

Sport participation and academic achievement: Is there a plateau effect?

Lindsay Hanson, Florida State University

Aubrey Kent, Florida State University

ABSTRACT

The purpose of this study was to investigate the relationship between athletic participation and academic performance in high school students; and more specifically, to determine if there was an optimal level in terms of time spent participating in organized sports and increased performance in the classroom. Possible differences between men and women were also investigated. By investigating various levels of athletic involvement, this research attempted to determine the most productive level of participation. One hundred sixty seven high school students were categorized into four involvement levels (low, medium, high, elite) based on the number of hours each student participated in sport each week. The results showed that there was an optimal level of athletic participation in terms of increased grade point average. Further, a plateau effect was evident as grade point average scores did not significantly decrease after the optimal point.

INTRODUCTION

Sport and athletics have become an integral part of our society. From an early age, many of us are exposed to sport and the positive benefits that can be gained from participation. Increased self-esteem (Smith, 1994; Soltz, 1986), the development of social skills and leadership ability (Gerdy, 1992; Harper, 1986), and increased body awareness are just a few of the benefits associated with participation in sport. However, there are those critics who believe that participation in athletics is detrimental, especially to the academic development of our children (Carlson, 1993). Accordingly, the relationship between interscholastic athletic participation and academic achievement has become a popular area of investigation (Smith, 1994).

Athletes have often historically been stereotyped as intellectually inferior, "dumb jocks" with little education or academic potential. This stereotype can be especially relevant and hurtful for student-athletes. Evidence supporting this negative characterization of athletes is somewhat mixed, which has fueled the controversy of whether sport participation is a help or a hindrance to academic performance. At the collegiate level, studies have largely shown that student-athletes do not academically outperform their non-athletic counterparts (e.g., Hood, Craig, & Ferguson, 1992; Maloney & McCormick, 1993). In fact, several studies report that collegiate athletes significantly underperform in the classroom, a finding especially true for traditionally revenue producing sports such as football and men's basketball (e.g., Ervin, Saunders, Gillis & Hogrebe, 1985; Gurney & Stuart, 1987).

At the high school level, athletics and physical education programs have often been similarly criticized for interfering with academic performance; time spent participating in sport is seen as time wasted and better spent in the classroom (Carlson,

1993). Gabbard (2000) states that many school administrators feel that physical education should be viewed as an extra activity, especially if academic performance is low. In accordance with this notion, physical education programs across the country are being eliminated from educational curricula (Virshup, 1999). Further, the interest level in athletics of adolescents, and particularly females, is on the decline. This trend is not only problematic from a long-term health perspective, but is also troubling from an academic and personal development standpoint as well.

Contrasting these criticisms, numerous studies conducted at the high school level have shown that student-athletes outperform their non-athletic counterparts in terms of grade point average (e.g., Nuhn, 1991; Shafer & Armer, 1968; Soltz, 1986; Tucker, 1999; Whitley, 1999) and class ranking (Stegman & Stephens, 2000). It is clear that the sport and physical education community has the daunting task of simultaneously absorbing growing cuts and criticism while trying to overturn long-held stereotypes of the attributes of student-athletes. At the high school level in particular, it seems that there should be ample evidence to support the need for continued emphasis on physical activity and extra-curricular sport involvement. Yet with increasing internal, public and fiscal pressures, more and more athletic programs are being viewed as expendable. Anderson (2000) reported that budget cuts in Kansas school districts have resulted in restrictions on equipment and the implementation of student activity fees for participation in school sports. Keim (1999) and Mahtesian (1993) have also reported cutbacks in interscholastic athletic programs. It seems as though the decrease in funding to schools has escalated the backlash towards interscholastic sport, and student-athletes in turn.

While there are examples of student-athletes over-emphasizing their sport participation to the detriment of their academic achievement, empirical research into the issue shows that on average, sport participation has substantial short and long-term benefits. As such, the question seems to be whether or not a balance can be found where one can participate in athletics and enjoy its purported benefits without hindering academic performance. This investigation is an attempt to find such a balance. As is well known in the athletic performance domain, there is such a thing as "over-training", referring to the point at which the usual benefits of training no longer translate to performance. In this vein, it can be suggested that interscholastic athletic participation can enhance academic performance only to a certain extent, but that as participation rates approach extreme levels, academic performance will naturally suffer. This might, in part, explain the contradictory findings common among studies of academic performance among high school and collegiate student-athletes, as the commitment level differs among these groups. While a fair amount of research has been done on this issue, few studies incorporate athletic participation as a categorical or continuous variable, with most studies having athletic participation as simply a "yes" or "no" dichotomous variable (e.g., Soltz, 1986; Whitley, 1999).

Eidsmoe (1963) used grade point average to investigate the relationship between academic achievement and participation in interscholastic sport, as did many subsequent researchers (Jefferson, 1999; Nuhn, 1991; Shafer & Armer, 1968; Soltz, 1986; Stegman & Stephens, 2000; Tucker, 1999; Whitley, 1999). However, various other measurements have been introduced in addition to grade point average. Nuhn (1991) implemented the MMAT, a standardized test that evaluates knowledge in the

areas of language, mathematics, social studies and science. Soltz (1986) differentiated between academic performance during the competitive season and academic performance during the off-season. More specifically, the number of failing grades received by student-athletes while competing on an athletic team was compared to the number of failing grades received when not competing on a team. Further measurements that have been used include class rank (Stegman & Stephens, 2000), SAT scores (Landers, Feltz, Obermeier, & Brouse, 1978), leadership ability (Dobosz & Beaty, 1999), and grades in various disciplines, such as science and math (Zaugg, 1998). The demographic category investigated most often was gender (Dobosz & Beaty, 1999; Landers et al., 1978; Nuhn, 1991; Stegman & Stephens, 2000; Whitley, 1999). However, racial identity (Whitley, 1999) and degree of athletic involvement (Shafer & Armer, 1968; Stegman & Stephens, 2000) were also introduced in some studies. In addition, both Landers et al. (1978) and Feltz and Weiss (1984) included service-oriented activities in their evaluation of academic achievement. Involvement in service-oriented activities was defined as participating in one or more service or leadership extracurricular activities (Feltz & Weiss, 1984). Students were categorized as "service-athlete," "athlete-only," "service-only" or "neither."

Overwhelmingly, the results have indicated that student-athletes at the high school level outperformed their nonathletic counterparts in the classroom with superior grade point averages (Nuhn, 1991; Shafer & Armer, 1968; Soltz, 1986; Tucker, 1999; Whitley, 1999) and higher class rankings (Stegman & Stephens, 2000). Nuhn (1991) found that both male and female athletes had significantly higher grade point averages than nonathletes. Focusing on only male participants, Shafer and Armer (1968) reported that athletes had a mean grade point average of 2.35, while nonathletes recorded a mean grade point average of 2.24. Along the same lines, Soltz (1986) reported a mean grade point average of 2.67 and 2.12 for athletes and non-athletes, respectively. Whitley (1999) reported the most significant difference in grade point average with athletes achieving a mean of 2.86 and non-athletes achieving a mere 1.96 mean grade point average. Similarly, based on mean scores obtained using the Leadership Ability Evaluation (LAE), Dobosz and Beaty (1999) found that athletes had a greater capacity for leadership than those not involved in sport. Female athletes were shown to significantly outperform all other demographic groups in academic achievement (Jefferson, 1999; Stegman & Stephens, 2000) and leadership qualities (Dobosz & Beaty, 1999). Further, as students became more heavily involved in sports (i.e. participation in two or three sports as opposed to just one), grade point average and class rank increased (Shafer & Armer, 1968; Stegman & Stephens, 2000).

While these findings are compelling, Jefferson (1999) reported no difference between the grade point average of athletes and non-athletes. Landers et al. (1978) and Feltz and Weiss (1984) found that students involved in both service and athletic activities outperformed those students involved in athletics only. Further, Zaugg (1998) reported that athletes outperformed non-athletes in only one out of four academic areas. A comparison of midterm and final grades in math, social studies, English and science revealed that athletes had significantly higher grades in science only. In addition, academic performance by athletes has been shown to decrease in the off-season (Soltz, 1986).

The purpose of this study was to examine the amount of participation in sport activity by high school student-athletes, and assess its relationship with academic performance. More specifically, this study sought to determine if there was an optimal level of time spent participating in sport, in regard to its impact on performance in the classroom. As alluded to previously, the main hypothesis underlying this effort was that a 'plateau' effect may be evident, indicated by a pattern of diminishing returns for academic performance as athletic participation approaches elite levels.

METHOD

Subjects

One hundred seventy-six high school students participated in this study. Ranging in age from 14 to 19 and representing all high school grade levels, the participants were drawn using two methods. The first group was contacted by mail in a county of the state of Florida, while the second group participated in the study at a school in the state of Indiana in a census fashion.

Instrument

The Leisure Time Activities Survey, which was developed by the researchers specifically for this study, included questions pertaining to type of athletic activity, number of hours per week spent participating in the activity, number of months out of the year spent participating in the activity, and total number of years in which the participant has been involved in the activity. The participants were also asked to disclose their grade point average. Demographic questions concerning gender and age were included, as well. The students were then classified into categories based on two variables: number of hours spent in athletic participation and gender.

Each participant's response to survey question two, concerning the hours spent per week in athletic activity, determined their Level of Athletic Involvement (LAI) for the purposes of this analysis. Participants chose their level of weekly time commitment from five predetermined categories: less than 4 hours, 4–7 hours, 8–11 hours, 12–15 hours, and more than 16 hours. Students who spent less than 4 hours per week participating in athletic activities were excluded from this study. Within the group of participants retained for the study, those who spent 4–7 hours practicing their sport were considered "low" involvement while those who were classified in "medium," "high," and "elite" categories responded as spending 8–11, 12–15 and 16 or more hours practicing their sport each week, respectively. Hourly time commitment per week was chosen as the measurement for LAI because this reflected the true nature of athletic commitment, and correlated with academic achievement, in terms of absolute hours spent in one pursuit versus the other. As there was no previous research that addressed level of athletic involvement in this manner, the hourly commitment levels constituting "low," "medium," "high," and "elite" involvement, respectively, were assigned to the selection options described earlier.

Procedure

For the Florida sample, mailing labels were obtained from several high schools through the county school board. Survey packets containing the one-page survey instrument were then mailed to each student. Participants were asked to return the completed survey to the researcher in the enclosed self-addressed, stamped envelope. The participants in the Indiana sample completed the survey instrument as part of a class activity. After obtaining consent from the local school administrators, the researcher attended several high school classrooms, at which time the students received instructions and an explanation as to the purpose of the study. Following this, both groups completed a one-page survey designed to gather data on the level of athletic participation and grade point average of each participant. Those students choosing to participate then returned the surveys directly to the researcher.

Data Analysis

Several types of data analyses were used to compare the demographic groups and test for the hypothesized plateau effect of athletic participation, including frequency and descriptive reports, ANOVA, and pairwise comparisons. An alpha level of .05 was used for all statistical analyses.

RESULTS

Of the one hundred sixty-seven student-athletes who properly completed the surveys and were retained for the study, 21.0 % were classified as "low" involvement student-athletes ($n = 35$), 25.7 % as "medium" involvement ($n = 43$), 26.3 % as "high" involvement ($n = 43$), and 26.9% as "elite" involvement ($n = 45$). The mean GPA for each involvement level was 3.182, 3.505, 3.425, 3.457, from "low" to "elite," respectively (See Figure 1). Focusing on gender, the mean GPA for females ($n = 71$) was 3.532 while the mean GPA for males ($n = 96$) was 3.308. The mean age of the respondents was 15.68 with a range of 14 to 19 years old.

A two-way ANOVA was performed to determine if the student-athletes' GPA was significantly predicted by the level of athletic involvement (LAI) and gender. The test indicated that gender ($F = 7.419, p = .007$) was a significant predictor, and LAI ($F = 2.465, p = .064$) was not a significant predictor of grade point average. The interaction of gender and LAI was not significant ($F = .779, p = .507$). To determine if there was a within group difference on GPA for LAI, a one-way ANOVA was utilized. Results of the one-way ANOVA and subsequent pairwise comparisons indicated that differences among groups existed ($F = 2.986, p = .033$). Specifically, the "low" group significantly differed from the "medium" ($t = -2.793, p = .006$), "high" ($t = -2.114, p = .036$), and "elite" ($t = -2.405, p = .017$) groups. However, there were no significant differences between the "medium" and "high" groups ($t = .733, p = .465$), the "medium" and "elite" groups ($t = .440, p = .661$), or the "high" and "elite" groups ($t = -.229, p = .766$). This pattern of results supports the notion of a plateau effect. The GPA means plot clearly indicates a sharp increase in GPA as the level of athletic involvement goes from "low" to "medium," at which point a marked leveling-off occurs. When separated by gender, the plateau effect is still in evidence, although as LAI increases from "high" to "elite," the males' GPA improved slightly while the females' GPA showed a slight decline (Figure 2).

DISCUSSION

Within the athletic and sport community, there is very little debate about the relative merits of participation in physical activities and its benefits for adolescents and young adults. Although some conflict still exists in regard to student-athletes, many studies have shown a positive relationship between participating in athletics and academic performance (e.g., Nuhn, 1991; Shafer & Armer, 1968; Soltz, 1986; Tucker, 1999; Whitley, 1999). However, research to date has not extended significantly beyond examining this relationship. Borrowed in part from sport psychology literature, the idea of a plateau effect makes intuitive sense in terms of the relationship between athletics and academics. Whereas the idea that involvement in athletics will help other aspects of the student-athlete's life (including academics) is accepted by most, it certainly seems logical that involvement must also have limits in order for the most benefit to be gained. The identification of a plateau effect in this preliminary investigation offers hope for those who would seek to identify an 'optimal level' of athletic involvement needed to enjoy and excel at sports without sacrificing academic achievement. From this investigation, high school student-athletes in the "medium" involvement level represented the point of optimal return, as those participants in "high" and "elite" groups did not have significantly higher grade point averages relative to those in the "medium" group. More specifically, student-athletes who participated in more than eleven hours of athletic activity per week did not exhibit added benefit in terms of increased GPA.

The results presented here buttress previous work which concluded that moderate to high levels of athletic participation were in no way detrimental to student-athletes in terms of academic performance (e.g., Shafer & Armer, 1968; Stegman & Stephens, 2000). In fact, as in other studies, those athletes involved in moderate to high levels had significantly higher grade point averages than did those engaged at a "low" level. The current results also support the need for future endeavors to stratify more specifically the level of athletic involvement. From the standpoint of measuring the impact on outcomes like academic achievement, distinguishing amongst student-athletes beyond merely "high" and "low" categories is essential to advance the understanding of the relationship. Additionally, this increased attention to detail will help to guide recommendations that are to be made to parents, coaches, and or academic support personnel regarding the cost-benefit analysis of high level athletic involvement of students.

In investigating gender as a significant variable, an optimal level continued to be present after isolating male and female groups. Corroborating previous research (Dobosz & Beaty, 1999; Stegman & Stephens, 2000), for each involvement level, the female group recorded a higher GPA than the corresponding male group (See Table 1). However, it is interesting to point out that female performance decreased from the "high" to "elite" level while male performance continued to increase. This may be due in part to a restriction in range, given that the female GPA's were already high, and thus were constrained from rising further. More likely this is a result that is particular to this sample, one in need of replication on a larger scale before any appropriate conclusions can be drawn. Further investigation of this phenomenon should be addressed by future research.

Some limitations of the current study must be recognized before conclusions can be made. For this preliminary and exploratory study grade point average was self-

reported, which in future efforts of larger scale could pose problems of inferential power. Obtaining official records directly from the schools would help to eliminate this limitation, however it would also reduce the level of anonymity enjoyed by the participants. For this study, the assurance of anonymity of respondents helped ease any concern of erroneous GPA reporting. Further, by its nature, GPA is a subjective measure, left to the discretion of the educators at each school. As such, including a more standardized measure such as SAT/ACT scores might be advisable. Additionally, future researchers should attempt to expand the current investigation by involving not only more, but more diverse, subjects. Finally, by including more variables for comparison, such as type of sport played, number of sports played, participation in other extra-curricular activities, and general attitudes towards academics, future research efforts can continue in this vein to advance our understanding of the relationship between academics and athletics.

This study presents yet another finding in support of the notion that participation in interscholastic sport is associated with the academic performance of high school students. Among this sample, it has been shown that as participation increases, so too does academic achievement. Most importantly, this study revealed preliminary evidence that an "optimal level" of participation can be identified in terms of the relationship between grade point average and athletic involvement. It is notable that while a plateau in GPA was evident at roughly eleven hours of involvement per week, "elite" participation (16 or more hours/week) in athletics did not have a significantly negative impact on GPA.

In conclusion, proponents of sport participation for students need to remain aware of the demonstrated academic benefit of involvement in order to counter claims by those who view sport as a frivolous endeavor. Moreover, if further evidence more specifically identifies optimal time commitment levels for activity, heightened specificity in designing schedules can be attained by parents, coaches, academic advisors, and the student-athlete's themselves. Perhaps most importantly, if the stereotype of the "dumb jock" can continue to be contradicted with empirical data, evolving perceptions of sport participation, and the study of sport, can continue.

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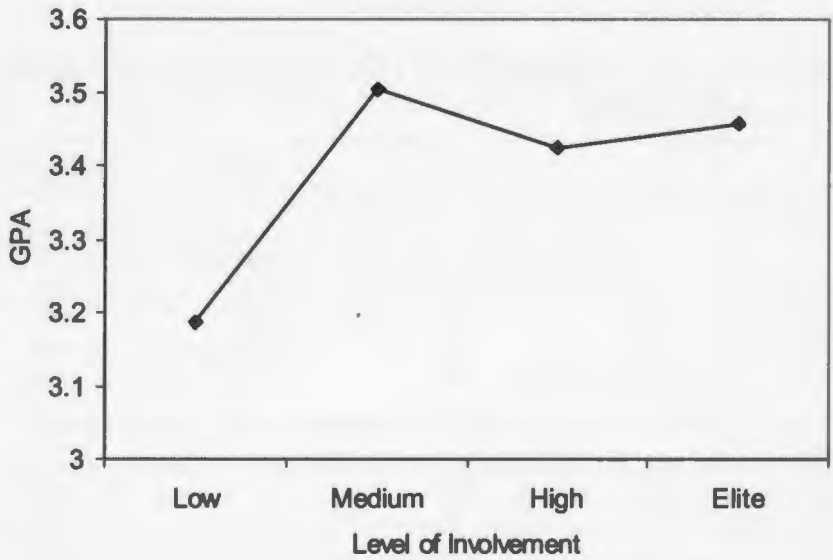


Figure 1. Mean GPA of overall sample by Level of Athletic Involvement.

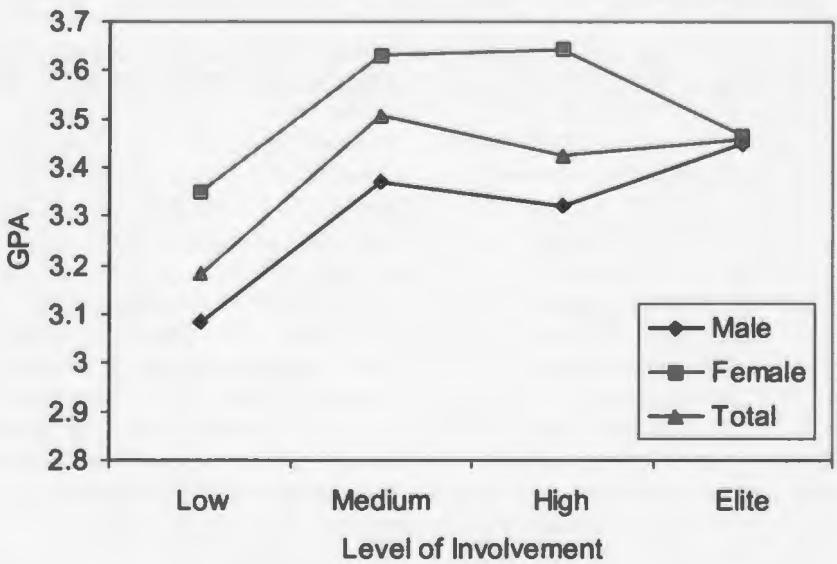


Figure 2. Mean GPA by Level of Athletic Involvement and Gender.

TABLE 1.

Mean GPA of overall sample by Level of Athletic Involvement (LAI) and Gender.

LAI	N	MeanGPA	Std.Deviation
Male:			
Low	22	3.082	.586
Medium	21	3.371	.543
High	30	3.323	.593
Elite	23	3.448	.506
Total	98	3.308	.568
Female:			
Low	13	3.352	.564
Medium	22	3.632	.202
High	14	3.643	.403
Elite	22	3.467	.407
Total	71	3.532	.406
Overall Total	167	3.403	.516

AUTHOR BIOGRAPHY:

Ms. Lindsay Hanson, is a doctoral student in sport management at Florida State University.

Dr. Aubrey Kent, is an assistant professor, and the graduate coordinator of sport management program at FSU. He also is the coach of the FSU Ice Hockey Team.