THE EFFECT OF COACH GENDER ON WOMEN'S VOLLEYBALL TEAMS' WIN-LOSS RECORDS

A THESIS

Presented to

The Faculty of the Department of Economics and Business

The Colorado College

In Partial Fulfillment of the Requirements for the Degree

Bachelor of Arts

By

Sarah Lawton

May, 2019

THE EFFECT OF COACH GENDER ON WOMEN'S VOLLEYBALL TEAMS' WIN-LOSS RECORDS

Sarah Lawton

May, 2019

Economics and Business

Abstract

Following the enactment of Title IX in 1972, the number of women's teams coached by females began declining, reaching a low of 42.2% in 2006 and sparking concern about the availability of female mentors to young female athletes. Female coaches are more likely than their male counterparts to foster autonomy-supportive athletic environments in which female athletes flourish. The purpose of this study is to examine the relationship between the presence of a female coach and women's teams' success rates, expecting a positive relationship. A basic OLS regression was used to model the production of wins based on data from the 2016-2017 Division I NCAA volleyball season. Results showed that multi-gendered and all-female staffs coach less successful teams. Additionally, female coaches produce more defensively adept teams while male coaches' teams are stronger offensively. The study concludes athletic administrators should aim to hire well-rounded coaching staffs with a wide variety of backgrounds, specialties, and coaching philosophies; as these characteristics often fall along gender lines, administrators should construct multi-gender coaching staffs.

KEYWORDS: (NCAA, coaching, mentoring, sports-economics)
JEL CODES: (D29, J24, L83, Z20)

ON MY HONOR, I HAVE NEITHER GIVEN NOR RECEIVED
UNAUTHORIZED AID ON THIS THESIS

Signature

TABLE OF CONTENTS

Introduction

Recently, light has been shed on the sudden decline in female coaches of National Collegiate Athletic Association (NCAA) women's sports. This trend is problematic mainly because it has led to a lack of female role models in female athletes' lives. This paper will explore the possibility that the lack of female coaches also affects teams' success rates.

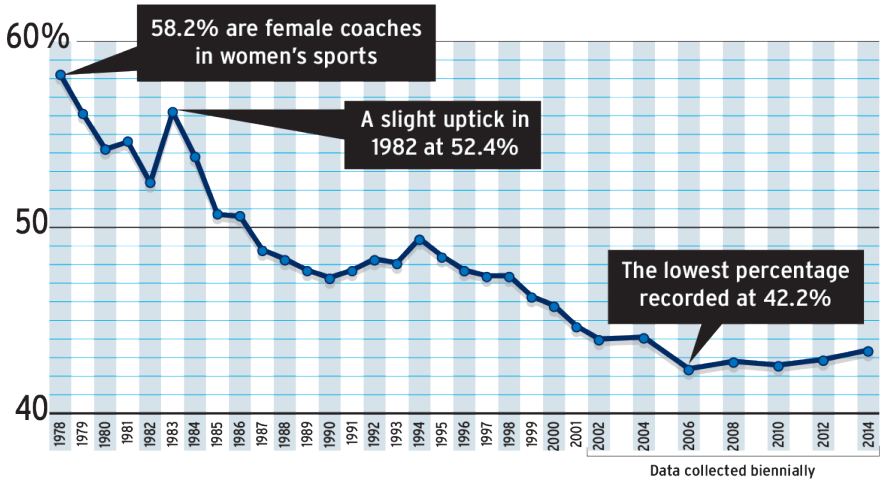
The introduction of Title IX in 1972 guaranteed equal treatment of female collegiate athletes in three realms: participation, scholarships, and other benefits such as court and field time. Its adoption triggered the creation of women's athletic programs at schools throughout the country: in 1970, schools sponsored an average of 2.5 women's teams (Acosta & Carpenter, n.d.). By 2014, this number had increased to 8.83. This growth was accompanied by an explosion of participants: from 16,000 female athletes in 1970 to over 200,000 in 2014 (Acosta & Carpenter, n.d.).

Before Title IX was enacted, 90% of all women's collegiate teams were coached by females; by the time Title IX compliance was mandated in 1978, this number had dropped to 58.2% (Acosta & Carpenter, n.d.). Over the next several decades, numerous forces drove women out of coaching positions and in 2014, only 43.4% of women's collegiate teams were coached by females (Acosta & Carpenter, n.d.). Head coach of a women's team thus became the first known occupation to transition from being female-dominated to male-dominated (Welch & Sigelman, 2007).

Female coach representation varies with sport; sports where both genders are coached together such as cross-country (18.6% female coaches), swimming (17.2%), and track & field (12%) have the lowest percentages of female coaches while field hockey

(100%), lacrosse (86.2%), and golf (81.3%) are top performers (LaVoi, 2017). Most American colleges are currently "failing" to equally represent women in coaching positions (LaVoi, 2017). However, recent data suggests the proportion of female coaches in women's sports is now stagnant instead of falling (LaVoi, 2017).

Figure 1. The Decline of Female Coaches Over Time



Source: Stark, n.d.

Researchers have provided many explanations for the decline of female coaches in women's sports. There are two main areas where females face barriers in coaching: ambition and hiring.

The lack of ambition among females to become coaches stems from three issues: the lack of role models, the demands of the job, and the perceived work environment. The sharp decline of female coaches following Title IX likely diminished the number of role models that existed within the profession leaving no one to encourage female athletes or young coaches to pursue coaching as a career (Bloom, Durand-Bush & Schinke, 1998). This short supply of female coaches, in addition to the lack of training and resources, left up-and-coming coaches uninspired and under-resourced. Additionally, the demands of a

coaching job, which extend far beyond a 9-to-5 commitment, may make women feel as though they can not fulfill their "familial responsibilities," including bearing and caring for children and managing a household (Welch & Sigelman, 2007). Further, the systematic gender bias in the professional world "creates an unpleasant workplace climate for many women," discouraging them from remaining in or seeking head coaching positions (LaVoi, 2017).

On the hiring side, Acosta and Carpenter (n.d.) explain how, following Title IX and the explosion of women's programs in the US, the demand for coaches of women's teams far outpaced the supply of capable and qualified female coaches, leading athletic directors to hire male coaches. Welch and Sigelman (2007) investigate the role an athletic director plays in female representation in women's head coaching positions, finding that female coaches are 10% more likely to be found at schools with female athletic directors. In 2014, 77.7% of athletic directors were male; the historic prominence of male leadership and administrations has effectively kept women out of coaching roles (Acosta & Carpenter, n.d.; Welch & Sigelman, 2007).

The importance of a head coach is well documented (Mageau & Vallerand, 2003; Pratt & Eitzen, 1989). Coaches comprise a team's leadership, serve as role models for their athletes, develop team culture and strategy (Pensgaard & Roberts, 2002), and are a large component in determining a team's success (Bloom et al., 1998; Mageau & Vallerand, 2003; Pensgaard & Roberts, 2001). Athletes depend on their coaches for skill-based instruction and the creation of a climate that fosters success (Pensgaard & Roberts, 2002). Such a large shift in the demographic makeup of coaches, from predominately

female to male, may have had an impact on the listed team characteristics, especially success.

Much research has been done to model team success including investigations of how funding, stadium quality, coaching changes, and off-field conduct affect team performance (Jones, 2012; Quinn, Bursik, Borick, & Raethz, 2003; Roach, 2013; Stair et.al, 2008). However, there is a lack of research investigating the impact of head coach gender on female collegiate athletic success. The goal of this paper is to investigate how the gender makeup of the coaching staff impacts a women's collegiate athletic team's success.

Literature Review

No literature directly addressing this research question exists. Therefore, this literature review is focused on how coaches impact team success. Many of the cited studies hail from sports psychology, including a mixture of qualitative and quantitative research methods. The literature identified three main avenues through which coaches affect success: the development of the athletic environment, coaching philosophy, and coach-athlete relationships.

Development of the Athletic Environment.

An athletic environment, or athletic climate, is the framework within which athletes function and includes how athletes interact with teammates and coaches and a motivational structure.

In a study on elite athletes, Pensgaard and Roberts (2002) find the coach is instrumental in the development of a team's athletic climate. Coaches, as the main leader of a team, can choose to be supportive or critical of their athletes. A climate in which coaches are critical of athletes transforms coaches into a source of distress, diminishing athletes' confidence and performance (Gould, Greenleaf, Chung & Guinan, 2002). Coaches should aim to develop an *autonomy-supportive environment* in which athletes are treated with respect and trust and experience connectedness and relatively low levels of pressure (Mageau & Vallerand, 2003). Coaches can foster this environment through small actions including providing athletes with choice (within limits), providing rationale for tasks, acknowledging athletes' feelings and perspectives, providing non-controlling competence feedback, avoiding controlling behaviors, and preventing ego-involvement in athletes (Mageau & Vallerand, 2003). Mageau & Vallerand (2003) find the autonomy-

supportive environment, established through the above behaviors, increases athletes' intrinsic and extrinsic motivation, therefore improving their athletic performance. They additionally find coach involvement, structure in practices, and the development of coach-athlete relationships to have similar effects.

In a study on Olympic athletes, researchers found many athletic-environmental factors influenced performance (Gould et al., 2002). These included strong coach-athlete relationships, positive team leadership, trust in coaches and teammates, alignment of coach expectations, and team cohesion. Team cohesion, which is fostered via clarity of goals, roles, and expectations, had an especially large and positive impact on performance (Carron, Colman, Wheeler & Stevens, 2002). Athletes who felt cohesion positively impacted their performance indicated, on a scale of one to ten (ten being an extremely positive performance impact), cohesion as an 8.55 (Gould et al., 2002). Other researchers additionally found a relationship between cohesion and performance, noting a larger effect in female teams (Carron et al., 2002). The establishment of a cohesive athletic environment is more important for and has a more significant impact on athletic performance within female teams than male.

Coaching Philosophy

In two separate studies, Pratt and Eitzen summarize the effectiveness of different leadership styles within sports teams and how they differ between genders. They first describe two main leadership styles: authoritarian and democratic. Authoritarian, or "traditional," leaders enforce strong discipline, rigid rules, and a hierarchical structure while demonstrating impersonal attitudes towards their athletes. On the other hand,

democratic leaders treat their athletes humanely, are consultative, participative, and value equality (Pratt & Eitzen, 1989).

In their first study, Pratt and Eitzen (1989) measure the effect a leadership style has on a coach's lifetime winning percentage. They find female athletes respond well to rigor, which is typically associated with an authoritarian coaching style; a coach that scores high in rigor has a winning percentage 6.96% higher than a low-rigor coach. On the contrary, when coaches of women's teams implemented fewer rules they were 4.44% more winning than coaches who implemented many rules (Pratt & Eitzen, 1989). Having fewer rules is typically associated with a democratic approach to team leadership and signals the presence of trust between coaches and athletes, indicating an autonomy-supportive environment. In order to maximize a women's team's wins, a coach should take a mixed approach, demanding dedication and effort from his/her athletes (rigor) while fostering a trusting and autonomy-supportive environment.

They then went one step further to investigate the differences in coaching philosophies based on the coach's gender. In many ways, there was no statistical difference between male and female coaches. However, when they did vary, female coaches tended to be more "traditional," suggesting an authoritarian coaching philosophy. Eitzen and Pratt (1989) also note that female coaches are dedicated to developing the complete athlete instead of solely athletic abilities. Surveys showed they are more likely to have rules about and establish the importance of sportsmanship, positive self-image, perseverance, academic performance, attitude, discipline, teamwork, and other autonomy-supportive behaviors. The female coach's apparent investment in the entire

athlete is a common trait of an autonomy-supportive environment (Mageau & Vallerand, 2003).

Additionally, an examination of female coaches by Lough (2001) revealed strong autonomy-supportive behaviors. Female coaches tend to valued connectedness with and between athletes, voice over vision, and treating athletes as more than pawns for performance. The values female coaches demonstrate in these studies help establish autonomy-support which can improve motivation and athletic performance and create opportunities for the development of positive coach-athlete relationships (Mageau & Vallerand, 2003). Lough (2001) also notes that, when interviewed, "the most successful male coaches often preach these very qualities," highlighting the importance of an autonomy-supportive environment regardless of coach gender.

Coach-Athlete Relationships

The importance of coach-athlete relationships can not be overstated. Quality coach-athlete relationships positively impact team success through several avenues. Prophet, Singer & Couter (2017) find that team cohesion and athletic performance improve when coaches develop strong relationships with their athletes. Researchers suggest coaches attempt to learn and understand each athlete's traits, motivation, and narrative in order to develop a thorough understanding of the athlete's behavior and desired support (Prophet et al., 2017). Other researchers report mentorship between coaches and athletes is important for the development of both an athlete's sports-specific technical skills and soft, interpersonal skills (Bloom et al., 1998). Mageau & Vallerand (2003) additionally find coach-athlete relationships have an important influence on athletes' motivation and performance.

Notably, the coach-athlete relationship is bidirectional (Prophet et al., 2017). Not only must the coach express interest in developing relationships and build the correct environment to sustain such relationships, but the athletes must also be invested. This bidirectionality is one major challenge inhibiting the proper development of these relationships.

The growth of these relationships may also be affected by gender. Whereas female coaches value connectedness and the development of the athlete as a whole, male coaches can be quite the opposite, sometimes underestimating their own athletes' ability based on gender (Eitzen & Pratt, 1989). If male coaches do not feel their athletes are capable and female athletes subsequently do not feel their coaches understand or believe in them, a relationship will not develop and performance will likely diminish (Gould et al., 2002). Male coaches place less value on non-performance-based skills such as concentration, self-control, and attitude (Eitzen & Pratt, 1989), ignoring the development of the athlete as a whole and stunting coach-athlete relationships. Male coaches are understood to concentrate so intensely on winning they forget to communicate and connect with their athletes (Lough, 2001). All of the above traits inhibit the male coach's ability to establish strong coach-athlete relationships and therefore an autonomy-supportive environment.

Great importance and power therefore lies in the development of female/female coach-athlete relationships. Female athletes may be more willing to connect with female coaches because they are more likely to communicate effectively and value connectedness, traits that encourage positive relationships and empowering athletic environments (Lough, 2001). This, combined with other traits listed in the previous

section, such as the development of the athlete as a whole person, promotes the establishment of an autonomy-supportive environment, increases respect between coaches and athletes, and encourages positive relationships. Additionally, when athletes feel their coaches care about them as a person, a feeling female coaches foster when demonstrating interest in the entire athlete, coach-athlete relationships develop (Eitzen & Pratt, 1989; Prophet et. al, 2017). This is not to say male coaches don't care about their athletes, just that female coaches are more likely to express it.

The power of these female/female role model relationships is noted in multiple settings. Kunze and Miller (2017) find that, in the professional setting, female mentorship led to more females being promoted. Additionally, Bednar and Gicheva (2014) find that, though the gender of an athletic director does not predict female friendliness within the athletic department, female athletic directors tend to spend more money on women's sports than male athletic directors. Rask and Bailey (2002) find some evidence to suggest that a gender-based role model effect exists in academia, specifically within small intimate learning environments where role models may play a role in determining a student's success. Bednar and Gicheva (2014) summarize that superiors better understand a subordinate's ability if they share a characteristic, such as gender, or an experience, such as participation in collegiate athletics. As Eitzen & Pratt (1989) find female basketball coaches are more likely to have played collegiate basketball than their male counterparts, there is a likelihood that female athletes will connect better with female coaches than males. Therefore, female collegiate coaches may be more equipped to connect with and advocate for female athletes than male coaches, enabling stronger relationships to improve athlete motivation and performance.

Overall, the literature reveals the power of coaching philosophy and leadership in athletics. Athletes all respond differently to separate coaching styles, but trends can be generalized along gender lines. Female athletes thrive in rigorous yet trusting environments where they are pushed physically and supported emotionally. Female coaches, likewise, are more likely to exhibit traits and establish athletic environments that match female athletes' preferences. However, male coaches are more likely to exhibit the rigor female athletes need to succeed. Coaches, especially female coaches, are equipped to create conducive environments through the establishment of autonomy-support and development of strong coach-athlete relationships. Coaches should strive to develop strong role model relationships with their athletes to improve team performance.

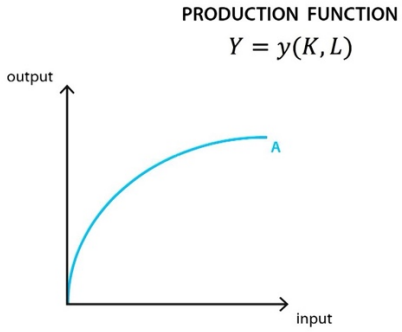
Theory

The profit maximization model, which is commonly used in general and sports economics, is not applicable in this study. Though professional and some collegiate sports teams (i.e. Division I men's basketball) aim to maximize their profits, most sports, especially women's programs, do not fall into this category. Of the top 48 women's athletic programs in the country, only eight break even (Rosas & Orazem, 2012). Collegiate teams do not collect enough revenue to offset their costs and rely on other programs at their schools, such as basketball, and their athletic departments to raise the funds to sustain their programs (Rosas & Orazem, 2012). With revenue as a non-concern, collegiate teams focus on maximizing wins.

We think of win maximization in collegiate sports as a production function. Given inputs, how many wins can a program produce? Three main inputs are considered in my model: coaching, player talent, and performance.

$$Wins = f(Coaching,\ Player\ Talent,\ Athletic\ Performance) \quad (1.0)$$

Figure 2. Standard Production Function



Source: Policonomics, 2014

Coaching

Coaching is a function of coaching philosophy, experience, talent, and motivation. In psychological studies, coaching philosophy is measured via extensive surveying. Though studies showed gender and coaching philosophy are related, the relationship is not solid enough for gender to serve as a proxy variable; therefore, coaching philosophy is an intangible variable that cannot be measured in this study. Experience can be measured through the number of years a coach has been coaching; I expect experience to have a positive effect on wins. Talent, measured through a coach's career record and the number of assistant coaches on staff, should also increase the number of wins. Factors affecting a coach's motivation include love of the game, coach-athlete relationships, and salary. Of these, salary can be measured quantitatively and the coaching staff's gender composition is used as a proxy for the quality of coach-athlete relationships. Together, these variables are used as a measure for motivation, which we expect to have a positive effect on wins. Specifically, we expect the presence of female coaches at any level to have a positive impact on wins.

Coaching = f (# Years Coaching, Coach's Career Record, # Assistant Coaches, Coaching Staff Gender Makeup, Coach Salary) (1.1)

Player Talent

Player talent is measured for the program as a whole rather than individuals and is a function of program reputation and recruiting expenses. Program reputation and recruiting expenses determine the number and type of players a program can attract and therefore the amount of talent present in a program. I use the historic number of appearances in the NCAA tournament, the program's conference, and revenue as proxies

for reputation. The number of historic NCAA appearances has a direct impact on program reputation; more appearances make a program more attractive to a potential player. Conference is used because schools in more successful conferences may have an easier time attracting players than schools in lesser-known conferences such as the Big Sky or the Southwestern Athletic Conference (SWAC). Since the NCAA began hosting a playoff tournament for volleyball in 1981, teams in the Pac10, Big12, and Big10 have won 27 of the 34 titles. I have therefore identified these as the "power conferences" of women's volleyball. I use a dummy variable indicating whether a school is a member of one of the power conferences to proxy reputation. Revenue acts as a proxy for local reputation because it measures local support, game attendance, and apparel sales. I expect increased reputation, via NCAA tournament appearances, presence in a power conference, and revenue to have a positive effect on wins. Additionally, recruiting expenses, indicating how much programs invest in attracting talent, will have a positive effect on wins.

Player Talent = f(#NCAA Appearances, Power Conference, Revenue, Recruiting Expenses) (1.2)

Athletic Performance

Athletic performance is a function of previous year performance, sport-specific measures, mid-season performance, mental strength, health, athletic environment, coach-athlete relationships, and motivation. Previous performance is measured through the previous season's record and presence on the American Volleyball Coaches Association (AVCA) preseason poll; success in the previous year should have a positive effect on this season's success. For this specific study on collegiate volleyball teams, we use hitting

percentage, digs per game, and blocks per game to measure the effectiveness of the team's offensive and defensive efforts. Mid-regular season rankings are used to measure team performance. Being ranked in the mid-season polls should have a positive effect on wins. Mental strength and athletic environment are both intangible variables that can not be measured in this study. Health is difficult to measure due to privacy laws so we therefore assume that Division I programs have sufficient bench players to substitute for injured or ill first-string players. It is therefore important to include number of participants in the regression, which I expected to have a positive, though diminishing, effect on wins. Coach-athlete relationships and motivation are measured through two variables: the gender of the head coach and the gender of the assistant coach. I expect that the presence of a female coach at any level (head or assistant) will have a positive effect on wins.

Athletic Performance = f(2015 Record, Preseason Ranking, Hitting %, Digs per Game, Blocks per Game, Mid-Season Ranking, # Participants, Coaching Staff Gender Makeup) (1.3)

The overarching model appears as follows:

Wins = f(# Years Coaching, Coach's Career Record, Coach Salary, Coaching Staff Gender Makeup, # Assistant Coaches, #NCAA Appearances, Revenue, Recruiting Expenses, Power Conference, Preseason Ranking, Mid-Season Ranking, Hitting %, Digs per Game, Blocks per Game, 2015 Record, # Participants, Operating Expenses) (1.4)

Operating expenses are included because teams who have more room in their budget to spend on services such as sports psychologists or nutritionists may find more success.

Omitted variables include those intangibles listed above such as coaching philosophy, health, mental strength, and athletic environment. Other potential omitted variables that can not be measured include team leadership and cohesion. One variable purposefully omitted is the dollar amount of scholarships provided. This is left out because each school is allowed to give the same number of scholarships and this would therefore be constant. Despite their absence, they will not affect my model because these characteristics are likely captured by other included variables.

Data

Data were collected from a variety of sources. Due to the complexity of constructing my own data set, I chose to include data for only Division I NCAA women's volleyball teams. Data from Equity in Athletics Data Analysis (EADA) were used to collect information on head coach gender, assistant coach gender, number of assistant coaches, operating expenses, recruiting expenses, revenue, and number of participants. Gender is represented through a dummy variable, with a one representing a female coach and zero representing male. All other EADA variables are numerical. Notably, the data on recruiting expenses include the budget for all women's teams, instead of exclusively the volleyball team.

Team records for the 2015 and 2016 seasons, coaches' lifetime records and number of years coaching, hitting percentages, digs per game, and blocks per game were collected from the NCAA's database on an individual basis. Both pre and mid-season rankings data were pulled from the American Volleyball Coaches Association's (AVCA) website. Rankings are represented as dummy variables, with a one indicating the team was ranked and a zero indicating otherwise. Information on the number of NCAA appearances and the historic results of the NCAA tournament were collected from the NCAA's website. Conference-member information was collected from Wikipedia. Presence in the Pac12, Big 10 and Big 12 are represented via a dummy variable that indicates membership in one of the three power conferences.

For schools that were missing any of the above information, I visited their individual athletic websites to collect the necessary information. Data were collected for the 2016-2017 season in accordance with the most recent available EADA dataset. Other

variables, such as noAC and multigender, were constructed using conditional statements within the EADA dataset. Variables with large values, such as coach salary and operating expenses were logged to improve readability and accuracy of results.

As seen in Table 1, the distribution of coaching staff gender makeups among Division I collegiate volleyball programs is relatively female-skewed. Of the 329 programs, only 20 are all-male; the other 320 programs employ female coaches at either the head or assistant coach level. A total of 114 programs are all-female while 195 employ multi-gendered staffs. About 47.11%, or 155 programs, employ female head coaches, as compared to the overall NCAA average of 43.4% in 2014 (Acosta & Carpenter, n.d.).

Table 1. Coaching Staff Makeup

Indicator	Count	Percent
femaleOnly	114	34.65
maleOnly	20	6.08
multigender	195	59.27
Total	329	100
Female head coach	155	47.11
Female assistant coach	263	79.94

Table 2. Variable List

Variable	Abbreviation	Input	Source	Expected Impact
Years Coaching	coachExperience	Coaching	NCAA	+
Head Coach's Historic Record	coachRecord	Coaching	NCAA	+
Head Coach Salary	logSalary	Coaching	EADA	+
Head Coach's Gender	femaleHC	Coaching / Athl. Perf.	EADA	+
Assistant Coach's Gender	fmachoachd	Coaching / Athl. Perf.	EADA	+
# Assistant Coaches	totalAC	Coaching	EADA	+
# NCAA Appearances	programAppear	Player Talent	NCAA	+
Power Conference	power	Player Talent	NCAA	+
Preseason Ranking	preRank	Athl. Perf.	AVCA	+
Mid-Season Ranking	Week7Rank	Athl. Perf.	AVCA	+
Recruiting Expenses	logRecruiting	Player Talent	EADA	+
Hitting Percentage	hit	Athl. Perf.	NCAA	+
Digs per Game	digspg	Athl. Perf.	NCAA	+
Blocks per Game	blockspg	Athl. Perf.	NCAA	+
2015 record	previousRec	Athl. Perf.	NCAA	+
# Participants	participants	Athl. Perf.	EADA	+
Operating Expenses	logOppExp		EADA	+
Revenue	logRevenue	Player Talent	EADA	+
Multi-Gender Coaching Staff	multigender	Coaching	EADA	+
No Assistant Coach	noAC	Coaching	EADA	-

Results and Discussion

Initial regression results using variables femaleHC and femaleACdummy, indicating the presence of a female head or assistant coach, were insignificant (Appendix C). When using the multigender variable, constructed to indicate a coaching staff has both a male and female coach present, to model coach gender, a basic Ordinary Least Squares (OLS) regression produced several significant explanatory variables: logRecruiting, blockspg, digspg, hit, week7Rank, coachRecord, previousRecord, noAC, multigender, and femaleOnly. This model passed tests for heteroskedasticity and multicollinearity via the White and VIF tests, respectively (Appendix A).

Table 3. Regression Results with Record as Dependent Variable

Variable	Constant	95% CI	P-Value
logOppExpenses	-0.0124	[-0.0386, 0.0181]	0.478
logRevenue	-0.0074	[-0.0239, 0.0090]	0.375
logSalary	-0.0062	[-0.0452, 0.0328]	0.753
logRecruiting	-0.0389	[-0.0641, -0.0136]	0.003***
participants	0.0001	[-0.0041, 0.0043]	0.966
previousRec	0.1068	[0.0312, 0.1823]	0.006**
coachExperience	-0.0007	[-0.0014, 0.0043]	0.882
coachRecord	0.1383	[0.0296, 0.2471]	0.013**
programAppear	-0.0013	[-0.0014, 0.0009]	0.238
preRank	-0.0194	[-0.0859, 0.0471]	0.566
week7Rank	0.0784	[0.0128, 0.1440]	0.019**
totalAC	0.0102	[-0.0085, 0.0289]	0.283
noAC	0.0957	[0.0210, 0.1705]	0.012**
multigender	-0.0489	[-0.0954, -0.0024]	0.039**
femaleOnly	-0.0404	[-0.0881, 0.0074]	0.098*
blockspg	0.0472	[0.0156, 0.0788]	0.004***
digspg	0.0181	[0.0108, 0.0255]	0.000***
hit	3.3007	[2.9108, 3.6906]	0.000***
Power	-0.0029	[-0.0510, 0.0452]	0.905
Cons	0.1180	[-0.2818, 0.5177]	0.562
R-squared value	0.7957	---	---
Adjusted R-squared	0.7830	---	---
Observations	327	---	---

Note: * = p < 0.10, ** = p < 0.05, *** = p < 0.01

The negative coefficient associated with logRecruiting indicates that every additional 1% the athletic department spends on recruiting for women's team decreases the volleyball team's win percentage by 3.9%. This is likely reflective of the pattern that low-reputation, low-success, or newer programs must spend more money to attract players than traditionally successful programs. It is notable this statistic includes spending on all women's sports by a school's athletic department, not a specific team. This may have decreased the accuracy of this variable and results should be taken with caution.

Playing statistics, including those for blocking, hitting, and digging have positive impacts on season record; increasing blocks per game by 1 increases win percent by 4.7%, 1 extra dig per game increases win percent by 1.8%, and a 1% increase in hitting percentage increases win percentage by 3.3%. Variables representing the coach's lifetime record and the team's previous record both had positive impact on team win percentage.

The positive, sizable, and statistically significant coefficient on the noAC variable, indicating there are no assistant coaches at a program, is not logical. The regression results suggest schools that employ zero assistant coaches have records that are 9.57% higher. As assistant coaches help with important responsibilities such as recruiting, scheduling, practice planning, and logistics, it is unlikely that the absence of an assistant coach improves win percent and more likely that this variable is catching other variance in the model. Upon investigation, only nine schools out of the 329 included in this sample, have no assistant coach. Though this result doesn't make sense and the number of programs exhibiting this characteristic is small, including this variable improves the regression's R-squared value.

Notably, the multi-gender staff and femaleOnly variables resulted in negative correlations, indicating that the presence of a female coach has negative impacts on a team's success rates. Teams with a multi-gendered staff win 4.89% fewer games while teams with all-female staffed teams win 4% fewer games. Since the femaleOnly indicator is a dummy variable, the variable flips to indicate that having an all-male coaching staff increases win record by 4%. These results clearly contradict this paper's hypothesis and will be discussed in depth.

The non-significance of indicators such as fmhdcoach and fmacoach in initial regressions suggests there may be other factors associated with a female-only or female-run staff that aren't accounted for in this model. These omissions may additionally be affecting the coefficients associated with the femaleOnly and multigender variables. For example, program prestige is relevant to winning percentage and prestigious programs more frequently employ male head coaches. Following the enactment of Title IX, many female coaches were pushed out of the profession and male coaches therefore came to be viewed as more professional choices for the job; this connotation exists today as 24 of the 32 power-conference schools are coached by male head coaches. Seven of ten programs in the SWAC, a conference from which zero members advanced to the 2016 NCAA tournament, are coached by all female staffs. Including a variable to explain or model program prestige might catch some of the variability currently being caught by the femaleOnly variable and therefore improve the estimations for the femaleOnly variable, other coach gender indicators, and the overall model.

Notable non-significant explanatory variables include power, preRank, programAppear, coachExperience, and participants. It is also worth noting the power

conference variable was insignificant in this model. This is logical when we consider that volleyball teams play the majority of their regular-season matches against conference opponents. Therefore, wins should be relatively evenly distributed throughout all conferences and belonging to a power conference should not affect overall record. However, when you measure team success through an appearance in the NCAA tournament instead of win/loss record, the power variable becomes a strong predictor of success (Appendix B). According to that regression, a power-conference school is 22% more likely to appear in the tournament than any other team, illustrating the current competitive imbalance present in the NCAA Division I volleyball program. However, the insignificance of the programAppear variable hints at the presence of competitive balance. Teams that have recorded more historical appearances in the NCAA tournament are not necessarily more likely to be successful this season. There is an ebb and flow of talent and success throughout these programs, though it may be isolated within a specific group of schools.

Preseason rankings were additionally found to be insignificant which is notable since these rankings are a professional attempt to predict a team's success based on available knowledge. Factors taken into consideration include previous season's success and strength of schedule, reputation, number and significance of graduating and incoming players, and significant changes to the program such as coaching changes. The insignificance of the preseason ranking suggests just how difficult it is to model success, at least for the 2016 season.

There was additionally no observable effect of coaching experience on a team's success. This could be a reflection of many things including a diminishing marginal

return on coaching experience, change in the style of the game since the coach played or began coaching, and/or decreasing ability to connect with athletes as the age gap grows.

Diminishing marginal returns is likely responsible for the insignificance of the participants variable; the 12th participant is impactful on success because it allows a team to play 6-on-6 game-style drills in practice while the 19th contributes far less and likely takes away from other key players' practice time.

In the framework of our overarching model, athletic performance was the most impactful input on team production of wins while player talent was the least impactful. This is likely a result of ease of measurement of each category. Whereas there are many solid and consistently collected statistics representing athletic performance, such as playing statistics and rankings, these are harder to collect for player talent. Perhaps more accurate measures of player talent such as the number of seniors that graduated the previous year, the number of returning players who received all-conference honors, and the number of incoming players, should have been considered.

Table 4. Significance of Variables by Input Category

Input	# of Variables	# of Significant Variables
Coaching	6	3
Player Talent	4	1
Athletic Performance	8	6

Independent regressions allowed more insight into the impacts of coach gender on specific team successes. As seen in Table 5, the presence of a female head coach or a female staff has a statistically significant negative impact on hitting and blocking statistics. Teams with all-female staffs experience hitting percentages 1.6% lower and get

0.11 fewer blocks per game. On the contrary, having a male-only staff decreases digs per game by 0.79. These impacts may be due to coaching philosophy; men are traditionally more focused on winning and technical aspects of the game. This philosophy is suited to hitting and blocking, which are highly technical skills, while collegiate defensive competency comes simply with experience, repetition, and mental strength. Female coaching styles, which are more focused on the mental aspect of the game, and perhaps less focused on technical skills, would produce better defensive and poorer offensive statistics.

Additionally, these effects may rather be a result of coach characteristics. Male coaches are less likely to have actually played the sport and, when they enter the profession, are eager to learn about how to score points. This preference may shape their knowledge of the game, how they coach, and, therefore, how their players perform. Female coaches, on the other hand, are more likely to have played and understand the value of defense; they may emphasize defense during practice sessions, leaving less time to work on technical improvements in hitting and blocking, therefore have a better-performing defense and a low-performing offense.

Table 5. Independent Regression Results

Dependent Variable	Independent	Coefficient	P-Value
Hit	femaleOnly	-0.0156	0.004***
Hit	fmhdcoach	-0.0169	0.001***
Hit	maleOnly	-0.0147	0.175
Hit	multigenderstaff	0.0181	0.001***
blockspg	fmhdcoach	-0.0914	0.043**
blockspg	femaleOnly	-0.1068	0.024**
blockspg	maleOnly	-0.0756	0.424
blockspg	multigenderstaff	-0.1181	0.010*
digspg	femaleOnly	0.0589	0.755
digspg	fmhdcoach	0.1865	0.300
digspg	maleOnly	-0.7854	0.036**
digspg	multigenderstaff	0.1305	0.475

These results contradict the negative coefficient associated with the multigender variable. The differences in performance statistics based on coach gender highlight the importance of having both genders on staff in order to develop all skills. Employing both male and female coaches allows coaches to focus on their preferred area of expertise and produce a better-performing technical team. Additionally, the multigender coaching team should produce actual success due to the combination of coaching philosophies. While a female coaching philosophy helps to foster an encouraging athletic environment for female athletes, the presence of a male coach is also necessary for the establishment of rigor and development of skills and technical proficiency. The combination of female and male coaching philosophies should create balance within coaching philosophies, strategy, and the athletic environment. We may not be seeing this result due to underlying variables, limitations of the sample, or other characteristics of the data set such as sports-specific trends and phenomenon.

Conclusion

Implications

Based on the results of the main regression, men appear to be more effective coaches, in terms of how many wins they can produce. Given the need to re-establish women within this profession to serve as role models for female athletes, some questions need to be asked. What skills do men have, or are they developing throughout their professional experiences, that women lack or aren't developing? What professional development should be offered to women in order to develop these skills and produce more effective female coaches? Based on this study, the development of rigor within coaching style and competency across all technical skills are necessary to help produce successful female coaches.

Despite the results of the main regression, there are benefits to hiring female coaches. Traits and philosophies of female coaches, as discussed in the literature review, are beneficial for female athletes, though these benefits don't appear in record-based measures of success. Female coaches are advantageous for their development of positive athletic environments, focus on the development of the entire athlete, and the fostering of positive coach-athlete relationships.

Athletic directors, administrators, or those otherwise responsible for hiring should aim to hire coaching staffs that are diverse in coaching background, skills, and experiences. Hiring should therefore be focused on finding a candidate who fits well with the program and will offer additional knowledge and benefits beyond what the current coaches supply. Overall, administrators should be aware of the effect gender may have on

coaching style and team success and include this characteristic in their consideration of candidates.

Additionally, coaching staffs should assess each member's strengths, weaknesses and coaching philosophies in order to identify possible areas for improvement or professional development. A stereotypical all-female staff may consider conducting research about how to run practices with more rigor and check in with their athletes about how they like to be pushed in training. Additionally, they could opt to bring in a male volunteer assistant coach to help develop said rigor. On the other hand, all-male staffs should research and respect the importance of developing relationships and an autonomy-supportive environment. They should also consult their athletes about what the coaching staff can improve upon in this less concrete area of coaching. Multi-gendered staffs should still assess their strengths and communicate with their athletes about what should be changed in order to produce the optimal athletic environment for success.

It is important to recognize that coaches, coaching staffs, and teams do not always align with stereotypes. Each team will have specific needs that may not conform with the expectations outlined here. Likewise, individual coaches hailing from unique backgrounds will present distinct characteristics that can not always be categorized into one of two genders.

Limitations

As demonstrated by the r-squared value, this model is imperfect. Many intangible or immeasurable factors exist when attempting to predict a team's success including injury, team chemistry, conflict, incoming freshman talent-level, and travel. This model additionally lacked a proper proxy variable for program prestige, which may have a large

impact on the quality and ability of coaches and the program's ability to recruit highly-skilled players. Program age and length of coach tenure should be included to improve the model's accuracy. It may have been beneficial to construct a more accurate dependent variable measuring success by mathematically combining overall record, NCAA tournament appearance, NCAA tournament outcomes, and conference tournament outcomes.

This study is limited in its applicability to other sports. The data used are only representative of division one NCAA volleyball programs. The result may be applied to other female sports, especially team sports, and / or divisions but should be done with caution.

As this dataset was constructed by hand, there was significant opportunity for error in data entry. However, caution was taken when entering data and data were cleaned and inspected before running any regressions.

Further Research

Repeat studies should be conducted while taking into account other variables as mentioned above. Studies similar to the one conducted here should be completed for other sports, divisions, and years to see if the effects noted here remain consistent. Additionally, athlete surveys should be conducted at the collegiate level about how the development of cohesion, coach-athlete relationships, and the athletic environment vary along coach gender lines. Academics in sports psychology should investigate the major differences in coaching philosophy and athletic environment development based on gender.

Appendix A

Table 6. Full Regression Results with Record as Dependent Variable

Source	SS	Df	MS
Model	10.766869	19	0.566677315
Residual	2.764665	307	0.009005423
Total	13.531534	326	0.041507773

Number of obs	=	327
F (19, 307)	=	62.93
Prob > F	=	0.0000
R-squared	=	0.7957
Adjusted R-squared	=	0.7830
Root MSE	=	0.0949

Record	Coefficient	Std. Error	T	P > |t|	95% C.I.
logOppExpenses	-0.0124	0.0144	-0.71	0.478	[-0.0386, 0.0181]
logRevenue	-0.0074	0.0084	-0.89	0.375	[-0.0239, 0.0090]
logSalary	-0.0062	0.0198	-0.31	0.753	[-0.0452, 0.0328]
logRecruiting	-0.0389	0.0128	-3.03	0.003	[-0.0641, -0.0136]
Participants	0.0001	0.0021	0.04	0.966	[-0.0041, 0.0043]
previousRec	0.1068	0.0384	2.78	0.006	[0.0312, 0.1823]
coachExperience	-0.0007	0.0007	-0.15	0.882	[-0.0014, 0.0043]
coachRecord	0.1383	0.0553	2.50	0.013	[0.0296, 0.2471]
programAppear	-0.0013	0.0011	-1.18	0.238	[-0.0014, 0.0009]
preRank	-0.0194	0.0338	-0.57	0.566	[-0.0859, 0.0471]
week7Rank	0.0784	0.0333	2.35	0.019	[0.0128, 0.1440]
totalAC	0.0102	0.0095	1.08	0.283	[-0.0085, 0.0289]
noAC	0.0957	0.0380	2.52	0.012	[0.0210, 0.1705]
multigenderstaff	-0.0489	0.0236	-2.07	0.039	[-0.0954, -0.0024]
femaleOnly	-0.0404	0.0243	-1.66	0.098	[-0.0881, 0.0074]
blockspg	0.0472	0.0161	2.94	0.004	[0.0156, 0.0788]
digspg	0.0181	0.0037	4.86	0.000	[0.0108, 0.0255]
hit	3.3007	0.1982	16.66	0.000	[2.9108, 3.6906]
Power	-0.0029	0.0245	-0.12	0.905	[-0.0510, 0.0452]
cons	0.1180	0.2031	0.58	0.562	[-0.2818, 0.5177]

White Test for Heteroskedasticity:

White's test for Ho: homoscedasticity

Against Ha: unrestricted heteroskedasticity

$Chi^2(183) = 194.66$

$Prob > chi^2 = 0.2638$

Table 7. VIF Test for Multicollinearity:

Variable	VIF	1/VIF
Multigender	4.90	0.20
femaleOnly	4.84	0.21
logSalary	4.29	0.23
logRecruiting	4.26	0.23
logOppExpenses	3.76	0.27
Hit	3.05	0.33
preRank	3.04	0.33
coachRecord	2.92	0.34
Week7Rank	2.85	0.35
programAppear	2.51	0.40
previousRec	2.21	0.45
Power	1.92	0.52
totalAC	1.85	0.52
Blockpg	1.54	0.65
coachExperience	1.41	0.71
noAC	1.40	0.71
Digspg	1.29	0.78
Participants	1.25	0.80
logRevenue	1.18	0.85
MeanVIF	2.66	

Appendix B

Table 8. Full Regression Results with 2016 NCAA Appearance as Dependent Variable

Source	SS	Df	MS
Model	6.5792301	19	0.346275268
Residual	20.6684763	307	0.067324027
Total	27.2477064	326	0.083581922

Number of obs	=	327
F (19, 307)	=	5.14
Prob > F	=	0.0000
R-squared	=	0.2415
Adjusted R-squared	=	0.1945
Root MSE	=	0.25947

Record	Coefficient	Std. Error	T	P > |t|	95% C.I.
logOppExpenses	-0.0289	0.0394	-0.73	0.464	[-0.1064, 0.0487]
logRevenue	0.0272	0.0228	1.19	0.235	[-0.0178, 0.0721]
logSalary	-0.0191	0.0542	-0.35	0.724	[-0.1257, 0.0874]
logRecruiting	-0.0089	0.0351	-0.25	0.801	[-0.0779, 0.0602]
Participants	0.0043	0.0058	0.74	0.460	[-0.0072, 0.0158]
previousRec	0.0229	0.1050	0.22	0.827	[-0.1838, 0.2296]
coachExperience	-0.0013	0.0019	-0.71	0.476	[-0.0050, 0.0023]
coachRecord	0.0.2426	0.1511	1.60	0.110	[-0.0549, 0.5400]
programAppear	-0.0033	0.0030	-1.11	0.266	[-0.0092, 0.0026]
preRank	0.1677	0.0924	1.81	0.071	[-0.0142, 0.2496]
week7Rank	0.1334	0.0912	1.47	0.143	[-0.0457, 0.3132]
totalAC	0.0188	0.0259	0.73	0.469	[-0.0323, 0.0670]
noAC	0.0365	0.1039	0.35	0.725	[-0.1679, 0.2410]
multigenderstaff	0.0065	0.0646	0.10	0.919	[-0.1206, 0.1337]
femaleOnly	0.0339	0.664	0.51	0.610	[-0.0967, 0.1645]
blockspg	0.0010	0.0439	0.02	0.981	[-0.0854, 0.0874]
digspg	-0.0073	0.0102	-0.72	0.475	[-0.0274, 0.0128]
hit	0.9087	0.5418	1.68	0.095	[-0.1574, 1.9748]
Power	0.2313	0.6687	3.46	0.001	[0.0998, 0.3629]
cons	0.0377	0.5554	0.07	0.946	[-1.0552, 1.1306]

Appendix C

Table 9. Full Regression Results with fmhdcoach and fmachoachd as Coaching Staff Gender Makeup Measure and Record as Dependent Variable

Source	SS	Df	MS
Model	10.7462193	19	0.565590487
Residual	2.78531466	307	0.009072686
Total	13.5315339	326	0.041507773

Number of obs	=	327
F (19, 307)	=	62.34
Prob > F	=	0.0000
R-squared	=	0.7942
Adjusted R-squared	=	0.7814
Root MSE	=	0.09525

Record	Coefficient	Std. Error	T	P > |t|	95% C.I.
logOppExpenses	-0.0126	0.0144	-0.88	0.381	[-0.0410, 0.0157]
logRevenue	-0.0065	0.0084	-0.77	0.441	[-0.0230, 0.0100]
logSalary	-0.0139	0.0128	-0.70	0.485	[-0.0532, 0.0253]
logRecruiting	-0.0331	0.0128	-2.58	0.010	[-0.0583, -0.0078]
Participants	0.0005	0.0021	0.25	0.804	[-0.0037, 0.0048]
previousRec	0.1046	0.0386	2.71	0.007	[0.0287, 0.1805]
coachExperience	0.0001	0.0006	0.03	0.974	[-0.0014, 0.0014]
coachRecord	0.1426	0.0555	2.57	0.011	[0.0335, 0.2518]
programAppear	-0.0012	0.0011	-1.09	0.274	[-0.0034, 0.0010]
preRank	-0.0192	0.0340	-0.57	0.572	[-0.0861, 0.0476]
week7Rank	0.0742	0.0336	2.21	0.028	[0.0081, 0.1402]
totalAC	0.0060	0.0098	0.61	0.541	[-0.0133, 0.0252]
noAC	0.1133	0.0380	2.98	0.003	[0.0386, 0.1880]
fmhdcoach	-0.0136	0.1124	-1.21	0.228	[-0.0357, 0.0085]
fmacoachd	0.0080	0.0151	0.53	0.597	[-0.0218, 0.0378]
blockspg	0.0484	0.0162	3.00	0.003	[0.0166, 0.0802]
digspg	0.0179	0.0037	4.80	0.000	[0.0109, 0.0253]
hit	3.2682	0.1991	16.41	0.000	[2.8764, 3.6600]
Power	-0.0038	0.0246	-0.15	0.877	[-0.0521, 0.0445]
cons	0.1150	0.2039	0.56	0.573	[-0.2862, 0.5162]

References

Acosta, V., & Carpenter, L. (n.d.). *Women in Intercollegiate Sport. A Longitudinal, national Study, Thirty Seven Year Update. 1977-2014"*(Rep.). Retrieved www.acostacarpenter.org

Bednar, S., & Gicheva, D. (2014). Are Female Supervisors More Female-Friendly? *American Economic Review,104*(5), 370-375. doi:10.1257/aer.104.5.370

Bloom, G. A., Durand-Bush, N., Schinke, R. J., & Salmela, J. H. (1998). The Importance of Mentoring in the Development of Coaches and Athletes. *International Journal of Sports Psychology,29*(267), 281st ser., 267-281.

Carron, A. V., Colman, M. M., Wheeler, J., & Stevens, D. (2002). Cohesion and Performance in Sport: A Meta Analysis. *Journal of Sport and Exercise Psychology,24*(2), 168-188. doi:10.1123/jsep.24.2.168

Eitzen, D. S., & Pratt, S. R. (1989). Gender Differences in Coaching Philosophy: The Case of Female Basketball Teams. *Research Quarterly for Exercise and Sport,60*(2), 152-158. doi:10.1080/02701367.1989.10607430

Gould, D., Greenleaf, C., Chung, Y., & Guinan, D. (2002). A Survey of U.S. Atlanta and Nagano Olympians: Variables Perceived to Influence Performance. *Research Quarterly for Exercise and Sport,73*(2), 175-186. doi:10.1080/02701367.2002.10609006

Jones, W. A. (2012). Exploring the Relationship Between Intercollegiate Athletic Expenditures and Team On-Field Success Among NCAA Division I Institutions. *Journal of Sports Economics,14*(6), 584-605. doi:10.1177/1527002511433469

Kunze, A., & Miller, A. (2017). Women Helping Women? Evidence from Private Sector Data on Workplace Hierarchies. *The Review on Economics and Statics,99*(5), 769-775. doi:10.3386/w20761

LaVoi, N. M. (2017). *Head coaches of women's collegiate teams: A report on select NCAA Division-I institutions, 2016-17*(pp. 1-12, Rep.). Minneapolis, MN: The Tucker Center for Research on Girls & Women in Sport.

Lough, N. L. (2001). Mentoring Connections between Coaches and Female Athletes. *Journal of Physical Education, Recreation & Dance,72*(5), 30-33. doi:10.1080/07303084.2001.10605749

Mageau, G. A., & Vallerand, R. J. (2003). The coach–athlete relationship: A motivational model. *Journal of Sports Sciences,21*(11), 883-904. doi:10.1080/0264041031000140374

Olympiou, A., Jowett, S., & Duda, J. L. (2008). The Psychological Interface between the Coach-Created Motivational Climate and the Coach-Athlete Relationship in Team Sports. *The Sport Psychologist,22*(4), 423-438. doi:10.1123/tsp.22.4.423

Pensgaard, A. M., & Roberts, G. C. (2002). Elite athletes experiences of the motivational climate: The coach matters. *Scandinavian Journal of Medicine and Science in Sports,12*(1), 54-59. doi:10.1034/j.1600-0838.2002.120110.x

Policonomics. (2014, February 23). Retrieved March 12, 2019, from https://www.youtube.com/watch?v=A5E1sOYh6No

Pratt, S. R., & Eitzen, D. S. (1989). Contrasting Leadership Styles and Organizational Effectiveness: The Case of Athletic Teams. *Social Science Quarterly,70*(2), 311-322. Retrieved from https://www.jstor.org/stable/42862572.

Prophet, T., Singer, J., Martin, I., & Coulter, T. J. (2017). Getting to Know Your Athletes: Strengthening the Coach-Athlete Dyad Using an Integrative Personality Framework. *International Sport Coaching Journal,4*(3), 291-304. doi:10.1123/iscj.2017-0009

Quinn, K. G., Bursik, P. B., Borick, C. P., & Raethz, L. (2003). Do New Digs Mean More Wins? *Journal of Sports Economics,4*(3), 167-182. doi:10.1177/1527002503251966

Rask, K. N., & Bailey, E. M. (2002). Are Faculty Role Models? Evidence from Major Choice in an Undergraduate Institution. *The Journal of Economic Education,33*(2), 99-124. doi:10.1080/00220480209596461

Roach, M. A. (2013). Mean reversion or a breath of fresh air? The effect of NFL coaching changes on team performance in the salary cap era. *Applied Economics Letters,20*(17), 1553-1556. doi:10.1080/13504851.2013.829181

Rosas, F., & Orazem, P. F. (2012). Is Self-Sufficiency for Women's Collegiate Athletics a Hoop Dream? Willingness to Pay for Men's and Women's Basketball Tickets. *Journal of Sports Economics,15*(6), 579-600. doi:10.1177/1527002512462706

Stair, A., Mizak, D., Day, A., & Neral, J. (2008). The factors affecting team performance in the NFL: Does off-field conduct matter? *Economics Bulletin,26*(2), 1-9. Retrieved from http://economicsbulletin.vanderbilt.edu/2008/volume26/EB-08Z00036A.pdf

Stark, R. (n.d.). Where Are the Women? | An NCAA Champion Feature. Retrieved from http://www.ncaa.org/static/champion/where-are-the-women/

Weinberg, R., Reveles, M., & Jackson, A. (1984). Attitudes of Male and Female Athletes Toward Male and Female Coaches. *Journal of Sport Psychology,6*(4), 448-453. doi:10.1123/jsp.6.4.448

Welch, S., & Sigelman, L. (2007). Whos Calling the Shots? Women Coaches in Division I Womens Sports. *Social Science Quarterly,88*(5), 1415-1434. doi:10.1111/j.1540-6237.2007.00509.x