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# Effects of Sport Specialization on Youth and Interscholastic Athletes

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**Effects of Sport Specialization on Youth and Interscholastic Athletes**

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**A Synthesis Project**

**Presented to the**

**Department of Kinesiology, Sport Studies, and Physical Education**

**The College at Brockport**

**State University of New York**

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**In Partial Fulfillment**

**of the Requirements for the Degree**

**Master of Science in Education**

**(Athletic Administration)**

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**By**

**Joseph Innes**

**Fall, 2017**

THE COLLEGE AT BROCKPORT  
STATE UNIVERSITY OF NEW YORK  
BROCKPORT, NEW YORK

Department of Kinesiology, Sport Studies, and Physical Education

Title of Synthesis Project: How Effective Are School-Based Obesity  
Prevention Programs in the United States? A Synthesis of the  
Research Literature.

*Cathy Houston-Wilson*

12/12/17

Instructor Approval

Date

Accepted by the Department of Kinesiology, Sport Studies, and Physical Education, The College at Brockport, State University of New York, in partial fulfillment of the requirements for the degree Master of Science in Education (Physical Education).

*Cathy Houston-Wilson*

12/12/17

Chairperson Approval

Date

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## **Abstract**

Athletes are beginning to specialize in one specific sport more recently than ever before. There are two types of athletes, a single sport athlete, and a multi-sport athlete. Therefore, the purpose of this synthesis was to review the literature on sport specialization. More specifically the various effects specializing versus participating in multiple sports has on an athlete, both physically and mentally. Research has shown that there are positive and negative effects to both sport specialization and diversification. Further research on this topic can give athletes a better idea on what is best for them overall.

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## Chapter 1-Introduction

Sport specialization versus diversification has been a topic of interest throughout the last decade. According to Neeru, Pinkham, Dugas, Patrick, & LaBella (2013) sports specialization is defined as “intense, year-round training in a single sport with the exclusion of other sports” (p.251). Diversification is the participation in a variety of sports and activities where the athlete develops multiple physical, psychological, and social skills. More and more high school athletes are starting to specialize in one sport compared to doing multiple sports. Not only are high school athletes making this change but younger athletes as well. They are focusing and training year round for one specific sport in hopes to reach that elite level status. According to Bell, Post, Trigsted, Hetzel, McGuine, & Brooks (2016) this is occurring especially more in larger high schools throughout the United States. Several factors may be in play regarding this specificity of sport specialization. The competition level to gain a competing spot on a sports team is much more difficult when there are more athletes and students to choose from. For instance according to the New York State Public High School Athletic Association the classification cut-off numbers for a class AA school is 910 students, and a class D school is below 169 students (<http://www.nysphsaa.org/>). That means a Class AA school has at least 700 more kids to choose from than a class D school. Therefore at larger schools some athletes believe that the only way they can compete for a starting spot is by only focusing on that one specific sport throughout the year. Whereas a Class D athlete has less competition and pressure to worry about and is more likely to compete on multiple sports.

There has been many studies on this topic of sport specialization that have provided valuable information on the effects it has on athletes. The various effects can be both negative

and or positive on athletes. The literature review in this synthesis will aim to generate more information that will be valuable to future athletes. This information will give athletes a better understanding on the varying effects specializing can have on them, both mentally and physically, and both good and bad. According to Neeru, Pinkham, Dugas, Patrick, & LaBella, (2013) they believe “risks of early sports specialization include higher rates of injury, increased psychological stress, and quitting sports at a young age” (p.251).

Athletes are getting pressured to specialize by coaches and parents because they want to reach that elite level status in that certain sport they are specializing in. Research has shown that these athletes feel that the only way to reach that elite level status is to only participate in one sport, and train and compete in the one sport year round Wojtys (2013). It is their hope that if they train and compete 12 months out of the year in that specific sport, it will give them more of an opportunity to make it to the college level and even professionally. However, the majority of athletes are beginning to specialize without knowing the various effects it can have on them whether they be good or bad. Athletes, parents, and coaches need to be educated on the varying effects specializing can have on a child. Some effects are certainly beneficial, but some are also negative. Parents, coaches, and athletes need to be able to evaluate the varying effects and make a decision on what is best overall for the student-athlete.

### **Statement of the problem**

Sport specialization is becoming more and more common because athletes feel it is needed to reach that elite level status. Athletes are making the decision to specialize without knowing and understanding the effects it may have on them. High school athletes need to know and understand what types of effects may come from specializing in just one sport. Some effects may be positive and some may be negative both physically and mentally. A review of the



research provides valuable information on this topic and will better allow athletes to consider and evaluate if it is best for them to specialize or not.

### **Research Question**

What are the consequences of sport specialization on student athletes?

### **Purpose of the Study**

The purpose of this synthesis is to review the literature on sport specialization. More specifically the various effects specializing versus participating in multiple sports has on an athlete, both physically and mentally.

### **Operational Definitions**

The following presents the operational definitions used in this synthesis:

- 1. Sport specialization-** In the context of this synthesis, according to Neeru, Pinkham, Dugas, Patrick, & LaBella, (2013) is defined as “intense, year-round training in a single sport with the exclusion of other sports” (p.251).
- 2. Diversification-** In the context of this synthesis, this refers to the participation in a variety of sports and activities where the athlete develops multiple physical, psychological, and social skills.

### **Assumptions**

The following assumptions were used in this synthesis:

1. The Literature review was exhaustive and comprehensive
2. Participants were reflective of the population under study.
3. Results reported were reflective of the population under study.

### **Delimitations**

This synthesis is delimited to:

1. Population includes male and female athletes aged 7-22 years old.
2. All sports will be considered for review, not one specific sport.
3. Participants are both male and female athletes.
4. Literature review from 2000 to 2017.

## Chapter 2 – Methods

The purpose of this chapter is to review the methods used to find literature on sport specialization. More specifically the various effects specializing versus participating in multiple sports has on an athlete, both physically and mentally. The studies collected for this synthesis were located using the EBSCO database from The College at Brockport's Drake Library. Within the EBSCO database the following databases were searched: SPORTDiscus and Academic Search Complete. Within these databases a total number of 12 articles and sources met the criteria for inclusion as part of the critical mass within this literature review. In order for an article to meet the criteria for selection in this synthesis it must have been published between 2000-2017, this will provide the synthesis with the most up to date and current information available. Other criteria for selection included scholarly and peer reviewed articles that were full-text. Having scholarly and peer reviewed articles provides more validity within the articles and better overall quality. Other articles or sources selected as part of this literature review provided context about the topic, background information and supplemental information to complete the review. All articles and sources are appropriately cited in the reference section of this paper.

In order to gather valuable articles for this synthesis certain keywords and phrases were used when searching the data-base. The first keyword searched was "sport specialization" which yielded 1008 hits on the data-base. This was the first and main topic searched because it is most relevant to the purpose of this synthesis, which is to review the literature on sport specialization. More specifically the various effects specializing versus participating in multiple sports has on an athlete, both physically and mentally. "Single sport athletes" was searched next which resulted in 2,439 hits on the data-base, followed by "sport diversification" which yielded 191 hits. The final keywords and phrases searched included "sport specialization + injuries in sport"

which yielded 89 hits, “sport specialization + youth athletes” which yielded 140 hits, “sport specialization + burnout” which yielded 21 hits, and lastly “sport specialization + gross motor coordination” which yielded 1 hit on the data-base. Articles that were selected for use in this synthesis were scholarly and peer reviewed articles that were full-text. Also when selecting articles for use in this synthesis it was important that each article selected had valuable information on the consequences of sport specialization on student athletes.

Specific criteria were used in order to be a part of the literature review. All of the articles selected were related to sport in one way or another. Participants were both male and female athletes that had participated in one or more sports at one point in their athletic career.

For this synthesis a total number of twelve articles were used to compile data on the topic of sport specialization. There was four different journals that provided two articles each for use in the literature review. The remaining four articles came from different journals that were all relevant in some way to the topic of sport specialization. The Journals of Sports Medicine, Sports Health, Sport Behavior, and Sports Sciences all provided two articles each that were utilized in the literature review. The remaining four journals that were used included the Journal of Sports Rehabilitation, Physical Education and Pedagogy, High Ability Studies, and the Journal of Chiropractic. For the majority of the articles the data was analyzed in similar ways. One article used survey questionnaires to collect the data. It was then reported using frequencies and percentages, and a Chi-square test. All analyses were then done with the SPSS software. Some articles were similar and used forms and questionnaires that were completed related to the different aspects of the study. The analysis was then conducted using the SPSS software, and ANOVA was used to evaluate potential group differences. One articles information was attained from the Flemish Physical Activity Computerized Questionnaire. A two-way multivariate

analysis of covariance with a Bonferroni correction for multiple comparison was used, and then all the data was analyzed using the SPSS software. Another article used descriptive statistics and a t-test in analyzing the data, as well as ANOVA to gather results. Another study conducted a pre-planned orthogonal contrast using separate univariate ANOVA tests to compare groups. Finally the articles that were literature reviews compared research from other sources to come up with various conclusions on the topic of sport specialization.

The critical mass for this synthesis is comprised of 4,168 total participants. Within the 12 articles used for the literature review there was a total of 2,698 males, and 1,458 females. There was one article that had twelve different parents complete the questionnaires, but other than that the ages of the participants ranged from 7 years old up to 22 years old. Every participant was currently playing at least one sport or more, or previously had played one sport or more. However the majority of the articles in this study focused on youth and high school athletes.

## **Chapter 3 Literature Review**

The purpose of this chapter is to present a review of literature on sport specialization. More specifically the various effects specializing versus participating in multiple sports has on an athlete, both physically and mentally.

### **Sport Specialization**

According to Neeru, et al. (2013) sports specialization is defined as “intense, year-round training in a single sport with the exclusion of other sports” (p.251). Russell (2014) defines it as the “limiting of participation to one sport that is practiced, trained for, and competed in on a year- round basis” (p. 287). Athletes are starting to specialize at younger ages in hopes to become elite level athletes. In doing so they are not aware of the various effects specializing may have on them both physically and mentally. Neeru et al. (2013) believes that some degree of sport specialization is necessary to achieve that elite level status that most of these athletes are looking for. However they believe that intense training in one specific sport with the exclusion of others should not occur until late adolescence to assure success while decreasing the risk of injury and stress. Wojtys (2013) believes that the main goal of sports specialization at a younger age is to focus and develop athletic skills in that one specific sport to increase their chances of competing at the next level. In terms of specialization groups developing lifelong interests and having fun in athletic activities does not seem to be the goal of many.

### **Influences**

Parents and coaches play a significant role in influencing and promoting specialization in young athletes. Some parents may not even know they are doing it, however they are by paying for summer sport clinics and camps, as well as paying for private 1-1 lessons. Some parents even go as far as building a field or court at their house to allow their children to practice and play all

the time. Coaches are convincing athletes that year-round training in a specific sport is a must to attract college interest and scholarships, and to win sectional and state championships (Hecimovich 2004). Bell et al. (2016) examined the prevalence of sport specialization in high school athletes. The study looked into the various influences on why athletes were deciding to specialize. Specifically the study looked into if specialization was influenced by sex, year in school, and school size. The participants in the study included 302 athletes between the ages of 13-18 years old from two local high schools. The athletes were classified into low, moderate, or high specialization groups. Participants completed both a sport specialization survey questionnaire and an injury history questionnaire. Once the data was collected it was then reported using frequencies and percentages, as well as a Chi Square test. The findings in this study suggest that the larger school had a higher percentage of students classified under the high specialization group. This could be due to the increased competition for gaining a roster spot on a team. Whereas athletes from the smaller school were more likely to be a multi-sport athlete due to less pressure to make a team because of the decreased number of athletes going out.

### **Negative Effects**

Neeru et al. (2013) believes that there are many risks involved with specializing especially during early childhood. These risks include much higher rates of injury, increased psychological stress, and quitting sports at a young age. Hecimovich (2013) believes some negative effects include burnout, both physically and mentally. “Loss of social contacts through other sports, loss of transferable athletic skills, and loss of the influence of coaches of other sports” (p.35). These are all serious risks that athletes are not being educated on before deciding on specializing. With knowing and understanding the possible risks and negative effects involved with specializing, athletes would be able to better evaluate what their best option would be in

terms of specializing or sampling multiple sports. Without knowing however, athletes are being persuaded by parents and coaches to specialize who are also uneducated on the process. Wojty (2013) believes that for children and adolescent athletes, sports should be kept fun, understanding that the elite level status is attained by very few athletes overall. Russlle and Limle (2013) believes that intensive training and focus on one sport may limit overall fundamental motor skill development. As youth athletes, developing fundamental motor skills is one of the most important factors when getting introduced to sports, and physical activity.

Bell et al. (2016) also examined if athletes would be more likely to report a history of lower extremity injuries. The study suggested that athletes in the high specialization group were more likely to report a history of overuse knee injuries compared with the moderate or low specialization group. Bell et al. (2016) also concluded that the athletes that trained more than 8 months out of the year were more likely to report a history of knee and hip injuries.

Hall, Foss, Hewett, & Meyer (2015) looked into sport specialization's association with an increased risk of developing anterior knee pain in adolescent females. The purpose of the study was to determine if sport specialization increases the risk of anterior knee pain in adolescent female athletes. Participants included 546 female athletes that either played basketball, soccer, or volleyball. The testing consisted of a standardized history and physician-administered physical exam. The findings in this study concluded that specialization in a single sport increased the risk of patellofemoral pain (PFP), which is also known as anterior knee pain. It also suggested that early sport specialization in female adolescent athletes is associated with increased risk of anterior knee-pain disorders.

Jayanthi, LaBella, Fischer, Pasulka & Dugas (2015) looked into the risk of injury for sports-specialized intensive training. The purpose of the study was to examine growth rates,



weekly training volumes, and sport specialization in association with an increased risk for injury and overuse injuries in young athletes. Participants included injured athletes aged seven-eighteen years old that were recruited from two hospital-based sports medicine clinics and were compared with healthy athletes from a primary care clinic that were undergoing physicals to participate in a sport. A total number of 822 injured participants and 368 uninjured participants completed the surveys on questions based on hours spent per week on organized sports and degree of specialization. The findings demonstrated that the injured young athletes were older and spent many more hours in organized sport per week. Jayanthi, et al. (2015) concluded that “the risk of injury, overuse injury, and serious overuse injury increases as the degree of specialization increases”. The training risk factors in this study will help educate coaches and parents on teaching young athletes the various risks of overuse injuries related to sports participation.

Russell (2014) looked into the relationship between youth sport specialization, youth sport motivations, and reasons for participation. The goal of the study was to determine former athlete’s decisions to specialize in relationship to their sport participation, sport motivation, and current exercise. Participants in the study included 200 undergraduate students who were surveyed through a general education wellness course. The course was taken at Midwestern University, and the participants were surveyed on their reasons for physical activity enjoyment, and youth sport motivations. They were also surveyed on their reasons for youth sport participation, and current sport and exercise participation. Within the findings Russell (2014) concluded that sport specializers were less likely to participate in sport as young adults than non-specializers. Non-specializers participated more than specializers to stay in shape, learn skills, and feel more confident about their physical abilities. These findings suggest that youth sport specialization may have negative effects on long-term participation in sport.

Russell, and Limle (2013) researched the relationship between youth sport specialization and involvement in sport and physical activity in young adulthood. The goal of the study was to identify if young adults sport and physical activity patterns and perceptions were related to perceptions of their youth sport experience, which includes sport specialization. The participants in the study included 153 participants that were gathered from a general education class at Midwestern University. Ages ranged from 18-22 years old and participants had to complete a survey on questions based on whether they specialized in one sport at a young age or not, physical activity enjoyment, and youth sport perceptions. Within the findings youth sport perceptions, and physical activity enjoyment had no relationship to the participants sport specialization status. However participants who specialized in sport at a younger age were less likely to continue to participate in sports as they got older. Russell, and Limle (2013) believes overall that specialization is linked to burnout, dropout, and will also lower participation motivation.

### **Positive Effects**

Hecimovich (2004) conducted a literature review on sport specialization in youth athletes. The goal of the literature review was to look at different advantages and disadvantages of younger athletes that specialize in one specific sport. The review of literature looked into sociological, psychological, and physical/physiological aspects. Overall there are many trade-offs for athletes that specialize. However some positive effects of specializing can be the enhancement of an athlete's skills in that specific sport, which in turn will better allow them to reach and achieve that elite level status that they are hoping for. Within the study it suggests that the specialized training in one sport should only occur after a certain age. An exact age was not mentioned on when it would be appropriate to specialize. However this should only occur when

the “general conditioning for the sport is almost completed and when the young athletes character, talent, and inclination suggest that his/her chances for success are good” (p.34).

### **Diversification**

Wall, and Cote (2007) supports the argument of sport diversification over sport specialization. They concluded that the results in the study were “consistent with previous research that has found that early diversification does not hinder-sport specific skill development and it may, in fact, be preferable to early specialization” (p.78). The study researched developmental activities that lead to dropout and investment in sport. The purpose of the study was to determine if the amount and nature of childhood organized sport and deliberate practice and play influenced athletes decision to either quit and stop playing a sport or invest in organized sport. Twelve different hockey parents were involved in the study and they all completed a survey that assessed their son’s involvement in organized sport and deliberate practice activities from the age of six-thirteen years old. After collecting the data the results demonstrated that dropout players began off-ice training at a younger age and invested many more hours in off-ice training, indicating that off-ice training activities at a young age (deliberate practice) may have negative implications for long-term hockey participation. This supports the argument of sport diversification over sport specialization. They believe that sports programs “should focus not on developing athletic fitness through intense and routine training, but rather on sport-specific practice, games and play activities that foster fun and enjoyment” (p.86). Russell and Limle (2013) believe that the “psychological and social benefits of regular physical activity through youth sport may help children cope with stress, counterbalance sedentary lifestyles, foster positive relationships and protect against youth delinquency”.

Fransen et al. (2012) looked into differences in physical fitness and gross motor coordination in boys aged 6-12 years old that are specializing in one sport versus doing more than one sport. The main purpose of the study was to determine whether it was more beneficial for the athletes to sample across multiple sports, or specialize in one single sport. It also looked into whether it was more beneficial for the children to spend many or few hours in sports on fitness and gross motor coordination. Participants in the study included 735 boys in three different age groups. Each of the various age groups were examined through a fitness test as well as a physical activity questionnaire to obtain data on sports participation. The findings in this study concluded that spending multiple hours in sports and participating in different sports will better develop strength, speed, endurance, and gross motor coordination.

Ford, Ward, Hodges, and Williams (2009) looked into the role of deliberate practice and play in career progression in sport, specifically elite level youth soccer players. The main purpose of the study was to examine youth participation activities of elite soccer players to determine whether or not it affected their opportunity to play professionally at the age of 16. Participants in the study were between the ages of six to twelve and they were divided into two different groups which included “still elite athletes”, and “ex-elite athletes”. Participants completed a physical activity participation questionnaire which included different questions about play, practice, and competition. The data collected was compared to a specific control group of recreational players and then examined in the context of the Developmental Model of Sport Participation. The model supports the importance of early diversification between the ages of six-twelve and recommends late specialization. Russell (2014) explains the model as a “framework to study youth sport progressions within three trajectories: (1) recreational participation through sampling, (2) elite performance through sampling, and (3) elite

performance through early specialization”. The results demonstrated that the elite athletes who went on to compete professionally had more hours in soccer play activities. However they did not in competition, practice, and other sports.

Bridge and Toms (2013) conducted a study on the specializing versus sampling of multiple sports. The purpose of the study was to determine whether early specialization or early diversification throughout childhood and adolescence has an impact on performance levels. Participants included 1106 UK athletes that completed an online questionnaire that collected data on the athletic history of each participants. Within the findings the results demonstrated a significant correlation between the numbers of sports participated in at a young age and the standard of competition that they competed in from the ages of 16-18 years old. Participants that participated in multiple sports at a young age were much more likely to compete at the national level compared to those who only specialized and focused on one sport. In turn the results demonstrate and support the need for sport diversification, especially at the younger ages.

### **Summary**

Specialization versus diversification has various effects on athletes of all ages. Educating athletes, parents, and coaches will better allow them to evaluate what is best for the specific athlete overall. Various influences, negative effects, and positive effects are reviewed in this literature. As there are positive and negative effects of both, more research needs to be conducted to give athletes a better understanding on what’s best for them in the long run.

## Chapter 4

### Discussion, Recommendations for Future Research

The effects of sport specialization in youth and interscholastic athletes was reviewed in this synthesis project. Based on the review various conclusions were discovered. The research question focused on the consequences of sport specialization on student athletes. There were many more negative effects on athletes that specialized compared to multi-sport athletes. In terms of influences, parents and coaches play a very important role. Some parents and coaches believe that athletes need to focus on that one specific sport year round if they want any chance to play at the collegiate or professional level. Unfortunately they are uneducated on how participating in one single sport can be detrimental for athletes, especially youth athletes. School size also played an important role in whether athletes competed in one sport or multiple sports. With bigger schools comes more athletes trying out for teams which in turn makes competition to gain a roster spot much more difficult, compared to a smaller school that has less athletes trying out for teams. Within the literature review there was various negative effects on athletes that specialized. Some of these negative effects included higher rates of injury, increased psychological stress, quitting sports at a young age, and burnout, both physically and mentally. Athletes that specialize were much more likely to report a history of overuse knee injuries. Specialization in a single sport also showed an increased risk of patellofemoral pain in female athletes. Participants who specialized in sport at a younger age were also less likely to continue to participate in sports as they got older. However a positive effect of specializing can be the enhancement of an athlete's skills in that specific sport, which in turn will better allow them to reach and achieve that elite level status that they are hoping for. As a coach for three different sports it is valuable to gain a better understanding of the negative effects that specializing has on

athletes. Gaining this knowledge will allow coaches to spread awareness on the various effects that it can have on an athlete. In terms of participating in multiple sports athletes gain more positive effects than negative effects. The positive effect that is most important is that spending multiple hours in sports and participating in a variety of sports will better develop an athlete's strength, speed, endurance and gross motor coordination. This is especially important at younger ages. Research has also shown that participants that participated in multiple sports at a young age were much more likely to compete at the national level compared to those who only specialized and focused on one sport. Diversification in sports at an early age provides a child's body to develop multiple motor skills that may crossover between sports. Overall the results and findings in this synthesis demonstrate and support the need for sport diversification over specialization, especially at the younger ages.

### **Recommendations for Future Research**

In terms of this synthesis and the articles that were reviewed in the literature there are many recommendations for future research to gather more valuable data. In terms of influences Bell et al. (2016) only collected data from two schools which may affect the external validity of the study. Future studies can provide a much larger sample size that focuses on specific sports in which athletes are specializing in. Some of the studies also only looked at either male or female athletes. When conducting future research it is crucial that both genders are utilized when collecting data. Some of the studies used a very small sample pool which could certainly hinder the external validity of the results. Future research can provide a larger sample pool that includes a diverse range of participants. Another important factor when conducting future research would be to examine if athletes are specializing more in teams sports or more in individual sports.

Overall this is a very important topic that is very much relevant in today's society. More research needs to be conducted to gain a better understanding on what is really best for athletes.



**APPENDIX A**

**ARTICLE GRID**

Author	Title	Source	Purpose	Methods & Procedure	Analysis	Findings	Discussion & Recommendations
Bell, Post, Trigsted, Hetzel, McGuine, & Brooks (2016)	Prevalence of Sport Specialization in High School Athletics: A 1-Year Observational Study	<i>The American Journal of Sports Medicine</i>	To determine the prevalence of sport specialization in high school athletes and to determine if specialization is influenced by classification method, year in school, sex, and school size. A secondary	Students aged 13-18 and current freshman, J.V, or Varsity participants 302 total participants between two schools completed the survey 180 females, 123 males	Survey questionnaires were used to collect data. It was then reported using frequencies and percentages, and a Chi-square test. All analyses were done with the SPSS statistical software.	The large school had a higher percentage of students under the high specialization. The athletes in the high specialization group were more likely to report a history of overuse knee injuries.	Only two schools were used for the study which may affect the external validity of the study. Also, future studies can be done with larger samples that focus on specific sports in which athletes are specializing in.

			<p>y purpose was to determine if highly specialized athletes would be more likely to report a history of lower extremity injuries.</p>				
<p>Hall, Foss, Hewett, &amp; Meyer (2015)</p>	<p>Sport Specialization's Association With an Increased Risk of Developing Anterior Knee Pain in Adolescent Female Athletes.</p>	<p><i>Journal of Sport Rehabilitation</i></p>	<p>. To determine if sport specialization has any relation to an increased risk of anterior knee pain in adolescents compared with athletes that play multiple sports.</p>	<p>546 Female athletes 357-Multisport 189-Single sport</p>	<p>Forms and questionnaires were completed related to the different aspects of the study. The analysis was conducted using the SPSS software, ANOVA was used to evaluate potential group differences.</p>	<p>Specialization in a single sport increased the risk of PFP- also known as anterior knee pain Early sport specialization in female adolescent athletes is associated with increased risk of anterior knee-pain disorders.</p>	<p>This study focuses only on female adolescent athletes. Future research should be done on male adolescent athletes to see if there is any correlation between genders when it comes to the risk of anterior knee pain from sport specialization.</p>

Fransen, Pion, Vandendriessche, Vandorpe, Vaeyens, Lenoir, & Philippaert (2012)	Differences in physical fitness and gross motor coordination in boys aged 6–12 years specializing in one versus sampling more than one sport	<i>Journal of Sport Sciences</i>	To determine differences in anthropometry, physical fitness, and gross motor coordination in boys who participate in one sport versus multiple sports.	735 total boys 161- Aged 6-8 years 310-Aged 8-10 years 264-Aged 8-10 years	The information was attained from the Flemish Physical Activity Computerized Questionnaire. A two-way multivariate analysis of covariance with a Bonferroni correction for multiple comparison was used, and all the data was analyzed using the SPSS software.	Spending multiple hours in sports and participating in different sports will better develop fitness and gross motor coordination.	The authors could also examine females that are the same age as the male participants that were used for this study. This would allow them to gain perspective and data on both genders.
Neeru, Pinkham, Dugas, Patrick, & LaBella (2013)	Sport Specialization in Young Athletes	<i>The Journal of Sports Health</i>	Some experts believe that sport specialization is necessary to achieve elite level	N/A	English-language articles from 1990 to 2011 discussing sports specialization, expert athletes, or elite versus novice	Risks of early sports specialization include higher rates of injury, increased psychological stress, and quitting sports at a young age.	

			status, but there is also a concern that it could have negative effects on youth athletes.		athletes, including original research articles, consensus opinions, and position statements		
Wall, & Cote	Developmental activities that lead to dropout and investment of sport	<i>Physical Education and Sport Pedagogy</i>	To determine whether the nature and amount of organized sport, deliberate play and deliberate practice participation influenced athletes to quit or stop playing a sport, compared to investing in an	8 parents of current male (high level) hockey players formed one group which was considered the active group. 4 parents of (high level) hockey players who had recently withdrawn from competitive hockey formed the other group which was considered the dropout group.	Descriptive statistics and t-test were used in analyzing this data, as well as ANOVA to gather results.	Dropout players began off-ice training at a younger age and invested more hours in off-ice training. This indicates that off-ice training activities at a young age may have negative implications for long-term hockey participation. This supports the argument for sport diversification over sport specialization	This study uses a very small sample pool which may affect the external validity of the results. This study should take it a step further by using a larger sample pool that includes a diverse range of participants.

			organize d sport.				
Ford, Ward, Hodges, & Williams	The role of deliber ate practic e and play in career progre ssion in sport: the early engage ment hypothesis	<i>High Ability Studies</i>	To look into early participa tion differen ces between two groups of elite youth soccer players between 6-12 years old. The study looks into who had progress ed to play professi onally at 16 and who did not.	The participants were separated into 2 groups of elite youth soccer players aged 6-12 years old Still-Elite group-11 Ex-Elite group-11	The study conducted a pre- planned orthogonal contrast using separate univariate ANOVA tests to compare groups on each of the soccer activities.	The elite players who went on to attain professional status had more hours per year in soccer play activities, but not in soccer practice, competition or other sports. The two elite groups did average more hours per year in soccer practice compared with recreational players, but not soccer play, competition or other sports.	The can examine the type of training that was utilized by the participants and whether or not it affected their future professional status.
Russell (2014)	The Relati onship Betwe en Youth Sport Specia lizatio n, Reaso	Journal of Sport Behavi or	To determin e how former youth athletes sport motivati on, current	200 undergraduat e students (M=93, F=107) Were surveyed through a general education wellness	All data analysis was performed using SPSS.	Results demonstrated that sport specializers were less likely to participate in sport as young adults than non- specializers.	The study mostly examines sport specialists across team sports as opposed to individual sports. Researchers should look into specialists in team sport settings to

	ns for Participation, and Youth Sport Participation Motivations: A Retrospective Study		exercise, and sport participation was related to whether or not they specialized in one youth sport.	course at a Midwestern University. Participants were surveyed on their reasons for youth sport participation, current sport and exercise participation, physical activity enjoyment, & youth sport motivations.		Non-Specializers participated more than specializers to stay in shape, learn skills and feel competent about their physical abilities.	see if it affects future motivation.
Jayanthi, LaBella, Fischer, Pasulka & Dugas	Sports - Specialized Intensive Training and the Risk of Injury in Young Athletes	The American Journal of Sports Medicine	To determine whether sports specialization, weekly training volumes, and growth rates are associated with increased risk for injury and serious overuse injury in young athletes.	Injured athletes from 7-18 years old were recruited from 2 hospital-based sports medicine clinics & were compared with healthy athletes from primary care clinics undergoing sports physicals. 822 injured participants & 368 uninjured participants completed surveys reporting the	All analyses were completed using STATA. Descriptive statistics were used to summarize the characteristics of injured versus non-injured participants.	Injured athletes reported more total hours of physical activity than uninjured athletes. There is an independent risk of injury and serious overuse injury in young athletes who specialize in a single sport.	There is a selection bias as the study includes athletes who sought care for their injuries through sports medicine specialists. This could have led to an overestimation of the percentage of injuries accounted for by specialized athletes as these athletes are more likely to seek care from a sports medicine specialist opposed to a primary care physician.

				hours spent per week on organized sports and degree of sports specialization.			
Wojtys (2013)	Sports specialization vs Diversification	<i>Journal of Sports Health</i>	To determine what age athletes should start to specialize	N/A	Comparing research from other sources to come up with a conclusion on this topic.	Studies suggest that 10,000 hours over 10 years are needed for elite status. And athletes should start at age 5. Overall sports should be kept fun, especially for children.	
Russell & Limle (2013)	The Relationship Between Youth Sport Specialization and Involvement in Sport and Physical Activity in Young Adulthood	The Journal of Sport Behavior	To examine if young adults sport and physical activity patterns and perceptions were related to perception of their youth sport experience, including sport	153 participants (M=71, F=82) were obtained through general education classes at a mid-size Midwestern University. Participant's ages ranged from 18-22 years old. Each participant completed a survey asking about their youth sport perceptions,	Analyses were conducted using SPSS to determine current physical activity enjoyment and positive perceptions of youth sport experience based on sport specialization status in youth.	Physical activity enjoyment and youth sport perceptions were unrelated to participants youth sport specialization status. However, participants who specialized in sport at a young age were less likely to continue to participate in sports. Specialization	



			specialization.	physical activity enjoyment, and whether they specialized in one sport at a young age or not.		is linked to burnout and dropout and may lower participation motivation.	
Hecimovich (2004)	Sport Specialization in Youth: A Literature Review	<i>Journal of Chiropractic</i>	To look at different advantages and disadvantages of youth athletes that specialize in one sport. Specifically sociological, psychological, and physical/physiological aspects.	The studies for the review were selected from multiple sources. The majority of the studies looked at the three main factors influencing athletes: sociological, psychological, and physical/physiological aspects.	The author uses all three: vote counting, meta-analysis, and qualitative criteria when he talks about individual studies to the level of general assertions or conclusions about this topic of sport specialization.	Overall there are many trade-offs for athletes that specialize but specializing can also enhance an athlete's skills in that specific sport, which will better allow them to achieve greatness in that specific sport.	
Bridge & Toms (2013)	The Specializing or Sampling Debate: A Retrospective	The Journal of Sports Sciences	To determine whether early specialization or early diversification	1006 UK athletes completed an online questionnaire that collected data on the athletic history of each	Data analysis was completed through the use of Chi-squared tests in order to	Results demonstrated a significant association between the number of sports participated in at a young age and the	This study can be taken a step further by including the current participation level of the participants as well as their competitive level in order to demonstrate the

	<p>e Analysis of Adolescent Sports Participation in the UK</p>		<p>through out childhood and adolescence impacts performance levels.</p>	<p>participant. Data included the amount of sports participated in by participants at the ages of 11, 13, and 15.</p>	<p>analyze the effect of the number of sports practiced each week at the ages of 11, 13, and 15. Data analysis was used to determine the effect of sampling or specializing in sports at a young age on an athlete's future.</p>	<p>standard of competition that participants competed in when they were 16 to 18 years of age. Participants who participated in more sports at a young age were significantly more likely to compete at a national level compared to those who specialized in one sport. The results support the need for sport diversification at a young age.</p>	<p>success they have had within athletics.</p>
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