

An Application of Gardner's Theory of Multiple Intelligences
on High School Athletes

Abstract

After Howard Gardner proposed his theory of multiple intelligences in 1983, many researchers took it upon themselves to find correlation between this theory and other aspects of life, such as varying groups of people. One such application has been toward student-athletes. This study explores the connection between Gardner's theory of multiple intelligences and high school athletes who play a variety of sports. The ultimate goal of this project is to determine how dominant intelligence types, based on Gardner's theory, apply to these athletes who participate in differing sports, with the ultimate goals of drawing conclusion for all sports. A survey was used for participants to self-determine their dominant intelligence types. This data was used to draw conclusions on the dominant intelligence types for each of the sports being analyzed.

Individualized sports were found to have intrapersonal intelligence as the most dominant intelligence type, and team-oriented sports has kinesthetic intelligence as the most dominant intelligence type. Additionally, basketball and lacrosse, the two most similar sports in the study, had almost identical intelligence rankings.

Keywords: multiple intelligence theory, high school athletes

Introduction

In 1983, Howard Gardner, an American developmental psychologist and Professor of Cognition and Education at the Harvard Graduate School of Education, proposed his theory of Multiple Intelligences in his book, *Frames of Mind: the Theory of Multiple Intelligences*, which provides a stark contrast to what had previously been viewed as a method of testing intelligence - such as standardized tests. Gardner theorized that there are eight different types of intelligences - logical, interpersonal, intrapersonal, musical, kinesthetic, visual, naturalistic, and linguistic - and that each individual human being has dominant intelligence types that can vary greatly from others. While one person's dominant intelligence type may be kinesthetic, because they are an extremely active person, another's may be interpersonal, because they are able to get along well with others easily.

Linguistic intelligence means that a person has the ability to use languages effectively to accomplish certain goals, and logical intelligence means that the individual has the capacity to analyze problems using logical reasoning and problem solving. Musical intelligence implies that the person contains skill in performance and the emotional aspect of sound, whereas kinesthetic intelligence entails using one's body to solve problems. A person with interpersonal intelligence has the capacity to understand the intentions, motivations, and desires of others, and intrapersonal intelligence requires the capacity to recognize one's own desires, fears, and capacities. Finally, naturalistic intelligence requires recognition for living and natural things, and visual intelligence implies an ability to recognize and manipulate the visual aspects of the world.

There is a simple test that can be used to determine an individual's dominant intelligence types. Participants are given a list of statements, each of which corresponds to one of Gardner's

eight intelligence types, and designate whether or not they feel that the statement applies to them. At the end of the test, the scores for each of the intelligence types is cumulated, and the intelligence types with the highest scores are considered that individual's dominant intelligence types. The ways in which these dominant intelligence types vary is not likely to be able to be predicted based on any factors, and the dominant intelligences of one individual will most likely change many times throughout their life.

Since proposing his idea in 1983, Gardner's theory has been applied to a variety of aspects of life, including adolescents and young adults, as well as subgroups such as males/females and in what activities the person might participate. One notable application of this theory is towards athletes - both at the high school and collegiate levels. Many scholars have previously conducted research with Gardner's theory and athletes, including finding differences between males and females, as well as comparing the dominant intelligence types based on how long a subject has been participating in the sport in question.

Literature Review

In 1983, as previously mentioned, Howard Gardner's book, *Frames of Mind: the Theory of Multiple Intelligences*, was published, and since then, scholars have used this theory to conduct a wide variety of research, all of which relates back to Gardner's theory on how each individual person has dominant intelligence types that often differ from others. One of the first applications of Gardner's theory was by Daniel Fasko Jr., a professor of education at Morehead State University, in his article, *An Analysis of Multiple Intelligences Theory and its Use with the Gifted and Talented*. In this article, Fasko explores the idea of using Gardner's theory to further promote the growth and education of students who fall under the category of being gifted and

talented. Fasko's goal was to determine the benefits and cautions of a multiple intelligence approach in students, as well as use these results as another means to identify and educate students who may be considered to fall into this category. In 2001, Dr. Adrianna Kezar, an assistant professor at George Washington University, published her article, *Theory of Multiple Intelligences: Implications for Higher Education*, in which she explores how Gardner's theory of multiple intelligences is used in higher education, such as at the university level. Furthermore, she explores the idea that what is implemented as a younger age continues on into higher education, with her goal being to take the methods previously used for multiple intelligences and apply these to college-age students, in order to determine their results.

However, while many scholars have been conducting research based on Gardner's theory of multiple intelligences, other scholars argue that the theory is not valid, due to a lack of proof at the validity of the theory. One such scholar, Lynn Waterhouse, a researcher in child behavior at the College of New Jersey, argues in her article, *Inadequate Evidence for Multiple Intelligences, Mozart Effect, and Emotional Intelligence Theories*, that there is a lack of scientific evidence to prove that Gardner's theory hold validity in a scientific sense. She continues by claiming that there is no support for Gardner's findings, and his theory should not be used in education because it has not been verified as legitimate. Waterhouse, however, seems to be one of few researchers who do not believe in the validity of Gardner's theory of multiple intelligences.

In 2011, Chou Hong-shih, Hsu Wei-ting, and Chen Wen-chang, published an article titled *Multiple Intelligences Development of Athletes: Examination on Dominant Intelligences*, with the goal of proving that while athletes are stereotypically not thought of smart, they are

intelligent in their own ways. One of the other main points of this article is an emphasis on the idea that intelligence cannot simply be measured by pre-existing one-dimensional standardized tests. This is one of the first articles written about research that is conducted with the goal of relating Gardner's theory to athlete intelligence and performance. In 2013, Dr. Matthew Kitz, Stephanie Dyer, and Dr. Brian Campbell collaborated on a study titled *Multiple Intelligence Profiles of Athletic Training Students*, which has a very similar approach and objective to that of the previously-mentioned 2011 study. The results of this study are consistent with other findings, both before and after this research was conducted. The authors place an emphasis on why standardized tests and intelligence quotient (IQ) tests cannot accurately measure an individual's intelligence, going even further as to compare how intelligence is typically defined presently with how intelligence should be defined. The main purpose of both of these studies is to strive towards applying their results in a way that will be beneficial for athletes' performance and education.

Current Gap of Knowledge

Despite the variety of research previously conducted with Gardner's theory and athletes of various ages, scholars in the field have yet to determine whether student-athletes who compete in different sports vary in their dominant intelligence types.

This project stems from a preexisting interest in both psychology and athletics - many scholars agree that the idea that intelligence may take on many different faces is an intriguing topic, because it therefore challenges the notion that a student must score well on standardized tests in order to be considered "smart" by not only themselves and their peers, but also by academic institutions. This idea has an application towards athletes, especially those who are attending

school at the same time, because it poses the question as to whether or not a student-athlete's academic standing may have a correlation with their performance in their sport.

While there is an existing stereotype that many student-athletes are more successful in their sport than in their academics, this is just another demonstration on how students' intelligence is solely based on their scores on tests, especially standardized tests. While it may be the case that a student-athlete's success in their sport leads to less than ideal grades in school, it should not be assumed that this student-athlete is not intelligent. Rather, because all individuals learn in unique ways, this student-athlete will have dominant intelligent types that vary significantly from those of a student who gets high marks in school, but does not participate in athletic activities. This is an interesting concept to study because the results can demonstrate how an individual's true intelligence does not always directly correlate with how they rank in academics. It is also interesting to analyze how a person's type of intelligence may lead them to be more successful in some sports rather than other. While each individual has different dominant intelligence types, oftentimes, those who participate in similar activities or have similar interests are theorized to have similar dominant intelligence types.

The purpose of this study is to apply Gardner's theory to high school athletes to determine their dominant intelligence types, just as previous scholars have already accomplished. However, the goal of this study is to determine how the dominant intelligence types of student-athletes vary depending on the sport in which the student-athlete is participating, because there is no existing scholarship with a purpose of finding a correlation between the type of sport being played and the dominant intelligence rankings for an athlete playing the given sport. Five different high school sports will be used to conduct this study - golf, volleyball, lacrosse, swimming, and

baseball/softball. Only juniors and seniors will be asked to participate in this study, because it is common for freshmen and sophomores to be participating in a sport solely for the physical education credit; by their junior and senior years, however, students are generally participating in their sport because they genuinely enjoy it, which is what is primarily being tested through this study. After participants have completed the survey described above, the scores for each individual's intelligence categories will be calculated, and then averaged with the rest of the scores for that sport in order to determine the most commonly dominant intelligence types for each sport. Finally, these cumulative averages will be compared to find differences in scores depending on the sport being analyzed. Ultimately, the purpose of this study is to utilize tests that other scholars have already examined, and use the results to determine whether the dominant intelligence types for individuals may vary dependent upon which sport they play.

Methods

The main component of this research project for data collection was a survey of student-athletes to determine their self-determined dominant intelligence types. Responses were categorized by which sport the student-athlete plays, but factors such as gender were not taken into account, as they were not deemed necessary or relevant to the information being studied in this project. Another factor that was taken into account for this research project was a meta-analysis of similar studies conducted previously by other researchers and research organizations. While the results of these studies were not directly used to draw conclusions within this study, the methods and analysis techniques were mimicked in order to ultimately conduct effective research.

The sports used in this study were boys' and girls' swimming, boys' and girls' golf, boys' and girls' lacrosse, boys' and girls' basketball, boys' baseball, and girls' softball. The goal was to ensure that each of the sports being analyzed would have varying levels of how much the student-athlete competes as an individual versus involvement as a team, as well as variations in the skills needed for each sport. Also, because this research study has no involvement as to whether participants are male or female, all results were grouped together based on the sport being played. Softball and baseball are considered one category because the two sports are the same - however, girls play softball and boys play baseball. Ultimately, because this study has a focus solely on comparing the five sports, with no regard toward gender, there is no way to distinguish whether results were from a male or female, as they are not being analyzed to affect the results of this study.

While the sports being analyzed were all high school sports, including both male and female student-athletes, there was an age limitation for data that was ultimately used to draw conclusions in this study. Only the responses gathered from juniors or seniors were analyzed, because these student-athletes were most likely to have been participating in the sport for the longest duration of time, and were most likely to be the most committed. Freshmen and sophomores were omitted from the analysis because, at the school being utilized for this study, a majority of freshmen and sophomores would participate in a sport for their mandatory physical education credits. After sophomore year, a majority of student-athletes will not continue with their sport if they were not interested enough, and were only doing so for their physical education credits. Because of this, there are much fewer juniors and seniors to take the survey,

but the results are predicted to be more accurate, because participants are more likely to be more committed to their sport.

Due to a mandate by the academic board of the school being used in this study, parental consent forms were necessary in order to conduct this survey, despite its nature being anonymous. Taking this factor into account, only those who had obtained parental consent could take the survey, and thus have their data analyzed. This, in turn, created a much smaller population from which to draw conclusions, as parental consent was needed, thus limiting the number of eligible participants. As many participants from each sport were asked to participate in this study, with close to 50% of athletes from each sport received consent to participate.

Interviews were also conducted with coaches as an attempt to understand how these coaches tailor their practices to their individual athletes' needs. However, as this data was inconsistent and generally unreliable, it was not included in this study. Attached in the appendix are results drawn from these interviews. The information from this process, however, was in no way used to affect or draw differing conclusions from that of the primary survey assessment.

Results

The results of this study are as follows, with no specific order given to any sport. For each of the sports analyzed, data from at least fifty percent of the eligible student-athletes, based on the aforementioned criteria, was collected.

The most dominant intelligence type for student-athletes who participate in swimming is an intrapersonal intelligence, and the least dominant intelligence type is an interpersonal intelligence type. In order of decreasing dominance, the remaining six intelligence types for

student-athletes who participate in swimming are as follows: linguistic, kinesthetic, naturalistic, visual, musical, and logical.

For student-athletes who participate in golf, the most dominant intelligence type is also an intrapersonal intelligence, with interpersonal intelligence also being the least dominant intelligence type. The second most dominant intelligence type for student-athletes who play golf is logical, followed by naturalistic, kinesthetic, musical, with linguistic and visual intelligence types having the same levels.

With regards to student-athletes who participate in basketball, the most dominant intelligence type found is a kinesthetic intelligence, and the least dominant intelligence type is a linguistic intelligence. After a kinesthetic intelligence, in descending order are intrapersonal, logical, naturalistic, musical, interpersonal, and visual, just above linguistic.

Similarly, the most dominant intelligence type for student-athletes who participate in lacrosse is a kinesthetic intelligence, with the least dominant intelligence type also being a linguistic intelligence. The second most dominant intelligence type, after kinesthetic, is also intrapersonal, followed by naturalistic, logical, musical, interpersonal, and visual.

Finally, for student-athletes who participate in baseball or softball, the most dominant intelligence type found was also a kinesthetic intelligence. The least dominant intelligence type for this group of student-athletes was a visual intelligence. In order of decreasing dominance, an intrapersonal intelligence was the second-most-dominant intelligence type, followed by naturalistic, logical, interpersonal, linguistic, and lastly, musical.

Below is a graph depicting how the average scores for each intelligence compare based on the sport being played, as well as comparing all of these values for each sport to one another.

It should be noted that the values for each set of data were calculated by finding the total sum of responses for each respective intelligence type, and dividing by the number of total participants for each sport, giving comparable average values.

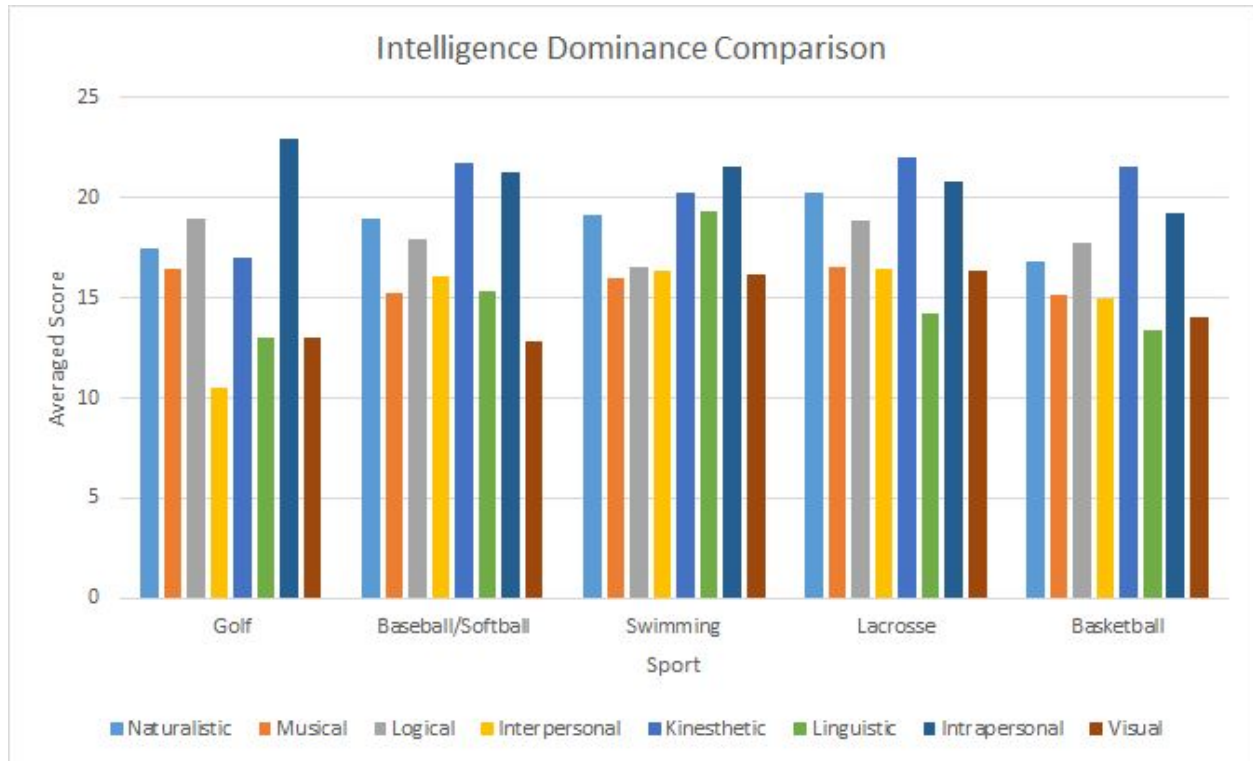


Figure 1: The graph above depicts how the average scores for each intelligence type compare based on the sport being played, as well as comparing all of these values for each sport to one another.

Discussion

The most relevant and obvious result of this study is that there is a noticeable difference in the dominant intelligence types of individuals who participate in different sports. As predicted, each sport that was surveyed for this study had its own distinct intelligence dominance rankings, save for basketball and lacrosse, the similarities of which will be discussed later in this paper. While, for the most part, some of the intelligence dominance rankings between sports were similar, each sport had its own intelligence dominance rankings.

One trend that was not expected was the contrast between athletes who play more individualized sports and those whose sports are more team-oriented. It could be assumed that athletes on team-oriented sports would have interpersonal intelligence as their most dominant intelligence type, if not one of their most dominant intelligence types, because of the necessity to communicate with and understand their teammates and the overall objective of the sports competition. However, athletes in sports that were team-oriented and required consistent cooperation with teammates – specifically baseball, softball, basketball, and lacrosse – had kinesthetic intelligence as their most dominant intelligence type. In all of the team-oriented sports studied, interpersonal intelligence was not even in the top half of dominant intelligences once the data was done being collected. While kinesthetic intelligence being more dominant than interpersonal intelligence could be due to an overall strong desire to be physically more fit and better than one's teammates, the exact reasons for kinesthetic intelligence being most dominant instead of interpersonal intelligence is unknown.

In comparison, athletes in sports that require more of an individualized focus – such as golf and swimming – had an intrapersonal intelligence as their most dominant intelligence type. In regards to individualized sports having a high intrapersonal intelligence, this can be expected, because an intrapersonal intelligence corresponds with knowing oneself and being focused on one's own actions, despite surrounding conditions. In a sport that is more individualized in nature, such as golf and swimming in this study, athletes are able to concentrate more of their time and energy into their own personal growth and progress, and are required to focus less on their teammates' improvements or other progress, because their success in the sport is overall determined solely by their own personal methods of improvement and progress.

Another result found by this data is that athletes who participate in lacrosse and basketball have almost identical intelligence dominance rankings. Aside from the third and fourth most dominant intelligence types (naturalistic and logic intelligences), the rankings for these two sports were the same. This is a reasonable conclusion because, of the five sports analyzed through this study, basketball and lacrosse have the most similarities – including practice styles, how competitions are conducted, and the general rules of the sport. While these general rankings do not depict how close each intelligence was to being more dominant than the intelligence that was concluded in this study to be more dominant, it is very interesting to note this very close similarity, especially within such a small research study.

Another characteristic of the final results of this study that should be noted is that many values for intelligence types within sports are very close in average. This may be due largely in part to the fact that each individual person is different, and will have varying experience with the sport. While the rankings of intelligences for each sport may give a general overview of that sports' athletes' intelligence dominance rankings, these should solely be used as a baseline for comparison. Each individual person and athlete is unique in their intelligences and how their own intelligences compare to one another, so deviations from the data collected throughout this study are to be expected. With a larger or smaller sample, it can be expected that some of the average values for intelligence types may vary greatly, which is dependent mostly on the demographic of individuals being surveyed as well as the size of the sample being conducted.

Because this study's primary purpose was to compare intelligence type dominance among sports, the amount of time dedicated to the sport may be a key factor in the possible variance of results. If an athlete has been playing their sport for a longer amount of time, it may

be assumed that their intelligence dominance scores may have a stronger correspondence with the sport's average values, in comparison with an individual who is only within their first few years of playing the sport.

Conclusions

This study shows that there is a difference among the dominant intelligence types of athletes who participate in different sports. As hypothesized, there is a notable difference between the dominant intelligence types of athletes who participate in team-oriented sports versus those who participate in more individualized sports. Furthermore, athletes who participate in team-oriented sports – basketball, softball, baseball, lacrosse – have kinesthetic intelligence as their most dominant intelligence type. Those who participate in more individualized sports – golf, swimming – have intrapersonal intelligence as their most dominant intelligence type.

Limitations

One of the major obstacles faced throughout the duration of this project was an unexpected necessity of parental consent, due to the fact that participants were minors. Because this information was not known at the beginning of the research design process, there was somewhat of a rush to distribute and collect parental consent surveys, with ever-approaching deadlines. The major limiting factor of this setback was a limitation as to the number of eligible participants for each sport. If parental consent was not necessary for this study, more student-athletes would have been eligible to participate, which would have made the sample size larger, thus making it more accurate to generalize the results of this study to the entire population of student-athletes being studied.

Another limitation to the design of this project was the minimal number of athletes who met the criteria for this research project. While some sports teams are larger than others, a great majority of participants are underclassmen, or those in the first or second year of high school, and due to the nature of this project, very few athletes' results were eligible for analysis for this research project.

A final limiting factor that potentially inhibited the overall success and application of this research project was the natural time constraint for this project. Only so much work can be completed in a given amount of time. However, the results and overall success of this project were unequivocally proportional to the amount of time allotted.

Further Directions

If this study were to be conducted in the future, it would be beneficial to ensure that parental consent, if needed, was obtained well before the deadlines of the project, so as to ensure the most effective manner of conducting and analyzing the data collected. Another possible method to inhibit this setback would be to conduct the research only on those who are above eighteen years of age, so as to avoid the need for parental consent forms prior to distribution of the survey.

Additionally, it would be beneficial for future studies to conduct this research based on a larger population of eligible student-athletes. In this study, only one school was utilized in order to draw conclusions. By increasing the sample size of a future research study, there will be a greater likelihood of being more accurate in an ability to generalize to the entire population.

With regards to the above statements, in future research regarding this research project, it would be beneficial to have more time allotted to conduct research, as this would then allow for more responses, and a greater ability to generalize the results to the population.

Annotated Bibliography

Adcock, P.K. (2014). The Longevity of Multiple Intelligence Theory in Education. *Delta Kappa Gamma Bulletin*, 80(4), 50-57.

The author of this article has conducted her research in order to support the claim that a knowledge of the theory of multiple intelligences is important and beneficial for teachers to have. She supports her claim by discussing the topic with teachers and those enrolled in graduate education courses who have a background in learning about multiple intelligences, with the goal of discovering how they have applied this knowledge to their classrooms. Her results showed that a knowledge of the theory of multiple intelligences has helped the teachers adapt their classrooms and their teaching styles in order to fully benefit the dominant intelligence types of all of their students.

Akarsu, S., Çaliskan, E., & Dane, Ş. (2009). Athletes have faster eye-hand visual reaction times and higher scores on visuospatial intelligence than nonathletes. *Turkish Journal Of Medical Sciences*, 39(6), 871-874. doi:10.3906/sag-0809-44

The point of this article, as told in the title, is that athletes have better hand-eye coordination and a better idea of their surroundings than do non-athletes. This is mainly due to the fact that athletes have to be good knowing what's around them and need to be able to react to changes in these surroundings in order to benefit themselves. Another important fact brought up in this research that is not necessarily emphasized is the fact that there does not appear to be a difference in hand-eye visual reaction times and visuospatial intelligence between athletes and nonathletes of the male and female genders.

Blue, T. (2015). A theory of multiple intelligences: Working with the adolescent brain/voice. *Choral Journal*, 55(9), 57-62.

The primary focus of this article is how to employ the multiple intelligence theory to benefit education in primarily music-based classrooms with a specific focus on choral classes. While the information within this article does not specifically relate to my topic, the reading was beneficial to my research because it helped me to gain a broader and more in-depth perspective of the application of the theory of multiple intelligences, specifically with adolescents.

Crombie, D., Lombard, C., & Noakes, T. (2009). Emotional Intelligence Scores Predict Team Sports Performance in a National Cricket Competition. *International Journal of Sports Science and Coaching*, 4(2), 209-224. doi:10.1260/174795409788549544

While two of the main focuses of this article - emotional intelligence and the sport cricket - are not related to my research topic, the most beneficial aspect of this article is how the scores for this study were able to predict performance in the competition. This relates to my topic because my focus is majorly on how the dominant intelligence types for each group of athletes can eventually lead to a greater understanding of how each type of athlete learns most effectively, which will, in turn, hopefully lead to an increase in performance and development, due to the knowledge of how it is best for the athletes to learn, based on their dominant intelligence types.

de Jesús Núñez Cardenas, F., Camacho, J. H., Tomas Mariano, V. T., & Felipe Redondo, A. M. (2015). Application of data mining to describe multiple intelligences in university

students. *International Journal Of Combinatorial Optimization Problems & Informatics*, 6(1), 20-30.

The information in this article is relevant to my study because both have the intent of using the multiple intelligence theory to categorize and characterize groups of individuals. The authors of the study want to use multiple intelligences to group together college-level students based on their dominant intelligence types, with a specific focus on how the multiple intelligence theory is being used in modern-day society. This study is also one of the ones off which I based my own survey, modifying the format to suit my needs, but the overall setup and phrasing will be almost identical to this researcher's, because my intended outcome is similar to their own.

Fasko Jr., D. (2001). An analysis of multiple intelligences theory and its use with the gifted and talented. *Roeper Review*, 23(3), 126.

The focus of this article is on how to use the multiple intelligence theory to further promote the growth and education of gifted and talented students, as well as use the multiple intelligence theory to more effectively identify and educate these students. This article emphasises that a person's intelligence should not be solely based on their scores on standardized tests, but that schools need to be able to identify and adapt for students who are differently intelligent; there need to be more varied ways to identify gifted and talented students besides just through standardized tests.

Gardner, H. (1983). *Frames of mind: the theory of multiple intelligences*. New York: Basic Books.

This is Howard Gardner's original book that sparked the ongoing conversation about the theory of multiple intelligences. His theory hypothesizes that individuals all learn in unique ways, and these varying ways can be determined by an evaluation based on the individual's characteristics. The most important aspect of this book is the fact that it was essentially the beginning of the conversation about multiple intelligences and how they can influence different groups of individuals based on their similarities and common traits as well how those within the group differ from one another in systematic ways.

Hong-shih, H., & Wen-chang, C. (2011). Multiple intelligences development of athletes:

Examination on dominant intelligences. *World Academy of Science, Engineering and Technology, International Journal of Social, Behavioral, Educational, Economic, Business and Industrial Engineering*, 5(5), 614-617.

This article compares the intelligence profiles of athletes and those of nonathletes. This article found the types of intelligences compared between these two groups while also giving an explanation as to why these differences occur and how the type of intelligence affects the athlete as well as their developmental process. The conclusions of this article found that athletes know themselves and each other well, and know how to effectively communicate with their own bodies.

Kezar, A. (2001). Theory of multiple intelligences: Implications for higher education. *Innovative Higher Education*, 26(2), 141.

The primary focus of this article is on how the theory of multiple intelligences is used in higher education, specifically on how processes and strategies implemented at a younger age have the tendency to continue on in pattern into higher education. This article is one

of the first to apply the multiple intelligence theory to college-age students, and then compare these results to those found in studies conducted on adolescents. The purpose of this article is to grant access to the benefits of multiple intelligence education assistance to the entire collegiate student population and to be able to accommodate the needs of all of these students.

Köksal, M. S., & Yel, M. (2007). The effect of Multiple Intelligences Theory (MIT)-based instruction on attitudes towards the course, academic success, and permanence of teaching on the topic of "Respiratory Systems." *Educational Sciences: Theory & Practice*, 7(1), 231-239.

This article specifically focuses on the application of the multiple intelligences theory in a specific course taught at a university in Turkey. The authors of this article observed that typical teaching methods were not effective, so they sought to employ the theory of multiple intelligences to help them redesign the course to better suit the needs of the students. They redesigned the course with an emphasis on how changing the teaching style can alter students' engagement as well as the effectiveness of the course.

Kutz, M., Dyer, S., & Campbell, B. (2013). Multiple intelligence profiles of athletic training students. *Internet Journal of Allied Health Sciences and Practice*, 11(1), 9.

This is a recent article that has a similar focus to my idea because I want to look into how the type of intelligence may affect the sport being played. I would take the information and methods from this conducted research and duplicate it, changing it only by separating each sport and comparing those results. The overall results of this study are consistent with the findings in other articles.

Lane, A. M., Meyer, B. B., Devonport, T. J., Davies, K. A., Thelwell, R., Gill, G. S., & ...

Weston, N. (2009). Validity of the emotional intelligence scale for use in sport. *Journal Of Sports Science & Medicine*, 8(2), 289-295.

While the topic discussed in this article is not directly related to my topic, as emotional intelligence and the theory of multiple intelligences differ slightly, the article is important for me when it comes to the interpersonal and intrapersonal intelligence types. This article is also helpful in the fact that it relates emotional intelligences to sports, and argues about the validity of this application, which has been done similarly in articles concerning multiple intelligence theory. This article also has an extensive literature review, which is important in gathering further more information about this topic.

Lane, A. M., Thelwell, R. C., Lowther, J., & Devonport, T. J. (2009). Emotional intelligence and psychological skills use among athletes. *Social Behavior & Personality: An International Journal*, 37(2), 195-201.

This article encompasses both of my topics - the multiple intelligence theory and its use and presence in athletes; the primary focus of this article is on how athletes use psychological skills to enhance their performance when participating in their specific sport. This article emphasizes that sports psychologists should be utilizing the fact that an application of the theory of multiple intelligences is beneficial for athletes in order to further enhance athletes' performance levels.

Lane, C. (2002). Multiple intelligences. *The Distance Learning Technology Resource Guide*.

This article is short, yet is a concise version of Gardner's original theory, which will be helpful to refer back to when I am designing my experiment, because it will hopefully

give me a better idea of how to test for each intelligence type. This article gives summaries of each intelligence type as discussed by Howard Gardner, but it also gives examples of how to test for each of the different intelligence types based on characteristics that are displayed by all human being, although in varying degrees. The credibility of this article is questionable, however, due to a noticeable lack of citations within the article itself.

Mathivanan, D. (2013). Comparison of male and female differences in emotional intelligence among trained universities athletes of Lusaka Province, Zambia. *European Researcher*, 55(7-2), 1938-1944.

The main point of this article is to determine how emotional intelligence differs between male and female athletes, with an emphasis on how this is influenced by societal gender roles. The author previously studied stereotypical workplaces, such as a corporate environment, in order to gain a background of typical gender roles. The authors also evaluated that emotionally intelligent people are good at adapting their emotions to best fit the needs of their current situation. Overall, the information in this article is not directly related to my study, but has valuable information regarding how the researchers evaluated certain aspects of the athletes and their intelligence levels.

Meyer, B. B., & Fletcher, T. B. (2007). Emotional Intelligence: A Theoretical Overview and Implications for Research and Professional Practice in Sport Psychology. *Journal of Applied Sport Psychology*, 19(1), 1-15. doi:10.1080/10413200601102904

The most important aspect of this article is the acknowledgement of how athletes interact with one another, as well as themselves, specifically how their actions and thoughts

inevitably influence their performance. The introduction of this idea to sports psychology is important in analyzing how to further development and performance of athletes and the teams on which they compete. This article is also important in that it discusses what emotional intelligence is and its prior application in this field; while I am not researching this exact topic, this discussion is important to have in understanding where my project fits into the discussion at hand.

Nicolini, P. (2010). Training teachers to observation: An approach through multiple intelligences theory. *Bulletin Of The Transilvania University Of Brasov. Series VII: Social Sciences. Law*, (52), 91-98.

The primary focus of this article is applying the theory of multiple intelligences to how teachers observe their students and collect this data. This article introduces the idea of using a computerized program when gathering observational information, because there is a lot of data to work with, which can more easily synthesize and analyze results.

However, this article focuses on younger children, specifically those younger than school-age, so the data found through this research is not necessarily applicable to my own research.

Shahzada, G., Khan, U. A., Ghazi, S. R., & Hayat, Y. (2015). Gender differences in self-estimated multiple intelligences among secondary school students. *Pakistan Journal Of Psychological Research*, 30(1), 81-93.

The topic of this paper is similar to my own research topic because I am also researching multiple intelligences in secondary school students, specifically juniors and seniors, the only difference between my project and this study is that this study has a focus on

comparing and contrasting the dominant intelligence types for genders, whereas I am focusing on doing so with different sports. Also, the design of this project is most likely very similar to what I am looking to employ for my own project. This article also includes a summary of who Howard Gardner was, his theory of multiple intelligences, and brief summaries of each of the different intelligence types, as originally described by Gardner himself.

Vales-Alonso, J., López-Matencio, P., Gonzalez-Castaño, F. J., Navarro-Hellín, H.,

Baños-Guirao, P. J., Pérez-Martínez, F. J., & ... Duro-Fernández, R. (2010). Ambient intelligence systems for personalized sport training. *Sensors* (14248220), 10(3), 2359-2385. doi:10.3390/s100302359

Originally I had thought that this article would be relevant to my study, because of the relation between athletes and personalized sport training, and the connection of intelligence systems and multiple intelligences. However, this study focuses primarily on technology and its use in personalized sport training, which does not relate very closely with my study at all. This article's focus is on how the athletes' equipment can communicate with how it is being monitored. Because of its focus on technology, there is very little information that can help me with my research project.

Waterhouse, L. (2006). Inadequate evidence for multiple intelligences, Mozart effect, and emotional intelligence theories. *Educational Psychologist*, 41(4), 247-255.

doi:10.1207/s15326985ep4104_5

I found this article extremely interesting today because the entire purpose of this article is to prove that the multiple intelligence theory is invalid and inapplicable. While I still plan

to continue my project as is, this article brought a new perspective and gave me information that is helpful in the fact that there are ways in which my project idea might not be viewed as valid or reasonable. The information presented in this article also was able to lead me to other articles because the author is obviously having an ongoing conversation with other authors' article, thus leading me to more research and findings pertaining to my topic.

Appendix A

List of Questions Asked on Survey

1. I enjoy categorizing things by common traits
2. I easily pick up on patterns
3. I keep my things neat and orderly
4. I learn best by interacting with others
5. Sitting still for long periods of time is difficult for me
6. Taking notes helps me remember and understand concepts
7. I am keenly aware of my moral beliefs
8. I enjoy creating art using varied media
9. I remember things well when I use graphic organizers
10. Fairness is important to me
11. It is easy for me to explain my ideas to others
12. I enjoy outdoor games and sports
13. Study groups are very productive for me
14. Solving problems comes easily to me
15. I've always been interested in playing an instrument
16. I enjoy activities such as hiking and camping
17. Animals are important in my life
18. It is difficult for me to concentrate when a TV or radio is playing
19. Disorganized people make me frustrated
20. I dislike working alone

21. I live an active lifestyle
22. Foreign languages interest me
23. Working alone can be as productive as working in a group for me
24. I can recall things in mental pictures
25. I am good at reading maps
26. I live to be involved in causes that help other people
27. I like to participate in activities such as debates and public speaking
28. I learn by doing
29. Clubs and extracurricular activities are fun for me
30. I can complete calculations quickly in my head
31. Remembering song lyrics is easy for me
32. I enjoy studying topics such as biology, botany, and/or zoology
33. I spend a lot of time outside
34. I remember things by putting them in a rhyme
35. Step-by-step directions are helpful for me
36. I like to participate in political discussions
37. I believe that being fit is important for living a good life
38. I enjoy reading all kinds of materials
39. My attitude affects how I learn
40. I enjoy three-dimensional puzzles

