

Does specialization matter?
An investigation of female DI and DIII soccer players and the
pathways that led them to the collegiate level.

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February 26, 2013
Final Report
Cohort 37

Abstract:

This paper investigates whether current female collegiate soccer players decided to diversify or specialize in high school, while noting the key influential factors that impacted their decision making process. During the 2012-2013 season, a survey was completed by 114 female collegiate (DI and DIII) soccer players. The findings indicated that there is no difference between female athletes who specialized or diversified in high school in regards to playing at the collegiate level. The results from this study attempt to further clarify previous research that examines if specialization or diversification in high school is necessary to reach the collegiate level.

Introduction:

Lisa Leslie, Mia Hamm, Gabby Douglas and the Williams sisters are arguably some of the best female athletes of our time. Yet, how did they become the best? What does it take to reach the top? Is it countless hours of practice dedicated to a single sport? Or is it a well-rounded, multi-sport athlete?

The proliferation of high school sports in America, especially for women, over the past 30 years has brought to light the issue of specialization vs. diversification. Instead of participating in multiple sports at the high school level, an increasing number of high school students are now focusing on one sport. Guttman (1978) states, "... that stiffening competition for highly desirable roles at elite levels is resulting in a corresponding increase in specialization at progressively earlier stages in youth sport" (as cited in Hill, 1991, p. 192). Yet, does focusing on one sport really increase your chance of future success? Or is it best to play multiple sports? Or does it even matter?

Literature Review:

The research question examined in this study is as follows: Which athlete is more

likely to reach the collegiate level (DI & DIII): A high school female who specializes in a single sport (specifically, soccer) or multiple sports (two or more, including soccer)? Female athletes are the point of emphasis within this study due to the significant increase over time of female participants in high school and collegiate sports, especially soccer. According to the National Federation of State High School Associations, female participation in high school athletics in the U.S. has reached an all-time high as female participants have increased from 294,015 (1971-72) to a total of 3,207,533 (2011-2012) (2012, p. 2). Out of the 10 most popular high school athletic girls programs in the U.S., soccer is fourth highest (National Federation of State High School Associations, 2012, p. 2). With regard to collegiate athletics (DI, DII, & DIII) in the U.S., as of 2012, there are a total of 25,164 female soccer players, which comes in close second to outdoor track & field with 26,227 female track athletes (National Collegiate Athletic Association [NCAA], 2012, p. 8).

The main concepts within this study involve sport specialization and diversification to accurately assess single sport and multi-sport athletes. “Sport specialization is defined as students limiting participation to one sport which is practiced, trained for, and/or competed in on a year-round basis” (Hill, 1991, p. 186). Diversification involves “participation in a variety of sports and activities through which an athlete develops multilateral physical, social, and psychological skills” (Wiersma, 2000, p. 13).

The foundation of the study is based upon the Development Model of Sport Participation (Ford, Ward, Hodges, & Williams, 2009). The Development Model of Sport Participation consists of two pathways in skill attainment for developing athletes and explains how the paths progress from the entry level into sport to expert performance as an adult (Ford et al., 2009, p. 66). The Early Diversification Pathway predicts that expert adult athletes have passed through three developmental stages consecutively: “the sampling years, the

specialization years, and the investment years” (Ford et al., 2009, p. 66). The sampling years are at the beginning of the developmental process as young athletes participate in multiple sports for recreation (Ford et al., 2009, p. 66). The specialization years are when athletes begin to work on skill development and become competitive (Ford et al., 2009, p. 66). The investment years are when athletes dedicate their focus to sport for rewards beyond the competition itself (Ford et al., 2009, p. 66). The Early Specialization Pathway is explained as an expert adult athlete who enters a specific sport early on in their development, around the same time other athletes are in the sampling years, and participates in a large number of hours of dedicated practice to that specific sport into adulthood (Ford et al., 2009, p. 66-67).

Parents, coaches, communities, and even the media can be influential contributors to an athlete’s decision to specialize. Due to extreme pressure to succeed and produce successful teams with elite players, college coaches play a critical role as many expect their athletes to train, practice, and compete in their sport all year-round (Hill, 1991, p. 189). In a study conducted by Hill and Simon (1989), high school athletic directors from Illinois completed a questionnaire to give their perspective on specialization and how it affects high school athletes, coaches, and athletic programs (p. 1). Out of 11 factors contributing to specialization, the athletic directors recognized the following as the top five factors: “pressure from coaches (80.0%), high parental expectations (77.3%), athletes desire to participate in state championships (71.8%), encouragement from college recruiters (71.3%), and a social trend toward specialization (66.4%)” (Hill & Simon, 1989, p. 6). This is a useful finding to understand the perspective that an athletic director has in regards to the key influential factors that impact the decision making process for high school athletes when deciding to specialize or to diversify.

While the goal may be an athletic scholarship or a state championship title, athletes who specialize are also susceptible to negative consequences. In the same study conducted by Hill

and Simon (1989), the Illinois athletic directors stated that the following negative consequences can occur with specialization: “physical and psychological burnout, loss of social contacts through other sports, loss of transferable athletic skills, and loss of the influence of coaches of other sports” (p. 2). In a review of specialization and young athletes, Bergeron (2010) also noted key risks associated with specialization such as overuse injury, social isolation, and burnout (p. 357). Athlete burnout or the “withdrawal from an activity that was previously enjoyable due to stress or dissatisfaction” (Strachan, Cote, & Deakin, 2009, p. 79) can occur due to added pressures and expectations of coaches and other adults. Athlete burnout is a common concern for young athletes who focus on a single sport. In fact, Strachan et al. (2009) assessed athlete burnout and found that specializers “scored significantly higher on the exhaustion dimension” (p. 88) than those who diversified. In addition to burnout, overuse injuries are common among specialized and multi-sport athletes. Cuff, Loud, & O’Riordan (2010) conducted a study examining athletic participation and overuse injuries (p. 734). Compared to males, female athletes have a greater risk of sustaining an overuse injury (Cuff et al., 2010, p. 734).

Despite the consequences or risks, some athletes choose specialization over diversification because of the benefits that are often associated with it. Hill and Simon (1989) concluded that some of the benefits high school athletes may gain through sport specialization include: “...increased chance for a collegiate athletic scholarship, development of refined skills in a sport, fulfillment of a desire to achieve excellence, increased recognition and upward mobility, and a means for a marginal player to make a varsity team” (p. 2).

In addition to the considerable amount of arguments against sport specialization, several studies have been conducted that support multi-sport athletes. In 1993, a “study was conducted to determine whether elite baseball players specialized in baseball at an early age or participated in several sports” (Hill, 1993, p.108). The study found that a majority of the players were multi-

sport athletes in high school, even though the majority of them continued to play baseball year round by practicing or training during the off-season (Hill, 1993, p.108). Additionally, Susanji and Stewart (2004) researched the connection between sport specialization and the success of varsity male college basketball players at nine, 4-year colleges and universities in Montana.

Although the study was limited in size, the results determined that "...only 20% of varsity college basketball players in Montana had specialized in high school, [which] appears to argue against popular belief that specialization is necessary for athletic success" (Susanji & Stewart, 2004, Conclusion section, para. 1). Both of these studies' conclusions supported an earlier study conducted by Hill (1991), which concluded that even though coaches "...want their athletes to remain active in their sport throughout the off-season, they perceive that specialization in a high school athletic program diminishes the available talent pool of athletes and ultimately is detrimental to all school sport teams" (p. 192).

A considerable amount of research has been done on sport specialization; however, most of the research has focused on male athletes. Minimal research has been done on sport specialization of female athletes. Thus, the focus of this study will be on female athletes, specifically collegiate women's soccer players. Based off the theory of the Early Specialization Pathway, the researchers assume that most female high school athletes will still be in the sampling stage early on in their high school sports career, whereas a smaller portion of the female high school athlete population will have already reached the "expert" level and have begun to specialize. Therefore, the hypothesis of this study is as follows: Female multi-sport high school athletes are more likely to be recruited to play at the collegiate level (DI or DIII) when compared to female high school athletes who specialize in soccer.

Methods:

As stated throughout the literature review, there has been a significant amount of research conducted on sport specialization of high school athletes. Several of the studies described in the review utilized a questionnaire to collect data. Therefore, this study distributed surveys to DI and DIII women's soccer programs to collect the appropriate data.

The dependent variable assessed in this study was the recruitment of a female high school athlete, specifically a soccer player, to play soccer in college at either the Division I (DI) or Division III (DIII) levels. The independent variables assessed in this study include specialization or diversification of female high school athletes.

As previously stated, this study focused on surveying current (2012-2013) female collegiate soccer players at the DI and DIII levels. The National Collegiate Athletic Association (NCAA) official website was used to determine the top 63 NCAA Division I and the top 63 Division III (126 programs total) women's soccer programs in the U.S. (NCAA, 2012). To ensure that the correct emails of all head coaches, assistant coaches and graduate assistants at each of the programs were collected, information regarding each contact's email address was obtained through each school's official website. By obtaining the appropriate email addresses the researchers were able to send an email to each head coach and, when available, assistant coach(es), politely asking them to administer the survey to their players. The goal was to receive a response to the survey from each player at each of the programs the researchers contacted, thus a cluster sample was collected.

To properly establish the sample size the following criteria were used for this study: 95% confidence level, 5% confidence interval (margin of error) and 50% variability. Based on these determinants and given a population of 18,677 (total amount of female college soccer players at the DI and DIII levels), a sample size of 376 people was needed for this study to be valid.

In the 2011-2012 season, women's soccer teams at the DI level had an average of 26.8 athletes per squad and women's soccer teams at the DIII level had an average of 23.9 athletes per squad (NCAA, 2012). Therefore, the researchers sent an email notification regarding the survey procedures to 126 teams, which included roughly 25 players per team. There was a possibility of receiving 3,150 responses if every player had responded. The researchers expected at least a 15% response rate, or a total of 472.5 responses. Achieving 472.5 responses would have exceeded the required sample size of 376 and established a valid conclusion with 95% confidence, 5% margin of error, and 50% variability.

A consent form was not needed for this particular survey. While the survey involved an interaction with humans, the results of the study were looked at as a whole, excluding all identifying information. In addition, the disclosure of the responses did not put the participants at risk for criminal, civil liability or financial harm.

Data:

A survey was completed by 114 female soccer players who currently play on their collegiate soccer team, during the 2012-2013 season (at the Division I or Division III level) in 18 different states in the United States. Exactly 56 DI and 56 DIII female soccer players took the survey, while one player indicated that she played at the DII level and one player did not respond. The participants played their senior high school soccer season in 29 different states, while three played internationally.

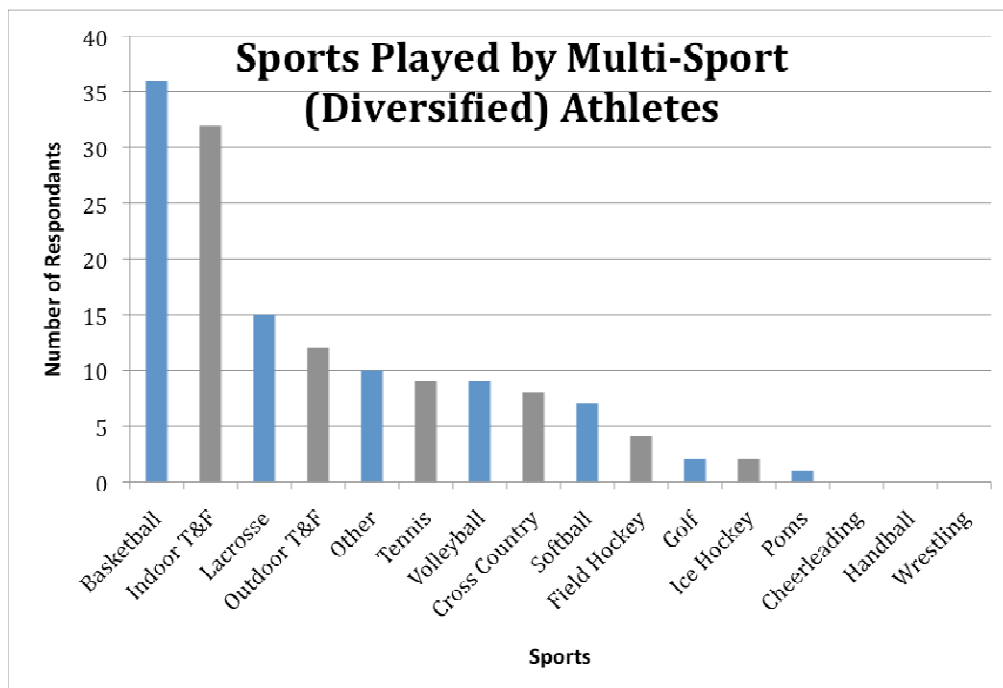
In this study an NCAA student-athlete was defined by satisfying one or more of the following criteria: "... as of the day of the varsity team's first scheduled contest: (a) is listed as a team member; (b) practices with the varsity team and receives coaching from one or more varsity coaches; or (c) received athletically-related student aid" (NCAA, 2012, p.7). To properly define high school athlete data, the researchers examined how many sports each female

athlete played at the start of their high school sports career compared with how many sports they played by the end date of their high school career.

The purpose of the study was to evaluate whether a multiple sport (2 or more sports, including soccer) or diversified female athlete is more likely to be recruited to play soccer in college at the DI or DIII levels as compared to a single sport (soccer) or specialized female athlete. In terms of specialization or diversification, a crosstab analysis found that there is no difference between a multiple sport or diversified female high school athlete and a single sport or specialized female high school athlete in terms of being recruited to play soccer in college at the DI or DIII levels ($p > 0.05$).

While no significant difference was found between multi-sport and single sport female high school athletes in terms of being recruited to play soccer in college, 76 of the 114 (67%) respondents did state that they played multiple sports. Below is a graph summarizing the different sports that these athletes played in high school (Figure 1).

Figure 1: Summary of the different sports that multiple sport athletes played in high school.



Additionally, similarities were found in an open-ended question regarding the reasons for why players chose to specialize or diversify. Below are two tables (Table 1 & 2) summarizing the reasons players chose to specialize or diversify.

Table 1. Free response answers to why the athletes specialized.

Why did you choose to only play soccer in high school? (Table 1)	
Reasons	Number of Respondents
No time to play anything but soccer	43%
Only liked/wanted to play soccer	28%
Good high school team	9%
It was too late to start a new sport	6%
To receive a college scholarship	6%
Friends/social	3%
Career goals	3%

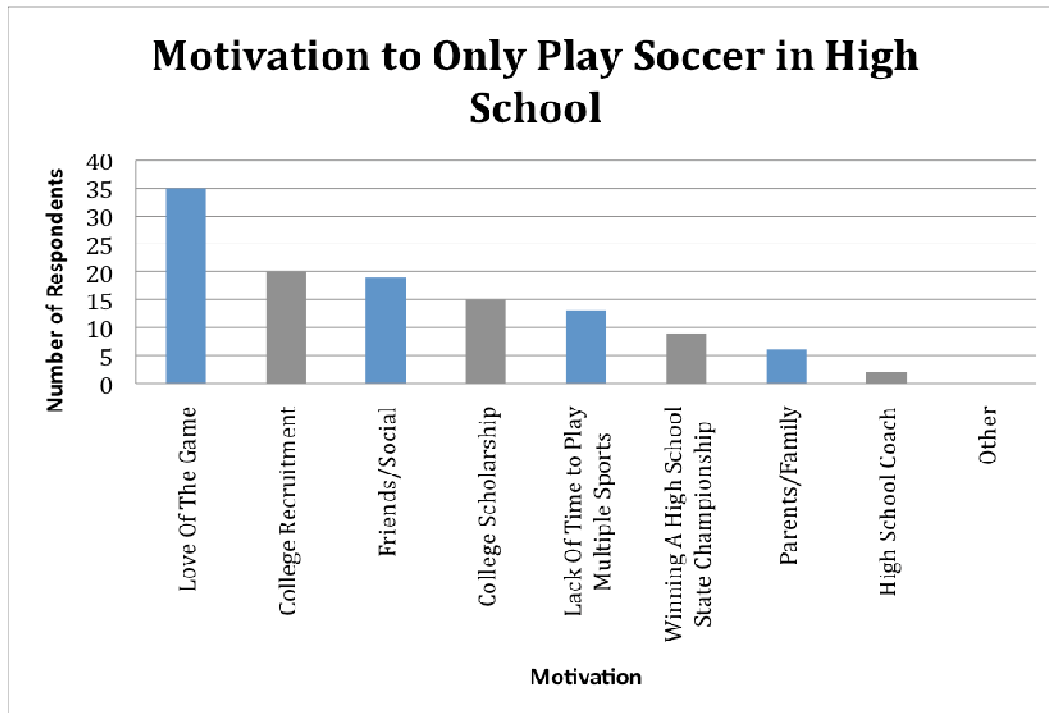
Table 2. Free response answers to why the athletes diversified.

Why did you choose to play multiple sports in high school? (Table 2)	
Reasons	Number of Respondents
To become a more well-rounded athlete/always played multiple sports	38%
To stay active, fit and healthy	20%
Fun	19%
To stay in shape/fit for soccer	13%
To try a new sport(s)	6%
To make friends	2%
For a challenge	2%
It was required to play a sport each trimester	2%

The players who noted that they were specialized athletes in high school were asked to be more specific about their reasons for specializing. A graph of the factors can be seen below (Figure 2). Of 119 responses to this particular question (select all that apply) the highest-ranking motivators were: love of the game (30%), college recruitment (17%), friend/social (16%), and college scholarship (13%). Researchers conducted two separate bivariate tests to examine how

two motivational factors, college scholarships and love of the game, affected a female athlete's decision to specialize in high school.

Figure 2: Summary of the different motivational factors for specializing in soccer.



Researchers also examined whether or not specialization (soccer) during high school affects which division level (DI or DIII) a female collegiate soccer player currently plays at. Three tests were performed to examine this hypothesis. A crosstab test illustrated that there is no significant difference between female collegiate soccer players who specialized in high school and whether they currently play DI or DIII soccer ($p > 0.05$). Two separate Pearson's correlation tests, one for DI and one for DIII, were completed to assess whether reaching the DI or DIII level is correlated to having a personal trainer in high school. At both the DI and DIII levels having a personal trainer was not correlated to recruitment ($p > 0.05$ for both tests).

When specifically assessing college scholarship and/or college recruitment as major motivating factors for specialization, researchers found with 95% confidence (in two separate tests, one for scholarship and one for recruitment), motivation for a college scholarship or college recruitment influences a female athlete’s decision to specialize in high school soccer ($p < 0.05$). However, results from two Spearman’s correlation analyses ($r = -0.550$ and $r = -0.652$) indicate that female athletes who are motivated by college scholarship or recruitment are less likely to specialize in only soccer in high school. This negative correlation may be due to an athlete believing that playing multiple sports in high school will increase their chances for collegiate scholarships.

Receiving a college scholarship is quite a significant motivating factor for specialization. A graph of scholarships received by the players in this study can be seen below (Figure 3). Athletic scholarships were only available to Division I players, but academic scholarships were available to both.

Figure 3: Summary of the type of collegiate scholarships received by the athletes.



When assessing the motivational factor associated with the love of the game, researchers found with 95% confidence, love of the game correlates to a female athlete's decision to specialize in high school soccer ($p < 0.05$). Yet, as with college scholarships results from a Spearman's correlation analysis ($r = -0.942$) indicate that female athletes who love the game of soccer are less likely to specialize in only soccer in high school. While it may seem counterintuitive for these two variables to have a negative relationship, with the increase of overuse injuries and athlete burnout, female athletes may be playing multiple sports to avoid these negative consequences of specialization.

Finally, when assessing friends/social opportunities as a motivation, researchers found, with 95% confidence, friends/social opportunities influence a female athlete's decision to specialize in high school soccer ($p < 0.05$). Yet as with the above motivators, results from a Spearman's correlation analysis ($r = -0.942$) indicate that female athletes who are motivated by their friends/social opportunities when choosing to specialize are actually less likely to specialize. This may be due to a female athlete's desire to participate in the same activities their friends do, which may not necessarily be playing one sport, such as soccer. Also, one of the side effects of the aforementioned athlete burnout is a loss of social contacts. Females may then be less likely to specialize because they feel doing so would provide them with a narrower circle of friends.

Table 3: Summary of test results performed on motivational factors to only play soccer in high school.

Table 3: Summary Of Test Results Performed On Motivational Factors To Only Play Soccer in High School (Crosstab and Spearman’s Correlation Analyses)	
Reasons	Correlation (r-factor at 95% confidence level)
College recruitment	-0.550
College scholarship	-0.652
Friends/social aspect	-0.942
Love of the game	-0/942

The last group of tests performed for this study was based on the number of total years a player had played soccer (including the 2012-2013 season) and/or seasons a player had played soccer during high school. A one-way ANOVA test was used to assess the relationship between the number of total years a female high school athlete played soccer and the athlete’s decision to specialize in soccer or play multiple sports in high school. No significant differences were found between the two variables ($p > 0.05$), demonstrating that there is no relationship between specialization and the number of years a female high school athlete played soccer. In addition, a one-way ANOVA test was used to evaluate the relationship between the number of years a female high school athlete played club soccer and a female athlete’s decision to specialize in soccer or play multiple sports in high school. Once again, researchers found that there is no significant difference between specialization and the number of years a high school female athlete participated in club soccer ($p > 0.05$).

The researchers also analyzed whether the division a player participates in depends on the amount of years and seasons that she played. Of those recruited to play at the DI level on average, the players had 13.3 years of playing experience overall and they played 14.9 seasons in high school. The researchers defined seasons as Fall, Winter, Spring, and Summer. Therefore, each year in high school a player could play four seasons, for a total of 16 seasons in an average

high school career. When compared to those who were recruited to play at the DIII level the findings were almost identical. DIII players had an average of 13.4 years of playing experience and 14.5 seasons played in high school. Even when comparing divisions there was very little difference indicating that most recruited players have similar backgrounds.

Discussion

Using the theory of the Early Specialization Pathway, the researchers initially assumed that most female high school athletes would still be in the sampling stage, early on in their high school sports career, whereas a smaller portion of the female high school athlete population will have already reached the “expert” level and have begun to specialize (Ford et al., 2009, p. 66). It is useful to note that 67% of the participants in this study were considered multi-sport athletes in high school, whereas 33% specialized in soccer. However, the results from the chi-squared (χ^2) test failed to provide support to conclude in favor of female high school multi-sport athletes. The results indicate that there is not sufficient evidence to conclude that female multi-sport (2 or more sports, including soccer) high school athletes are more likely to reach the collegiate level (DI or DIII) when compared to female high school athletes who specialize in soccer.

It is also useful to note that the descriptive statistics relating to a higher percentage of multi-sport high school female athletes that were established in this study relate to key findings in two previous studies that were conducted on male athletes. The study previously stated in the literature review, conducted by Hill in 1993, found that a majority of the male players were multi-sport athletes in high school, even though the majority of them continued to play baseball year round by practicing or training during the off-season (p.108). The study conducted by Susanji and Stewart (2004) researched the connection between sport specialization and the success of varsity male college basketball players at nine, 4-year colleges and universities in Montana. Although the study was limited in size, the results determined that “...only 20% of

varsity college basketball players in Montana had specialized in high school...” (Conclusion section, para. 1, p.1). Therefore, future studies should further investigate the descriptive statistics relating to multi-sport and specialized high school athletes.

Other key findings within this study include motivating factors associated with specialization such as a college scholarship, recruitment, love of the game, and friends/social opportunities. There was enough evidence to conclude that a motivation for a college scholarship and/or recruitment was correlated to specialization; however, the correlations were negative. In addition to college scholarships and recruitment being motivating factors, this study found that with 95% confidence, love of the game influences a female athlete’s decision to specialize in high school soccer. Yet, as with college scholarship and recruitment the correlation was negative. Researchers also found with 95% confidence, friends/social opportunities influence a female athlete’s decision to specialize in high school soccer. Yet, as with the above motivators, results from a Spearman’s correlation analysis indicate that there is a negative correlation between female athletes who are motivated by their friends/social opportunities and the decision to specialize.

Due to the possibility of receiving 3,150 total responses if every player responded to the survey, a realistic response rate goal of 472.5 responses (15%) was set prior to administering the survey. However, the researchers were only able to obtain a total sample size of 114 due to time constraints. In addition to obtaining a larger sample of participants, a future study should collect a larger variety of states where current female soccer players attend college since this study only received data from 18 total states.

Conclusion:

The implications of this study go far beyond just concluding that there is no difference between female high school athletes who specialize and those who diversified in regards to

playing at the collegiate level. The study provides support that athletic directors, coaches and parents can use to state that there is no one, exact, guaranteed method to reach the collegiate level. A female athlete is just as likely to reach the collegiate level whether she specializes or not. Further, this study shows that skills attained in one sport may be transferrable to another sport. Of the 114 females who responded to this study, 76 of them played another sport besides soccer for at least one season of one year in high school. In other words, 66.6% of the surveyed population played another sport, but still reached the collegiate level. The participants may have chosen to play another sport in the off-season to not only train for that sport, but also to refine transferrable soccer skills. For example, many of the female multi-sport athletes stated that they competed in indoor track and field in the off-season. The interval training used in track and field is also beneficial in soccer, which involves several short jog to sprint sequences. By refining these transferrable skills in the off-season these athletes were potentially making themselves a more viable candidate for recruitment. More specific, targeted research would need to be done to confirm this theory.

Lastly, the study showed the distinct difference between coaches, athletic directors and even parental perceptions of motivations for why athletes specialize and the athlete's actual perceptions. As stated in the literature review, the study conducted by Hill and Simon (1989) on high school athletic directors concluded that out of 11 factors contributing to specialization, the athletic directors recognized the following as the top five factors: "pressure from coaches (80.0%), high parental expectations (77.3%), athletes desire to participate in state championships (71.8%), encouragement from college recruiters (71.3%), and a social trend toward specialization (66.4%)" (Hill & Simon, 1989, p. 6). Yet, in this study, of those surveyed who specialized in high school their top five reasons for specialization included: lack of time to play anything but soccer (43%), only liked/wanted to play soccer (28%), good high school team

(9%), it was too late to start a new sport (6%) and to receive a college scholarship (6%). Not a single reason between the athletes and athletic directors was the same.

While this study helped to highlight and explain the issue of specialization of female athletes, additional research needs to be done. A future study should look at the college coaches (current coach of the players surveyed in this study) and their perceptions on specialization. Another study should focus on the process these athletes undertook to get recruited, whether it was by using an agent, showcase, tournament, luck, etc. In addition, a pitfall found in this study was how to define a multi-sport athlete in the survey. Researchers stated that a female just had to play one season of one year in high school to be considered a multi-sport athlete. Many of these athletes who fell into this category of playing another sport besides soccer for less than a year, may have assumed that they were considered a specialized athlete and indicated so on the survey. However, in this study the participant would be defined as a diversified athlete. In future studies, a multi-sport athlete should be defined as someone who played at least one year in another sport. Researchers should also ask the specific time period when the athletes started to specialize in soccer.

So does specialization matter? Not really. To reach the top, or in this case the collegiate level, an athlete who specialized is just as likely to reach an elite collegiate level as one who diversified in high school.

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