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With over a dozen published studies confirming the existence of academic clustering and an expose revealing the deleterious effect it can have on an institution (Smith and Willingham, 2015), recent investigations (Case, et al, 2017) have begun to explore reasons why athletes cluster into a limited number of academic majors and whether this phenomenon occurs outside of Division I athletics (Miller, 2021). The current study attempts to isolate one variable (national ranking) and explore its connection to academic clustering. The academic majors of 1410 intercollegiate baseball players from top ranked and lower ranked DI, DII, and DIII teams were obtained through athletics department websites. Chi-square analyses revealed that academic clustering was more frequent among highly ranked teams and it occurred more often in Division I baseball when compared to Division II and III. Results are discussed in terms of risk aversion, NCAA policies and initiatives designed to bolster academic success in DI athletics, and the 2015 comprehensive GOALS study conducted by the NCAA.

Without question, the role of intercollegiate athletics continues to expand within the university setting, but in doing so, presents increased challenges for college athletes trying to balance academic pursuits with a full-time commitment to athletics (Gurney, et al. 2017). While the NCAA touts its impressive graduation rates among athletes at all levels (Hosick, 2014), some critics have raised questions about the reliability and validity of that data (Gurney, et al. 2015) while others have continually highlighted the difficulties facing athletes in their pursuit of a college degree while meeting the demands of intercollegiate sport (Adler & Adler, 1991; Gurney, et al. 2017; Kidd, et al. 2018; Killeya-Jones, 2005; Marx, Huffmon, & Doyle, 2008; Sperber 2000).

College athletes have raised concerns about these difficulties in the 2015 GOALS study, where the NCAA surveyed over 21,000 college athletes regarding their athletic and academic experiences. Findings revealed that over one-third of the athletes agreed that participation in athletics precluded them from taking desired courses and/or choosing a particular major. This occurred more frequently in Division I athletics where the college experience centers more on athletic achievement and athletics is seen as a revenue stream for the institution compared to DII athletics, where specific initiatives (i.e., the 2009 *Life in the Balance,* the 2014 *Path to Graduation*, and the 2015 *Make it Yours*) were created to help athletes balance academics and athletics, and DIII athletics where the stated philosophy prioritizes academic pursuits over athletics success. Yet despite these difficulties, few athletes at any level reported any regret for their academic or athletic choices.

Further evidence that college athletes are not deterred by the challenges of coordinating academic demands with a full-time commitment to athletics comes from a study conducted by Rudd and Ridpath (2019) that found most of the Division I basketball and football players surveyed would prefer to pursue a degree while participating in sport instead of participating in intercollegiate athletics without any academic expectations, even those who aspired for a career in professional sport. Consequently, athletes' enduring pursuit of a degree obligates the athletics staff, the universities, and the NCAA to find ways to facilitate academic success while maintaining a multimillion-dollar business. It is likely that the tenuous marriage between athletics and academics becomes strained when athletic success supersedes academic goals.

Highlighting this strain, a comprehensive 2015 exposé by Jay Smith and Mary Willingham chronicled the scandal at the University of North Carolina. It revealed the lengths to which an institution of higher learning would go to maintain and maximize athletic success. For over two decades several UNC athletics department employees worked in concert with academic support counselors and faculty members to direct college athletes into an African and African Studies major which provided them with sham courses to maximize eligibility for NCAA competition.

Long before the UNC scandal came to light, researchers began to explore how participation in intercollegiate athletics impacts the academic choices made by college athletes. Case, et al. (1987) were the first to label the disproportionate percentage of college athletes (25 percent or higher) from an intercollegiate team into the same academic major or set of classes as *academic clustering*. Subsequent research on this topic suggests that academic clustering is a common phenomenon in American higher

education, but that not all clustering rises to the level of the academic fraud perpetrated at UNC. Nonetheless, an alarming number of college athletics departments have systematically funneled athletes into easy classes or engaged in other forms of academic fraud to maintain their team's success (Ridpath, et al. 2015).

Ironically, NCAA policies put into place earlier this century designed to promote academic progress among college athletes may inadvertently encourage individuals to seek out majors considered less challenging because they are believed to preserve athletic eligibility (Fountain & Finley, 2009). For example, the Academic Progress Rate (APR) and the Graduation Success Rate (GSR), metrics that attempt to quantify academic progress and graduation rates of athletic teams and even penalizes teams and coaches for not meeting the prescribed standards, can, as Lieber Steeg, et al. (2008) suggest, incentivize college athlete clustering in academic majors that are believed to help maintain athletic eligibility. Similarly, the "40-60-80 rule" that mandates continual academic progress toward a degree by providing benchmarks for eligibility may disincentivize academic exploration by making it difficult to change majors in the later years (Wolverton, 2017).

For decades, scholars have argued that admitting college athletes with strong professional sport aspirations into a college or university setting invites academic fraud in the form of extreme academic clustering (Edwards, 1985; Gurney, et al, 2017; Nixon, 2014; Sperber, 2000; Thamel, 2006). When athletes are admitted to top level colleges and universities with lower academic credentials than their classmates, it soon becomes apparent to them, particularly those participating in high-profile and high-revenue sports, that it will be difficult to balance challenging academics with what is essentially full-time athletic employment (Smith & Willingham, 2015). Because athletic scholarships provide a desirable pathway for many athletes to attend college, maintaining athletic eligibility becomes paramount and can lead to choosing a major based on non-academic reasons.

Based on the events at UNC and other athletic fraud cases outlined in Ridpath, et al. (2015), it has been shown that coaches and athletes who prioritize athletic success will go to great lengths to minimize the possibility of academic pursuits undermining athletic success. One way to reduce this possibility is to identify academic majors that are less likely to interfere with success in the athletic domain. Thus, grouping athletes into those majors may be a form of risk aversive behavior designed to protect athletes and coaches from the uncertainty stemming from the academic demands of particular rigorous majors. In other words, it is the preference for a predictable or safe outcome rather than gambling to achieve a higher alternative.

Coaches and athletes opting for "clustered" majors to protect athletic success represents a strategy common among financial investors and highlighted by an unwillingness to accept an uncertain payoff when given the choice of a safer alternative, even if uncertain yields potentially greater profits. As March (1996) explains, we tend to exhibit greater risk aversion as the stakes increase, and this behavior has shown to be a byproduct of accumulated learning. That is, in cases where the outcomes are positive, we tend to choose less risky alternatives in order to preserve that positive outcome. However, if the safe choice is producing little or no gains, we learn to be more risk seeking. There may be a shared understanding within athletics departments with championship aspirations that athlete eligibility and overall athletics success are potential gains not worth risking by having athletes choose academic majors less compatible with athletic

aims. This may be especially true if the athletes can still pursue a degree, albeit in a less desirable major, that does not impede athletic success. Therefore, clustering may provide a viable path toward that end.

To date, there has been no systematic exploration of whether this type of clustering is any more common among successful teams. Therefore, the specific aim of this study will compare the propensity for academic clustering within successful and less successful athletic teams not only at the Division I level, but in DII and DIII athletics as well. While research has focused primarily on DI programs, little is known about the academic choices made at the DII and DIII levels, where athletics departments at offer fewer (Division II) or no (Division III) grants-in-aid, have little or no television coverage, have a more localized travel schedule designed to maximize class attendance, and expect athletes to have a college experience similar to their non-athlete peers. This study attempts to determine the extent to which the rates of clustering are connected to athletic success at each level of competition.

Review of Literature

The first to study the phenomenon of academic clustering was Case, Brown & Greer (1987) who set the benchmark for a statistical non-random cluster at 25% or more of members of a team with the same major. They reviewed the media guides of 77 men's and 53 women's Division I intercollegiate basketball teams and found evidence that academic clustering occurred more often among the men's teams, more frequently within "big time" sports programs, and clustering was more pronounced among "elite" institutions perhaps due to academic isolation athletes may experience. Over two decades later, Lieber Steeg, Upton, Bohn and Berkowitz (2008) studied media guides from 142 schools and recorded the majors of over 9000 male and female Division I athletes in five prominent sports. Their results as reported in the USA Today revealed that in 83% of the athletics programs, there was at least one team that was disproportionally represented in one major. Overall clustering occurred in 34% of the 654 teams studied and more than half of those teams had higher extreme clustering, in which over 40% of the athletes enrolled in the same major.

There is ample evidence that football players have a high propensity for academic clustering, especially in the social sciences. For example, Otto (2012) analyzed the majors of 415 Division I football players in the PAC-10 (now PAC-12) listed in media guides during the 2009-2010 season. Academic clustering was identified in seven out of the ten football programs with extreme clustering occurring in one and in another clustering was observed in two different majors. Further, findings indicated that football players chose those majors significantly more frequently when compared to male non-athletes and the overall student population. Those findings were magnified when reported as area of study rather (e.g., social sciences) than specific major (e.g., sociology). Similarly, Schneider, Ross, and Fisher (2015) analyzed the majors of three different cohorts of football players from twelve programs over the span of 10 years and found that when compared to the general student body, football players were disproportionally choosing majors in the social sciences and communications. In a more recent investigation involving Division I football players, Houston and Baber (2017) studied the majors of 3046 athletes in 66 Division I football programs during the 2011-12 season as

reported in their respective media guides. Findings indicated high rates of clustering among the top football programs and it was more prevalent among non-white players.

Race was found to be a significant factor in academic clustering as Fountain and Finley (2009) found that Division I minority football players showed a higher propensity for clustering when compared to white athletes. Specifically, they analyzed academic majors based on media guides of football teams from the Atlantic Coast Conference and found clustering occurred at all 11 universities studied with clustering rates as high as 73%. Moreover, at six of the institutions they found that over 75% of the minority players were enrolled in only two majors. Two years later, Fountain and Finley (2011) followed up that study with a longitudinal study that followed 349 Division I football players in one BCS program over the span of a decade. Results showed that players migrated into a clustered major and those players who were drafted into the NFL chose that major at a higher rate than other players. Similarly, Sanders and Hildenbrand (2010) studied the majors of five cohorts of mostly male Division I college athletes from a large public university and found that clustering in the social sciences intensified as athletes, particularly African American athletes, entered their final two years of college. They also showed that clustering negatively impacted the earning potential for these athletes.

While most of the studies done included male athletes, Paule-Koba (2015) investigated the extent to which clustering was an issue within women's intercollegiate athletics. Specifically, she looked at the rate of clustering that occurred among Division I women's basketball programs in two consecutive cohorts. Findings revealed that clustering occurred in 30% of the programs in one year and in roughly 45% of the programs in the other year among the schools that reported academic majors of their athletes. Moreover, the percentage of athletes within the clustered majors did not mirror the percentage of non-athletes in those majors.

To address the question about the types of majors chosen by athletes, Foster and Huml (2017) asked 546 male and female athletes from Division I, II and III athletics programs to complete the Athletic Identity Measurement Scale (AIMS) and provided their academic major, and the rigor of those majors were assessed based on data gathered from the National Survey of Student Engagement. Results showed that that athletes with high athletic identity tended to cluster into less rigorous academic majors. That is, those who most identified as athletes were less likely to choose majors that aligned with career goals but instead, chose majors more conducive to their short-term athletic success.

In order to study the nature and scope of academic clustering Case, Dey, Barry and Rudolph (2017) administered an online survey to 97 academic advisors for athletes among Division I FBS and FCS athletics programs. Results of the survey revealed a majority of the advisors felt that academic clustering exists, especially among men's teams within Division I athletics programs, and that NCAA policies such as the APR may add to the high rates of clustering. Moreover, advisors reported feeling that it was part of their job to help athletes maintain eligibility and felt pressure, primarily from the coaching staffs, to do so. This supports the idea that clustering may be a widely used strategy among Division I programs to foster success in athletics.

Academic clustering has been viewed as only one of a plethora of concerns related to the relationship between athletics and academics at Division I institutions. While those concerns have been well articulated elsewhere, (Adler & Adler, 1991; Smith & Willingham, 2015; Sperber, 2000; Yost, 2009) a recent study by Miller (2021) sought

to determine the extent to which clustering existed outside of DI by analyzing the clustering rates and choices of major of over 3000 male and female athletes at 39 different institutions at all three levels of play. Findings revealed that clustering occurred more frequently among male teams, with baseball players clustering at a higher rate than other athletes in other sports. Additionally, academic clustering occurred significantly more among DI and (70%) compared to DIII teams (31%), and that DI athletes were more likely to major in the social sciences while DIII athletes were more apt to choose STEM majors. However, an unexpected finding was that DII athletes mirrored the behavior of DI athletes in terms of clustering and choosing social science majors over STEM. These findings suggest that more investigation of the academic choices of athletes outside of Division I is warranted.

While Miller (2021) was one of the first studies to investigate the rate of clustering in non-DI athletics programs, of additional value was the inclusion of sports other than football and men's basketball and finding that baseball had the highest rates of clustering when compared to football, soccer, softball, and basketball. Reasons why included the heavy travel demands throughout the baseball season and the sheer number of games (56) played during a three-month season which is the primary cause of missed class time. Taken together baseball players may be more impacted than athletes in other sports. Moreover, intercollegiate baseball players enter college knowing they become eligible for the MLB draft after the junior year, thus preparing for the draft during the first years of college may be the primary goal for many, especially those on highly ranked DI teams. This motive may preclude graduation with a degree in a preferred area of study. Though plausible, those motives for clustering were speculative because clustering research has focused on other sports like basketball and football and have lacked evidence of any specific motives for clustering. Nonetheless, the findings of the Miller (2021) study warrant further investigation into the rates of clustering in intercollegiate baseball, and thus provide the rationale for baseball teams being the focus of the current study.

Purpose of the Study

There is an abundance of evidence to suggest that academic clustering is common among Division I athletics programs, however questions remain as to the root causes and its proclivity outside of the highest levels of intercollegiate competition. Forming the basis for the present study, the following two research questions were developed:

Hypothesis 1: Based on the idea that both coaches and players on highly ranked teams would be more inclined to seek out academic majors more compatible with athletics as a form of risk aversion to protect the level of success, the first hypothesis is that academic clustering will occur at a significantly higher rate among teams ranked in the top 25 when compared to lower ranked teams.

Hypothesis 2: The second hypothesis is that clustering will occur more frequently within Division I programs, when compared to programs at the

other levels. This directly contrasts the Miller (2021) finding that DII athletes in a variety of sports including baseball clustered at the same rate as DI players, despite several initiatives designed to create more of a balance between athletics and academics for DII athletes. The expectation is that academic clustering among DII teams will be closer to that of the DIII schools.

Methods

Sample

The sample for this study consisted of 1410 baseball players from 60 different institutions. Because many colleges and universities often do not expect students to declare a major in the first year and students often change majors after the first year, only sophomores, juniors, and seniors with declared majors at the beginning of the 2019 baseball season were considered for this study. Further, athletes with undeclared or undecided majors were not included in calculation of clustering numbers.

Baseball teams ranked in the top 25 or the bottom 25 in the final three weeks of the 2018 regular season according to the NCAA website (ncaa.com/rankings/baseball) and had the academic majors published on their respective athletics department websites were deemed eligible for the study. Top 25 teams were chosen to clearly represent the top programs with championship aspirations, while the bottom 25 teams were chosen to represent programs that did not share those same aspirations.

On Division I teams there were an average of 20.7 players per team included the study, and on Divisions II and III there were 24.9 players per team. In the analysis, schools from seven to ten different athletic conferences were represented in each of the three divisions from schools in 25 different states. Aside from eight of the ten schools ranked in the top 25 in DI, a vast majority (83%) of institutions had enrollments under 10,000 undergraduate students, and most (76%) were private colleges or universities.

Finally, while race was found to be an important mediating factor with respect to academic clustering in some previous research (e.g. Sanders & Hildenbrand, 2010, Houston & Baber 2017) it was not possible to determine the race of individual athletes from information garnered from athletics department websites with any degree of accuracy, thus race was not a variable in this study.

Procedures

This research project was granted full approval from the Institutional Research Board based on the provision that no individual schools or players would be identified. The top 25 and the bottom 25 teams in each division were identified using NCAA rankings for the week of May 19, 2019. In all but two instances, 10-12 teams ranked in the top 25 or the bottom 25 of their respective divisions had internet data available. However, in DII and DIII there were only nine teams ranked in the bottom 25 providing internet data, so the search was expanded to the bottom 30 to include a tenth team in that category. In the two instances where there were more than ten teams eligible, ten of the twelve teams were chosen at random for the study.

Consistent with data collection in other academic clustering studies (Fountain & Finley, 2009; Paule-Koba 2015) the academic majors of the players were collected directly from athletics department websites from each institution. If the team website did not list the academic majors of the athletes, the team was omitted from the study. For analysis, the individual academic majors for all non-freshmen players were recorded on an Excel spreadsheet. A freshman was defined in terms of academic standing and not athletic standing, meaning that if a player was listed as a *redshirt* freshman, he was included in the study because presumably in terms of academics, he would have sophomore standing. Surprisingly, only three of the 1410 players were identified as having a double or split major (none of them were in clustered majors), and academic minors were not recorded. However, there were numerous non-freshmen, including over 20 seniors, who were listed as undecided or undeclared and those players were not included in the study.

Statistical Analysis

In all cases, the 25% benchmark, first established by Case, et al. (1987) was used to determine a statistical non-random cluster. That is, if one-quarter of the athletes (or more) on a team had the same declared major, a cluster was recorded. This standard has been used often in previous research (Fountain & Finley, 2009 & 2011; Otto, 2012, Sanders & Hildenbrand, 2010). By recording the clusters per team, this allowed for simple chi square tests for independence or association to be conducted to determine if clustering occurred more frequently among successful programs and among DI programs. Similarly, the percentage of players who chose clustered were recorded to allow for chi-square texts to determine if the percentage differed between top 25 and bottom 25 teams and to what extent the percentage varied among the DI, DII, and DIII levels.

Results

General Findings

Overall, clustering occurred in 37 of the 60 teams (61.7%) and 306 of the 1410 (21.7%) players chose “clustered majors” (see Table 1). The most sought out majors within the sample of clustered majors were Business (n=155) and Sport Management (n=93) and they were the most popular majors in each of the three levels of competition. Each one of the clustered majors identified in the current study were ones that do not involve lab courses and were seen as less rigorous majors according to the criteria outlined in the 2016 National Survey of Student Engagement (NSSE) as reported in Foster, et al. (2017). The data also revealed eleven instances (eight times in Division I, twice in Division II and once in Division III) in which the rate of clustering was more than 40% on a team, and in four of those instances in it topped 50% (all in Division I). There were no instances of multiple clustered majors on any one team.

Table 1
Academic Majors Selected and Frequency of Clustering

Division I Teams

Top 25	N	Major	#clustered	Bottom 25	N	Major	#clustered
Team 1	17	Pol Sci	6	Team 1	17	BusAd	7*
Team 2	14	Econ	5	Team 2	19	BusAd	10**
Team 3	23	BusAd	13**	Team 3	19	none	-
Team 4	30	Sport Man	10	Team 4	19	Kines	6
Team 5	14	BusAd	6*	Team 5	17	none	-
Team 6	24	BusAd	12**	Team 6	20	Sport Man	6
Team 7	24	BusAd	7	Team 7	19	BusAd	9*
Team 8	26	Sport Man	10	Team 8	21	BusAd	10*
Team 9	23	Comm	13**	Team 9	23	none	-
Team 10	21	none	-	Team 10	24	BusAd	9
	216		82 (38%)		198		57 (29%)

Division II Teams

Top 25	N	Major	#clustered	Bottom 25	N	Major	#clustered
Team 1	24	Sport Man	8	Team 1	23	none	-
Team 2	28	Comm	8	Team 2	21	none	-
Team 3	27	BusAd	7	Team 3	23	BusAd	8
Team 4	28	Sport Man	7	Team 4	28	Sport Man	8
Team 5	24	Sport Man	6	Team 5	19	none	-
Team 6	33	BusAd	9	Team 6	23	none	-
Team 7	28	BusAd	7	Team 7	21	Sport Man	8
Team 8	28	Crim Just	7	Team 8	26	BusAd	11*
Team 9	20	none	-	Team 9	24	none	-
Team 10	27	Sport Man	11*	Team 10	23	none	-
	267		70 (26%)		231		35 (15%)

Division III Teams

Top 25	N	Major	#clustered	Bottom 25	N	Major	#clustered
Team 1	26	Crim Just	7	Team 1	22	none	-
Team 2	24	BusAd	7	Team 2	23	none	-
Team 3	17	none	-	Team 3	21	none	-
Team 4	27	BusAd	7	Team 4	22	none	-
Team 5	24	BusAd	7	Team 5	32	Sport Man	8
Team 6	23	none	-	Team 6	27	none	-
Team 7	25	BusAd	9	Team 7	26	none	-
Team 8	39	none	-	Team 8	20	none	-
Team 9	23	Econ	6	Team 9	27	none	-
Team 10	25	Sport Man	11*	Team 10	25	none	-
	253		54 (21%)		245		8 (3%)

* indicates cluster of more than 40%
** indicates cluster of more than 50%

Question 1: Do top 25 ranked teams have a higher propensity for academic clustering when compared to lower ranked teams?

To address the hypothesis that top teams would cluster more than lower ranked teams, statistical non-random clusters were recorded from the data collected from ten teams ranked in the top 25 of each of their respective divisions and compared to ten ranked among the bottom 25 in each division (See Table 2). A Chi-square test of association (2x2) confirmed that 30 teams ranked in the top 25 showed a significantly higher propensity for academic clustering compared with the 30 lower ranked teams (χ^2

(1, N=60) = 11.92, p < .001). Specifically, one non-random cluster was recorded for 25 of the 30 (or 83.3%) programs ranked in the top 25 of their respective divisions. The rate dropped to 12 out of 30 (40%) for teams ranked in the lowest 50.

Table 2
Percentage of Clustering (Teams) by Rankings

	Top Ranked	Bottom Ranked
Division I	9 (90%)	7 (70%)
Division II	9 (90%)	4 (40%)
Division III	7 (70%)	1 (10%)
Total	25 (83.3%)	12 (40%)

A slightly different way of addressing the question is by comparing the number of athletes on top-ranked teams and lower-ranked teams who chose a "clustered major". Table 3 shows the number of athletes on the top-ranked teams who chose clustered majors compared to players on 10 lower-ranked teams in each division. Results of the Chi-Squared test of association (2x2) indicate a significant association between team ranking and rates of clustering (χ^2 (1, N=1410) = 42.61, p < .001). In total, players on top-ranked teams were almost twice as likely than those on lower-ranked teams to share a major with one-quarter or more of their teammates (29.2% to 14.8%). At each level of competition, players on top-25 ranked teams chose a clustered major more often than players on lower-ranked teams. For example, while 82 of the 216 (or 37.9%) of the players on top ranked teams shared a major with at least one-quarter of their teammates, this was true only 28.8% of the time on lower ranked teams. There was a similar pattern in DII where 29.5% of the players on top ranked teams opted for a clustered major compared to only 15.1% on lower ranked teams. The difference was most evident in DIII, where only 3.3% of the players on lower ranked teams clustered compared to 21.3% on higher-ranked teams.

Table 3
Percentage of Athletes Choosing Clustered Majors by Rankings

	Top-Ranked		Bottom-Ranked	
	Total	Clustered	Total	Clustered
Division I	216	82 (37.9%)	198	57 (28.8%)
Division II	267	70 (26.2%)	231	35 (15.1%)
Division III	253	54 (21.3%)	245	8 (3.3%)
Total	736	206 (28.0%)	674	100 (14.8%)

Question 2: Is the rate of academic clustering different among baseball programs with respect to level of play?

The second hypothesis was that clustering would occur significantly more in DI than at the other levels. Table 4 shows the rate of clustering for teams in each of the three divisions. Among the sixty teams in the sample, the rate of clustering was highest (80%)

among teams in DI, while in DII, the rate of clustering dropped to 13 of the 20 teams (65%). The rate of clustering was least among DIII teams with only eight instances (40%). A Chi-square test of association (3x2) shows that the differences in the proclivity of clustering among the three divisions was significant (χ^2 (2, N=60) = 18.62, p < .032). A follow up analysis showed that the only significant difference was the rate of clustering between DI teams (80%) and DIII (40%) teams (p<.01).

Table 4
Percentage of Teams with Clusters by Division

	# of Teams	Teams with Clusters	Teams without Clusters
Division I	20	16 (80%)	4 (20%)
Division II	20	13 (65%)	7 (35%)
Division III	20	8 (40%)	12 (60%)
Total	60	37 (61.7%)	23 (28.3%)

Similarly, Table 5 shows the number of baseball players choosing clustered majors in each division. A Chi-square analysis of association (3x2) shows that the differences in the rate of clustering between the three divisions was significant (χ^2 (2, N=60) = 18.62, p < .032) with 139 of the 414 players (or 33.5%) on Division I teams choosing the same major as at least 25% of their teammates while players in Division II did so 22.4% of the time (105 of the 468) and the number dropped to 62 out of 498 (12.4%) with players on Division III teams. Subsequent chi-square analyses showed Division I athletes chose clustered majors at a significantly higher rate than the other divisions (p < .0001) while Division III athletes chose clustered majors at a significantly lower rate (p < .0001).

Table 5
Percentage of Athletes Clustering by Division

	# of athletes Total	# Athletes Clustered	% Athletes Clustered
Division I	414	139	33.6%
Division II	468	105	22.4%
Division III	498	62	12.4%
Total	1410	306	22.2%

Discussion

The present investigation examined the rate of academic clustering among top 25 and bottom 25 ranked baseball teams across three different divisions of college athletics. The first research hypothesis, that clustering would occur more frequently among top ranked programs, was supported by the data. The findings indicated that the rate of clustering was significantly higher among top ranked programs (83.3%) compared to lower ranked teams (40%). In fact, non-random clusters were found in nine of the ten top-ranked teams in DI, nine of the ten top-ranked teams in DII, and seven of the ten top-ranked teams in DIII baseball. By comparison, this phenomenon was less commonly observed with lower-ranked teams, especially in DIII where it only occurred once.

Moreover, players on teams ranked in the top 25 of their respective division showed a higher proclivity for choosing a clustered major (29.2%) while those players on teams ranked in the bottom 25 were less likely to cluster (14.8%).

Taken together, these findings indicate a strong penchant for clustering among highly ranked teams that can be elucidated by a basic understanding of risk aversive behavior. As March (1996) posited, it is less common to stray from a safe option when it continues to produce positive gains. Therefore, it stands to reason that coaches (and athletes) involved in winning programs have learned over time how to avoid risks in any number of ways including academic clustering by adopting a "don't mess with success" mentality. That mentality is consistent with academic advisors and coaches encouraging athletes to opt into an academic major already proven to be compatible with athletics allows the program to thrive and pays dividends for the athlete in terms of reducing risk of ineligibility that could accompany a less common major as evidenced in Case et al. (2017) and Smith and Willingham (2015). Similarly, younger players may seek to copy the behaviors as older teammates if those behaviors are shown to produce positive results. Thus, choosing the same major as an older teammate who is successfully balancing the rigors of academics with the demands of intercollegiate athletics is a "safe" choice that produces gains in terms of maximizing athletic potential.

The second hypothesis that clustering would occur more frequently within DI programs, when compared to DII and DIII programs, was largely based on the body of literature already existing in this area and reasoning outlined throughout the literature (for a full review see Adler & Adler, 1991; Gurney, et al, 2017; Smith & Willingham, 2015; Sperber, 2000; Yost, 2009). However, the expectation that clustering is only an issue among DI programs was called into question by a recent finding by Miller (2021) that showed clustering to be equally present in DI and DII athletics programs. The findings of the present investigation are somewhat equivocal. As expected, the highest rate of clustering occurred in DI programs (16 out of 20 or 80%) and that was significantly more than what was observed in DIII programs. Consistent with the findings of Miller (2021) and contrary to the second hypothesis, there was no significant difference in the number of non-random clusters observed between DI and DII programs in the present study. However, in the Miller (2021) study, the rate of clustering among DII programs were found to be *identical* to DI programs. That was not the case in the present study as DII baseball teams clustered at a rate lower than DI programs but higher than DIII programs, suggesting that as the level of competition increases so does the rate of clustering. Similarly, the data related to individual athlete choice of majors revealed a similar pattern in that 33.6% of DI players selected a clustered major while this occurred 22.4% of the time at DII and only 12.4% at DIII. Taken together, the findings suggest the DI culture (and the DII culture to a lesser extent) may be more conducive to the types of academic choices that provide clear paths toward success in athletics.

Yet the results remain somewhat equivocal because there was no significant difference between the rate of clustering among DI and DII *teams*, the rate at which DI and DII *players* selected clustered majors yielded a chi-squared statistic that was significant. However, the significance may be more attributed to the large number of participants involved that may have skewed the chi-square results than actual between group differences. Given the nature of these findings, it is clear that clustering is

prevalent among DI programs, but more exploration into the culture of DII athletics is warranted.

The high rate of clustering found among Division I teams is in the current study can be explained in part by NCAA policies. For example, Lieber Steeg, et. al. (2008) point to benchmarks regarding progress toward graduation as contributing factors to clustering behavior in DI athletics. Both the APR and "40-60-80 rule" were put into place almost two decades ago to bolster academic progress toward a degree and penalties for noncompliance are quite serious. They argue because of these policies, athletes may be steered toward similar academic majors for the purposes of maintaining eligibility. These polices were deemed necessary and serve as guiding forces in DI athletics but do not explain clustering rates at the other levels of competition.

To further highlight the difficulties of balancing athletics and academics in Division I athletics, results from the 2015 NCAA GOALS survey on the college athlete experience revealed that when compared to DII and DIII athletes, DI athletes reported a) they had more difficulty keeping up in their courses while in-season and b) sport more often kept them from taking desired courses and/or enrolling in their desired academic major. Taken together these survey results indicate that a DI athlete, in this case a DI baseball player, is enrolled as a full-time student while committing a reported 40 hours per week (or more) to athletics during the season but is fully cognizant that his academic aspirations are not being fully recognized. To this point, compared to their DII and DIII counterparts, more DI athletes said they would prefer to spend *more* time on academics and *less* time on athletics, if given the choice.

Further evidence that Division I athletics programs have created a culture more conducive to clustering stems from Case, et al. (2017). Results of this survey study revealed that 75% of the academic advisors for athletics felt that they were pressured to keep athletes eligible for athletics, and that the pressure came to do so from coaches. These findings point to a culture of subordinating academics in favor of athletic success, and points to DI institutions straying from their academic priorities. These issues do not seem to arise in DIII programs, but the results of the present investigation are equivocal when it comes to DII programs.

Finally, it should be noted that researchers studying this topic have traditionally assumed academic clustering is at least somewhat problematic, and that assumption is one that warrants extreme caution. While concerns about clustering have been outlined extensively elsewhere (Elfman, 2009, Lederman, 2008; Suggs, 2003, Wolverton, 2007), there may be valid reasons why athletes disproportionally enroll in specific academic majors. Athletes' preference for some majors (in this case, Business, and Sport Management) may be based purely on interest and career goals and not a means of gaming the system. Athletes, like all students, should be able to choose an academic major based on interest and aptitude without severe scrutiny unless inexplicable patterns develop. Until there are specific investigations resulting in a better understanding of how athletes go about choosing their majors, the explanations for clustering are largely speculative and should be acknowledged as such.

Limitations

The results of this study clearly showed differences in the rate of academic clustering among highly ranked programs and across the three levels of competition, however the sample was relatively small with only 10 teams in each category. This was due to not having access to the relevant information on every school's website. Ten top-ranked and lower-ranked teams in each division may be representative of the top 25 in the given year, but the small sample may not be a true overall representation of "successful" or "less successful" programs in the sport. Thus, external validity is threatened. An alternative for future investigations is to include all NCAA teams in the study and establishing tiers related to success. This approach would yield much more data and increase the study's external validity.

While the number of teams used in the comparison is a limitation, the accuracy of the information regarding academic major is more of a concern. Without actual student records to verify the academic majors of all 1410 college athletes, there is no way to verify the accuracy of the data. In this type of data gathering, which data is taken directly from the individual institutions' athletics department websites or annual athletic department media guides, there was no way to verify when the information was last updated to show changes in academic major because there is no way to know how often the website data is updated. For example, there were several instances in which seniors had undeclared majors. This is a flaw in the research design shared by all academic clustering studies conducted to date.

Directions for Future Research

Since the first academic study of academic clustering in 1987, there have been over a dozen published studies on the topic. However, to date there has been no definitive explanation as to why clustering occurs, the role of the coach and the academic support personnel in the process, and to give the athletes a true voice in the research process, future studies could integrate qualitative methodology to assess the reasons why athletes chose their majors to better understand the influences on these types of decisions and perhaps find solutions to unnecessary academic clustering. Case, et al. (2017) began to address these questions by surveying experienced academic advisors for athletes to better understand why clustering occurs, yet no study has yet to examine the athlete's or coaches' first-hand perspective.

Like similar studies on this topic, the current investigation fails to explore the extent to which athletes differed from their non-athlete peers regarding their choice of major was not clear. Similar to the methods employed by Otto (2017), it would be wise to incorporate a non-athlete sample as a comparison group to determine variance between the types of majors chosen by college athletes and the rest of the student body. Finally, it is important to note that the there was no attempt to assess the level of rigor in each major in the present investigation, something that was attempted in a study conducted by Foster and Huml (2017).

Conclusion

Division I athletics programs have often been lauded for their athletic achievements but have also been disparaged for not living up to the promises made to college athletes regarding helping to fulfill their educational aspirations (Ridpath, et al, 2015; Smith & Willingham, 2015; Sperber, 2000; Suggs, 2003; Yost, 2010). Specifically, critics have highlighted athletics

departments who have exploited their own athletes as a means toward winning and financial gain by creating a culture that allows athletic goals to supersede academic pursuits. One byproduct of this exploitation is academic clustering. The findings from the present investigation provide further evidence that academic clustering common in sports other than DI football and basketball. These results coupled with the results of Miller (2021) suggest that the clustering rates in intercollegiate baseball are on par with, or perhaps surpass other sports and deserve further scrutiny and warrant immediate attention from academic counselors, athletic departments, conference leaders, and the NCAA. The results call into question the impact of a 56-game season on academic success for all baseball players.

Moreover, the results indicate clustering is more common among successful programs, *regardless of the level of competition*. Clustering is significantly more common among the most successful programs, suggesting that either successful programs are averse to having athletes explore outside of the safety of the clustered majors, or players in more successful programs are more inclined to choose majors that do not interfere with athletic success, or both. These findings provide further evidence that the NCAA metrics for defining academic success (GSR and APR in Division I) too often mask the challenges facing college athletes at the DI level, who aim to balance the demands of intercollegiate athletics with a rigorous academic major, but they also suggest that calls for academic reform should not only solely focus on DI basketball and football programs. Instead, they should consider the unique demands of each sport and should be extended to DII athletics as well.

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