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Who Is Playing? A Trend Analysis of Racial and Ethnic Diversity among NCAA Student-Athletes

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Abstract

As U.S. demographics shift, racial/ethnic representation in collegiate athletics has gained importance, yet most studies lack longitudinal analysis of diversity trends. This study examines changes in NCAA student-athlete racial/ethnic composition (2012–2024) and forecasts future trends to inform equity strategies. Using NCAA data, descriptive statistics tracked racial/ethnic proportions, while Shannon Entropy and the Herfindahl-Hirschman Index (HHI) measured diversity. A regression model projected trends to 2029. White student-athletes declined steadily, while "Other" groups (Asian, Hispanic/Latino, multiracial, international) increased significantly; Black representation remained stable. Diversity improved overall, with males showing higher diversity than females. Projections indicate "Other" groups will drive future diversification. NCAA racial/ethnic diversity is rising, but disparities persist by gender and sport. Institutions should tailor recruitment and support for international and minority student-athletes, addressing cultural adaptation and mental health. Future research should integrate policy and sociocultural factors to advance equity in sports.

Keywords: Demographic Change, Diversity Indices, Gender Differences, Racial/Ethnic Representation

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1. Introduction

As the primary governing body overseeing more than 500,000 collegiate athletes in the United States, the National Collegiate Athletic Association (NCAA) plays a vital role in reflecting and shaping the social structure of higher education institutions through its member demographics. The racial and ethnic diversity of student-athletes is not only a mirror of broader demographic trends but also a focal point for discussions on equity and inclusion in collegiate sports (Cooper et al., 2017; Jones et al., 2017). With the rapid demographic transitions and the rise of social justice movements in the U.S., there is an urgent need for systematic monitoring and scholarly analysis of racial/ethnic representation among student-athletes (Kroshus et al., 2023).

While some studies have outlined the demographic profiles of NCAA athletes (Brown et al., 2021; Hwang & Choi, 2016), a critical gap remains in examining the dynamic evolution of racial/ethnic diversity and the underlying structural factors. For instance, in the 2010–2011 academic year, White student-athletes constituted 71% of the NCAA population, while Black athletes accounted for 15% (Jones et al., 2017). By 2021, the representation of Black athletes increased slightly to 16%, while Hispanic/Latino athletes made up 6%, and multiracial athletes 5% (Kroshus et al., 2023). Beneath this gradual diversification, deeper structural issues persist, such as the disproportionate concentration of Black male athletes in Division I high-profile sports—58.9% in men's basketball and 45.8% in football (Cooper et al., 2017). This imbalance contrasts starkly with other sports and academic domains and may reinforce racial stereotypes and influence academic and professional pathways for these athletes (NCAA, 2010b).

Current literature presents limitations in both timeliness and methodological approaches. Official NCAA race/ethnicity reports are outdated, with the latest comprehensive data published for the 2009–2010 academic year (NCAA, 2010a, 2010b). Furthermore, nationally representative data sets such as the GOALS survey are difficult to access (Beron & Piquero, 2016), limiting the ability to assess the impact of recent social movements (e.g., Black Lives Matter) and policy changes. Most existing studies rely on static percentage distributions (Hwang & Choi, 2016) and lack comprehensive use of diversity indices or longitudinal analysis, making it difficult to evaluate differences across divisions, sports, and genders (Cooper et al., 2017; Tran, 2021).

This study seeks to contribute to the field both theoretically and practically through a multidimensional analytical framework:

First, from a theoretical standpoint, the study goes beyond traditional descriptive statistics by introducing Shannon Entropy from ecology (Shannon, 1948) and the Herfindahl-Hirschman

Index (HHI) from economics (Hirschman, 1964) to quantify the intensity and evenness of racial/ethnic diversity in NCAA athletics. These indices not only capture the static characteristics of group composition but also enable time series analysis (e.g., ARIMA modeling) to detect long-term trends and potential turning points influenced by institutional and social factors.

Second, in terms of practical implications, this study directly responds to three major challenges faced by the NCAA: (1) assessing the effectiveness of diversity, equity, and inclusion (DEI) initiatives; (2) balancing athletic performance with racial representation in high-profile sports; and (3) addressing the growing proportion of international student-athletes and the cultural integration issues they face (Foo & Wells, 2011). By establishing standardized diversity benchmarks, the findings aim to support policy formulation at different NCAA divisions.

Lastly, from a social perspective, this research emphasizes the link between racial/ethnic diversity and student-athlete development outcomes. Existing evidence shows that racial background significantly affects access to mental health services (Kroshus et al., 2023), academic achievement (Jones et al., 2017), and career aspirations (NCAA, 2016). Understanding disparities in participation opportunities and resource access among racial/ethnic groups can provide an empirical foundation for promoting racial equity on campus.

In summary, by employing an innovative methodological framework and leveraging recent data, this study expands our understanding of diversity dynamics in college sports and offers evidence-based guidance for building a more inclusive athletic environment. The following sections detail the research design and analytical methods, including data sources, operationalization procedures, and statistical modeling, to ensure the validity and generalizability of the findings.

2. Literature Review

Systematic Surveys of NCAA Racial/Ethnic Data

The NCAA has historically conducted systematic demographic monitoring of student-athletes. Key reports such as the Ethnicity and Gender Demographics of NCAA Member Institutions' Athletics Department Personnel and the Gender Equity Reports (NCAA, 2009, 2016) provide foundational demographic data. The NCAA Student-Athlete Race and Ethnicity Report, which adopts federal racial/ethnic classification standards (e.g., American Indian/Alaskan Native, Asian/Pacific Islander, non-Hispanic Black), presents data by gender, sport, and division from the 1999–2000 to 2009–2010 academic years (NCAA, 2010a, 2010b). Since the 2006–2007 academic year, these reports have separated ethnicity from residency status,

enhancing the precision of racial categorization (NCAA, 2010a). In addition, scholars have accessed the NCAA Sport Sponsorship, Participation, and Demographics Database to conduct cross-disciplinary analyses (Hextrum et al., 2024; Jones et al., 2017; Tran, 2021).

Despite this, major surveys still have limitations. The GOALS survey, launched in 2006, remains the largest NCAA student-athlete research initiative. Its 2010 wave sampled nearly 20,000 athletes from 600 institutions, with racial representation aligned with the general population (72% White, 15% Black, 12% Other; Jones et al., 2017). However, its early data grouped Asians, Blacks, and Latinos under "Other" (Cooper et al., 2017), and post-2006 data access requires formal applications (Beron & Piquero, 2016), limiting its timeliness. Reports focused on specific subgroups, such as racial minority women in sports careers (NCAA, 2016), are informative for policy but inconsistent in formatting, limiting longitudinal comparability.

Racial/Ethnic Distribution Among NCAA Student-Athletes Overall Trends:

Between 1999 and 2010, White athletes remained the majority (70–71% of males; 77–78% of females). The proportion of Black male athletes increased from 16.3% to 18.7%, and Black female athletes from 9.4% to 11.6%. The share of international student-athletes also rose (NCAA, 2010a, 2010b). In 2021, the proportions were 16% Black, 6% Latino, and 5% multiracial (Kroshus et al., 2023), suggesting gradual diversification.

Sport and Division Differences:

Black male athletes are overrepresented in Division I high-profile sports such as basketball (58.9%) and football (45.8%) (Cooper et al., 2017; NCAA, 2010b). Conversely, Division III reports significantly lower Black athlete representation (8.8%) compared to Divisions I (24.6%) and II (22.8%) (Cooper et al., 2017). International athletes are concentrated in Division I (Foo & Wells, 2011), reflecting structural disparities in resource distribution and recruitment strategies.

Analytical Gaps in Existing Research

There are three main limitations in the current literature:

Timeliness Issues:

Critical datasets (e.g., GOALS) do not provide full access to post-2006 data (Beron & Piquero, 2016), and the NCAA's official reporting ceased comprehensive updates after 2010 (NCAA, 2010a, 2010b).

Methodological Narrowness:

Most analyses rely on descriptive statistics (NCAA, 2010a) without interaction testing across division, gender, and sport (Beron & Piquero, 2016). Moreover, few studies apply diversity

indices such as Shannon Entropy or HHI to quantify evenness and richness of racial/ethnic composition.

Absence of Predictive Modeling:

Although studies have identified racial overrepresentation in certain sports (Cooper et al., 2017), they seldom apply time-series models to explore trends or forecasts, limiting policy applicability.

In response, this study proposes a three-pronged analytical strategy:

Trend Analysis:

Extending the NCAA's existing frameworks (NCAA, 2010a, 2010b) with updated data to construct a 20-year longitudinal comparison.

Diversity Indices:

Integrating Shannon Entropy and HHI to convert racial/ethnic distribution into quantifiable evenness scores, overcoming static percentage limitations (Nixon et al., 2021).

Predictive Modeling:

Using regression to identify cyclical patterns and project trend strength, providing strategic foresight for admissions and resource allocation (Cooper et al., 2017; Tran, 2021).

By combining trend analysis, diversity indices, and forecasting, this approach not only addresses gaps in timeliness and methodology but also generates policy-relevant indicators that support the NCAA's DEI efforts.

3. Methodology

Data Source

This study is based on secondary data analysis using publicly available statistics from the NCAA Demographics Database (NCAA, 2025). The database provides demographic breakdowns of student-athletes by race/ethnicity, gender, and NCAA division. The analysis focuses on data from 2012 to 2024 across all three NCAA divisions (I, II, and III). The primary variables include year, division, gender (male, female), and race/ethnicity categorized into three groups: White, Black, and Other.

Variable Definition

The data were structured to reflect proportional representation by race/ethnicity and gender within each year and division. "Other" includes Asian, Hispanic/Latino, multiracial individuals, and nonresident international student-athletes, in accordance with the classification system used in NCAA demographic reporting.

Data Processing

All data management and statistical analyses were conducted using Python. Descriptive statistics and trend analyses were first applied to exam

ine annual changes in the racial/ethnic composition of student-athletes. The analysis focused on six subgroup combinations: Male White, Female White, Male Black, Female Black, Male Other, and Female Other. This classification enabled intersectional insights into how gender and race/ethnicity jointly shape representational trends.

To assess diversity more precisely, two widely used indices were employed:

Shannon Entropy (H):

Let p_i represent the proportion of student-athletes in the i^{th} racial/ethnic group. Then, Shannon Entropy is defined as:

Shannon Entropy: $H = -\Sigma (p_i * \log_2 p_i)$

Note: Higher entropy values indicate greater diversity and evenness in distribution (Shannon, 1948).

Herfindahl-Hirschman Index (HHI):

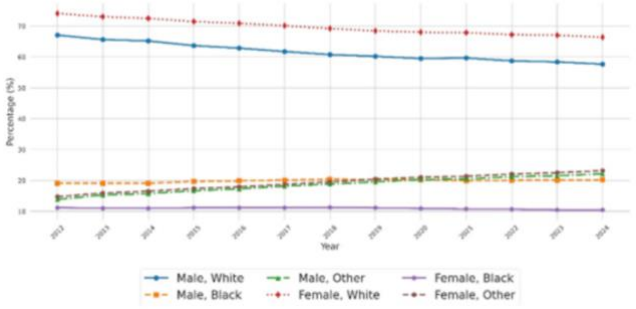
HHI measures the concentration of representation. It is calculated as the sum of squared proportions of each group:

$HHI = \Sigma (p_i^2)$

Note: A lower HHI value denotes greater diversity by measuring the concentration of racial/ethnic representation (Hirschman, 1964).

Figure 1.

Racial/Ethnic composition trends of ncaa student-athletes (2012–2024)



Using both indices in tandem provides a more comprehensive understanding of diversity trends, balancing sensitivity to group richness and evenness. Furthermore, linear regression models were built to forecast changes from 2025 through 2029 based on the subgroup proportions. These forecasts offer prospective insights into the direction and pace of racial/ethnic diversification within NCAA athletics, informing recruitment, DEI policy design, and resource allocation strategies.

4. Results

Racial/Ethnic Composition Trends (2012–2024)

This study analyzed racial/ethnic composition trends among NCAA student-athletes from 2012 to 2024 (see Figure 1). The results revealed significant shifts in the demographic composition of NCAA student-athletes (Table 1). Line graph displaying the proportion of White, Black, and Other NCAA student-athletes by gender from 2012 to 2024. The graph highlights a decreasing trend in White representation and increasing

diversity over time.

First, the proportion of White female athletes was consistently higher than that of their male counterparts, whereas male athletes exhibited greater racial/ethnic diversity than female athletes. This gender disparity aligns with earlier NCAA data reports. For instance, data from the 2008–09 and 2009–10 academic years also indicated a higher percentage of White female athletes (~77%) compared to males (~70–71%), while Black male athletes constituted a significantly larger proportion (~18%) than Black female athletes (~11%; NCAA, 2010b). These findings reflect persistent gender and racial/ethnic composition differences within the NCAA student-athlete population.

Table 1.

Annual racial/ethnic representation of NCAA student-athletes by gender (2012–2024)

year	Male White	Female White	Male Black	Female Black	Male Other	Female Other
2012	66.18	73.50	19.28	11.29	14.54	15.20
2013	65.42	72.87	19.38	11.24	15.20	15.89
2014	64.66	72.24	19.47	11.18	15.87	16.58
2015	63.89	71.60	19.57	11.13	16.54	17.27
2016	63.13	70.97	19.66	11.07	17.21	17.96
2017	62.37	70.33	19.75	11.02	17.88	18.65
2018	61.61	69.70	19.85	10.96	18.54	19.34
2019	60.84	69.06	19.94	10.91	19.21	20.03
2020	60.08	68.43	20.04	10.85	19.88	20.72
2021	59.32	67.80	20.13	10.80	20.55	21.41
2022	58.56	67.16	20.23	10.74	21.21	22.09
2023	57.80	66.53	20.32	10.69	21.88	22.78
2024	57.03	65.89	20.42	10.63	22.55	23.47

Note: Percentage distribution of NCAA student-athletes by gender (male, female) and race/ethnicity (White, Black, Other) from 2012 to 2024.

Second, although White athletes remained the largest racial group, their representation demonstrated a declining trend. The proportion of White

male athletes decreased from approximately 66.18% in 2012 to 57.03% in 2024, while White female athletes declined from 73.50% to 65.89% during the same period (Table 1). This observation is consistent with the long-term trend documented by the NCAA between 1999 and 2010, which reported an overall decrease in the proportion of White student-athletes (NCAA, 2010a, 2010b), confirming a continued reduction in their relative representation within the NCAA system.

Third, the proportion of Black athletes remained relatively stable during the study period (2012–2024), with males comprising approximately 19–21% and females 10–12%. While historical NCAA data from 1999–2010 indicated an increase in Black athlete representation (NCAA, 2010a, 2010b), the present study, focusing on the most recent decade, demonstrates that this group's proportion has stabilized within a consistent range. Black student-athletes continue to represent a higher proportion in specific sports such as men's basketball and football, which is consistent with the composition of certain study samples (NCAA, 2010a).

Finally, the most notable trend was the significant increase in the proportion of athletes

categorized as "Other" (non-White and non-Black). The analysis clearly indicated that the "Other" racial group exhibited the most substantial growth across all demographics. The proportion of male "Other" athletes rose markedly from 14.540% in 2012 to 22.55% in 2024 (an 8.01% increase), while female "Other" athletes increased from 15.20% to 23.47% (an 8.27% increase). In NCAA reports, the "Other" category typically includes Asian, Native Hawaiian/Pacific Islander, Hispanic/Latino, nonresident aliens, and multiracial identities (NCAA, 2010b). The pronounced growth of this category, based on data coverage and related literature, likely reflects broader demographic shifts in the U.S. population, an increase in multiracial identification among students, and changes in the proportion of international student-athletes within the NCAA (NCAA, 2010a, 2010b). While some sources discuss sociocultural factors affecting specific racial/ethnic groups (Hextrum et al., 2024; Lee et al., 2021), providing broader contextual insights, the primary empirical support for the expansion of the NCAA's "Other" category stems from the organization's own demographic reporting classifications and the inclusion of nonresident alien data (NCAA, 2009, 2010b). To enhance clarity regarding the composition of the "Other" cate-

gory, we provide a detailed subgroup breakdown in Table 2. Based on the NCAA's demographic classification, this group includes Asian, Hispanic/Latino, multiracial (two or more races), Native Hawaiian or Other Pacific Islander, American Indian or Alaska Native, and nonresident alien (international) student-athletes. While longitudinal trend data for each subgroup were not available, this disaggregated snapshot offers a clearer view of the internal composition of the "Other" cate

gory. Such distinctions help contextualize how specific racial and ethnic identities contribute to the broader diversity patterns observed in NCAA athletics.

Table 2.

Subgroup Composition within the "Other" Racial/Ethnic Category

Subgroup	Description	Example Classification
Asian	Individuals with origins in East Asia, Southeast Asia, or the Indian subcontinent	Chinese, Indian, Filipino
Hispanic or Latino	Individuals of Cuban, Mexican, Puerto Rican, South or Central American origin	Mexican-American, Cuban
Multiracial	Individuals identifying with two or more racial groups	Black and Asian, White and Latino
Native Hawaiian or Other Pacific Islander	Individuals with origins in Hawaii, Guam, Samoa, or Pacific Islands	Native Hawaiian, Samoan
American Indian or Alaska Native	Individuals with origins in North/South American indigenous groups	Navajo, Cherokee
Nonresident Alien (International)	Students who are not U.S. citizens or permanent residents	International student-athletes

In summary, the racial/ethnic composition of NCAA student-athletes has become increasingly diverse. The decline in White athlete representation and the rise in "Other" racial groups are the key drivers of this transformation. These evolving demographic patterns underscore the importance of continued attention to diversity

issues among NCAA student-athletes.

Diversity Analysis: Shannon Entropy and HHI

To further examine the dynamic changes in racial/ethnic representation among NCAA student-athletes, this study employed Shannon Entropy and the Herfindahl-Hirschman Index (HHI) to assess diversity and concentration trends (see Figure 2). The results revealed that male athletes exhib-

ited higher racial/ethnic diversity (entropy values ≈ 1.3–1.4) compared to female athletes (entropy values ≈ 1.0–1.1). This gender disparity aligns with historical NCAA data, which reported a higher proportion of Black male athletes than females (NCAA, 2010a). A steady increase in entropy and a decrease in HHI indicates rising diversity.

Notably, racial/ethnic diversity increased consistently for both genders. Female athletes' Shannon Entropy rose from 1.08 in 2012 to 1.22 in 2024, while male athletes' entropy increased from 1.24 to 1.41 during the same period (see Table 3). To assess the statistical significance of this trend, a linear regression analysis was conducted (see Table 4), with year as the predictor variable and Shannon Entropy as the dependent variable. The regression results indicated an average annual increase of 0.0124 bits in entropy ($p < .05$), confirm- ing a statistically significant

Table 3.

Comparison of Diversity for NCAA Student-Athletes by Gender in 2012 and 2024

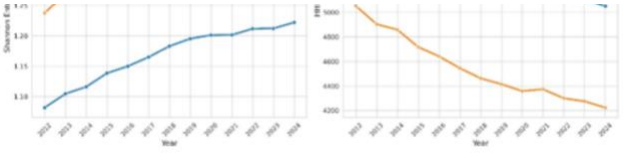
Year	2012	2012	2024	2024
Gender	Female	Male	Female	Male
Shannon Entropy	1.08	1.24	1.22	1.41
HHI	5827.74	5053.71	5051.16	4222.99

Table 4.

Predicting Diversity Trends with Year as the Independent Variable

	intercept	b	*β*	SE	P value	R squared
Shannon Entropy	-23.81	0.01*	.47	0.01	0.02	.221
HHI	136200	-65.02*	- .51	0.18	0.01	.259

Note: * $p < .05$.



upward trend in racial/ethnic diversity among NCAA athletes. However, the model's explanatory power (R^2 = 22.1%) suggests that additional factors—such as policy changes, sociocultural shifts, or sport-specific recruitment strategies—may also influence diversity trends. This implies that while temporal progression is a significant factor, approximately 77.9% of the variability remains unexplained, warranting further investigation into other potential drivers (e.g., NCAA policy reforms, broader demographic changes, international recruitment patterns).

Additionally, HHI analysis corroborated the Shannon Entropy findings. Since lower HHI values indicate reduced concentration (i.e., increased diversity), the observed declines in HHI—from 5,827.74 in 2012 to 5,051.16 in 2024 for females, and from 5,053.71 to 4,222.99 for males—reinforce the trend toward greater racial/ethnic diversity. A linear regression on HHI values revealed an average annual decrease of

65.017 (p = .008), further supporting the conclusion that racial concentration among NCAA athletes has diminished over time. The model's explanatory power (R^2 = 25.9%) was comparable to the entropy analysis, again highlighting the potential influence of unmeasured variables.

Although the regression models for Shannon Entropy and HHI revealed statistically significant trends, the relatively low R^2 values (22.1% and 25.9%, respectively) indicate that a substantial portion of variance remains unexplained. Potential omitted variables may include institutional-level policy reforms, targeted recruitment initiatives, changes in scholarship distribution, and broader demographic shifts such as international student enrollment surges. Future studies should consider multi-level modeling approaches or mixed-method designs to capture the complex interplay between policy, culture, and demographic transformation within NCAA athletics.

The increasing diversity in NCAA student-athlete demographics likely reflects broader U.S. population trends, as well as the NCAA's institutional efforts to promote inclusivity and diversity (NCAA, 2010a, 2010b). The growing presence of international student-athletes may also contribute to these shifts. Although the entropy and HHI models demonstrated limited explanatory power, they underscore the need for deeper exploration of policy interventions, recruitment strategies, and socioeconomic factors that may drive racial/ethnic composition changes (Hwang & Choi, 2016; NCAA, 2010a, 2010b; Tyrance et al., 2013). These quantitative findings provide empirical evidence of rising diversity within NCAA athletics and serve as a valuable reference for future policy development and academic research.

Projected Trends in Student-Athlete Demographic Composition

This study further examined temporal trends in racial/ethnic composition among NCAA student-athletes, with particular attention to gender differences. As illustrated in Figure 3 and Table 5, the proportion of White athletes exhibited a continued decline, while the "Other" racial/ethnic category demonstrated significant growth. Black athlete representation remained relatively stable.

Figure 3.

Projected Trends in Gender and Racial/Ethnic Composition Among Student-Athletes

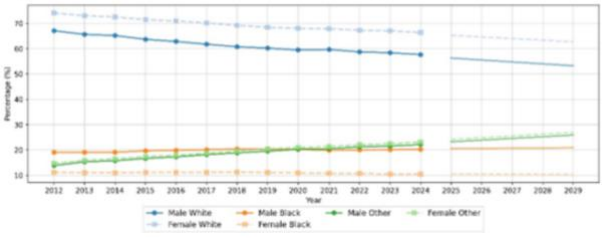


Table 5.

Forecast Regression Coefficients for NCAA Racial/Ethnic Subgroups by Gender

group	intercept	b	β	SE	P value	R squared
Male White	1599.98	-0.76	-.98	0.31	0.00	0.96
Female White	1349.82	-0.63	-.99	0.14	0.00	0.98
Male Black	-170.83	0.09	.77	0.09	0.00	0.59
Female Black	121.45	-0.05	-.78	0.03	0.00	0.61
Male Other	-1329.15	0.67	.99	0.10	0.00	0.98
Female Other	-1371.27	0.69	.99	0.05	0.00	0.99

Although racial/ethnic composition continues to evolve, persistent gender disparities were observed across groups, with some gaps showing signs of narrowing. The result shows declining White representation and growing diversity.

The study results reveal the following key findings:

Declining Representation of White Athletes

The proportion of White male athletes decreased from 66.18% in 2012 to 57.03% in 2024, with projections indicating a further decline to 53.22% by 2029. Similarly, White female athletes declined from 73.50% to 65.89% during the same period, with projections stabilizing near 65.89% by 2029.

Stable Representation of Black Athletes

Black male athletes maintained consistent representation, fluctuating between 19% and 21% (19.28% in 2012; 20.42% in 2024). Black female athletes remained within the 10%–12% range (11.29% in 2012; 10.63% in 2024). Notably, the narrowest prediction intervals were observed for Black athlete projections, indicating higher model confidence for this subgroup.

Significant Growth in "Other" Racial/Ethnic Groups

The "Other" category (encompassing Asian, Hispanic/Latino, multiracial, and international athletes) demonstrated the most substantial growth. Male "Other" athletes increased from 14.54% in 2012 to 22.55% in 2024, with projections reaching 25.89% by 2029. Female "Other" athletes exhibited a parallel trend, rising from 15.20% to 23.47%, and projected to attain 26.92% by 2029. This represents an annual growth rate of 0.8–1.0 percentage points—the fastest among all racial/ethnic groups.

Persistent Gender Disparities with Emerging Convergence

Gender-based disparities in racial/ethnic representation persisted but varied across groups: White athletes: An 8% gap (higher representation among females) remained consistent. Black athletes: An 8%–10% gap (higher representation among males) was observed. "Other" athletes: The gender gap was minimal (<1%), suggesting near-equitable distribution.

These projections align with broader demographic shifts in the U.S., including declining White majority populations and rising multiracial/immigrant communities (U.S. Census Bureau, 2020). The NCAA's recruitment strategies—particularly the growing inclusion of international student-athletes—may further amplify these trends (NCAA, 2020). While gender disparities persist, the narrowing gap among "Other" athletes highlights potential progress toward equitable representation.

Comprehensive Discussion

This study examined trends in racial/ethnic composition among NCAA student-athletes from 2012 to 2024, with projections extending to 2029. Our findings reveal three key patterns: a consistent decline in White athlete representation, (2) significant growth in the "Other" racial/ethnic category, and (3) relative stability in Black athlete proportions. Additionally, we observed persistent yet evolving gender disparities across racial/ethnic groups. Below, we contextualize these findings within broader sociodemographic, policy, and academic frameworks.

Sociodemographic Influences

The declining proportion of White athletes and concurrent growth of "Other" racial/ethnic groups mirror broader U.S. demographic shifts. While existing literature on mental health trends (Tran, 2021) and academic performance determinants (Beron & Piquero, 2016) does not provide direct comparisons with U.S. Census data, their use of multiracial classifications (e.g., White, Black, Hispanic/Latino, Asian/Pacific Islander, Native American, multiracial) reflects growing attention to population diversity. The significant expansion of the "Other" category may partially stem from increasing representation of immigrant and second-generation populations in college-aged cohorts. Notably, the inclusion of nonresident alien/international student-athletes as a distinct classification (Hextrum et al., 2024) suggests that global recruitment patterns contribute to these demographic changes, though quantitative assessments of this effect remain limited in current literature.

NCAA Policy Implications

NCAA policies regarding recruitment and scholarship allocation may influence racial/ethnic composition. Research on athlete GPAs has considered scholarship status as a key variable (Beron & Piquero, 2016), while studies of recruitment strategies identify scholarships as critical "exchange" resources (Magnusen et al., 2014). These findings imply that racial/ethnic disparities in scholarship access could shape compositional trends. Although no studies directly evaluate affirmative action's impact on athlete demographics, NCAA initiatives addressing mental health support for athletes of color (Kroshus et al., 2023) reflect institutional attention to minority athlete experiences. Coaching recruitment strategies (Magnusen et al., 2014) may also differentially affect racial/ethnic groups, though this requires further empirical investigation.

Sport-Specific Variations

While our aggregate results highlight overall trends, significant disparities exist across individual sports. Qualitative studies describe

crew as a historically "White-dominated sport" with persistent racial homogeneity (Hextrum et al., 2024), whereas track and field exhibits comparatively div

erse participation. These sport-specific racialization patterns imply that the decline in White student-athlete representation may vary substantially by program. Among female athletes, such trends further intersect with the institutional impacts of Title IX. Documented gender segregation in sports (Hextrum et al., 2024) adds complexity to interpreting race-by-gender dynamics, necessitating nuanced analysis.

Campus Climate Considerations

Increasing racial/ethnic diversity intersects with athlete campus integration. Studies measure athlete social engagement through campus belongingness and team connectedness (Hwang & Choi, 2016), while others highlight unique mental health challenges faced by minority athletes (Kroshus et al., 2023). Though no studies directly analyze compositional effects on campus climate, this literature supports examining how demographic shifts may influence team dynamics and athlete experiences.

Research Conclusions

Sustained Growth in Ethnic Diversity with Persistent Gender Disparities

Between 2012 and 2024, NCAA student-athletes demonstrated significant ethnic diversification: White participation consistently declined (male: 66.18% to 57.03%; female: 73.50% to 65.89%), while "Other" ethnic groups (including Asian, Latino, and multiracial athletes) exhibited marked growth (male: 14.54% to 22.55%; female: 15.20% to 23.47%). Notably, gender disparities persisted, with White female athletes maintaining higher representation than males, Black male athletes (19-21%) substantially outnumbering females (10-13%), and "Other" groups showing minimal gender gaps (<1%). Quantified diversity metrics (rising Shannon Entropy, declining HHI) confirmed these trends, with male athletes consistently exhibiting greater ethnic diversity than females.

Projected Trends and Structural Challenges

Regression modeling predicts: By 2029, White athlete representation will continue declining (potentially to 53.22% for males, stabilizing at ~65.89% for females), whereas "Other" groups will accelerate growth (annual increase of 0.8-1.0 percentage points, potentially reaching 25.89% male and 26.92% female), emerging as the primary drivers of diversification. However, while Black athlete proportions remain stable (narrowest prediction intervals, high confidence), their persistent overrepresentation in high-profile sports (e.g., basketball) reflects entrenched structural

inequities in opportunity allocation. Model limitations also highlight susceptibility to external shocks (e.g., policy reforms, geopolitical shifts), underscoring inherent predictive uncertainties.

Collectively, this study's tripartite methodology—combining trend analysis, diversity metrics, and predictive modeling—addresses key temporal and methodological limitations in the literature while generating actionable intelligence for NCAA diversity governance. The findings equip athletic administrators with empirically validated tools to track equity progress, forecast demographic changes, and implement targeted interventions that align with institutional commitments to inclusive excellence in collegiate sports.

Recommendations

Policy Implications

The findings of this study carry significant policy implications for NCAA institutions and athletic administrations. First, enhancing data transparency and granularity is fundamental to advancing racial equity. The current NCAA practice of aggregating Asian, Latino, multiracial, and international students into a single "Other" category, while streamlining reporting, obscures critical subgroup disparities (Tran, 2021). Future data releases should adopt finer-grained classifications and regularly publish diversity indices (e.g., HHI) in dedicated reports to monitor policy effectiveness. Second, targeted resource allocation is imperative: the overrepresentation of Black student-athletes in high-visibility sports like basketball and football reflects structural inequities in opportunity (Hextrum et al., 2024), necessitating scholarship reforms and diversified recruitment strategies. Concurrently, rapidly growing populations such as international and Latino student-athletes require tailored language support and cultural adaptation programs. Lastly, culturally responsive mental health services must be prioritized, as research indicates minority athletes face unique identity-related stressors (Kroshus et al., 2023). Institutions should train coaches and advisors to recognize these needs. Gender disparities in racial/ethnic diversity warrant targeted policy interventions. Given that male athletes consistently exhibit higher entropy scores than their female counterparts, institutions should examine sport-specific and division-specific gendered pipelines that may restrict access for women from underrepresented racial/ethnic backgrounds. Policies could include increasing funding for women's teams in sports with low minority representation, enhancing DEI training for female coaching staff, and establishing mentorship programs for women of color in collegiate athletics. Such initiatives would

address intersectional inequities and foster more inclusive participation.

Study Limitations

This study has several methodological and data-related limitations. First, the predictive models exhibit constrained explanatory power: despite employing regression analysis, the variance explained by Shannon Entropy (22.1%) and HHI (25.9%) suggests unaccounted factors (e.g., policy shifts or economic fluctuations) may influence trends. Second, insufficient data granularity—exemplified by the NCAA's heterogeneous "Other" category—prevents identification of distinct trajectories among subgroups (e.g., Asian vs. international students; Tran, 2021). Additionally, external disruptions (e.g., COVID-19's impact on international recruitment) were not modeled, potentially compromising long-term predictive robustness. These limitations underscore the need for complementary qualitative methods (e.g., interviews) to address gaps in quantitative data.

Future Research Directions

Building on this study's findings and limitations, future research should prioritize actionable directions to deepen understanding of NCAA athlete diversity trends. First, leveraging disaggregated data or linking institutional records (per Tran [2021]) could elucidate unique patterns among Asian, Latino, multiracial, and international subgroups within the "Other" category. Second, interrupted time-series analyses of recent policy changes (e.g., the 2021 Name, Image, and Likeness rule revisions) would empirically assess their immediate diversity impacts, aligning with Beron & Piquero's (2016) policy evaluation framework. Comparative institutional studies involving 10–15 strategically sampled schools could identify effective support practices through brief annual assessments.

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