 2

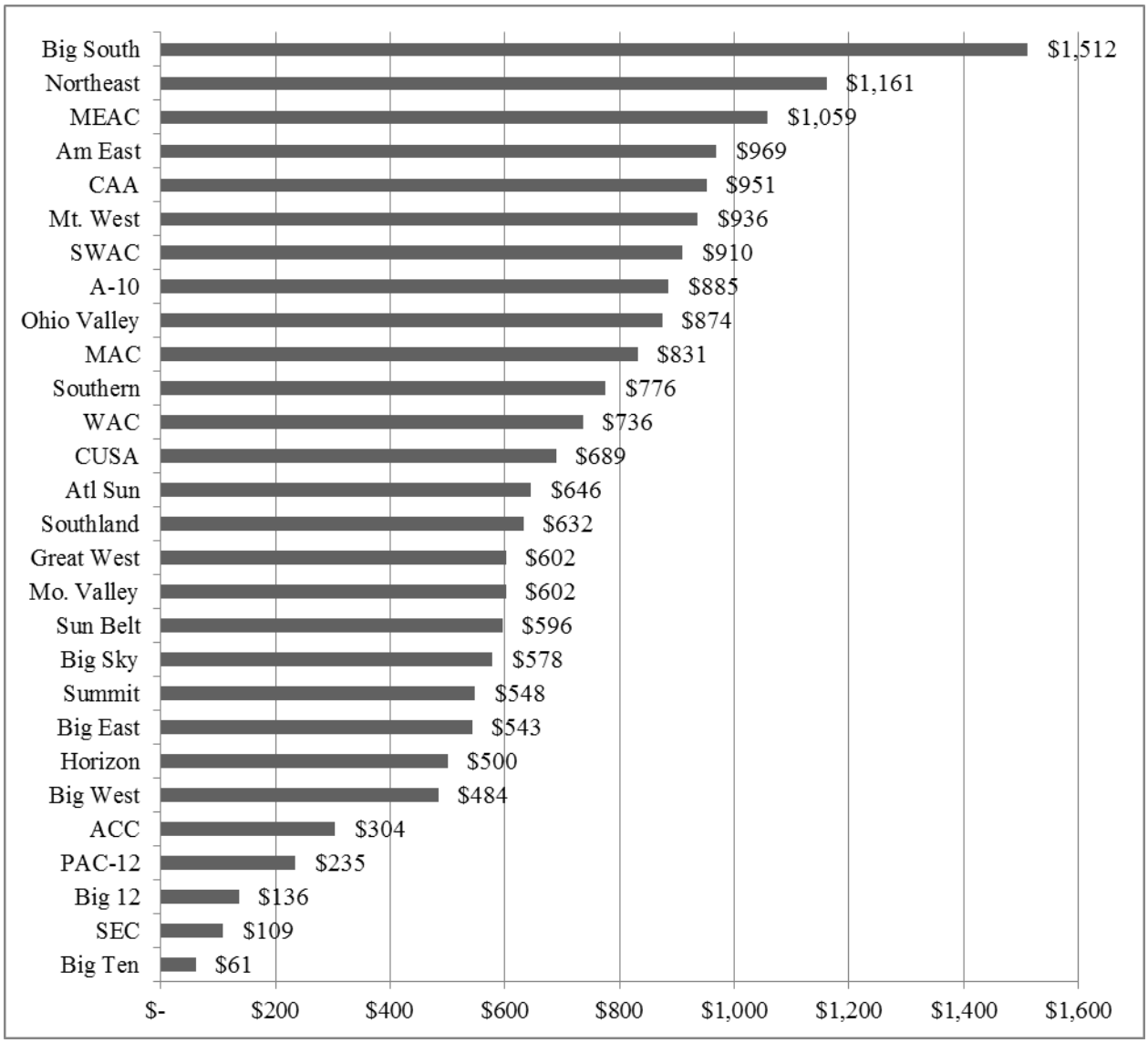
Division I Athletic Subsidies by State, 2010-11



Athletic subsidies have also been called a regressive tax, with the highest athletic subsidies aligning with institutions whose students most rely on Pell Grants and federally subsidized loans (Table 2) (Vedder & Denhart, 2010). Table 3 demonstrates the disparity between the revenues generated by athletic departments at major conferences (Big Ten, SEC, Big 12, Pac-12, ACC and Big East) and the mid-major conferences, similar to the MAC (Table 4). The average subsidy per student at a public university in a major revenue-generating conference such as the Big Ten Conference (Ohio State and Michigan for example) is $61, in contrast to the average subsidy per student in the Big South Conference (University of North Carolina-Asheville, Winthrop, Coastal Carolina, Radford, and Longwood Universities, and Virginia Military Institute) is $1,512 (Smith & Caldwell, 2013).

Table 3

Differences in Per-Student Athletic Subsidy between Conferences, 2010-11



Theoretical Framework for Study

This study follows the theoretical construct of the Asymmetric Information Theory (Akerlof, 1970). The theory concerns transactional decisions where one party has better information than the other. For this study, the one who has the information has the

transactional power (institution) and the purchaser (student) pays a fee to the institution without typically knowing the full amount of the general fee. In addition the purchaser does not know how the fee is spent and also lacks the choice of whether to pay the fee, or at the very least opt out of certain things the fees pay for. While previous studies have made it clear that explanations for spending in intercollegiate athletics, including charging fees to subsidize athletics, are needed and desired by involved stakeholders as demonstrated in the front porch and winner-take-all market theories, a perceived incentive exists to charge these fees as they will ostensibly make the athletics department more competitive, which might lead to gains in enrollment, marketability, etc. (Chapman et al., 2013; Vedder & Denhart, 2010). Incentives also exist not to make fees transparent or obvious to the consumer so as to keep the money flowing. This study analyzes the perceptions and knowledge (or lack thereof) of those fees by the primary stakeholders and largest athletic donors in the MAC: the students. The Asymmetric Information Theory provides a foundation for this study in that it discusses monetary charges for individuals who are not plainly aware of the charge or the implications while the one with the transactional power is aware.

Preliminary Data

The researchers conducted a pilot study in 2011, in conjunction with the Center for College Affordability and Productivity (CCAP), as a basis for this proposal to test the content and face validity of the survey instrument using a MAC institution (Ohio University) as a test population. All undergraduate and post-baccalaureate students enrolled on Ohio's main campus during the fall quarter of the 2010-11 academic year were invited to participate. The survey was conducted online, with an email containing the survey's link sent to all 19,843 students enrolled during the 2011-12 academic year. 910 total students responded completely to the survey and answered all of the questions (Chapman et al., Denhart & Ridpath, 2011; 2014; Rate & Karr, 2011, "Students speak out," 2010).

The findings provided an impetus for a more-detailed study such as this. In the pilot study, a higher percentage of Ohio University students (84.1%) were aware they paid an overall general fee that included intercollegiate athletics subsidies. Many respondents while understanding there was a fee paid toward athletics by each enrolled student, most (85.2%) were not aware of the amount of the total fee, suggesting a possible lack of transparency or explanation of the full amount of the subsidy. In rating the importance of intercollegiate athletics as to where students wanted their money allocated, athletics was rated consistently lower than its actual funding level and led the researchers to question the large subsidy if fee-paying students do not rate it as valuable as administrators/proponents/athletics boosters advertised (Chapman et al., 2014).

Methods

Demographics

One such NCAA Division I athletic conference with increasing and high institutional subsidies for athletics, including student fees, is the Mid-American Conference, headquartered in Cleveland, Ohio. According to the data presented in Table 3, the MAC is currently one of the highest subsidized conferences in NCAA Division I with regard to institutional subsidies and student fees (Table 3). Mid-major conferences such as the MAC find themselves trying to compete with institutions in NCAA Division I that have more resources and commercial funding. In the effort to keep up in the winner-take-all market, schools consistently charge students hefty subsidies to finance athletic departments that otherwise could not sustain themselves. In the MAC there are 13 member institutions split into an Eastern and Western division with a total student enrollment of more than 275,000, including more than 5,200 athletes in 23 sports (Table 4). Mid-American Conference institutions are considered peers athletically due to competitive equity, number of sports sponsored, athletic budgets, academic profile of prospective college athletes, and many other areas, such as demographics and size of institution (Ridpath, 2002).

The data demonstrate that the MAC and the Mountain West Conference (MWC) are the most highly subsidized athletic conferences through student fees for athletic programs in the 11 conferences of the BCS (Table 1). The MAC had 9 institutions in the top 25 highest recipients of student fees for athletics among all NCAA Division I BCS schools in 2009-10. (Chapman et al., 2014; “Chart,” 2010).

Research Questions

The questionnaire presented five specific research questions for analysis:

RQ1. Is the student aware that he/she is paying general fees, including an athletic fee? Y/N

RQ2. Is the student aware of the actual total amount of student fees at their institution? Y/N

RQ3. Does the student want to pay as much as they are paying for the general fee, specifically for athletics? Y/N

RQ4. Where does athletics rank on their priority list for general fee allocations? Y/N

RQ5. Do the students agree with the alignment of university allocations of general fee dollars with student desires, such as influencing school choice? Y/N

For this study, the researchers obtained data from students (undergraduate, graduate, doctoral, and professional) enrolled during the 2012-13 academic year at 12 of the 13 schools in the Mid-American Conference. The challenge of getting data ostensibly defined as public information was difficult and time consuming. One institution consistently refused Freedom of Information Act (FOIA) requests and others provided only limited information. The difficulty in obtaining public information from many of the schools cannot be understated and was challenging for the researchers to accurately

ascertain the amount of the subsidies considering some of the information was not publically available. Many of the institutions were also reluctant to provide exact amounts of their athletic-fee portion of the general fee, or it was challenging to find accurate numbers, specifically for the institutions that embedded the fee in the overall tuition amount. It took several FOIA requests, telephone calls, and separate Institutional Review Board (IRB) certifications (at some schools) to obtain secondary data and population information. Despite these challenges, the researchers feel that there is an adequate surveyed population and accurate numbers to conduct the study were obtained even though institutional response rates varied widely (Table 4). Limitations and suggestions for combating these issues are discussed in the limitations and suggestions for future research sections. Overall six institutions provided full directory information of all students, four provided smaller proportional stratified samples, two provided names only, and one institution refused to participate (Table 4).

Data Collection

Data collection was contracted with an independent data collection company, *Harris Interactive Research Bureau,* which conducted survey research via initial email and follow-up phone calls to increase the sample. The follow-up phone calls (1200 total calls, in which 761 responded) helped temper potential self-selection and non-response bias issues that might result by someone taking the survey to influence their point of view rather than to answer honestly (Phellas, Bloch, & Seale, 2012). There were several email reminders, along with the telephonic follow up, and a lengthy response time for the surveyed groups. The follow up phone calls were a non-response follow up and revealed similar answers as the survey between and among groups. In addition, the final breakdown of respondents closely resembles the demographic make-up of the institutions. Of the respondents over 80% represented the typical age of undergraduates (17-24 years of age), mirroring the undergraduate and post-undergraduate populations of the respective campuses for a representative sample across gender, class year, and ethnicity. This particular subgroup represents the largest population on all of the campuses in the study and the group most likely to go to one or more athletic event per year based on responses in the questionnaire. There was no filter to prevent currently enrolled intercollegiate athletes from participating in the survey. That was by design as the researchers wanted an accurate cross-section of university students, including athletes.

Data collection was conducted in four phases:

Phase I Summer-Fall 2012: Compile randomly selected stratified proportional sample, and/or adequate purposive sample of students at MAC institutions using publically available directory information obtained through public-records requests and internet research.

Phase II Late Fall-Early Winter 2012-13: Targeted emails sent to selected population encouraging them to participate in study.

Phase III February-March 2013: Second round of email surveys sent to those who did not respond to survey request. Provide more incentives if applicable.

Phase IV March-June 2013: Telephonic contact attempted with a sample of those who did not complete survey to encourage survey completion and reduce non-response bias.

The instrument used in this study was a self-developed questionnaire, gleaned from and similar to the one used in the pilot study to maximize reliability, with questions regarding institutional subsidies to intercollegiate athletics based on existing literature and empirical data. The specific issues covered in the survey were constructed to obtain the best answers to the research questions. Several questions contained a Likert scale and also asked numerous exploratory and descriptive items such as gender, ethnicity, and year in college. To minimize issues of content validity, the self-reported survey instrument was developed through an extensive review of past and present literature, surveys, and questionnaires, and trial-tested through the pilot test of a like population to strengthen internal validity and consistency (Chapman, et al, 2014; Denhart & Ridpath, 2011; Johnson & Christensen, 2000).

The overall response rate to this study, using the revised numbers (Table 4) was *n=3282* respondents out of *N=110,670* including Akron and Buffalo. For the data analysis, the final numbers were $N_1 = 109,821$ and $n_1 = 3258$, excluding Akron and Buffalo for a final response rate of 3% using purposive sampling and stratified proportional samples, depending on the institution. While under the initial goal of 5000 responses, the researchers strongly feel that the sample was representative and adequate based upon using the purposive sampling technique of Proportionate Distribution combined with the Equal Probability Selection Method giving everyone who received the survey an equal chance of answering (Johnson & Christensen, 2000). The researchers decided to stop the questioning and follow-up phone calls when a proportionate sample of MAC university demographics (such as Gender, Ethnicity and Grade Level) was reached. While the overall response rate was lower than planned, a 3% response rate at a 95% CI with a =/- 5% margin of error, meets criteria where smaller sample sizes are acceptable (Groves, 2006). While it is the goal of all research to generate the largest amount of responses possible, some recent research suggest that that changes in nonresponse rates do not necessarily alter survey estimates (Groves, 2006). Some notable on-line research services, such as Snap Research and Survey Monkey accept less than 700 total completed surveys for a random population of 200,000 (Snap Research, 2013). While 10%-80% is generally considered to be an effective response rate for a research-based survey, it is still arbitrary and there is no agreed-upon standard of what constitutes an acceptable response rate. It depends on the study itself, the population, and how the survey was conducted (Cummings, Savitz & Konrad, 2001).

Table 4

Athletic fee, Surveyed Population and Responses. Excludes part time students

School	Athletic Fee	Population	Responses
	Sem/Year		
University of Akron	$327/$654	312	16
Ball State University	$204/$408	17052	254
Bowling Green State University	$352/$703	14224	301
University of Buffalo	$237/$474	537	8
Central Michigan University	$309/$618	5000	127
Eastern Michigan University	$305/$609	5000	138
Kent State University	$271/$541	5000	683
Miami University	$453/$906	4000	87
Northern Illinois University	$253/$506	14494	228
Ohio University	$201/$401	12353	635
University of Toledo	$300/$600	11759	368
Western Michigan Univ.	$331/$663	N/A	N/A
University of Massachusetts	$463/$925	20939	387
		N= 110,670	n=3282
		N_1 =109, 821	$n_{1=}$3258

Data Analysis

This research was designed as a descriptive research design, mixed-methods study, with quantitative and qualitative data that enables the researchers to perform a deeper analysis of the findings provided by the respondents' answers. This proposal incorporated self-reported data gleaned from the survey instrument of a purposive proportional sample of students who attended MAC schools during the 2012-13 academic year. The population was selected according to the steps mentioned in the data-collection section.

Descriptive Statistics

One objective of this study was to glean a sample of up to 5,000 enrolled students at MAC institutions during the 2012-13 academic year at all academic levels who were fee-paying students (undergraduate, masters, doctoral, and distance learning). Another objective was to ensure a good cross-section of the population proportionate

demographically to limit potential bias of any one group such as graduate, doctoral, or distance-learning students who might pay fees, but likely have a lesser interest in the university sports program than undergraduates which was validated by answers given on the questionnaire (Denhart & Ridpath, 2011).

Of the respondents, 60% were female and 39% were male. This is slightly higher than the overall male/female ratio in MAC institutions, but valid for the purposes of the study. The ages of the respondents varied from 18-65+, but 89% of those responding were in the 17-29 age group, a key demographic more likely to watch sporting events (Milner & McDonald, 1999). This proportion is almost exact with the enrollment breakdown by age at MAC institutions which have primarily traditional college aged students attending (18-22 years of age). With regard to ethnicity, 84% identified as Caucasian/White, while the remaining percentage identified as non-white (African-American, Latino, or other). This also resembles the overall ethnic breakdown of MAC schools. The majority of the respondents were undergraduates (75%), and 25% identified as master's or doctoral students. The bulk of the population also fell within the 2.5-4.0 GPA range, which matches well with the overall average GPAs of students at MAC institutions.

To add to the validity of the study, the researchers performed some data cleansing and eliminated the responses from the Universities of Buffalo and Akron due to their low institutional response rates (Table 4). The researchers also eliminated part-time students for the data analysis because they typically pay much lower pro-rated general fees including the athletic subsidy and the amount part-time students paid in fees varied substantially by institution. The final analysis numbers kept the response rate fairly consistent, but more accurate by using only full-time degree-seeking students paying the full general and athletic fees at their respective institutions. Considering the population of currently enrolled college students at MAC institutions, the researchers are confident in the adequacy and representation for the purposes and goals of this study.

Results

Research Questions 1-3

The researchers employed *t*-tests, excluding part-time students and respondents from Akron and Buffalo, to analyze the research questions by comparison of conditional means. For Research Questions 1, 2, and 3, the analysis was done both separately for the full revised sample. Subsequent analysis eliminated full-time graduate and doctoral students for a robustness check to insure the results were consistent. The other questions were analyzed using the entire revised sample excluding Akron, Buffalo, and part-time students.

The first test statistic was defined from how students responded to the question, "To your knowledge, does your university charge a general fee (in addition to tuition and room/board charges)?" They had the options "yes," "no," and "I don't know." Those who

answered "yes" were given a value of 1, while those who were unsure were given a zero to create the variable of interest ($var1_i$). The test statistic (x_1) was calculated by $x_1 = \frac{\sum var1_i}{n}$ and was tested for significance in Table 5 with a one-tailed t-test against the following hypothesis:

H_0: Students all know that they are charged a student fee (x=100%).

H_A: Students do not all know that they are charged a student fee (x<100%).

The second test statistic was defined by the difference between student responses when asked to estimate their fees (est_i) and the actual fees for their respective school (act_i). The test statistic (x_2) was calculated by $x_2 = \frac{\sum est_i - act_i}{n}$ to capture the average error of the estimation. x_2 is tested for significance in Table 5 with a two-tailed t-test on the following hypothesis:

H_0: Student estimates of the fee are equal to the actual fee (x=0).

H_A: Student estimates of the fee are not equal to the actual fee ($x \neq 0$).

The third test statistic was defined from how students responded to the question, "Please select a range that you would be willing to pay per year to support the intercollegiate athletics department maintaining its current Division 1 status in the (MAC) of the National Collegiate Athletic Association (NCAA)." They had the options to decrease, to keep the fee the same in the future, or to increase the fee by several different amounts per semester. These answers are shown more fully in Table 6. Those who answered that they wanted the fee to decrease in the future were given a value of 1, while those who did not were given a zero to create the variable of interest ($var2_i$). The test statistic (x_3) was calculated by $x_3 = \frac{\sum var2_i}{n}$ and was tested for significance in Table 5 below with a one-tailed t-test against the following hypothesis:

H_0: Students are content with the fee and do not want to reduce the fee (x=0%).

H_A: Students are not content with the fee (x>0%).

Table 5

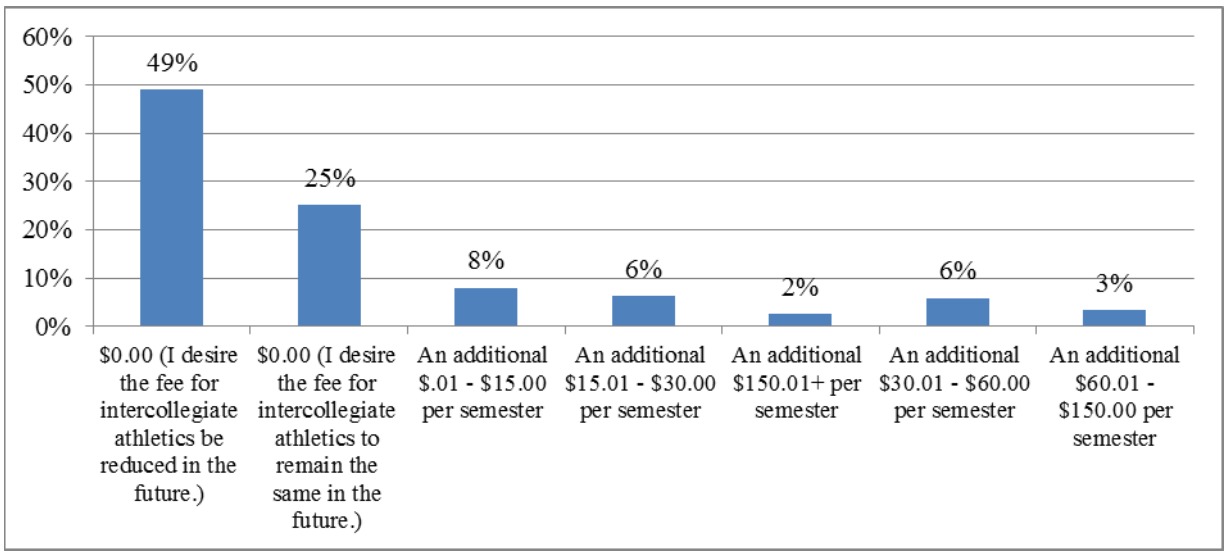
Research Questions 1, 2 & 3 Comparison by Conditional Means

	Full Revised Sample				Without Graduate Students			
	Mean	t statistic	p value		Mean	t statistic	p value	
RQ1:	37.30%	39.07	<.001	***	40.90%	39.27	<.0001	***
	(0.0095)				*(0.0104)*			
RQ2:	-$95.00	-8.56	<.001	***	-$103.32	-8.51	<.0001	***
	(11.10)				*(12.14)*			
RQ3:	48.20%	48.86	<.001	***	46.90%	44.37	<.0001	***
	(0.0099)				*(0.0106)*			

Standard Errors are reported in parentheses below statistics

Table 6

Do students want to pay as much as they are paying to finance the athletic department?



One of the more consistent claims by university presidents, certain alumni, and athletic administrators and coaches is that having a successful athletic program is a priority of the student body and funding it to a competitive level is important. In addition athletics is often touted as a strong and positive enrollment driver, along with it being a significant reason for a prospective student in choosing a college or university to attend. (Chapman, et al, 2014; Rate & Karr, 2011; Vedder & Denhart, 2010). The data presented in Tables 7 & 8 contradict that line of thinking, at least in the Mid-American Conference. Since it is one of the highest subsidized athletic conferences it is important to glean the data from the student body to ascertain if indeed it is as important as often claimed.

Table 7

Where does Intercollegiate Athletics rank as a priority for funding and was it important in school choice? (RQ 4)

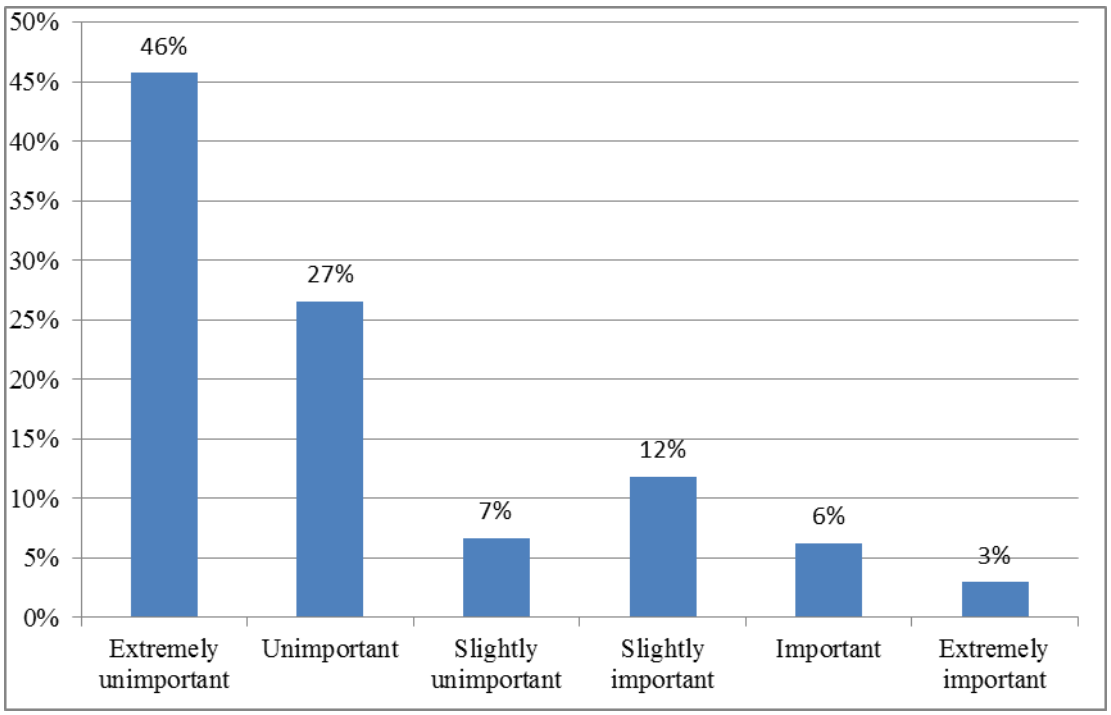
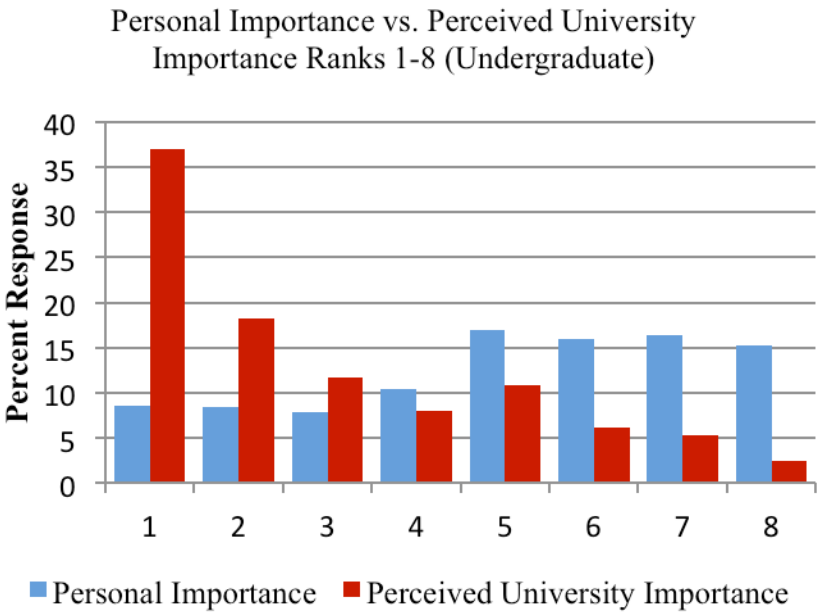


Table 8

Ranking the 8 Most Commonly Funded Areas of Student Fee Allocations (RQ 5)



Qualitative Responses

At the end of the survey, the students were given an opportunity to make additional comments on the topic of athletic fees. The qualitative statements mirrored the quantitative responses in most cases. Almost 700 students responded to the last question, and specific comments are below. These responses were varied and at many times pointed, but the themes that consistently came across in the qualitative answers, like the quantitative responses, mostly indicated a lack of knowledge, disappointment, or outright anger over the charging of the fees. A low percentage (less than 5%) of qualitative responses supported the continuation of athletic fee assessments at the current amounts or even supported increase fee assessments in the MAC.

While many qualitative answers were similar to the quantitative ones, the overriding theme of the qualitative responses was a desire to have an itemized bill so that the students/parents would know how universities spent the money. The amounts going to specific athletic programs was surprising to many, but even in cases like this several respondents still expressed a desire to continue paying fees to athletics because they felt it was good for the entire school and they enjoyed sports, but not at the amounts that were provided in the survey. Again, the majority of the respondents did not know the university assessed an athletic fee in addition to tuition. Some sample qualitative

statements that supported the themes above and are representative of over 90% of the answers given include:

1. *"Thank you for bringing this to my attention. I really appreciate this."*
2. *"Knowing multiple athletes, I still think we have to pay too much for the athletic program."*

3. *"Before this survey I knew there was a general fee, but I had no idea how much."*
4. *"In order to continue the fine level of athletics in the Mid-American Conference it is essential to continue to ask for the support of the student body. Otherwise the larger more profitable conferences will continue to dominate with their excess of funds."*

5. *Absolutely ridiculous! I had no idea this was going on. I will definitely look into this. I have never been to a sporting event here, nor do I ever plan to.*

6. *"I didn't even know there was a general fee. This survey actually shocked me and I was just so surprised because I feel like that is a lot of extra money per year. I can barely afford college as is and finding out that I have to pay about $1,500 dollars more just for some of the stuff mentioned in the survey it made me mad. I can't get help to pay for school because my school doesn't have it yet I have a little over $1500 due and it could be because of that general fee. Are you serious??? That could be the reason that I can't afford to go here. That is some bull crap."*

7. *"Students should have a greater input into how their general fee contribution is used."*

8. *"I would appreciate knowing exactly what my general fee was going towards and exactly how much."*

9. *"The general fee should be itemized to give students a better understanding of what they are paying for. College is expensive and it's important to know where our money is going and if it is relevant to us."*

10. *"I understand that athletics are important to some, but I feel that a learning institution such as a college should focus on academics and the teaching/learning experience. I would prefer to go to a college that has a Division 1-type status in some sort of knowledge-based competition. The athletics can still be a maintained part of the school, but I feel as if it is*

supported and advertised over the educational accomplishments the school should be striving for first and foremost."

Conclusions and Recommendations

The quantitative and qualitative data demonstrate that a sizable number of students remain unaware that they pay an overall general fee, much less a specific athletic fee. The ones aware of the fee were unaware of the amount. That disconnect can exist for several reasons: the students themselves do not pay the bill, expenses can be largely covered by grants, loans, and scholarships, and the fact that most institutions in the MAC lack transparency with their fees, often only listing a total general fee amount and not itemizing the actual amounts, specifically the amounts for athletics ("Examining the University Bill," 2011). In most cases, it is very difficult to find the exact amounts charged in the general fee and even more difficult to find out the exact amount of the general fee that goes toward athletics. While this information is publically available in all cases for MAC institutions, it is a difficult exercise to find exact numbers through university records ("Examining the University Bill," 2011; Ridpath et al., 2013). In the case of the MAC and similar institutions that do not generate enough revenue to cover costs, the athletic programs almost entirely depend on financial support from students. The lack of transparency and ignorance surrounding fees by students as the primary consumer challenge the theory that funding at the highest possible level increases competitive equity and tis important to the overall good of the institution (Tucker, 2011).

At the very least, a primary recommendation for institutions in the MAC is to be transparent about their fee structure, including the exact amount that goes for athletics. Let the student/parent decide if they want to pay it by enrolling or not enrolling, but do not hide it or make it seem like a backdoor tuition increase. Deception makes it appear as if the university prefers the public to be ignorant. That may not reflect reality, but it is a realistic perception considering the difficulty in finding exact numbers. This aligns with the theoretical construct of Asymmetric Information in that the student consumers as purchasers do not have the information to make informed decisions. The institutions with transactional power often do not give the full information of the fees and what they are used for, specifically for spending in intercollegiate athletics. Affordability and access to a high-quality postsecondary education is critical in the 21st century for workforce development, economic output, and individual career success. However, while tuition, fees, and room and board at four-year residential institutions continue to increase, many students turn to more affordable two-year institutions. By 2009, almost half of all college students at public institutions attended a two-year campus and this trend is continuing at roughly 45% in 2012-13 (American Association of Community Colleges, 2014; Deil-Amen, 2011; Vedder & Denhart, 2010). An economic theory called the Teibout Hypothesis supports the trend toward lower cost educational options and is a contrast to the Asymmetric Information Theory in that it supports that information received on perceived higher costs may actually cause a reverse effect on enrollment, even if an

institution has high levels of athletic success. The hypothesis, developed by Charles Teibout, explains why people would switch voting districts because of economic benefits, real or perceived, in the other district. In essence, the Tiebout hypothesis formalizes voting with the feet or casting a vote for the jurisdiction with the most preferred package of government activity. If one district has higher taxes than another with lower taxes that encourage business activity, a citizen can essentially cast a vote for the most compatible district by moving there (Wooders, 1999). Continued growth in intercollegiate athletic expenses, mostly through increased student athletic fees can lead to the consumer choosing the lower educational cost option and have the opposite effect desired by the institutions who are charging the fee.

While institutions believe that this primary funding mechanism for intercollegiate athletic programs is needed and desired by involved stakeholders, it is clear at least in the MAC as demonstrated in the front porch and winner-take-all market theories, a perceived incentive exists to charge these fees. The belief is this subsidy might make the "front porch" more appealing through athletic success and lead to gains in enrollment, marketability, fund raising and academic status. There appears to be an incentive not to make fees transparent or obvious to the consumer because as the data demonstrate, most students do not know about the fee and do not want to pay it. While the fee paying student would desire this information, colleges and universities are theoretically more incentivized to keep tuition down and transparent while many hidden costs are within the general fee amount. Colleges and universities should understand the real possibility that fee-paying students and their parents will look at other, more optimal and market-like educational options should athletic fees become too burdensome, at least at some schools as in this data set, where athletics do not drive college choice.

If institutions want to justify the amount of student fees going toward athletics department operations, institutions need to do a much better job of showing the benefits of an athletics department and increasing institutional subsidies for it. The schools can do that by providing empirical data (if it exists) and long-term benefits of athletics to the student population, academic programs, and alumni, and not continue to recite empirically unsupported statements like the Front Porch Theory. Repeating a belief opinion does not make it fact if unsupported by data. If tangible gains and benefits exist, universities should be able to document and show those beyond unsustainable short-term positive spikes.

Limitations of Study

Several limitations in this study must be discussed. While it was disappointing not to get full cooperation from all 13 schools of the MAC, it did not limit the data findings but did limit the ability to get a larger participation sample. In the areas where the researchers had to find personal student data themselves by online data mining, the response rate was very low, causing those schools (Akron and Buffalo) to be excluded from the final data analysis. It cannot be said for certain that, if Western Michigan

participated and if Akron and Buffalo provided directory information, the results would be the same. The data might support the trends that have been presented, or it might change the results enough to alter the conclusions. Based upon the trends and the minimal information provided by Buffalo and Akron, including the confidence interval of the current analysis, the researchers believe those exclusions would not alter the findings of the study based on the diversity of the population, answers given, and the confidence interval of the data analysis.

Getting the exact amount of fees paid by each student, specifically the athletic fee was also challenging. Some universities in this study were reluctant to share—or, at least, share easily—that information while others were very cooperative. It is not for certain whether the athletic fees reported for this study are 100% accurate, as many times the exact subsidy can be a moving target. One university (Toledo) could not provide an exact amount, only an estimate, based on the trend of calculating at the end of the fiscal year what students will pay for their athletic subsidy and other student fees based upon total amount of general fee revenues collected at the end of a fiscal year.

Recommendations for Further Research

Excluding part-time students from the final analysis was a decision of the research team because they are not paying the full amount of the fee. In the future, it might be interesting to analyze the perceptions of part-time students to gauge their assessment of fees they pay, including the athletic fee, regardless of the percentage difference. The researchers plan to expand this study regionally and nationally in the future while enhancing and expanding the qualitative aspect to gather more direct and detailed responses, in addition to enhancing the survey instrument. There simply needs to be a greater awareness of the issue to all constituents involved in higher education, and an expanded study will assist in that goal.

The influence of new media on intercollegiate athletics also cannot be discounted. It can be argued that athletics had a greater influence on school choice before the proliferation of college games, in every conceivable sport, being readily available on television, computers, and handheld electronic devices. Consequently, it can be hypothesized that many consumers, including students attending mid-major schools like those in the MAC, no longer have the attraction to their own institution's athletic programs because of the availability for constant contact with larger, more popular intercollegiate programs in the state or region. That could significantly affect the viability of mid-major programs in that they lose fans and other revenue streams to institutions that have financially viability, thus creating a situation where more institutional subsidies are needed for the winner-take-all market.

Any future study must involve some level of compensated legal counsel for public-information extraction from public institutions to free up researchers for data analysis. A tremendous amount of time was spent on filing FOIA requests, responding to answers and inquiries. Additionally, future researchers should involve elected officials

and their local offices to accelerate public-information access so that all students at public institutions, along with parents and funding agencies, can have the opportunity to know how much their institutions charge for the total general fee, including the amount that goes towards athletics.

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NFL Time Management: The Role of Timeouts in End-Game Scenarios

Bryan Beasley
University of San Francisco

Ryan Greenwald
University of San Francisco

Nola Agha
University of San Francisco

Abstract

Time management is an important part of game strategy in the National Football League (NFL), especially in the second half of a game that could be decided by a field goal. This paper determines the in-game factors that contribute to an NFL offensive team's total time taken to reach field goal range during the final six minutes of regulation in games that are within three points or less. Using data constructed from 2009-2011 NFL regular season games, we find that neither quarterback rating nor the number of All-Pro players affect the speed at a which a team reaches field goal range. However, counter to conventional wisdom, using an offensive timeout during the final drive of the game extends the time it takes to reach field goal range by 22 seconds. On the other hand, the mere availability of an offensive timeout decreases the time it takes to reach field goal range by 19 seconds. Both of these effects are found in games where the offense is behind by 1, 2, or 3 points, but not in tied games. These findings inform in-game coaching decisions for football head coaches.

Introduction

> "It's about strategically giving your team the best chance to win. That's really the essence of it. How to do that? There's 1,000 different ways, based on the situations. Those situations present another set of circumstances that you have to spend a lot of time reviewing, understanding, preparing for. The game is going to happen so quickly, if you're not prepared for it, it could affect you." – Michael Lombardi, NFL Network Analyst and former NFL Player Personnel Executive

Time management in the National Football League (NFL) is a heavily discussed topic because the ability to manage the game offensively and defensively affects a team's probability of winning (Branch, 2011; Sackrowitz & Sackrowitz, 1996). For example, the 2012 Super Bowl featured New England Patriots head coach, Bill Belichick, making the unprecedented decision to let the New York Giants' Ahmad Bradshaw run for a 6-yard touchdown on the Giants' final possession. Belichick dwindled the clock down at the two-minute warning to the 57-second mark because he underestimated the sufficient time he needed to score with one timeout remaining. This mismanagement of time by Belichick and his staff minimized the Patriot's opportunity to respond to Bradshaw's touchdown.

Hadley, Poitras, Ruggiero, and Knowles (2000) estimate that efficient coaching accounts for three to four additional wins in a season. This dramatic difference in success suggests that it is a head coach's duty to utilize all information on-hand to influence their play-calling decisions to give their team the best chance of winning. Indeed, NFL teams have added entry-level positions known as quality control coaches who prepare statistical analysis on both sides of the ball. As evidence of the incredible importance placed on time management as part of the current NFL coaching strategy, many former quality control coaches including Lane Kiffin, Eric Mangini, Mike Munchek, Mike McCarthy and Raheem Morris have worked up from this rank to become head coaches in the league.

NFL teams use various techniques to manage the time left on the clock near the end of a game. When there are less than two minutes left in the game, players can control the clock by ending a play out of bounds, spiking the ball, or calling a timeout. Coaches, on the other hand, control the time by their choice of plays and using timeouts. Because timeouts are an important tool for coaches to control the clock, teams carefully guard their timeouts and rarely use them until the end of the half or the end of the game when they feel clock control is most important. Yet, a fascinating phenomenon occurs at the end of the game – even

coaches in close games that require careful control of the clock rarely use their timeouts.

This inspired our focus on situations where the use of timeouts should be most prevalent, specifically, in games where the offense is down by three points or less with less than six minutes left on the clock. In these games the offensive teams should have two identical objectives: 1. to score a field goal, at minimum, to win or tie the game and 2. to manage the clock so that little or no time is left for the opponent to score (see Figure 1). If a field goal is the minimum score needed to avoid a loss, then the offensive team is actively positioning the ball to be at least at the opponent's 35-yard line so a game-winning or game-tying field goal can be attempted. Romer (2006) identifies the 35-yard line as the point where a team's decision to punt or attempt a field goal changes.

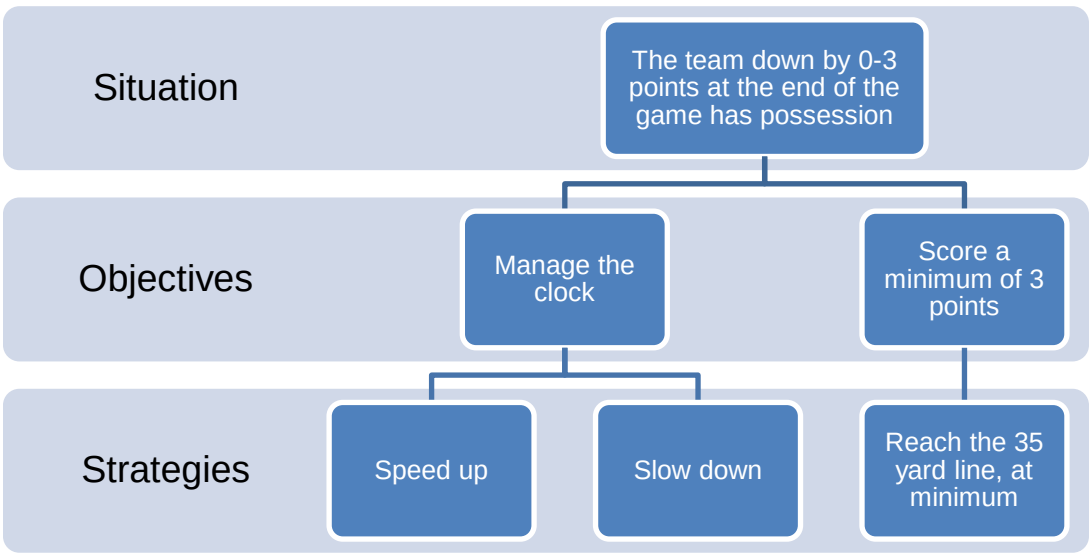

Figure 1. Different strategies employed by teams with identical objectives in the same situation.

While the objectives of teams down by three points or less are identical, the time management strategies by which they achieve their objectives are a function of whether they are seeking to speed up the game or slow it down. Said differently, teams that take possession of the ball with several minutes left in the game achieve the objective field position by running as much time off the clock as possible while simultaneously putting themselves in scoring position. On the other hand, teams that take possession of the ball with little time left in the game achieve the objective field position by stopping the clock as much as possible and preserving enough time for their offense to score. This research carefully

distinguishes between these different strategies to determine the variables that affect the speed at which a team moves down field. The critical similarity in both cases is the need to know which variables speed up or slow down the drive separate from the plays called by the coach. Thus, using secondary data obtained through content analysis of recent NFL games, the objective of this explanatory research is to investigate the in-game factors that affect a team's total time taken to reach field goal range.

As time management continues to play a significant role in game outcomes, understanding these variables will inform coaches and allow for adjustment of game decisions and play-calling. Existing research on this subject is minimal at best, which provides the opportunity to relate in-game variables to the total time an offense needs to move into scoring position.

Time Management

A considerable body of literature exists that examines the probabilities of success given certain in-game situations. Sackrowitz and Sackrowitz (1996) argued that when an offense focuses on maximizing time of possession, at the expense of focusing on scoring, the probability of scoring actually decreases. Despite their conclusion that an optimal strategy is to maximize the number of possessions in a game, in the time since their results were published the discourse on time management in the NFL has continued to emphasize time of possession.

Similarly, both Alamar (2006) and Kovash and Levitt (2009) report that passing plays have a higher rate of expected returns than running plays, yet teams run and pass with equivalent frequencies. Further research (Alamar, 2010) confirmed this finding even after accounting for the outcome of the play in relation to the drive. Likewise, Romer (2006) reported divergence from optimal behavior in his analysis of fourth down attempts. He found a team's play calling choices are "dramatically more conservative" (p. 354) than one would expect based on probabilities of success in fourth down situations. Further investigation using kickoff strategies (Urschel & Zhuang, 2011) clearly confirms NFL coaches are both risk averse and loss averse which explains why their behavior diverges from decisions that would increase the probability of success.

The reality is that NFL teams still spend considerable time and effort controlling the time on the clock despite the availability of analytical research which suggests otherwise (Alamar, 2006, 2010; Kovash & Levitt, 2009; Romer, 2006; Sackrowitz & Sackrowitz, 1996; Urschel & Zhuang, 2011). Romer (2006) reminds us that coaches are not statisticians; instead, they make conservative, risk-averse decisions based on a variety of intangible variables at hand.

As coaches do not follow the strategies that result in the highest probability of winning, the body of research devoted to probabilities is of limited use to the present study. Instead, we follow the call of Bursik (2012) who

suggested we set aside theoretical optimization and instead investigate the actual behaviors of actors in the NFL. Accordingly, given the reality that coaches do not select strategies that optimize the probability of success, we approach the time management decision at the end of the game from the perspective of a practitioner, specifically, a coach who continues to believe that retaining possession of the ball at the end of the game is the optimal strategy. Currently, coaches simultaneously attempt to score and to maintain possession of the ball through careful time management. Thus, the question at hand is which variables affect the speed at which the ball moves down field. More specifically, because timeouts are the primary tool used by coaches at the end of the game to manage time, it is imperative to know how the availability and use of timeouts affects the time management process. Without evidence to inform a coach's decision to hold timeouts or deploy timeouts, there is little incentive for a coach to change his ways. If a coach knew the average time needed to allow his offense to get into field goal range, a coach could better allocate his timeouts in order to give his team the proper amount of time to drive down the field.

Once we moved away from the probabilistic research, above, we have identified no previous research that utilizes time taken to reach scoring position as the dependent variable. Instead, informed by research on team production and determinants of scoring, we utilize the variables available to coaches as our independent variables. In other words, from the perspective of a coach standing on the sidelines, the variables in front of them are the amount of time left on the clock, their actual field position, the timeouts available to them and to their opponent, whether the two minute warning will occur during their drive, the quality of their players, and whether they are playing a home game or not. We explain each briefly here and provide more detail in the Methods section.

The amount of time left on the clock will be a strong indicator of the time taken to reach scoring position because this will determine whether a coach implements a strategy to speed up or slow down (see Figure 1). Similarly, actual field position will dictate how fast a team needs to move downfield. The number of timeouts available to both teams will affect the time taken to reach scoring position because these are tools at the control of each coach that are available to stop the clock. Carter and Machol (1971) conducted probabilistic research on timeouts and Goldschmied, Nankin, and Cafri (2010) found that timeouts do not "ice" a kicker. Beyond that, there is no research that indicates how the availability or use of a timeout affects the time that it takes for a team to move into scoring position. Similar to timeouts, the two minute warning stops the clock and is used by coaches as a tool to control the clock and the speed at which they move downfield. The quality of players is a determinant of both production (Berri, Schmidt, & Brook, 2006) and scoring (Pfitzner, Lang, & Rishel, 2009) when measured for entire games and is thus likely to affect the speed at which a

team moves downfield during a shorter portion of a game. Berri et al. (2006) found that a quarterback's success is tied closely to the skills of their teammates thus variables that capture both quarterback quality and team quality are included in our analysis. Finally, considerable evidence exists that home field advantage is real (e.g. Jamieson, 2010).

Because no research has investigated the variables that affect the time needed to move into scoring position at the end of a game, this research is very important and has practical applications for the thousands of football games played in high school, college, or professionally every year.

Method

Sample and Data

In the 2009-2010, 2010-2011, and 2011-2012 seasons there were 768 regular season NFL games. Within those, 83 possessions met the specific criteria for this research: the games were tied or within 3 points in the last 6 minutes of regulation play, the team behind had possession of the ball, and that team reached the 35-yard line before the end of the game. Postseason games are excluded because the league changed overtime rules beginning in the 2010–2011 season.

The data comes from NFL game books and play-by-plays from NFLMedia.com. Looking at the score lines going into a potential last possession, the play-by-plays include down and distance, time of the snap, stoppage of the clock, and timeout usage. The data omits factors such as weather conditions, field conditions, offensive style, strength of defense, kicker range, and failed attempts. These and other unobserved factors are accounted for in the residual error term.

Variables and Expectations

The dependent variable is the number of seconds it takes to move the offensive team from their starting position to the opponent's 35-yard line. As discussed before, this is the time that an offensive coach must control to achieve their two objectives: scoring and leaving as little time on the clock as possible for the opposing team should the offensive team score. Thus, there will be times when the offense has little time left and is running a hurry up offense, also referred to here as hurried. There will also be times when the offense is moving slowly downfield to run out as much time as possible, referred to here as not hurried.

Each of the nine independent variables and the expected direction of effect are described in detail below. They are further summarized in Table 1.

Table 1: Summary Statistics: Mean (sd)

		Not Tied	Not Tied		Tied	Tied	
	Total Sample	(all)	and Not Hurried	and Hurried	(all)	and Not Hurried	and Hurried
Observations	83	56	31	25	27	17	10
Total Time Taken	82.49 (51.42)	89.52 (52.62)	101.45 (61.24)	74.72 (35.28)	67.93 (46.43)	73.71 (52.96)	58.10 (32.75)
Time Remaining (seconds)	170.82 (87.91)	183.13 (87.40)	226.68 (82.90)	129.12 (58.54)	145.30 (84.93)	170.88 (88.21)	101.80 (60.54)
Starting Yard Line	28.16 (14.04)	24.54 (12.47)	27.32 (14.62)	21.08 (8.15)	35.67 (14.36)	38.35 (15.91)	31.10 (10.44)
Offensive Timeouts Available	1.81 (1.04)	1.79 (1.14)	2.13 (0.99)	1.36 (1.19)	1.85 (0.82)	2.00 (0.71)	1.60 (0.97)
Offensive Timeouts Used	0.51 (0.76)	0.46 (0.74)	0.45 (0.68)	0.48 (0.82)	0.59 (0.80)	0.47 (0.62)	0.80 (1.03)
Defensive Timeouts Used	0.53 (0.83)	0.45 (0.71)	0.45 (0.77)	0.44 (0.65)	0.70 (1.03)	0.82 (1.19)	0.50 (0.71)
Two Minute Warning	0.47 (0.50)	0.46 (0.50)	0.48 (0.51)	0.44 (0.51)	0.48 (0.51)	0.53 (0.51)	0.40 (0.52)
Home Game	0.53 (0.50)	0.52 (0.50)	0.61 (0.50)	0.40 (0.50)	0.56 (0.51)	0.65 (0.49)	0.40 (0.52)
Quarterback Rating	86.17 (12.66)	85.48 (12.15)	86.10 (12.29)	84.71 (12.17)	87.61 (13.80)	87.16 (13.90)	88.38 (14.32)
Number of All-Pro Players	0.87 (0.93)	0.88 (0.94)	0.81 (0.91)	0.96 (0.98)	0.85 (0.95)	0.88 (1.05)	0.80 (0.79)

The amount of time remaining in the game, measured in seconds, is the primary indicator of whether a team is seeking to speed up or slow down the clock. Thus, we expect the time remaining variable to be positive. The more seconds left in the game when the offensive team takes position, the longer it will take them to reach the 35-yard line.

Starting field position is measured as the distance from the offensive end zone, with 1 indicating a drive starting on a team's own 1 yard line and 65 indicating the objective 35-yard line (see Figure 2).

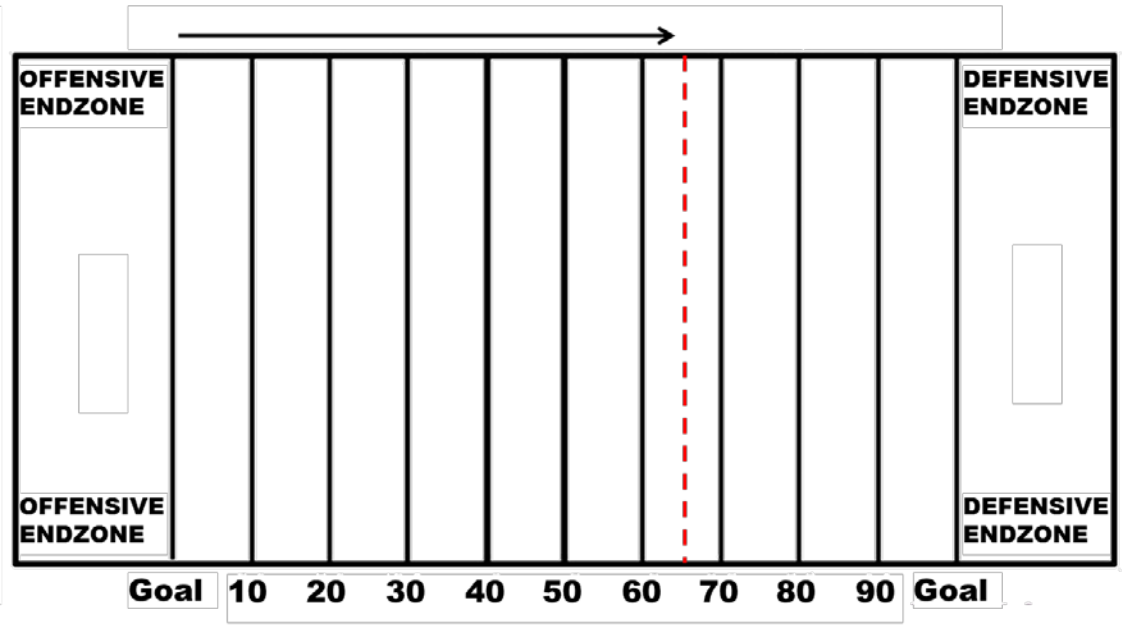

Figure 2. Starting field position is measured as the distance from the offensive end zone. The dotted line represents the 35 yard line as the minimum objective distance for scoring a field goal.

Regardless of how fast or slow a team is attempting to move down field, we expect a team starting closer to the opponent's 35-yard line will take less time to reach that point.

The number of offensive timeouts available is measured upon the commencement of the offensive drive. As discussed above, having timeouts available gives the offense a greater ability to control the clock and the time of possession, should they need to do so. Because teams seek to either retain time or run time off the clock, depending on the circumstances when they gained possession, we have no *a priori* expectation that the simple availability of

timeouts will lead to an overall increase or decrease in the time taken to reach field goal range.

Offensive timeouts used measures the number of timeouts the offense used during their possession when the clock wasn't already stopped. Because the clock would not have stopped without the timeout, using the timeout effectively reduces the time it takes to reach field goal range by allowing fewer seconds to tick off the clock.

We also measure the number of timeouts the defense used during the offense's possession when the clock wasn't already stopped. When the offense has the ball, defensive timeouts are most often used to stop the clock to preserve time for the defensive team should the offense score. By stopping the clock and preserving time, a defensive timeout should effectively reduce the time taken to reach field goal range.

In addition to timeouts, the two-minute warning will stop the clock. This artificially reduces the time it takes to reach the 35-yard line because the clock might have continued to move without this artificial stoppage. Inside the two-minute warning the clock also stops more frequently and should reduce an offensive team's time of possession. The two-minute warning's effect on an offensive drive is measured by a dummy variable.

The offense playing at their home stadium is also measured with a dummy variable. Having the benefit of reduced crowd noise when playing at home should allow for better on field communication and allow an offense to better execute.

In terms of players, a high quality quarterback can more successfully throw passes to the sidelines to stop the clock and more effectively throw long balls down field. Both effectively reduce the time taken to reach the 35-yard line. We suspect that a high quality quarterback will matter more when trying to speed up the game than when trying to slow it down. The quarterback rating at the end of the season is used to measure the quality of the team's quarterback.

The number of star players is measured as the number of offensive players elected to an All-Pro team in that specific season. Star players are more capable of moving the ball fast or slow, as needed, although similar to a quality quarterback, they will likely matter more in a situation where a team has limited time to move into scoring position.

Due to the fact that coaches will implement different strategies in different game situations, we further delineate our results by two factors: whether the game is tied or not and whether the team is playing a no huddle offense or not. Accordingly, we explain our expectations in the paragraphs below.

When the offensive team is losing by 1-3 points the singular goal is to score in order to tie or win the game. Thus, non-tied games may move faster to scoring position because more is at stake and the offensive team cannot risk

running out of time. On the other hand, when a game is tied the offensive team has an incentive to score, but has an equally large incentive to maintain control of the ball and not turn it over. This often requires less risky plays, fewer long passes down field, more running plays, and thus a longer time to move the ball down field.

Finally, there will be circumstances when a team is playing a no huddle offense. Generally this occurs later in the game and results in less time taken to move into scoring position. A high quality quarterback and more stars should facilitate teams moving quickly.

Model

An ordinary least squares (OLS) model is used to estimate the time it takes to reach offensive field goal range.

$$\text{Total Time Taken to Reach} = \beta_0 + \beta_1 \text{Start Time} + \beta_2 \text{Starting Yard Line} + \beta_3 \text{Offensive TOs Avail} + \beta_4 \text{Offensive TOs Used} + \beta_5 \text{Defensive TOs Used} + \beta_6 \text{Two Minute Warning} + \beta_7 \text{Home Game} + \beta_8 \text{QB Rating} + \beta_9 \text{All-Pro Players} + u$$

Variance inflation factors (VIF) suggest no multicollinearity between the independent variables. A Breusch-Pagan test indicates the presence of heteroskedasticity ($\chi^2 = 7.13$, $p = 0.0076$) and White's robust standard errors are implemented.

Results

The summary statistics in Table 1 show that of the 83 observations, approximately 33% were tied games and 67% were games where the offense was down by 1, 2, or 3 points. In non-tied games, the offense took control of the ball with an average of 183 seconds left in the game, took more time to move the ball to the 35-yard line (mean=89.52), and started at their own 25 yard line. In contrast, in tied games the offense took control of the ball with an average of 145 seconds remaining in the game, took less time to move the ball to the opponent's 35-yard line (mean=67.93 seconds) but also had the advantage of starting at their own 35-yard line. Beyond the total time taken, seconds remaining, and starting yard line, the other notable difference between the tied and not tied subsamples is that the defense took more timeouts in tied games (mean=0.70) than in not tied games (mean=0.45). This behavior is consistent with trying to prevent the offensive teams from running out the clock.

The not-tied and tied sub-samples were further broken down into teams that played a no huddle, or hurry up, offense and those that did not. As expected,

the no huddle offense occurred in situations where you would most expect it; with less time on the clock and when teams started further from field goal range in both the tied and not tied sub-samples. Also as expected, the hurry up offense reached field goal range in less time than offenses that were not hurried. In a not hurried tied game, the defense used more timeouts (mean=0.82) than in any other case, presumably to prevent the offense from taking excessive time off the clock.

OLS regression of the total sample (Table 2) indicates that time remaining, offensive timeouts used, and the two minute warning are associated with an increase in the amount of time it takes to reach the 35-yard line. Specifically, for every one-second of additional time remaining when the offense takes possession of the ball, there is a 0.48 second increase ($p=0.0001$) in time taken to reach the 35-yard line. As expected, teams with more time on the clock when they obtain possession at the end of a game attempt to leave as little time as possible on the clock for the opponent by slowing down their play.

Every offensive timeout used on the drive is associated with a 18.11 second increase ($p=0.002$) in time taken to get into field goal range. Because a timeout stops the clock, its main effect is expected to be a reduction in the time taken to reach field goal range. Instead, it appears as if the opposite is occurring. The two minute warning has a similar effect. Offensive drives that are affected by the two minute warning are 15.49 seconds longer ($p=0.042$).

Also of interest is that the mere availability of an offensive timeout is associated with a 16.05 second decrease in the total time taken to reach the 35-yard line.

Starting field position, defensive timeouts used, whether the offense was at home, the quarterback rating, and the number of All-Pro players on the offense were all statistically insignificant at $p > 0.05$.

Table 2: Effect on Total Time Taken to Reach the 35-Yard Line in the Last Six Minutes of NFL Games that are Tied or Within 3 Points

	Total Sample		Not Tied		Tied	
	β	t	β	t	β	t
Time Remaining (seconds)	***0.476	8.69	***0.542	9.64	0.239	1.93
Starting Yard Line	-0.343	-1.13	-0.125	-0.34	-0.767	-1.40
Offensive Timeouts Available	***-16.047	-3.57	***-19.836	-4.13	0.508	0.04
Offensive Timeouts Used	***18.109	3.30	***22.571	3.57	8.601	0.83
Defensive Timeouts Used	-3.149	-0.65	0.741	0.12	-13.770	-1.58
Two Minute Warning	*15.493	2.07	10.694	1.22	37.811	1.92
Home Game	-6.763	-0.94	-12.297	-1.49	18.224	1.11
Quarterback Rating	-0.168	-0.57	-0.275	-0.69	0.263	0.42
Number of All-Pro Players	-2.022	-0.46	-2.852	-0.58	-8.483	-0.90
Constant	44.834	1.83	45.390	1.39	20.100	0.31
N	83		56		27	
R^2	0.6523		0.7316		0.6091	

Note. Two-tailed *p < 0.05, **p < 0.01, ***p < 0.001. OLS with robust standard errors. Dependent variable is total time taken to reach the 35-yard line.

A Chow test (F(10,63), p=0.021) indicates games that are tied and those that aren't have statistically different coefficients. From Table 2 it is clear that games that are not tied reflect estimates that are very similar to the total sample except that drives affected by the two minute warning are not significantly lengthened or shortened.

Table 3 presents regressions that further differentiate not tied games and tied games by whether the offense was playing a hurry up offense or not. There are not enough degrees of freedom to generate estimates in tied games that played a hurry up offense, but in games that were not tied and used a hurry up offense, every additional All-Pro player on the team was associated with a 12.2 second decrease (p=0.021) in time taken to reach the 35-yard line. The number of offensive timeouts available was associated with a 17.24 second decrease (p=0.0002) in the time taken to reach field goal range and the number of offensive timeouts used was associated with a 13.57 second increase (p=0.028) in the time taken to move down field. A standard huddle offense in a tie game had no statistically significant determinants.

Table 3: Effect on Total Time Taken to Reach the 35-Yard Line in the Last Six Minutes of NFL Games that are Tied or Within 3 Points with a Hurry Up Offense

	Not Tied				Tied		
	and Not Hurried		and Hurried		and Not Hurried		and Hurried
	β	t	β	t	β	t	
Time Remaining (seconds)	***0.620	5.89	***0.481	7.08	0.064	0.33	
Starting Yard Line	-0.125	-0.22	0.395	0.90	-0.618	-0.82	
Offensive Timeouts Available	*-22.658	-2.42	***-17.238	-4.97	29.325	1.15	
Offensive Timeouts Used	23.631	1.86	*13.567	2.42	4.425	0.13	
Defensive Timeouts Used	2.916	0.28	10.211	1.54	-5.553	-0.43	
Two Minute Warning	10.452	0.58	4.930	0.63	48.642	1.55	
Home Game	-18.958	-1.24	-1.179	-0.17	0.666	0.02	
Quarterback Rating	-0.513	-0.72	0.496	1.37	0.246	0.19	
Number of All-Pro Players	1.830	0.21	*-12.207	-2.59	-14.103	-1.07	
Constant	49.939	0.71	-15.270	-5.03	-4.882	-0.03	
N	31		25		17		10
R^2	0.7271		0.8832		0.7248		not enough df

Note. Two-tailed *p < 0.05, **p < 0.01, ***p < 0.001. OLS with robust standard errors. Dependent variable is total time taken to reach the 35-yard line.

Discussion

In every case analyzed here, starting field position played no role in the time taken for a team to move downfield at any pace. It appears that skilled coaches and teams can effectively control the clock and move the ball into field goal range regardless of where they begin their drive. The pace at which an offense moves is also unrelated to home field advantage or the quality of a team's quarterback.

In almost every case, the time left on the clock at the beginning of an offensive drive played a clear role in whether the team moved quickly downfield or not. This is in line with our expectation on time management strategies in end-game scenarios. Coaches maximize the odds of scoring while simultaneously leaving the defensive team with as little time left on the clock as possible.

Interestingly, there were two findings that ran counter to our *ex ante* predictions in terms of the role timeouts play in managing the clock. First, taking an offensive timeout increases the time taken to get into field goal range. Second, the availability of offensive timeouts decreases the time it takes to reach field goal range. Each of these unique findings is discussed below.

Offensive Timeouts Taken

The specific act of taking a timeout cannot lengthen the time of a drive because by definition a timeout stops the clock. Yet, the results show taking a timeout increases the time taken to get into field goal range by anywhere from 13 to 22 seconds. Because a timeout itself cannot lengthen a drive, it appears that the act of taking a timeout has residual carry on effects that affect the game once play resumes.

From a strategic view point, the offensive team is attempting to increase the odds that it scores and to leave little time on the clock for the opponent. In this context, offensive timeouts are used to increase the odds of scoring because stopping the clock with an offensive timeout does not run out time on the clock.

Thus, we assume that a team that does use an offensive timeout is probably in one of two different situations to increase the odds of scoring:

1. the offensive team is not operating efficiently and thus used a timeout to regroup or avoid a penalty
2. the offensive team is trying to stop the clock to preserve enough time to score or get into scoring position

In the first case, it is conceivable that an offense that is struggling offers an advantage to the defense by taking a timeout. While the offense is using the timeout to re-group, the defense is using the timeout to more effectively defend an offensive play. In this case, it appears that taking an offensive timeout benefits the defense more than the offense.

In the second case, the offense may view the timeout as a tool to preserve time or get into scoring position, but the result may be that the time taken also affords the defense time to rest, regroup, and better defend the next play.

From these two scenarios, it is unclear if taking a timeout lengthens the drive because it benefits the defense in some way or if taking a timeout reflects that the offense is struggling. While it's conceivable that both are occurring within this sample, the coefficient on two-minute warnings seems to provide some help in determining which effect is predominate. The game stoppage for the two minute warning occurs regardless of the momentum of the offense or the time management strategies of the offense. Yet, the effect is the same as an offensive timeout. In the full sample the two minute warning increases the time taken to reach the 35-yard line by 15 seconds ($p=0.04$) and in the tied sub-sample, it increases the time by almost 38 seconds ($p=0.07$). Because both a voluntary and involuntary stoppage result in an increase in the time taken to reach the 35-yard line, we conclude that in most cases an offensive timeout lengthens the time it takes to reach scoring position by affording benefits to the defense.

Offensive Timeouts Available

Consistent with their risk averse and loss averse behavior, teams carefully retain their timeouts for the end of the game. In a situation where the offense needs to score and needs to stop the clock, a timeout is often the only way to do

so. Thus, timeouts are valuable in one important scenario. Yet, the reality is that most teams don't end up in this scenario. There are only 83 observations in a three-season time span where close games resulted in a losing or tied offensive team successfully reaching the 35-yard line. Even within these 83 observations where we might be most likely to see offensive teams need to use their timeouts, there is still a reluctance to do so. Only 19% of the offensive teams used all of their available timeouts while 63% used no timeouts at all. On average, offensive teams in this sample had 1.8 timeouts available but used only 0.51 timeouts.

Despite the fact that most teams do not find themselves in a close or tied game at the end of the second half, this lack of opportunity to use timeouts does not fully explain why teams retain timeouts but rarely use them. These results show the simple availability of timeouts, not their use, reduces the amount of time it takes a team to move downfield. Perhaps a team with more timeouts available plays with more confidence and takes more chances knowing that they have a timeout available if necessary. There may be a peace of mind from having a timeout available which allows the offense to operate more efficiently and, thus, less time is needed for the offense to reach scoring position.

If coaches are aware that having more timeouts available exerts a positive psychological effect on teams then coaches will chose to retain as many timeouts as possible. An alternate explanation is that coaches are already aware of the peculiar phenomenon uncovered here—that using an offensive timeout increases the time it takes for a team to reach field goal range. In either case, it appears entirely plausible that the defense benefits more from a stoppage at the end of the game than does the offense.

Conclusion

Coaches seek to achieve two objectives near the end of a close or tied NFL game: to move the ball into scoring position and to leave as little time on the clock as possible for the opponent. Achieving these two objectives requires that a coach know what factors are most influential in affecting the time of the drive. Thus, this research informs dual-objective, end-of-game coaching decisions by estimating the factors that affect the time needed to reach scoring position.

Romer (2006) discussed that the 35-yard line was the spot where a team's choice to punt or kick a field goal changes. To maximize the chances of getting into field goal range, this sample shows the average NFL team with 1.8 timeouts available needs 80 seconds to produce a successful drive to the target 35-yard line from the mean starting field position at the 30-yard line.

In some cases, like Bill Belichick in Super Bowl XLVI, coaches are overly optimistic and ineffectively judge the adequate amount of time for the offense to make a last possession run. A large part of this optimism may stem from the idea that player personnel make a difference (Sackrowitz & Sackrowitz, 1996).

However, the results show that neither quarterback rating nor the number of All-Pro players affect the time of the drive.

Instead, we identified two peculiar effects found in games where the offense is behind by 1, 2, or 3 points, but not in tied games. First, counter to conventional wisdom, using an offensive timeout during a possession in the last six minutes of the game extends the time it takes to reach field goal range. It appears this effect occurs because both an offensive timeout and the two-minute warning provide a benefit to the defense in the final minutes of a close game. Second, quite opposite of the first effect, we found each additional offensive timeout available decreases the time it takes to reach field goal range. It appears the mere existence of a timeout provides a confidence or peace of mind to the offense that allows them to perform better.

These important findings on timeouts, as well as the variables that affect the time of a drive, inform the time management decisions made by coaches and practitioners during critical offensive drives at the end of close games. Football coaches at all levels, athletes, and analysts can all benefit from these results.

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A Qualitative Study of Momentum in Basketball: Practical lessons, possible strategies. (Case Study)

Christopher Schoen
Salem State University

Abstract

Momentum has intrigued coaches and players, sport participants and researchers for years due to its ephemeral nature, association with success, and complexity as a subject of investigation. It is one of the most desirable, yet least understood performance experiences in social sport psychology. This study explored the experiential phenomenon of momentum, defined as an emotionally infused appraisal of current performance, using qualitative procedures involving 11 basketball players and coaches as informants. A case study helped highlight important features of what happens during instances of momentum. It was found that momentum is a hard to create but a valuable phenomenon for athletes and coaches, alike. Additionally, momentum seemed to elicit significant emotional, behavioral, and cognitive effects which constituted patterns of response to events in competition. These effects, manifested differently for players and coaches, occurred as performance appraisals and likely had considerable performance consequences for those experiencing it. This article will conclude with suggestions for practical application for both coaches and players and even fans who thrive on the ebb and flow of competitively spirited contests.

Introduction

Think back to an experience you may have had which you would characterize as momentum. It could have been as an athlete, or maybe during exercise, perhaps at work or even as a student taking good notes in class and contributing to a stimulating discussion. What was the experience like? How did it develop or begin? How long did it last and was it easy to generate or did it just happen? In sports, coaches invoke momentum frequently, usually in an effort to motivate their players or as some kind of que to focus. Some coaches actually plan and practice for momentum. They must know something the rest of us do not because it seems to be a well-kept secret and based on a review of literature an especially intangible element of quality performance.

Researchers in the field of sport psychology have been studying momentum for nearly four decades, but with little headway towards identifying factors that create momentum and reliably improve performance. Many of these early studies employed various forms of experimental design to create momentum and to control for various factors thought to be associated with it. In aggregate findings were mostly equivocal. As a topic of inquiry studies of momentum that had been published to date were provocative and in some cases very innovative but generally still at an early theoretical stage (Schoen, 2007). Traditional experimental approaches diluted any powerful and natural occurrence of momentum as a psychosocial phenomenon and that collectively researchers had yet to satisfactorily describe momentum. There had not been any qualitative work published on what momentum was and what it meant for the participants; the athletes and coaches and even spectators who actually play a part in many episodes of momentum. Consequently, in this investigation the approach was to provide some depth or substance to the developing theoretical framework that had become commonplace in the more recent studies. Accordingly, what follows will be a brief summarization of some of the more established literature to illustrate the basic framework, and then a description of the qualitative method used here. A case study of a particular episode of momentum that served as a showcase example of how momentum can completely turn a competitive contest around and lead to success will be included. Conclusions and lessons learned that may have some practical benefit for performers and coaches will complete this manuscript.

Early Articulations and Distinctions

One of the earliest studies of momentum in sport, Iso-Ahola and Mobily's examination of wins and losses in racquetball tournaments, defined momentum as the "added or gained psychological power which changes a person's view of himself or others' view of him and themselves" (1980, p. 392). This definition was often used in many subsequent studies of momentum, but was originally operationalized as psychological momentum (PM). However, both terms still appear together in published studies, sometimes interchangeably, with little

clarification given to their distinctiveness. The view taken here is that momentum and PM should be regarded separately. The difference involves a matter of perspective and context. Momentum may be best understood at this point as a *shared* perception of improved or improving performance conditions that generates excitement and rising confidence in a group of people. Stanimirovic and Hanrahan (2004) have used the term *collective-efficacy* in reference to this social condition. Alternatively, PM refers to an individual experience of one's own performance fluctuations. The performer's thinking and emotional condition may change in a specified time frame having a favorable, more skillful impact on performance behavior at times and likely just as often a detrimental impact when things take a turn for the worse. Momentum represents a cognitive act, an appraisal of social events and performances in competitive situations. In contrast, PM involves personal psychobehavioral changes taking place during any meaningful activity, and typically only appears as a construct in sport psychology or motor learning and behavior research.

Assorted methods to study momentum have included; quantitative procedures such as observations of performance outcomes (Iso-Ahola & Mobily, 1980, Adams, 1995), statistical analysis of winning streaks (Vergin, 2000), surveys and questionnaires (i.e. who is likely to win given recent scoring in a competition, see Burke, Edwards, Weigand & Weinberg, 1997), or actual experimental designs (i.e. Perrault, Vallenrand, Montgomery, Provenchar, 1998). During this timeframe theoretical structures began to emerge.

The Conceptual Structure of Momentum and PM

Two landmark papers have provided structure to the concepts of PM and momentum, respectively. Vallerand, Colavecchio, and Pelletier (1988) developed the antecedents-consequences model of PM that emphasized an individual's experiential aspect of various events in the midst of a performance and postulated what this perception does to one's feelings of confidence and control. Taylor and Demick (1994) later devised a "4-component" model detailing emotional, physiological, and behavioral aspects associated with perceiving momentum in social settings, along with cognitive and motivational considerations that are in agreement with the research of Vallerand et al. (1988). Their multidimensional model of momentum (MMM) emphasized the interactive nature of these individual components in relation to performance but stressed that ultimately performances are affected by how individuals interpret various events occurring in the competitive environment. An essential point of note regarding the MMM concerns the authors' insistence that the model, at its core, reflects *individual* psychophysiological and behavioral changes occurring during instances of *social* momentum. The antecedents-consequences model, however, focused more on factors contributing to individual perceptions of PM and on the following

consequences; an emphasis decidedly focused on cognitive considerations rather than a more holistic, psychobehavioral perspective illustrated in the MMM.

A Call for Qualitative Procedures

From 1980 to about 2005 no discernible comprehensive qualitative inquiry had been done on momentum. Several researchers (Adams, 1995; Burke, et al., 1997; Crust & Nesti, 2006) noted this represented a significant gap in researchers' understanding of the phenomenon, especially with regards to how individual and team performances are influenced by it. Burke, et al. however, did use a form of qualitative inquiry (responses to an open-ended survey question) with 20 tennis players to develop an operational definition of momentum - "a positive change or continuation of good performance, and to a lesser degree an increase in emotion" (p. 84). The degree of emotional impact depends on the "importance" of the situational context and is a critical feature in theories about momentum (Vallerand, et al., 1988). Context, it has been stressed, must be considered elemental in psychological studies acknowledging a holistic systems orientation (Lazarus, 1999). Accordingly, to fully appreciate an experience of momentum it is imperative to acknowledge the cognitive-affective-behavioral interaction of the individual operating within the overall social psychological atmosphere where that instance of momentum takes place (Taylor & Demick, 1994).

To best access momentum from the performers' perspective a qualitative method of phenomenological inquiry was chosen. An interview guide that examined Taylor and Demick's constituents of momentum was designed. In accordance with phenomenological studies, it was necessary to also investigate the meaning of momentum for these players and coaches. Just as we all understand a conversation or written communication when we understand the meaning of the words used, so to we must understand the meaning of experiencing momentum from the perspective of the performers. Furthermore, in order to capture momentum as it occurred naturally it was decided to focus as much as possible on the context in which momentum took place. This becomes one of the defining features of a case study.

Case study

The case study method has strong roots in research of the psychotherapeutic practice and the effectiveness of various techniques on individual patients. The nursing and education fields also use case studies, to evaluate procedures and programs, respectively. In sport psychology, cogent and compelling arguments for using case studies date back to the mid1980s as Martens (1987) and Smith (1988) recognized the limits of more traditional empirical studies, especially as investigations into the psychosocial aspects of sport increased dramatically within academic circles. From a philosophical standpoint case studies adhere to what is called the constructivist paradigm (Baxter & Jack, 2008). This approach assumes that truth is relative to the

individual and emerges from the subjective experience. As such, the method is differentiated from experimental designs which utilize an objectivist and reductionist school of thought, that phenomena can be reduced to constituent elements, measured and controlled within the experimental design.

Several factors are considered in choosing a case study. These would include when to use a case study, what type of case study to use, and determining the unit of analysis. Yin (2003) discussed three conditions for deciding upon a case study method; the type of research question that will be asked, how much control the researcher has over the actual events taking place in the study, and the focus on the present rather than on historical phenomena. In this investigation, the essential questions were; what is momentum?, how does it occur? and is it related to improved performance? The objective was not to control the events involving experiences of momentum, but to accurately document them. The instances of momentum explored all happened recently enough where the research respondents could recall with some detail about what it felt like and how it influenced their play.

In this investigation the type of case study was descriptive which is used for describing a phenomenon in its natural context. Other main types of case studies include explanatory, which looks at causal links with interventions, and exploratory where an intervention that is being used has no clear cut outcome (Baxter & Jack, 2008, Yin, 2003). Here the unit of analysis is momentum itself, which also captures a fourth type of case study, multiple cases which look for similarities with the phenomenon in question. What follows is an actual case of momentum that took place while the comprehensive examination of momentum was underway. This example stood apart from the dozens of other instances of momentum which were documented for this study due to its power and influence. In the results section references to the specific event are included along with excerpts from the interviews conducted and analyzed.

The Case of Big School and Small Town

This case involved one of the schools which was closely observed for a period of two years while this project was underway. In that period of time a particular focus on coaches was included in the study protocol. The coaches' behavior was catalogued, physiology variables heart rate and heart rate variability (HRV) were gathered during games and interviews after games where momentum was acknowledged to have occurred. Videotapes of the games were collected in order to recall consequential episodes. The event recounted below occurred during the 2005 playoff game during the state basketball tournament where the study took place.

The team, identified here as 4A Big School, found themselves struggling through the first round game of the playoffs, for the third straight year. They had been a perennial power for some time, blessed with solid, experienced coaching

and top talent from across the city. With similarly strong teams in the last two years this squad had been defeated in the first round game each time. A heavy favorite going in to this game, they were matched against a smaller school from up state. This school, Small Town, had managed to build a 4 point lead at the half. They proceeded to come out very strong in the third quarter, outscoring Big School by 11 points. Now at the start of the last quarter of this opening round game Big School was down by 15 points with 8 minutes to play. Small Town clearly had control of the game and it looked like the tournament's top seed was going to lose in the first round for the third year in a row. Small Town continued to play tough by stopping yet another scoring attempt from the top player in the league, forcing another turnover and scoring an easy basket to start the fourth quarter. The underdog clearly had momentum, which was palpable throughout the entire arena. To make matters worse, Big School's normally unflappable coach received a technical foul for arguing a hard foul against his team's best player. This meant that he was confined to the bench and was not allowed to move. He had to remain seated for the rest of the game or be ejected. He gathered his team for one last meeting. At this point he likely instructed his team to remain calm and patient and to keep playing tough defense. He was famous for teaching his players that two minutes is a long time in basketball, anything could happen. Now with 7 and a 1/2 minutes left in the game he was letting his players know that they still had time to fight back from 15 points down. Just keep playing to their strength and to methodically work their way back.

And then it happened. You could feel it, you could see it, and you could gauge the sudden change in energy within the arena. About 30 seconds after the coach's technical foul Big School's top player made a mid-range jump shot and got fouled in the process. This was the catalyst signaling a sudden shift in momentum. The entire team's confidence immediately leapt off the chart. This was the break they needed and what they had been working towards the entire game, indeed the entire season. The player made the free throw to cut Small Town's lead to 12 and the amount of energy exuded by Big School could be felt all throughout the arena. They had trained for just such a moment. They had been told how to be patient, how to stay in control of their emotions, how to fight back from deficits and stay focused on their plays. With just over 6 minutes left Big School started their tremendous comeback and there was no stopping them. Every player expressed extreme confidence by how they executed every move, on offense and defense. Every player contributed. Small Town's team exhibited classic choking symptoms. They started pressing and rushing and playing conservative. They tried to slow the game down and became tentative. They almost instantly and visibly lost all confidence. In the ensuring 5 minutes their 12 point lead vanished. Big School's best player took over and scored 22 points while the rest of the team contributed their own offensive skills. In the end Big

School scored 41 points in the last 8 minutes, a total that many teams in that league often need an entire 32 minute game to score. They won going away by 17 points. The Desert News (Utah) called it one of the best scoring performances in the tournament's history. It served as the most poignant, powerful and instantaneous example of a momentum swing witnessed throughout this study of the phenomenon of momentum.

Methods

Participants

The informants for this study were 11 basketball players and coaches, including a coach and player from the case study featured above. Six females and 5 males were interviewed qualitatively. Four of the informants either were playing or coaching at the high school level (2 of each), 4 participated in the college ranks (1 player, 1 transitioning from player into assistant coaching, 2 coaching), and 3 worked at the professional level (2 athletes and one coach). A total of 8 interviews were conducted; the first 5 being done with a single interviewee, and the last three interviews conducted in a focus group format with a coach and one of his players (2 such interviews) or with two coaches present (head and assistant)

Procedures

The study was conducted within a traditional qualitative design. The data collected consisted of transcribed interviews with the informants, extensive notes taken in the field, and process notes extracted from informal discussions with dozens of coaches, athletes, and sport psychology professionals, along with the viewing of many athletic events. Heuristic procedures outlined by Patton (1990, 2002) guided this process as well the analysis and report of findings

Interview protocol. Each interviewee was contacted initially by phone, except the professional players and coach who were contacted through the team's media official. After agreeing upon a time and place (usually at a coach's office or where the players practiced and could take time from practice) the interviewees were met and given a copy of an official consent form outlining the study. Even though all informants had been briefed on the phone about the study's intent, the form had to be read and then signed. Upon completion of these steps all the interviews began with my asking them to define for me what they felt momentum was. A semi-structured interview format proceeded from there. Subsequent questions followed the lead of the informant according to where s/he went with the first question, but kept close to the interview guide that had been constructed prior to the first interview. Patton's (1990) interview guide approach has been described by many (Munroe, Giacobbi, Hall, & Weinberg, 2000; Newman, 1992; Poczwardowski & Conroy, 2002, to name just a few) and found to be very useful here. The development of this interview guide was based mostly upon Taylor and Demick's theoretical framework of momentum and a personal heuristic

conception of momentum as a fan of sports and from extensive review of the momentum literature.

Cote, Salmela, Trudel, Baria, and Russell elaborated on heuristic paradigms for qualitative studies. That is, the "whole, subjective experience of individuals [may be understood] by examining the way people perceive, create, and interpret their world" (1995, p. 127). Vallerand et al's (1988) theoretical viewpoint that perception underscores an experience of momentum was the assumptive approach taken in pursuing this line of inquiry. Personal experiences of watching basketball games and feeling momentum as a spectator helped in the probing of issues which seemed to represent this perception in the study informants. Patton's process evaluation approach (2002) helped to structure the line of inquiry taken regarding the numerous ways that people experience momentum and how they respond to this perception. Dunn and Holt (2004) used a process evaluation approach to study the team-building activities and process of ice hockey teams. An assumption for this study, consistent with the MMM (Taylor & Demick, 1994), was that momentum occurs as a kind of process. The data was analyzed accordingly.

After the initial question of "what is momentum?' the rest of the interview questions examined 4 main areas; what kind of emotions are associated w/ momentum, what momentum feels like, how it influences behavior, and what momentum means when it is experienced. For this study, emotions were considered to be psychophysiological reactions to the ongoing social environment where adaptation is a requisite function (Lazarus, 2000) for performing well. Feelings were open to the interpretation of the respondents but were meant to refer to affect, or the second-order experience of emotions (Charland, 2005). This means that when emotions enter into the awareness of the individual some sort of quality is given to the emotion, such as positive or negative valence. Behaviors were thought to include any visible activity, be it their own, or other's actions that could, in turn, influence their own. Marshall and Rossman (1999) categorized the meaning element as an essential feature of phenomenological interviewing. Just like when we understand the meaning of words we can form higher levels of understand when used in the context of various sentences. By asking what meaning momentum had for the informants, it was also anticipated that a better sense of the social psychological context could be developed, essentially assisting in data analysis.

Data analysis. After each interview, which lasted on average about one hour and twenty minutes, the recorded conversation was transcribed verbatim (important to remember as the excerpted quotes to follow are the speaker's actual words and should be read closely). Each interview transcript was then read an initial time, while listening to the recorded interview, in order to become familiar with the general tenor and quality of the questioning and to get a general sense of

the respondent's style of expression. This step allowed for determining how well the interview was conducted and to make decisions regarding how to conduct the next scheduled interview. The basic interview guide remained throughout the entire data gathering process, but notes were taken on what kinds of improvements may be useful for greater depth and clarity of the explored concepts. After all of the interviews were conducted the main analysis began.

Tesch (1990) discussed two main analytical procedures that qualitative researchers may use; structural analysis or interpretational analysis. Structural analysis corresponds to traditional theory building. Interpretational analysis is often applied when a theoretical structure already exists and the study is focused on describing the propositions of the model qualitatively. Furthermore, Tesch outlined de-contextual and re-contextual data management and analysis procedures, which were used in this study. De-contextualized data refers to quotes or segments corresponding to specific elements in the theoretical framework that have been removed from the body of the interview and grouped together. So then each interview response concerning behaviors during momentum was separated out and then grouped together with interview segments from other informants that discussed behavior. In this manner the interview segments are re-contextualized and meanings developed from the compilation. In the second round of reading interviews the de-contextualization process occurred. During re-contextualization field notes were made and prior notes read. All of these notes, as mentioned, became part of the data and the analysis proceeded accordingly. The data was analyzed with a focus on the components of thinking, feeling, and behaviors, as mentioned above. Finally, a focus on meaning allowed for a description of the phenomenon that may be used to compare against other situations where momentum may occur, even PM.

Reliability and validity. Elements that serve to establish reliability and validity in qualitative studies are constantly being refined as naturalistic inquiries continue to gain wider acceptance. The convention proposed by Krane, Andersen, and Strean (1997) to replace lengthy discussions of data management and reduction procedures with references to authors who have established methods in print will be observed here. For example, in this study Morrow and Smith's (2000) methods of rigor were adopted. These included taking steps to ensure quality of the data by; immersion into the field, managing bias, documenting the "story" of the research process, and using participant checks and/or peer debriefers. However, it is the actual writing of the researcher which is the final test of rigor and credibility (Morrow & Smith, 200). This means simply that while the data and analysis is not mathematically derived from computer manipulations and abstract in the tradition of hard science (Lazarus, 1991; Pinker, 1997) it should stand alone as credible and useful to the reader, no matter their background or area of interest. Actual quotes are used to establish various points,

and the reader is encouraged to interpret them based on their own experiences with momentum. Naturalistic generalization will have been achieved when

> sense made of the account by the reader [through] the adequacy and vividness of the portrayal and the persuasiveness of the interpretation, the reader makes associations and implicit comparisons between the situation described by the research and some other case in the reader's experience (Morrow & Smith, 2000, p. 221).

If the data appeals to the reader on an intuitive level based on its presentation in the study, than this study will have merit.

Results

To reiterate, five broad categories were examined in each interview; identifying momentum (what is it?), what kind of thinking happens during momentum, the feel of momentum, one's behavior during momentum, and its overall meaning. The results concerning the first four are presented as a description of what was found after analyzing the interviews with coaches and players. Overall meaning, although largely informed by the participants, contains some of the researcher's own interpretations combined with literature from various allied fields (motor learning, exercise physiology, etc). It is hoped that the findings and subsequent interpretations contribute practical implications and applications of momentum as a performance component that may serve coaches and athletes alike.

What is momentum?

Momentum was rarely defined outright by players or coaches. Respondents to the opening question of my structured interview often searched deliberately for the right words to use to describe it, if they could. One player struggled with the question for five to six minutes, repeatedly complaining that it was too early in the morning or not sure that she really understood the question. The difficulty with verbalizing momentum, despite the fact that respondents had heard and even used the word numerous times before, probably indicates that the players at least had not put too much thought into what it really means personally, or actually trained for ways to produce it. They knew what it felt like but could not easily articulate what creates it or where it comes from. In this manner momentum seemed to resemble the autonomous understanding idea from the Fitts and Posner's (1967) model of skill development. The autonomous stage of learning signifies a high level of developed skill but a long-lost vocabulary to explain how that skill is performed. Hatfield and Hillman (2001) talked about neural efficiency where effective performance is characterized not by analytical processing during the activity, but rather rapid temporal-spatial processing.

Perhaps during momentum the athlete is on autopilot and performing quite well, as they have trained for many hours to do. A high school athlete characterized it like this, “everything just comes natural. I’m not thinking about things, the crowd’s not involved, it’s just me and my teammates, and the coach, and the game”.

Coaches talked about momentum as a series of executions. Often their focus is on stopping the opponent with specific defensive plays and following that with execution of plays on the offensive side. When these plays are strung together during the game coaches often think that preparation and game planning are working as intended. In this sense coaches often think of momentum as an expression of team execution; that players are working together to implement a system or have learned what their specific responsibilities are and are supporting each other by executing their roles. One coach talked about a combination of “collective forces” that result in a “will to win”. She suggested that players sometimes have to be taught how to win and it begins in practice with players learning about their teammates and coaches teaching them how to play within a format or system. A player turned coach expressed it like this:

> When I’m a coach I’ll look at it [momentum] from a different perspective. As a coach, well we won by 6, but should have beat these guys by 20. You know we’re not executin’ very good, we’re not, we got some work to do. I think of different plays, different ways. But as a player to win, there’s nothin’ like winnin’. You just, the highs and the, the emotion of winning is so great compared to losing.

Another feature expressed often concerns the notion of momentum as something to gain or take possession of. One player offered this perspective:

> It’s what you want to have. As soon as you step on the court you want to have the momentum, and you want to keep the momentum. You don’t want it to sway from team to team, ‘cause then you don’t know exactly how it’s gonna end. You know, who’s, who’s gonna have the momentum at the end, to win. You wanna keep it throughout the whole, the whole time.

What “it” is seems to be different for everyone but confidence and energy are expressed most often. Players and coaches alike will talk about the energy that comes from a big play or from the crowd, especially during big games. Energy may also be present in the form of big rivalries where there tends to be more fans in the gym and the energy level on the court is higher. In such games

momentum is more likely to occur. In the case provided the energy was profound. Tension and frustration could be felt viscerally when Big School struggled in the first three quarters, but when the momentum suddenly shifted, the entire gymnasium, and all the fans watching the game, could feel the surge of energy emanate from the floor.

One interesting area of difference between coaches and players may be in the time frame each thinks about having momentum. For players momentum usually occurs in games. Coaches, on the other hand, often tend to think of momentum happening over longer periods of time, such as over days or weeks. One coach explained this point by saying that players are often focused on playing time and performing minute to minute and game to game in order to keep their starting position.

Momentum and cognition

Cognition was particular focus of the interviews since it was hypothesized that momentum would be a product of an appraisal of certain situations. Appraisals form the basis for emotional responses and arguably initiates an experience of momentum. As such, two items immediately become evident when cognitive processes are grouped together from the interviews. One is the notion that less thinking occurs when a team has momentum. The other occurrence is that one's focus tends to change from more of an external or task focus perspective during positive momentum to an introspective, admonishing type of self-talk during negative momentum. One post-up (inside) player put it this way:

> You don't think about all the things you're doing wrong. When someone else is having a good game you just think, oh wow, they're doing really well. You start thinking about how well they're doing, in a way, and it just comes, you start forgetting about your bad, like your mistakes and errors. I don't know, for me, if I stop thinking about my bad shooting it just kind of comes back.

This reflects the task relevant focus that corresponds to effective play and may reflect the self-consciousness concept (Jackson, Thomas, Marsh, & Smethurst, 2001) of letting go of worry that seems to occur more often when things go badly for the player and the team collectively. During negative momentum thoughts become more negative and concerned with matters not tied to the present game situation, as this professional player explained:

> When things are going bad you sit there and constantly think about, ok, well what did I do wrong and then why did I do that

> wrong, you know? Um, a healthy way to do it is, how can I change it? But sometimes you just think about, why is this going wrong and you tend to focus on the things that you did and the things that you could have done better. Which is part of what makes a person, you know? It can make you better but I think if you concentrate too much on looking back at what you've done wrong, you're just gonna lose the momentum. You're just gonna lose your, your ah, your confidence in yourself and that's gonna make you play worse.

The player-turning-coach described it like this:

> I think it's different for everyone. Some people might have to concentrate and totally put everything that they have into trying to keep that, or, you know, try and remember what, what it is, how we got here, you know, what it is that took us here, and how to keep it, and, you know, really need to concentrate on that. How can we get it back again? And some just people, I mean, and I think those are the natural leaders that just like know what it takes and, you know, don't really have to think about it a lot.

On the other hand, coaches have to be thinking all the time; on the score, time of the game, how his or her players are matching up against the opponent, and various strategies. When it comes to momentum situations coaches talked about recognizing situations well, anticipating what would happen next, and properly implementing various types of strategies such as timeouts, substitutions, or even clock management. This last item, one coach confessed, sometimes causes his team to lose momentum if he gets his team to think more about killing time and over-emphasizing safe passes to minimize errors, especially late in the game.

Task present focus may be an important element to equate with the creation of momentum and keeping it. From a cognitive aspect putting effort into focusing on the task at hand seems to be more effective than thinking about what just happened or focusing too much on parameters peripheral to the current action. These become distractions if a player or coach dwells on them. Hatfield and others (Hatfield & Hillman, 2001; Kerick, Iso-Ahola, & Hatfield, 2000) have observed differentiated neurological manifestations of this sort where self-talk and analytical cognitive processes can inhibit visual-spatial and kinesthetic awareness. This could be the type of cognitive change suggested by Taylor and Demick's (1994) hypothesis.

Momentum-affect

A factor that seems most critical in keeping momentum or losing it can be who manages their emotions best. For players this often comes down to a leader making a key play or, in some cases, an emotional leader who "can get us pumped up", according to one college player[1]. For the high school players interviewed coaches were often cited as the emotional leaders. This seemed evident from watching many of their games. During games when excitement reaches a peak or situations become most critical usually the coaches at the high school level were models of composure and if their players could pick up on that emotional control it seemed to be reflected in better play. One player stated:

> But an older coach you kind of have, what, doesn't have to be older just someone who's had the experience who's had, who you, who you feel like has been in a lot of situations, who you feel the trust in. You kind of, he's kind of a relaxing influence, he's kind of, you don't pick up these emotions you pick up kind of the, the confidence. Not just the, the blind, you know like, c'mon guys, let's work harder, but, okay, where everything's gonna be fine or, you know, we know we can win this.

This quote perfectly captured the steady influence of Big School's coach, even as he had received a technical foul for challenging the bad call. A close observer could see he had kept his composure with the players and coming out of the last huddle they looked calm and still under control. This emotional conveyance is known as embodiment, which Niedenthal, Barsalou, Ric, and Krauth-Gruber (2005) described as the manner through which emotion is expressed in facial and somatic behavior and then perceived by others. A common sentiment in the interviews reflects this as feelings associated with momentum were described as being contagious.

Emotional contagion is a form collective mood transferred between members of a group. Smith & Mackie (2008) articulated this in their theory of interpersonal emotions (IET) and indicate the emotional transference occurs through appraisal processes in response to events that the group experiences together. Contagion with several players took form when linked with several emotionally-laden words such as fun, excitement, energy and the feeling of flow. Fun proved to be a common expression of the feel of momentum, as did the feeling of easy effort. Although excitement and ease of effort may not be

[1] Baseball fans in New England may recall, as a great example of this, Kevin Millar's emotional leadership in 2004 when, on the verge of elimination in the division series against the New York Yankees Millar kept everyone loose and positive with his infectious positive energy.

considered emotions by certain standards of primary affect (Barrett, Niedenthal & Winkielman 2005), when fun and energy are lumped together they correspond to the basic emotion of happiness. Botterill and Brown (2002) suggested that the function of happiness is to increase available energy and enthusiasm in the pursuit of a goal. One player stated it this way, "the team gets more energy, your game picks up, um…it's funner, like, it's funner to be out on the court and play". The above quote, and many others offered by players in this study, seemed to resemble self, outcome, and social comparison processes described by Vallerand's (1987) intuitive-reflective appraisal model. These appraisals are more deliberate cognitive functions compared to intuitive or subconscious appraisals (Lazarus, 2000) and seem to be the basis for emotional behavior that can be recognized by other players and fans alike, and where the notion of contagious energy may originate. A high school player and his coach offered this example in one interview. The player stated:

> I think you can sense when your teammate is feeling good, or when their teammate is feeling bad, um, just little things that we talked about, how the shoulders, you know, if they're looking you in the eye or not, how they're feeling. And I think when your guys start getting it, yeah, definitely it's contagious. You start, you start kind of emulating, you start kind of feeling the way they are. You start kinda doing the things they do, you know?

…followed by the coach;

> My kids believed in, in my philosophy and the, my things they bought into it and when one guy buys in the other guy buys in and everyone starts buying in and I think, you know and it's very contagious. On the board, somebody hits a shot that's contagious, my confidence starts growin'.

From a spectator's vantage point it is not uncommon to feel a change in the energy of a game, and on more than one occasion during this study experiences of excitement and emotionality from games where data was being gathered occurred. A 41 point 4th quarter stood as the most prominent example of the visceral power of momentum.

From the negative emotion standpoint the same kinds of contagious effects also seem to happen. Here, players discussed frustration, negativity toward fellow players, and from the coach anger and disgust. In another of the most extreme cases experienced during this study a different high school coach talked about the

locker room at halftime as "being like a morgue" because of the stunning nature in which the opposition, also an underdog team in a playoff game, had completely taken control of the game. He confessed that he had no answers for the players and this affect was so debilitating that his team could never recover losing their game. Undoubtedly, this also was the experience for Small Town as they saw their 15 point lead evaporate in the span of 4 minutes.

Momentum-behavior

In negative momentum situations focus tends to be on various types of distractions. The coaches who recognize this will often remind their players to get back to basic fundamentals. This meant, for the coaches in this study, getting the players to get back on defense and stop the other team from scoring. Whether they were high school, college, or professional coaches the physical behaviors they looked for in stopping the other team's momentum, or turning around their own negative momentum, was sound defensive play. Getting the players to focus on the simple fundamentals that they had been physically practicing seemed to act as a behavioral cue which these coaches found to be effective. Additionally, the coach's own behaviors were to interact more with the players by talking to or instructing them on specific points. As the professional coach put it:

> I'd say it's, no, it's more important when things are negative. To be more hands on and, and coach them, and try to get 'em out of it. That's where, when momentum's going poorly I think it's more important for a coach to step in. But when things are going well, players almost don't need a coach.

This theme has also been expressed in coaching behavior research (Bloom, Compton, & Anderson, 1999; Gallimore & Tharpe, 2004) albeit from pedagogically oriented studies conducted mostly in practice settings rather than in games.

From the player's perspective behaviors during momentum were expressed often from an energetic or a kinesthetic viewpoint. This professional player stated:

> I think of momentum as something that propels, like feels like, carries you, something underneath, you know I don't mean it literally, but I'm saying like some underlying thing that helps you…something that kind of builds on each other until it kind of starts running on it's own. And so it, you kind of don't really have to work on anything anymore. It's more of just kind of, I don't

> know, pushing along and not really knowing that something is behind you, and something is kind of helping you a little bit.

A college player talked about how the team played during momentum, "It's not looking sloppy anymore. It's, it's all clicking, like you said. It's comin' together, everything's coming together", and about the energy involved with momentum, "everyone gets excited, it just kind of flows through each person, and like energy just picks up in everyone". Another college player talked about behaviors from people not on the team. Specifically she mentioned the media and their ability to help create momentum by being supportive in the press, and parents of team members who showed support for the team by coming to games, cheering, and handling various team management functions. Park (2004), in a study exploring factors influencing coaching confidence, found that support from administrative and institutional sources were often cited.

One other apparent behavioral element, mentioned by coaches and players alike, concerns the notion of "building" momentum. This was often expressed by coaches when they talk about getting their players to learn specific roles that fit into a broader system. Once the players assume role responsibilities, and "buy in", then momentum can more easily happen. However, depending on the team, this can take some time. A college coach described it this way:

> People say we're building momentum, we're building momentum. You can see it happening. It might not be one moment that gives you momentum. But the team really works together, even in an individual sport that, like you said, developing strategies or using the mental aspects of the game to get an edge over someone that is far more athletic. You, you build momentum by doing that.

In making this same point a player talked about how coaches want "this dance kind of thing…when you're all just dancing together and, I think they want that, you know, to occur more often".

The meaning of momentum

The meaning of momentum seemed to be the hardest concept to grasp overall. Momentum meant something different for everyone but a trend of sorts became evident as the interviews took place. Coaches talked about meaning with more clarity than the players. Patton (2002) equated meaning with the values a person has regarding experiences of cultural relevance. In a purely speculative sense perhaps athletes have not had the exercise of reflecting on these types of issues as much as coaches who in many cases see themselves as teachers. Or

maybe athletes are more familiar with having a set of values prescribed for them by their coaches and have not yet been able to define their own value system.

On the other hand some players have thought a lot about it. In describing what momentum meant for her during her best college season a college player put it this way:

> I just think that deep down inside, you know, you just have this…I wouldn't say your heart or, it's just you, like the inner you and, and what you're all about and what you bring, you just feel that inside of you and, and I would describe that as your soul. I think that if you are a really close team, I mean our team did stuff outside of basketball and I think that I knew everyone pretty well. I knew their, their soul.

One professional player, however, was succinct. For her momentum simply meant winning. A high school coach had a slightly different perspective saying:

> I think players would probably have a little bit different aspect of it. I think from a coaching standpoint we look at the performance of the team and, and in accordance with the game plan, yes, we have to change game plans once in a while but, you know, are we, are we staying with what we think is necessary to be successful against our opponent.

A college coach related that momentum was more relevant for him in practice rather than games. He insisted that practice time was his most important time with the team since this was where he, along with his staff, was able to "establish the type of team he wanted to put out on the floor". By this he meant that his players had a responsibility to play with a certain type of emotion or passion, and that in practice it was up to him and his staff to model that approach. A high school coach had the same sentiment where he stated that, "some players, and even their parents, are more concerned about who scores the points, rather than if the points are scored".

It was this response in particular that the concept of process gained much more traction as a broad theme in the building of momentum. Noted sport psychology consultant Ken Ravizza talks frequently about process (2002) and awareness (2001). Process refers to doing the daily things, putting "the hay in the barn", being in the present moment as often as possible, while awareness means being able to recognize right away one's own affect and how it contributes to

current performance or where a player is placing his or her focus. The coaches in this study seemed to be consistently process minded. Having a longer time frame in mind they recognize that momentum takes time to create. This was evident from the college coach who remarked that practice was more important than the games, and the professional coach who talked about starting to build momentum early in the preseason. The frequent references, by both coaches and players, to effort and building one step at a time further signify the process theme. When understood in this way momentum becomes a function of the amount of energy that goes into the system. And the more energy into the system - deliberate, focused, on-task practice, for instance, often results in more sustained episodes of momentum. In social situations it is this idea of system that seems to determine the quality of momentum situations and also how long the momentum will last.

Discussion

Vallerand, et al. (1988) mentioned the concept of synchronism in their model of psychological momentum (PM) but did not define it. Taylor & Demick talked about the cognitive, affective, physiological unity of components which effect behavior and finally performance but did not give it an operational term. Covey (1990) might have called these concepts synergy, but he used it in the context of interactive dynamics between people who work together to create something greater than the sum of themselves. On an individual level it may be appropriate to think of creating PM by attuning to; specific behaviors needed for the task, energizing self-talk and context appropriate focus, the physiological state conducive to functional productivity, and finally the right kind and amount of emotion which seems to bring all of these components together. Getting these components to work in unison requires patience, time, and effort emblematic of a process and the awareness of how one is doing in trying to capture these elements of improving performance. Recognizing that each situation is different and the environment is always changing means that the player, coach or performer has to be able to recognize and adjust to situational demands in order to keep PM.

Momentum may also be thought of as a product made up of core components such as energy, velocity, respect, and mass. **Energy** may be the amount of preparation and work that goes into practice or getting ready for a game or assessing the progress that is being made. Another source of energy can come from fans and support networks. Momentum becomes most evident in big games, perhaps because the ultimate goal is close and in sight or the social relevance is more broadly felt. **Velocity** may be thought of as the direction a team is headed. Velocity denotes the direction of a traveling object and if a team is made up of individuals with a variety of agendas it becomes harder to work together. On the other hand if a coach has built a system and gotten players to adhere to that system than the team has a lot of the same goal focus. A team with

the same purpose should have velocity because they are working together while pointed toward the same direction. This is more likely to happen if **respect** exists. How well the coaches have taught their lessons of team, and how well players trust and look out for one another in a supportive way should determine how much respect exists among everyone. Respect also refers to role responsibility and learning to fulfill that role even if it requires a shift away from personal goals. Finally, **mass** would be all of the factors combining in a favorable manner for the team or event. If the school has tradition, good resources, lots of enthusiastic fans, talent on the team, good emotional leaders and strong physical players, good all-around athletes, smart people on the court and coaches who can be adaptable and creative than momentum is likely to happen and last for a while. A high school coach said it simply, "to the extent that I have more people on the court operating under the same emotional wavelength than the other side, then momentum will happen for us".

For coaches looking to create momentum several implications may be of value. Momentum perhaps should be thought of as a growing sense of confidence by the players and coaching staff. Totterdill (2000) has found evidence that affect can move among individuals within a team. Understanding that affect and emotion are distinct from one another in the psychology literature (Lazarus, 1991) it seems plausible to regard momentum as a form of sport emotion. Thusly, emotion is the product of an appraisal of changing conditions favoring the group that has close emotional and instrumental ties (Smith & Mackie, 2008). Momentum is more likely to occur when;

- players are working collaboratively and sacrificing individual goals,
- coaches have successfully articulated their system and long range goals,
- a relative lack of errors and worrying about errors takes precedent,
- in sports like basketball matchup advantages are identified and practiced for,
- rapid adjustment capabilities exist,
- player role responsibilities are well understood and executed as it relates to strategy and the system the coaching staff as instituted (Schoen, 2009).

To sum this all up into one idea, it would be that to train for momentum is to train for developing long lasting confidence. Athletes know that things do not always go as planned and that being successful is hard. But coaches must teach them that what matters most are being in the present moment and to remain focused on the process. When athletes learn this they can learn to trust themselves and their teammates. The confidence flows from this knowledge and is a key, if not the key ingredient of momentum.

Coaches face many obstacles when trying to create momentum. One is that it takes time. Contemporary society places much emphasis on instant results. Building momentum is not conducive to urgent agendas. Second, successfully

establishing the team concept seems increasingly difficult in a sporting society that promotes individual greatness. Coaches often lament that it is so difficult these days to get players to trust one another and to overcome egocentric comparisons to their peer group. A third, related factor concerns the apparently declining ability for younger players to listen to and understand what coaches tell them, especially in the heat of battle when emotions are high. Consequently, one of the key elements that has to be in place for momentum to occur is the presence of emotionally adept and mindful floor leaders. If momentum is a kind of sport emotion, those that can develop emotional awareness and regulate their emotion may be more successful in creating momentum and sustaining for longer periods of time. This is where further studies should continue to make progress.

Conclusions

We still know little about how momentum occurs. Just as there have been more than thirty studies done experimentally on momentum and PM, there should be at least as many done phenomenologically. Any justifiable approach will help illuminate the topic further. For example, this study was descriptive of what the reader should consider to be a process of performance. A process evaluation, showing how elements or components of a system are related to one another (Patton, 2002), could focus specifically on verifying the theoretical relationships in Taylor and Demick's (1994) model of momentum. In a more traditional manner, absent the heuristic focus, a phenomenological exploration of momentum should be conducted which unveils the "schema" element mentioned in both Vallerand, et al.'s (1988) and Taylor and Demick's studies. This schema forms the basis for a perception of momentum and has yet to be explored in any depth.

An investigation of momentum in cooperative settings rather than competitive situations will give us yet another view. In competitive settings the other side is always trying to find weaknesses and exploit deficiencies. Being successful includes learning how to make adjustments when necessary. However, this is also the case in cooperative group situations where the interpersonal dynamics are always shifting. Making adjustments here is also important but the principles of momentum creation and maintenance may be different than in competitive situations.

The more perspectives the better when it comes to understanding momentum. Hanin and Stambulova called for a sharper focus on "performance-related experiences [and] person-relevant, task-specific assessments" (2002, p.396-397). How momentum is created, what disrupts it, how to maintain it, all seem to be important aspects to examine in this area. As our knowledge grows about this experiential concept it can become more applied as the focus reverts back to learning how it influences performance. The Projected Performance Model (Cornelius, Silva, Conroy, and Petersen, 1997) seems especially well

developed for this purpose. The PPM relies on a clearly objective definition of performance. By learning about the psychobehavioral components that are required in creating those performance measures, by focusing on the process, PM and momentum may become more useful to coaches, players and performers in the broader sense.

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