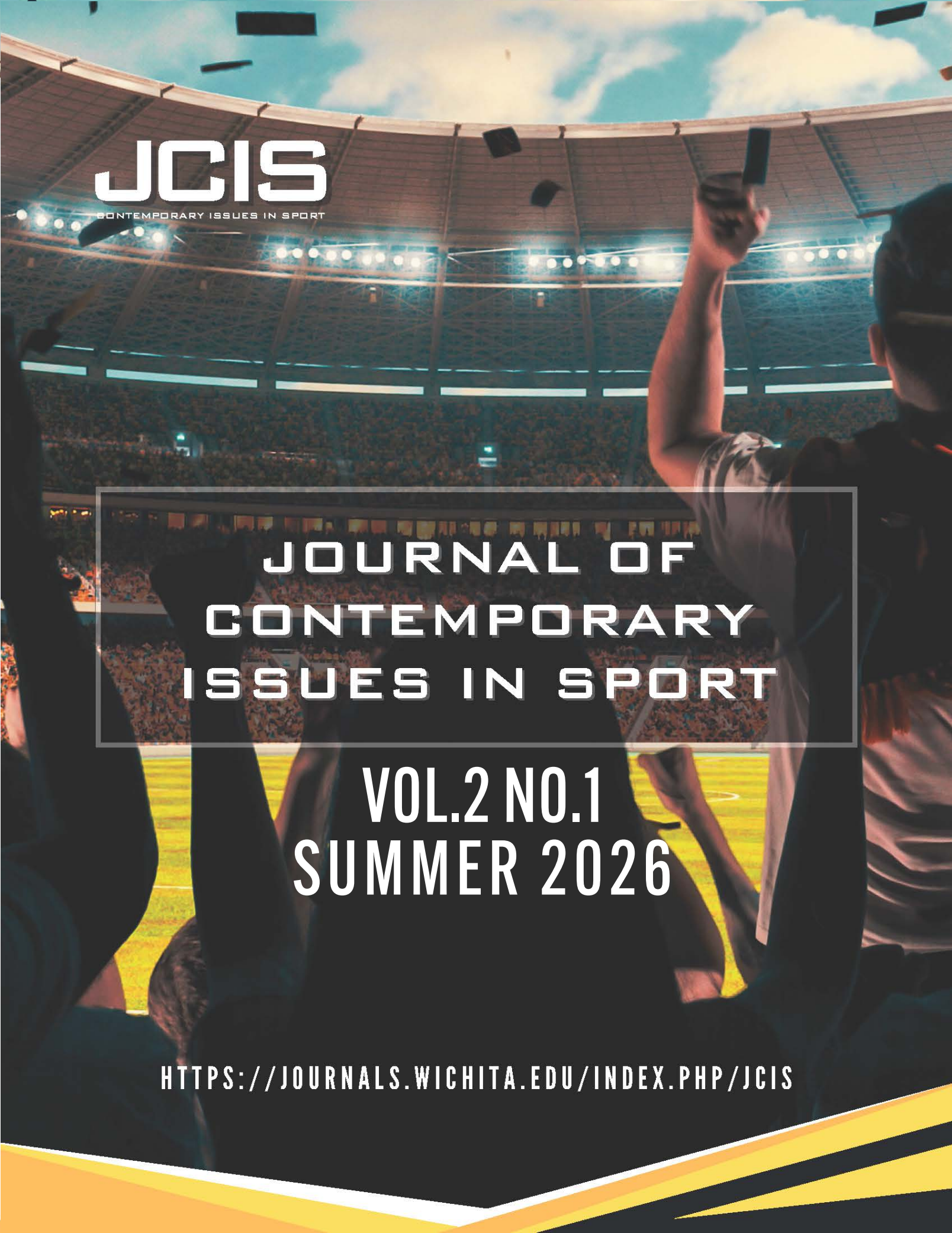




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The Impact of NIL and the Transfer Portal on Individual Player Performance in NCAA Division I Men's Basketball

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Abstract

The implementation of name, image, and likeness (NIL) policies and the National Collegiate Athletic Association (NCAA) transfer portal has transformed the landscape of collegiate athletics, introducing new opportunities and challenges for intercollegiate athletic departments, teams, coaches, and student-athletes. This study examined the relationship between NIL valuations, transfer status, and individual player performance among NCAA Division I men's basketball players. Using a linear regression model, data ($n = 153$) from three seasons were analyzed to assess whether NIL valuations and off-season transfer status impacted changes across seasons. The results indicate that NIL valuations, transfer status, and the interaction between them did not have a significant effect on performance, suggesting that these changes may not impact on-court outcomes as has been assumed. The findings and discussion will assist both scholars and practitioners interested in the evolving NIL practices and transfer policies.

Keywords: NIL, transfer portal, college athletics, athlete performance, basketball

Introduction

Historically, college athletics in the United States were considered amateur sports, meaning athletes were prohibited from profiting from their athletic skill and identity. However, the structure of sports within the National Collegiate Athletic Association (NCAA) shifted dramatically due to multiple court cases (e.g., *Alston v. NCAA*, *Board of Regents v. NCAA*, *O'Bannon v. NCAA*) which challenged the NCAA's authority to restrict financial benefits for athletes (Fridley et al., 2024; Reid, 2021). In part because of these legal decisions, name, image, and likeness (NIL) has become a significant topic in the institutional setting of college athletics. NIL refers to the legal rights that individuals have to determine how their name, image, and likeness are used for commercial purposes. The name of an athlete is just that, the legal name, or nicknames, associated with the athlete; the athlete's image refers to the exact portrayal of the athlete's face and/or body; and their likeness is a less literal representation of the athlete, such as a cartoon, their

voice, or even a signature. NIL allows student-athletes to profit from their personal brands through sponsorships, endorsements, social media promotions, and other commercial activities. They can receive deals from businesses and national corporations, collectives created by boosters or fans to fund opportunities for athletes, or personal ventures such as monetized podcasts, videos, or merchandise (Economou & Gamble, 2025; Sanderson & Siegfried, 2015). In July of 2021, mounting pressure resultant from state level legislation prompted the NCAA to implement the first NIL policy, dramatically changing the landscape of college athletics (Murphy, 2021).

Similar to the pervasive nature of NIL, eased transfer restrictions among competing college athletes has significantly reshaped the landscape of college sports in the United States. The *transfer portal* is a system that allows college athletes the opportunity to migrate between schools while maintaining their eligibility to participate in college sport. The transfer portal was introduced by the NCAA in 2018 to regulate the transfer process and provide transparency for both athletes and athletic programs. In 2021, the NCAA removed the year-in-residency requirement which previously required college athletes to athletically redshirt upon transferring institutions (NCSA College Recruiting, 2025). In April of 2024, the NCAA further expanded the opportunities of the transfer portal. College athletes enrolled in undergraduate programs of study are now able to transfer multiple times during their college career, permitted they have athletic eligibility remaining and maintain adequate progress towards an academic degree (Durham Wright, 2024). Notably, thousands of college athletes transfer each year, drastically affecting recruiting strategies, team dynamics, and personnel decisions (Corr et al., 2024). Given extant research has established college athlete transfer intentions and NIL intersect very saliently (Madden & O'Hallarn, 2024; Reese, 2023), college athletes seeking transfer in pursuit of increased NIL opportunities cultivates additional monetary incentives and performance pressures.

NIL and the transfer portal shape athletes' performance in complex ways (Fridley et al., 2024). As NIL valuations are often perceived as reflections of a player's athletic ability, lucrative deals can create external pressures and distractions (Corr et al., 2023; Harris et al., 2021). In addition, transferring to a new school can cause added stress and a change in environment that also affects athletic and academic performance (Madden & O'Hallarn, 2024; Richards et al., 2016). When NIL and the transfer portal intersect, student-athletes may face compounded pressures that could amplify negative effects on performance. However, these factors may also lead to more positive results. The new financial opportunities provided by NIL deals could relieve financial stress for athletes and add positive motivation to perform at a higher level to retain – and potentially gain more – positive perceptions of personal brand (Hollabaugh et al., 2024; Wyld, 2025). Furthermore, transferring could lead to a more positive team environment, better training, and more opportunities for players which could then potentially lead to improved game performance (Richards et al., 2016). The purpose of this study was to empirically evaluate these claims within the context of NCAA Division I men's basketball, addressing whether NIL deals and transfer decisions impact on-court performance.

While research on NIL and the transfer portal has expanded in recent years, most studies have been theoretical, qualitative, or focused on other sports like football (Fridley et al., 2024; Reese, 2023). Few studies have empirically assessed measurable outcomes in basketball, particularly individual player performance (Stokowski et al., 2024). This gap motivates the present exploratory study, which examined whether NIL valuations, transfer status, or their interaction significantly predicted changes in athletic performance. Based on the gaps in existing literature, the following hypotheses were tested in this study:

H1: NIL valuation will significantly influence individual performance in NCAA Division I men's basketball.

H2: Transfer status will significantly influence individual performance in NCAA Division I men's basketball.

H3: The interaction between NIL valuation and transfer status will influence individual player performance.

NIL, the Transfer Portal, and Performance

The introduction of NIL and the transfer portal have raised major questions regarding athlete performance, motivation, and wellbeing. Prior literature has examined these changes through legal, psychological, sociological, and economic lenses. This review highlights the theoretical frameworks and findings that directly inform the hypotheses tested in this study.

NIL Valuation and Performance

Several bodies of research provide insight into how NIL influences athlete motivation and performance. Prompted by state level legislation, the NCAA's 2021 interim NIL policy removed restrictions prohibiting college athletes the right to monetize their identity through sponsorships, endorsements, and social media engagement. While NIL offers new financial opportunities for competing college athletes, they also introduce potential psychological pressures and identity conflicts. Fridley et al. (2024) contended NIL results in an added *influencer* role within the college athlete role-set, resulting in a complex tetrad of distinct yet interconnected roles (i.e., athletic, academic, social, influencer) college athletes navigate while competing in NCAA athletics. As influencers develop and maintain a personal brand by combining their personality and lifestyles with product promotions to influence followers' behavior (Joshi et al., 2025), the novel influencer role within the college athlete role-set is inherently connected, yet still distinct, from extant athletic, academic, and social roles. While such phenomenon can be empowering for the athletes, it also requires time and energy to be devoted to personal branding, an increasing challenge considering the athletic and academic expenditures placed on competing college athletes (Santos & Sagas, 2023).

Given the financial incentives cultivated through NIL, college athletes may be inclined to become engulfed in their role as an influencer, leading to less time committed to improving athletic performance and more anxiety when trying to balance the new responsibilities (Corr et al., 2023). In fact, Stokowski et al. (2024) found that among NCAA Division I men's and women's basketball players, an athletes reported NIL valuation was most positively correlated to their aggregate social media following on *Instagram*. Such findings serve to potentially affect the college athlete experience as financial incentives to produce social media content and cultivate followers may not coincide with athletic and academic performance demands. Accordingly, the introduction of NIL causes strain between the distinct roles competing athletes assume while competing in NCAA athletics. These dynamics informed the first hypothesis for this study: NIL valuation would significantly influence individual performance in NCAA Division I men's basketball.

Transfer Status and Performance

While NIL emphasizes financial incentives, the transfer portal highlights issues of mobility and institutional change, making it critical to consider how transfers may impact performance. The transfer portal allows athletes to change institutions without harming their eligibility. Reese (2023) mentions that while this enhances player autonomy, it also introduces instability and unintended consequences, such as impulsive decision-making, lack of institutional oversight, and loss of academic momentum. Student-athletes may experience dramatic changes in coaching styles or academic setbacks that they were not anticipating when joining a new team and institution. Economou and Gamble (2025) also framed the NIL and transfer portal landscape as a "career transition", as athletes must now make business decisions with potentially ambiguous regulations and added performance pressure. Student-athletes are often signing contracts without a full understanding of what they entail since they lack the business knowledge needed for some of those types of decisions. This can be stressful for the young athletes as they continue to strive for athletic and financial success without much guidance or oversight. Although many view the portal similar to free agency in professional sports, its impact on athletic performance remains unclear. Some scholars suggest that the added stress of transferring, especially when driven by financial incentives, can negatively affect the well-being and performance of college athletes (Harris et al., 2021;

Wyld, 2025). Based on the previous work in this area, it was postulated in the second hypothesis that transfer status would have a significant effect on measurable performance outcomes.

Interaction of NIL and Transfer Status

Two psychological theories (expectancy and self-determination) provide the foundation for an understanding of the potential impact of the intersection between NIL and the transfer portal on performance. Expectancy theory suggests that motivation is shaped by an individual's belief that efforts lead to performance and that performance yields desirable outcomes (Solomon & Rhea, 2008; Vroom, 1964). In the sport setting, athletes' expectations can be influenced by internal beliefs (e.g., confidence, hard work), external pressures (e.g., NIL valuations), and coach feedback. Wilson and Stephens (2004) found that athletes' intrinsic drive for performance, rather than coaches' expectations, were more predictive of motivation. This reinforces the need to examine whether there is a shift in motivation in relation to external rewards like NIL deals and transfer opportunities to see if the internal beliefs outweigh the external by examining the athletes' changes in performance.

Self-determination theory introduces the idea that optimal motivation and well-being are achieved when three psychological needs are met: autonomy, competence, and relatedness (Ryan & Deci, 2000). The financial and physical freedoms that come with NIL and the reformed transfer portal potentially support autonomy. However, they may threaten competence due to the heightened scrutiny that comes with being in the social spotlight. They could also weaken relatedness by switching teams and creating financial separation from their fellow teammates. This could introduce motivational and emotional strain on the athletes. Deci et al. (1999) conducted a meta-analysis that found that performance-contingent rewards can significantly undermine intrinsic motivation, particularly when perceived as controlling rather than validating their skill. This is important in the context of NIL because athletes may feel pressure to perform in order to retain sponsorships or social media relevance. According to cognitive evaluation theory (a sub-theory of self-determinism), rewards interpreted as controlling can shift an athlete's perceived source of behavior from internal to external, weakening their sense of inherent satisfaction and enjoyment, which will likely impact in-game performance (Deci et al., 1999). Together, these frameworks highlight how NIL pressures and transfer decisions may interact, leading to compounded or offsetting effects. This directly informed the third hypothesis tested in this study, as it was hypothesized that the interaction between NIL valuation and transfer status would predict measurable changes in individual player performance.

Despite the growing body of research on NIL and the transfer portal, few studies have quantitatively examined how these factors affect objective performance metrics such as field goal percentage. Most existing literature are qualitative or theoretical in nature, emphasizing well-being, identity, or institutional policy (Economou & Gamble, 2025; Fridley et al., 2024; Harris et al., 2021). Additionally, a substantial portion of the literature combines athletes across sports or focuses primarily on football, leaving a gap in basketball-specific empirical study. The purpose of this study is to evaluate whether NIL valuations, transfer status or their interactions significantly affect changes in player performance, specifically measured by field goal percentage (FG%). It addresses the gap within the literature by using a linear model to assess these relationships among NCAA Division I men's basketball players.

Methodology

A linear model was built to examine the impact that NIL and the transfer portal have on individual athletic performance in men's college basketball. With such a narrow focus (on NIL, transfer status, and their interaction), this study was exploratory in nature and had limitations (as, for instance, athlete performance can be influenced by a variety of factors ranging from minutes played and team style to injuries and competition level). Since NIL was officially implemented in July of 2021, three years of NIL data were collected for this study. The dataset included three seasons (2022-24) of the Division I men's basketball players who were ranked in the top 100 in NIL valuation according to the site On3, a leading authority on NIL, drawing on roster value, market trends, and sponsorship data to estimate athlete worth (Terry, 2022). The sampling of the top 100 NIL-valued athletes per year was determined by the structure of the available data rather than by selective inclusion. On3, the industry's most widely cited and methodologically transparent NIL valuation platform, only provides publicly accessible valuations for the top 100 athletes in each sport, representing the entire population of athletes for whom verified NIL valuation data exist. Focusing on the top 100 also remains theoretically appropriate, as these athletes are the ones more likely to experience the heightened visibility, financial incentives, and role-related pressures that NIL scholarship suggests could influence performance. Accordingly, the sample captures the population for whom NIL forces are most consequential, providing a conservative and meaningful test of the study's hypotheses. The information from On3 was used to represent NIL in the linear regression model. Performance data were collected for each player to examine changes in player performance from the season prior to receiving an NIL valuation to the season following the NIL valuation. Two predictors were included in the model as well: NIL and Transfer. The interaction term between those two variables was also included to test whether the relationship between NIL and performance differed depending on transfer status. Data were collected from the ESPN (2025) statistics page of each athlete by examining what school they played for in each season.

Field goal percentages (FG%) were used to measure the performance of the athletes. While the study was limited by focusing on a single performance measure, FG% was selected as the dependent variable in this exploratory study because FG% serves as a consistent, position-agnostic indicator of scoring efficiency. While FG% is a narrow measure of performance as it is influenced by many individual and team factors (role changes, defensive pressure, etc.), FG% was used as it is an important metric for players regardless of position as it can be considered as indicating how well players contribute to team scoring while minimizing wasted possessions. An elevated FG% reflects greater shooting efficiency, signaling a stronger offensive contribution to the team's total points, and it isolates a player's ability to convert scoring opportunities independent of volume. For replicability, etc., FG% provided the most complete, comparable, and consistently reported performance metric that allowed for a uniform performance-change measure across three seasons. It is calculated by dividing the number of shots made by the number of shots that were attempted throughout the season. It is important to note that the dependent variable in this study reflects change in FG% across seasons, rather than overall FG% level, meaning the analysis tests whether NIL or transfer activity affects performance improvement or decline rather than absolute shooting efficiency. In order to capture the change in the players' performances, the FG% data for each player were collected from ESPN (2025) for the seasons before and after the recorded NIL valuation for each year and then subtracted to find the change.

Although the initial dataset included 300 observations across the top 100 NIL-valued players for three seasons, complete performance data were not available for every athlete. Many players exited the NCAA between the pre- and post-valuation seasons due to entering the NBA Draft, injury-related inactivity, redshirting, or graduation. These athletes could not be included because the performance-

change variable required two consecutive seasons of FG% data. Athlete observations with missing values were excluded to preserve the integrity of the analysis. One outlier was also removed, Cam'Ron Fletcher, when his career stats revealed that he averaged only four minutes of participation in only 11 games in the season after his NIL valuation, creating an extreme value for his PC (44.5). Fletcher's playing time (40 total minutes) was deemed insufficient to represent performance for a season. Thus, after the various exclusions, only complete cases (N=153) were analyzed in this study. Table 1 and Table 2 display the descriptive statistics for each of the variables mentioned above.

Table 1

Descriptive Statistics for Categorical Variables

Variable	Category	Frequency	Percentage
Year	2022	47	30.7%
	2023	53	34.6%
	2024	53	34.6%
Transfer	Yes	65	42.5%
	No	88	57.5%

Note. Percentages are calculated based on the total sample size ($n = 153$).

Table 2

Descriptive Statistics for Continuous Variables

Variable	M	SD	Min	Max
PC	0.08	5.97	-15.20	18.20
NIL	1.81	2.11	0.29	14.00

Note. M = Mean; SD = Standard Deviation; PC was calculated by subtracting FG% Year1 from FG% Year2; NIL is measured in units of \$100,000.

After examining the descriptive statistics, a substantial right skew was identified for the NIL variable. This pattern is expected because NIL compensations is not evenly distributed across athletes; a relatively small number of high-profile athletes at the top of the rankings tend to receive disproportionately larger deals, while the majority of athletes secure comparatively modest agreements. Because skewed data can bias parametric analyses, several transformations were considered to normalize the distribution. Square-root transformation and Winsorization (replacing extreme values at the tails) provided only modest improvements, while the log transformation ($\log(x+1)$) produced the greatest reduction in skewness and yielded a distribution closest to normal. The addition of one ensured that all values, including very small ones, could be transformed without producing undefined results. The log transformation was therefore applied to the NIL variable prior to analysis.

$$\text{Model 1: } PC = \beta_0 + \beta_1 \log(NIL + 1) + \beta_2 \text{Transfer} + \beta_3 [\log(NIL + 1) * \text{Transfer}] + \varepsilon$$

Model 1 tested the effect of NIL (log-transformed to reduce skew) and transfer status on performance change, including an interaction term to assess whether the relationship between NIL and performance differed by transfer status.

Results

To test the effect of NIL and transfer status on performance change (PC), a linear regression model was estimated with log-transformed NIL, transfer status, and the interaction as predictors (Model 1). The overall model was not statistically significant, $F(3, 149) = 1.09$, $p = 0.356$, and explained a small proportion of the variance in PC ($R^2 = 0.02$, $Adjusted R^2 = 0.002$). Neither log-transformed NIL ($\beta = -0.36$, $p = 0.778$) nor transfer status ($\beta = 1.68$, $p = 0.993$) were significant predictors of PC. In addition, the interaction between log(NIL+1) and transfer status was not significant ($\beta = 1.68$, $p = 0.392$). These results indicate that, within this sample, NIL value and transfer status were not meaningfully associated with changes in athlete performance.

Table 3
Model Results

	β (SE)	t(149)	p-value	CI
(Intercept)	-0.26 (1.26)	-0.21	0.837	[-2.75, 2.23]
log(NIL+1)	-0.36 (1.29)	-0.28	0.778	[-2.91, 2.18]
Transfer1	-0.02 (2.00)	-0.01	0.993	[-3.97, 3.93]
log(NIL+1):Transfer1	1.68 (1.96)	0.86	0.392	[-2.19, 5.56]

Notes: SE = Standard Error; CI = Confidence Interval; Transfer1 refers to athletes who switched schools in the off season.

Model diagnostics were examined to assess whether the assumptions of linear regression were met. Figure 1, a plot of residuals versus fitted values, indicated no clear evidence of heteroscedasticity, as the variance of the residuals appeared approximately constant across the range of fitted values. While a few cases (e.g., observations 117, 137, and 150) showed larger residuals, these did not appear to exert undue influence on the overall model fit.

Figure 1
Heteroscedasticity Check

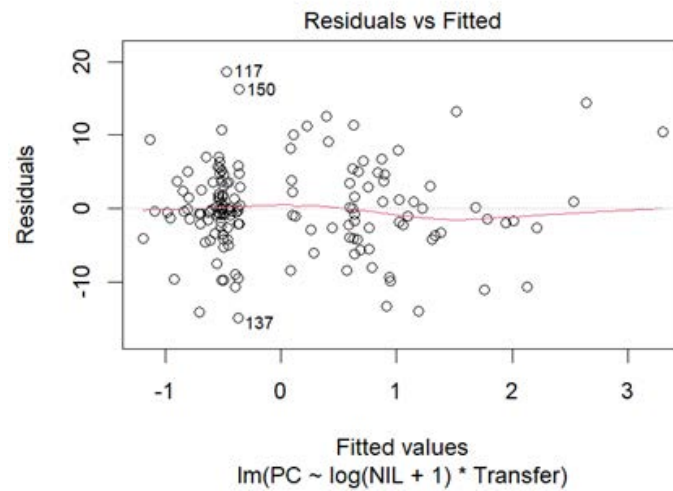
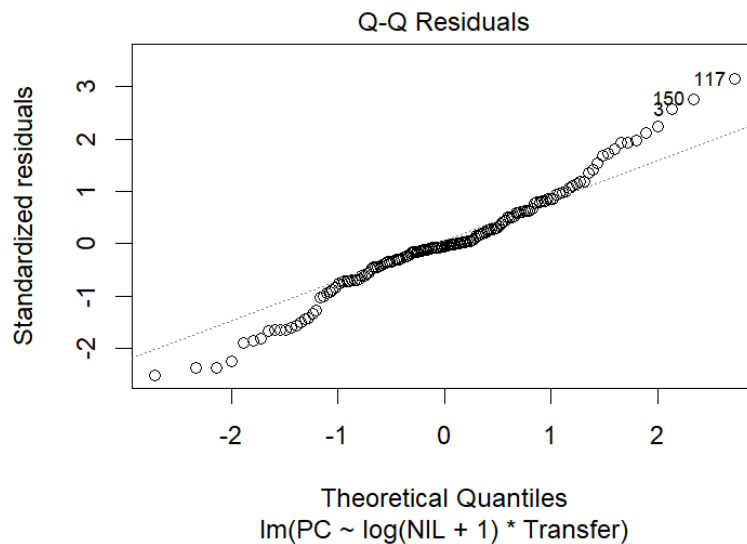


Figure 2, the Q-Q plot of standardized residuals, suggested that the residuals were approximately normally distributed, with only minor deviations at the lower and upper tails. These deviations are not uncommon in applied sport science data and were not considered problematic given the robustness of linear regression to mild departures from normality (Thrane, 2023).

Figure 2

Normality Check



Variance inflation factors (VIFs) were examined to assess multicollinearity. VIF values for the predictors ranged from 1.77 to 5.20. While these values indicate some correlation among predictors due to the inclusion of the interaction term, they remain below the conventional threshold of 10, suggesting that multicollinearity was not a serious concern in this model.

To assess robustness, the model was re-estimated using alternative specifications of NIL (square-root and untransformed). As noted in Table 4 and Table 5, results of robustness checks were consistent across the models, with no significant interaction detected (all p-values > 0.10).

Table 4

Square-Root Transformation Model Results

	β (SE)	t(149)	p-value	CI
(Intercept)	-0.22 (1.45)	-0.15	0.879	[-3.08, 2.64]
sqrt(NIL)	-0.29 (1.10)	-0.27	0.791	[-2.47, 1.89]
Transfer1	-0.75 (2.27)	-0.33	0.740	[-5.23, 3.72]
sqrt(NIL):Transfer1	1.81 (1.67)	1.09	0.279	[-1.48, 5.11]

Notes: SE = Standard Error; CI = Confidence Interval; Transfer1 refers to athletes who switched schools in the off season.

Table 5

No Transformation Model Results

	β (SE)	t(149)	p-value	CI
(Intercept)	-0.45 (0.82)	-0.54	0.590	[-2.07, 1.18]
NIL	-0.07 (0.31)	-0.23	0.820	[-0.68, 0.54]
Transfer1	0.12 (1.28)	0.09	0.925	[-2.41, 2.65]
NIL:Transfer1	0.72 (0.46)	1.59	0.115	[-0.18, 1.62]

Notes: SE = Standard Error; CI = Confidence Interval; Transfer1 refers to athletes who switched schools in the off season.

Overall, the data analysis revealed no support for the three tested hypotheses. While the results challenge common assumptions about NIL and the transfer portal as direct drivers of performance, they also highlight the importance of situating these factors within broader motivational and contextual frameworks.

Discussion

Prior to performing main data analyses, the multivariate non-normality was tested using the MVN package in R-Studio (Korkmaz et al., 2014). The results showed that the data were not normally distributed because of the significant levels of Mardia kurtosis (38.633, $p < .001$) and skewness (905.860, $p < .001$). To account for this non-normality, a robust estimation technique was carried out (i.e., maximum likelihood robust).

The purpose of this exploratory study was to evaluate whether NIL valuations, transfer status, and their interaction predicted measurable changes in player performance, operationalized as change in field goal percentage (FG%). Across all models, none of the predictors emerged as statistically significant, resulting in a lack of support for the three hypotheses. Although these null findings may seem unexpected given the heightened discourse surrounding NIL and the transfer portal, they provide an important empirical counterweight to prevailing assumptions that these structural shifts produce immediate, measurable effects on athletic output. Instead, the results suggest that short-term on-court performance—at least in the context of shooting efficiency—is relatively stable despite substantial alterations in the organizational and financial landscape of NCAA Division I men's basketball. These findings reinforce the emerging argument that NIL and transfer policies may shape the ecosystem of college sports without directly translating into quantifiable changes in individual performance (Economou & Gamble, 2025; Fridley et al., 2024).

Hypothesis 1 posited that higher NIL valuations would predict changes in FG%, drawing on cognitive evaluation theory, which argues that rewards perceived as controlling may undermine intrinsic motivation (Deci et al., 1999). Concerns have been raised that NIL activities—especially social media obligations and branding expectations—may shift athletes' focus on external pressures, potentially detracting from training or mental preparation (Corr et al., 2023; Stokowski et al., 2024). Conversely, self-determination theory holds that NIL could enhance autonomy by providing financial freedom and validating competence (Ryan & Deci, 2000). The absence of a significant relationship between NIL valuation and performance in this study suggests that athletes may possess the capacity to balance these competing demands without degrading in-game execution. This result aligns with findings that NIL's primary effects may manifest in psychological domains—identity management, stress, or well-being—rather than objective performance metrics (Harris et al., 2021). It is also plausible that unmeasured moderating factors such as role-set management (Fridley et al., 2024), academic pressures (Santos & Sagas, 2023), or social support structures shaped the extent to which NIL obligations translated into performance outcomes.

Hypothesis 2 predicted that transfer status would significantly influence FG% change, based on scholarship describing the instability and transition-related stress that can accompany institutional movement. Transfers may encounter unfamiliar coaching systems, new team dynamics, or academic disruptions, raising the possibility of performance volatility (Reese, 2023; Wyld, 2025). Expectancy theory further predicts that transfers are often made with the belief that new contexts will enhance opportunity or performance (Vroom, 1964). Yet the null results indicate that these potential benefits and challenges may counterbalance each other, resulting in no measurable short-term change in shooting efficiency. This finding aligns with research emphasizing the primacy of intrinsic motivation in sustaining performance despite external pressures or expectations (Wilson & Stephens, 2004). It also supports work suggesting that athletes possess substantial adaptability, enabling them to recalibrate quickly when moving between institutional environments (Madden & O'Hallarn, 2024; Richards et al., 2016).

Hypothesis 3 predicted an interaction between NIL valuation and transfer status. The theoretical justification drew from the possibility that NIL considerations increasingly factor into transfer decisions, potentially compounding motivational or emotional strain as athletes adjust to new environments while

managing public visibility and sponsorship obligations (Economou & Gamble, 2025). Self-determination theory suggests that such combined pressures could simultaneously challenge autonomy, competence, and relatedness, thereby influencing motivation and performance (Ryan & Deci, 2000). Although no interaction effect emerged, this absence may reflect the subtlety and individual specificity of how NIL and transfer processes intersect. It remains plausible that these forces influence one another in ways that were not measurable in the dataset or that FG% is not the athletic dimension most sensitive to such pressures. Given the complexity of athletes' role-sets under NIL (Fridley et al., 2024) and the variability in institutional contexts, larger or sport-specific samples may be needed to detect nuanced effects.

Practical Implications

The broader implications of these null findings suggest that NIL and transfer policies – while transformative in terms of athlete rights, market positioning, and institutional strategy – may exert weaker short-term effects on individual performance than commonly portrayed in public discourse. Rather than driving immediate changes in athletes' measurable efficiency, these reforms appear to function primarily as contextual forces influencing the broader college sport environment. These include changes in athlete branding responsibilities (Joshi et al., 2025), mobility patterns, recruitment practices, and the business-like nature of athletic decision-making (Economou & Gamble, 2025). The stability observed in FG% may indicate that core determinants of on-court performance remain rooted in traditional factors such as coaching quality, team cohesion, sport-specific skill development, and personal identity alignment with the athlete role (Salcinovic et al., 2022; Yukhymenko-Lescroart, 2024).

For practitioners – including coaches, athletic administrators, and support staff – these findings carry several practical implications. Primarily, concerns that NIL engagement or transferring will inherently destabilize performance may be overstated. While athletes may face increased psychological or time-management pressures, these do not necessarily translate into reduced on-court effectiveness. Support structures should therefore focus not on restricting NIL involvement or discouraging transfers, but on providing targeted resources: education on branding and financial literacy, transition support for transfers, and mental-health services to help athletes navigate heightened visibility and role complexity. As NIL and the transfer portal appear to influence context rather than immediate performance, athletic departments may need to shift their strategic emphasis toward managing the environmental ripple effects (e.g., team chemistry, roster continuity, communication) rather than assuming direct performance impacts. This includes proactive approaches to integrating transfers, clarifying expectations regarding NIL commitments, and fostering cultures that preserve relatedness and intrinsic motivation despite increased external pressures.

In addition, the absence of significant performance effects underscores the need for further empirical research. Given NIL and transfer scholarship remains theoretical or qualitative (Corr et al., 2023; Economou & Gamble, 2025; Fridley et al., 2024; Harrison et al., 2021), this study adds quantitative evidence that the relationship between these reforms and athletic output is complex, multidimensional, and likely mediated by psychological and social variables not captured in FG%. Future research examining multiple performance indicators (e.g., usage rate, defensive efficiency, assist-to-turnover ratio) and incorporate longitudinal designs to evaluate whether effects emerge over time as NIL markets, athlete branding strategies, and transfer norms continue to evolve. While NIL and the transfer portal continue to significantly reshape the institutional setting of collegiate athletics, they do not appear to produce immediate, measurable changes in men's basketball shooting performance. Instead, athletes demonstrate notable resilience and adaptability, highlighting the importance of institutional strategies that support holistic athlete development amid a rapidly changing sport ecosystem.

Limitations and Suggestions

This study is not without limitations. For instance, the dataset for this investigation was restricted to athletes in the top 100 NIL valuations. This sampling decision has limitations, as it overrepresents elite athletes and thus limits the study's generalizability. This sample also likely introduces restriction of range in performance change such as there is less likelihood for dramatic fluctuations in the performance of top athletes. Also, with a focus on the top NIL valuations, the study fails to consider how to control the athletes who most likely experience NIL-related stress or benefit (i.e., mid-tier athletes with emerging NIL profiles). Future research in this area should involve analyses such as comparing top-NIL athletes with mid-valuation athletes. Lastly, regarding the limitations of the dataset, missing data due to entry into the National Basketball Association (NBA), injuries, or graduation may have reduced statistical power.

Another limitation is the study's use of a single performance metric (FG%) that limits the interpretive power of the findings. FG% is a narrow measure of performance, especially given the diverse roles of basketball players across the various positions in the sport (i.e., guards, forwards, and post-players). Shooting efficiency is influenced by usage rate, minutes, lineup context, defensive pressure, role changes, and team system; may not reflect performance effects for transfers who gain different roles; and typically exhibits low year-to-year variance, reducing model sensitivity. While FG% is meaningful, it represents only one dimension of performance as athlete performance is known to be influenced by many factors. These factors help explain the low explanatory power observed in the model ($R^2=.02$) and suggest that FG% change may not capture more nuanced performance patterns. As such, NIL and transfer effects might manifest in other metrics (e.g., minutes played, decision-making metrics, coaching changes, injuries). Thus, by not examining the influence of the other factors, the current study has limitations, and its null findings should be interpreted as specific to shooting efficiency rather than reflective of all facets of performance. Future research should consider using multi-dimensional measures to assess the level of successful performance, including but not limited to the player efficiency (EFF) or Player Efficiency Rating (PER), True Shooting Percentage (TS%), and Win Shares (WS).

While there are limitations associated with the model examined in this study that only included NIL value, transfer status, and their interaction, the exploratory nature of this study provides a launching point for future investigations. As NIL regulations, transfer rules, and school-based compensation models continue to evolve, future research using larger and more diverse samples, additional sports, and broader performance metrics will be essential for determining whether the null effects found in this study will persist as collegiate athletics continues to venture into unprecedented uncharted territory.

Summary

This exploratory study provides an empirical contribution to a field largely dominated by theoretical and qualitative discussions. By testing NIL and transfer effects quantitatively in men's basketball, this study demonstrates that these reforms have not yet produced measurable disruptions in performance efficiency. Grounded in expectancy, self-determinism, and cognitive evaluation theories, the findings suggest that athletes' intrinsic drive and resilience may buffer against structural changes. Rather than contradicting these psychological theories, the results suggest that NIL and transfer decisions may be operating primarily as contextual or motivational modifiers rather than direct determinants of performance efficiency. The findings of this study suggest that while NIL and the transfer portal have reshaped the business and cultural landscape of college athletics, their impact on individual player performance remains limited in the short term. Rather than acting as direct performance drivers, NIL and transfer decisions were found in this study to function as contextual forces that intersect with athletes' motivation, identity, and team environments.

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Athlete Brand Mark Ownership: The Current Landscape of Trademark Usage in the National Basketball Association

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Abstract

The need for athletes to protect and take ownership of their brand mark(s) has become increasingly evident as more athletes enter their brands and brand marks into the marketplace. Recent instances where athletes have had to protect their personal logo, or related brand mark(s) reinforce the growing necessity of the utilization of federally registered trademarks. This investigation examined what type of brand marks, and by what type of athlete (e.g., more experienced, more famous) are being strategically protected, in addition to the type of mark these athletes most frequently protect. Results indicated that while experience was not a representative variable for which athletes utilized trademarks, salary and number of followers were. Additionally, the athletes were most likely to protect their logo, followed by trademarks of other business-related entities (e.g., restaurants), in comparison to other brand marks. Further results are discussed, as well as implications, such as the need for professional athlete and/or brand managers to recognize the value in protecting the athlete brand.

Keywords: brand management, athlete logos, brand marks, trademark law, brand protection

Introduction

The opportunity for businesses and brands to become regional, national, or even international entities has never been greater than it currently is, given the proliferation of social media and advances in certain technologies (e.g., digital marketing, supply chain). With the growth in both the quality and quantity of nationally relevant brands, the need for federal protection regarding brand marks has also grown. In 2000, there were over one million active trademark registrations in the U.S. Comparatively, there were over 3.25 million active trademark registrations in 2024, more than 600 thousand than even four years prior (Gerben, 2024). It is evident that many business entities recognize the crowded marketplace in which

they operate within, and understand the benefits of utilizing federally registered trademarks to protect the most salient visual elements of their brand, their logos and brand marks (Park et al., 2013).

This trend of increased brand mark protection has become increasingly prevalent in the sporting landscape as well. Teams (e.g., the Philadelphia Phillies and 'Ring the Bell'), conferences (e.g., the National Collegiate Athletic Association and 'March Madness'), leagues (e.g., the Women's National Basketball Association and any one of their team's official name), professional athletes (e.g., Saquon Barkley and 2KSA), and even collegiate athletes (e.g., Brigham Young University quarterback Jake Retzlaff and 'BYJEW'; Liberman, 2024) have taken the appropriate steps to protect their brand marks from potential infringement and harm by utilizing federally registered trademarks. Although some brands invoking such marks may avoid infringement without obtaining a trademark registration, a number of recent instances have proven the positive opportunity cost of trademark registration, particularly for athletes. The current investigation examines athletes specifically, due to their unique role in the sports realm and the brand hierarchies for which they are a part of (Su et al., 2020), and due to the substantial differences of brand capitalization by various athletes.

A focal aim of this investigation is to understand brand ownership in the athlete branding context. Athletes have the autonomy to act in any way they desire, and to involve themselves in whatever businesses or decisions they see fit. These decisions in conjunction with the performance of the athletes will constantly influence their brand image and awareness (Keller, 1993). While they will always have ownership of those decisions and at least some control of how they are perceived based on their actions, ownership in the context of this investigation pertains specifically their public business practices of brand mark utilization. As discussed later in the paper, athletes sometimes outsource the creation and protection of their brand marks, leading to a plethora of different outcomes and strategies. Furthermore, while the utilization of brand marks is neither required nor standardized amongst athletes, enough brand mark ownership issues have arisen to warrant an investigation into how these brands (specifically brand marks) are being protected. Thus, ownership is conceptualized as the entity that is in legal protection of federally trademarked brand mark(s).

This study provides an empirical examination of registered trademark usage by athletes that currently employ brand marks in the marketplace, thereby providing insights into which athletes are taking strategic steps to protect various brand marks that they employ as business entities themselves. Through an examination of who is protecting their brand marks, and what is being protected, future athletes and brand managers may have a better understanding of both the breadth and depth that some athletes have taken to fend off external entities and provide greater value to their own personal brand. As more athletes enter their brand marks into the marketplace (Pedersen et al., 2024), a greater need to both carve out specific brand marks, in addition to protecting such marks for the most optimal brand longevity (Williams et al., 2022), will be paramount moving forward. Hereafter, a literature review of athlete branding, athlete brand mark litigation, and brand protections in the realm of sports will be conducted. Four research questions will be presented, followed by a description of the methodological process, the results, and a discussion on the implications of the findings.

Literature Review

Athlete Branding and Brand Marks

The inherent interest in athletes by sport fans delivers an opportunity for all athletes to capitalize upon the fandom that they generate (Williams et al., 2015). Certain athletes, though, leverage this fandom and their brand much better than other athletes, many of whom fail to capitalize on their name, image, and

likeness (NIL) at all. For example, less than half of the most rich and famous athletes around the world have created a personal logo to represent themselves on gear, merchandise, and brand extensions (Pedersen & Williams, 2022). Similarly, over 70% of the top 25 male and female athletes in the niche sport of disc golf utilize a personal logo (Pedersen, 2024), even though these athletes make substantially less money than those that compete in more mainstream sports.

While theoretically athletes have always had a brand, or several unique associations that differentiate an athlete in the marketplace (Williams et al., 2015), a greater number of athletes have been more heavily engaging in brand management practices like logo creation over the past two decades. Athletes choose to engage in brand management strategies in order to elevate their personal brand equity (Arai et al., 2014), subsequently allowing for the potential creation of additional revenue streams (Walsh & Williams, 2017), the establishment of post career opportunities and success (Williams et al., 2022), or increased fandom in general (Doyle et al., 2022). Additionally, although a logo is not the only brand mark an athlete can have, it does predominantly serve as an indicator of which athletes have recognized the influence that they have in the marketplace.

A brand mark is, “any symbolic mark that seeks to represent a brand in marketing or communication materials in the form of a brand name, a logo, or a slogan” (Pedersen & Williams, 2024). These brand marks are used, in the realm of athlete branding, to further differentiate one athlete from the next or to capitalize on specific marketing campaigns for the athlete. The importance of protecting these brand marks is demonstrated in the industry time and again. After winning the Super Bowl, and in conjunction with his endorser (i.e., Jordan Brand), Jalen Hurts had a marketing campaign dispersed regarding his success with the tagline “Love, Hurts.” Hurts was seen during the Super Bowl parade wearing a sweatshirt with the same tagline, and promoting videos on social media with it as well. However, in that short amount of time, there was already an individual that filed that same specific tagline with the United States Patent and Trademark Office (Gerben, 2025). The lack of protection around the tagline now calls into question how big the campaign can be in the future, given that neither Hurts nor his brand managers have official rights to the brand mark. While Hurts and his team have some rights given that they were the first to introduce the tagline on a product, they now have to deal with a potential legal situation that could slow the campaigns momentum down.

The existence of disputes between athletes and apparel manufactures (e.g., endorsers) over the use of athlete logos is evidence of how far athlete branding has come, and how important athlete branding now is. Athlete branding is a form of brand management that is crucial for athletes who look to capitalize on the immense fandom they have the opportunity to create. When athletes choose to create a logo, they are choosing to create a multifaceted and symbolic mark. The athlete logo is the most important visual element of the athlete brand, as it is representative of all of the branding efforts that the athlete partakes in (Pedersen et al., 2024). It serves as both a mark that is representative of components of the athlete's brand image (Arai et al., 2014), and a symbol that can be used to elevate brand awareness through its usage at times and on inventory when the athlete is unable to be present or utilized (Pedersen et al., 2024). Each of the elements of brand equity (i.e., brand associations and brand awareness; Keller, 1993), are significant components of greater brand knowledge and equity. With how important logos can be for athletes, an examination of how athletes are protecting their most representative symbol (and related brand marks) is needed. As athletes continue to present themselves as unique business entities, and as they utilize many business practices seen in the corporate realm, investigating how athletes embrace trademarks will provide novel insights.

Trademarks and Brand Protection

Trademarks are one of the most valuable assets for athletes and athlete brands (Brown et al., 2019). In

marketing, trademarks are defined as a name, design, slogan, or other identifier used to distinguish goods and services from those owned by competitors (Levy & Rook, 1999). Heightened awareness of brand value by the athletes has led to an immense increase in trademark applications over the past decade (Glaus, 2021). While most trademarks may not be highly profitable, they still serve their primary purpose of protecting the athletes' brand. Today's athletes can safeguard a broad range of their brand through trademark law and have greater enforcement power over their trademarks compared to the average individual (Glaus, 2021).

By registering their trademarks, athletes can protect their personal brand and endeavors federally by preventing unauthorized use and capitalizing on commercial opportunities (Demcak, 2023). Although individuals accrue rights in their marks once they begin using them in interstate commerce, it's immensely easier to protect intellectual property with federal registration. Failure to do so could result in someone else claiming rights to a name or phrase that is associated with an athlete, as such was the case with Jeremy Lin during his meteoric rise with the Knicks (Chase, n.d.). Two individuals were the first to file for trademark applications for "Linsanity" prior to Lin filing his own application, but fortunately Lin was able to gain trademark ownership of the phrase.

Athletes are not required to seek federal trademark registration, or even simple brand-building endeavors. Many athletes do very little to capitalize on the commercial power of their NIL, with just around half of the most famous and wealthy athletes in the world even entering a brand mark into the marketplace, trademarking it aside (Pedersen and Williams, 2022). However, as more athletes have found more successful and efficient ways to capture the equity they are producing, the next logical sequential or supplemental step after brand equity generation is brand protection, which is a process that sport teams and general business entities follow as well. If athletes are just seen as just endorsers like they have been in the past (Thomson, 2006), while they have a brand, there is nothing to federally protect from a trademark perspective. However, once athletes see themselves as business entities with commercial power that can benefit from the sale and promotion of their own products or intellectual property, brand protection via trademarks becomes an import tool for athletes and their brand managers.

Instances where trademarks (or the lack thereof) have proven to be consequential for athletes and their brands have consistently shown up in the media and sport industry. In 2020 Nike settled two disputes with two of the brands' biggest endorsees, basketball star Kawhi Leonard and tennis legend Roger Federer (Cambers & Graf, 2023). Both athletes had recently left Nike for newer endorsement deals, and although it is common for athletes to change endorsers throughout the course of their career, these moves were obviously not appreciated by Nike given the legal battle that ensued in both cases. In both situations Nike decided to retain the trademark to each of the athletes' logos, barring future use of the logo by the athlete. Kawhi Leonard and Roger Federer throughout most of their professional careers have utilized two iconic logos, with Leonard's representing of one of his most well-known brand associations (i.e., his large hands; Chorpenning, 2020), and Federer's displaying his symbolic 'RF' initials. Even though these brand marks were specifically used and created for these athletes, they could not use them in commerce, as they did not own the trademark.

Leonard lost the battle with Nike and was no longer able to utilize his 'Klaw' logo (Chorpenning, 2020), while Nike worked with Federer to eventually transfer ownership back to the tennis star (Cambers & Graf, 2023). Many athletes now have brand marks that they utilize in the marketplace due to the fact that many athletes now operate as business entities themselves (Pedersen & Williams, 2022). Recent incidents such as the aforementioned disputes, in addition to situations where athletes do not fight previous endorsers over logo ownership (e.g., Kyrie Irving, Neymar Jr.), point to a novel phenomenon where athletes are barred from the utilization of a mark representative of themselves as an athlete. The protection does not have to be from an endorser, though, and the mark does not have to be a logo.

Football quarterbacks Lamar Jackson and Troy Aikman have even clashed over the trademark of their jersey number (i.e., eight), given how both of the athletes use this mark and association in commerce (McCann, 2024). Legendary golfer Tiger Woods left a 27-year endorsement with Nike in 2024, and although Woods owned the rights to his iconic TW logo, he decided to embrace a new identity and brand called Sun Day Red. While Nike or his new endorser had no legal issue with the use of this mark, rival sport apparel manufacturer Puma and Tigeraire (a personal cooling device company) have filed trademark disputes with Woods over the use of his new logo (Schiffer, 2025).

These situations prompted the current investigation, as the landscape of brand management from the athlete's perspective provides crucial information for the growing number of athletes deciding to enter their brand marks into the marketplace. The purpose of the current investigation was to examine how athletes were deciding to protect their brand marks, from endorsers or individuals with malicious intent, through the usage of federally registered trademarks. Although protecting a trademark entails monitoring potential improper uses by outside parties, registering a trademark is the first step in protecting a brand.

Furthermore, while registering a trademark is the first step in protecting a brand, it should be noted that it is not the first step in creating a brand. There are myriad ways in which athletes go about generating and bolstering their brand image and brand awareness amongst sport fans and consumers, with no specific timetable or uniform path that an athlete must follow. Athletes can choose to protect their brand marks at any point in their career, with a potential specific metric for recognizing the need for protection unavailable, thus the aim of this investigation. Several high-profile athletes who work with large endorsers (e.g., Nike) will register their trademarks before any public announcement of a logo or phrase is used, but their personal brand image and brand awareness are typically well into their athlete brand lifecycle (Hasaan et al., 209) in these instances.

As athlete brands and personal logos have increased in value, it is important to understand the current landscape of those who have registered marks and what elements of their brands are registered. Thus, this could help inform the current trends and encourage athletes looking to build their personal brand to register and protect their brand in order to fully realize the commercial value. With this in mind, the following research questions have been developed, specifically in the context where athlete logos are most heavily utilized, the National Basketball Association (NBA; Pedersen & Williams, 2022), amongst the athletes that already use a personal brand mark. The variables of salary, career length, and following were utilized as potential metrics that could be both easily tracked and potential indicators of enhanced reasoning behind pursuing a trademark.

RQ1: Is NBA athlete salary positively associated with likelihood of federal trademark registration among athletes who have a personal logo?

RQ2: Is NBA athlete career length positively associated with likelihood of federal trademark registration among athletes who have a personal logo?

RQ3: Is NBA athlete following positively associated with likelihood of federal trademark registration among athletes who have a personal logo?

RQ4: What brand elements do NBA athletes protect with their federal trademark registrations among athletes who have a personal logo?

Methodology

Sample and Procedure

The sample population for the current investigation consisted of NBA athletes, given their high use of personal logos (Pedersen & Williams, 2022) and their prevalence of collaborations with apparel manufacturers (DePaula, 2023). Furthermore, the current investigation sought to understand the differences amongst athletes who currently employ a personal logo, given that this is the symbol that previous disputes have centered around (e.g., Kawhi Leonard). The athlete logo also represents a common, symbolic, and objectively representative attempt to self-brand by the athlete, as athletes are not required to create and/or use a personal logo.

Additionally, the actions of logo introduction and trademark registration are not linear or sequential for many athletes. Athletes may have logos for many years before federally trademarking them, if at all, while some athletes trademark their logo and seemingly never utilize it in the marketplace. While the current sample is restricted to the number of athletes discussed hereafter, this sample is believed to sufficiently represent the athletes that are engaged in trademarking activities, as searches into other NBA athletes' trademark activity was minimal outside of the current list. To construct the appropriate list of NBA athletes to be utilized in the analysis, the roster of each of the 30 NBA teams before the start of the 2023-2024 season was utilized (via [espn.com](https://www.espn.com)). Athlete logo website [logoroster.com](https://www.logoroster.com) was then consulted, which houses a list of basketball athlete logos, indicating a total of 115 NBA athletes on a roster and utilized a personal logo at the start of the 2023-2024 season.

Significant to this investigation was also the knowledge of what official registered trademark activities that athletes and apparel manufacturers engaged in. Understanding official trademark activities can be challenging given the ability athletes have to register trademarks under external entities (e.g., LLC) with either nicknames or unrelated names. However, the approach taken hereafter is believed to have reasonably exhausted the searching capabilities to identify any trademark activity taken by the NBA athletes. The first step was to consult [gerbenlaw.com](https://www.gerbenlaw.com), which hosted a list of professional athletes who have engaged in some form of trademark registration. Evaluating this database produced a list of 36 NBA athletes with logos who utilized a federally registered trademark. The remaining 79 athletes' names and logos were utilized to uncover any further trademark registration on this list. Utilizing the United States Patent and Trademark Office ([uspto.com](https://www.uspto.com)), each athlete's name was searched for using their full name, their first and last names individually, any known nickname of the athlete, their jersey number, their initials, and descriptions of their logos.

After using the aforementioned search logic, five additional athletes were found to have registered their personal logo. Therefore, the final list of 115 NBA athletes who utilize a personal logo was comprised of 74 athletes who have a logo but have not engaged in any trademark registrations, juxtaposed to the 41 that have. In relation to the entirety of the NBA, these numbers represent 13.7% and 7.6% of the league respectively. Although the usage of athlete logos is growing, the number of athlete's employing a personal brand mark is still low in comparison to the number of athletes in the league.

Finally, the metrics of player salary, social media following, and experience were required. Regarding player salary and experience, [espn.com](https://www.espn.com) was again consulted to gather this information for the 115 NBA athletes by the start of the 2023-2024 basketball season. Salary, rather than wealth or contract, was utilized to give a more accurate representation of how money factors into these trademark decisions. Through the use of the experience variable, which represented the number of years athletes have played in the NBA, wealth and/or current contract could present a metric that is less useful given the larger contracts that more recent athletes enjoy. Athlete following in the current investigation is conceptualized as the number of followers that the athlete had on the X platform. Although several different platforms

exist that athletes can utilize to connect with fans (e.g., Instagram, Facebook, TikTok), and while different athletes use different social media platforms to varying degrees, X was chosen as the common metric for this variable as only six athletes did not have a public account.

Analysis

To examine the research questions, several statistical measures and methods were used. To better understand RQ1, RQ2, and RQ3, descriptive statistics were assessed, and both independent t-tests and non-parametric Mann-Whitney U-tests were utilized when appropriate. To better understand RQ4, a content analysis was performed on the type of trademark activity athletes with logos engaged in (only 12 athletes without a logo were found to engage in any trademark activity). Not all athletes trademark their primary logo, as some athletes choose to trademark their name or charity, for example. The content analysis consisted of two independent coders with extensive knowledge of athlete branding tactics and trademark usage. An initial coder meeting was held where the coders discussed the codebook for the investigation. The codebook delineated the process the coders were to adhere to, which consisted of observing an athlete's trademark activity and categorizing each of the potential marks as either an athletes' trademarked logo, name, nickname, philanthropic venture, or other (e.g., restaurant, company), slightly altering Pedersen and Williams' (2022) codebook to the trademark context. The trademark activity of 21 of the 41 athletes (51%) were assessed by both coders, with any disagreements being discussed until agreement of the appropriate trademark category (Pedersen et al., 2024). There is a chance that some brand marks can be confusing or misunderstood, such that a philanthropic logo may be perceived as a personal logo, or that a nickname be mistakenly understood as an actual name. Therefore, the inclusion of an additional coder was purely utilized to ensure that the instances in which confusion about a brand mark arose, scholars were able to identify and correctly categorize a vague brand mark.

Results

A total of 115 NBA athletes possessed a personal logo at the start of the 2023-2024 season. Out of these 115 athletes, 41 engaged in some level of trademark activity (e.g., registering a trademark of their name, logo, foundation). Each of the following analyses compared athletes that do have a logo and utilize registered trademarks to athletes that have a logo but do not have any registered trademarks (see Table 1). A t-test was performed to understand RQ1 and RQ2, which asked about athlete salary and experience and their potential association with registered trademark usage respectively.

Each of the variables met the required assumptions considering the constructs were properly setup (i.e., continuous dependent variable, nominal independent variable, independence of observations), there were no significant outliers, and homogeneity of variance was met for both the variable of salary ($F(1,113) = 3.47, p = .065$) and experience ($F(1,113) = 1.37, p = .244$). Welch's t-test was utilized as it is robust against violations of homogeneity of variance, even though this assumption was met. The result of the first t-test indicated that salary was associated with trademark usage, given that this variable was significantly positively different ($t(113)=3.81, p<.001$) for the athletes that did use a trademark compared to those that didn't, providing insight into RQ1. Conversely, experience had no association trademark usage, given that this variable was not significantly different ($t(113)=1.14, p=.25$) regardless of trademark activity, providing insights into RQ2. This result may be the outcome of more NBA athletes being able to capitalize on their brands at a younger age. With more access to social media, and heightened levels of media attention as well, there are not just one or two superstar athletes that enter into the league each year. The NBA has a steady stream of popular athletes entering into the league each year, potentially offsetting the need for athletes to wait until they are established within the league to capitalize on their brand.

Table 1*Descriptive Statistics*

		<i>N</i>	<i>M</i>	<i>SD</i>
Salary	No Trademark	74	16,184,675.38	13,464,399.48
	Trademark	41	27,312,419.93	15,804,297.03
Experience	No Trademark	74	7.89	4.31
	Trademark	41	8.92	4.84
Following	No Trademark	68	512,728.19	1,150,669.37
	Trademark	41	3,364,231.65	9,004,418.13

An examination of the descriptive statistics for the variable related to athlete following on X indicated that a number of significant outliers existed, and upon further analysis was observed as not being normally distributed like the previous two variables. The skew of this variable was expected, though, as the NBA has a salary cap that limits the players earning potential earnings regarding their salary, and athletes within the league produce a reasonable spread of years from rookie to veteran. However, regarding following, there is no limit or threshold to the popularity that athletes can have on a global platform like X, which leads to outliers and a highly skewed variable. However, these instances of immense fame (e.g., LeBron James has more than 52 million followers) are crucial to the dataset, making the usage of a non-parametric test, such as the Mann Whitney U-test, appropriate. Although the data for this variable is not normal, for both groups the data is heavily positively skewed and represents the same shape. The results of this non-parametric test also indicated that following was a significant associated with trademark usage ($U = 845.5$, $p < .001$), providing insight into RQ3.

Regarding the content analysis, coding by the two coders produced an initial agreement of 72%. This was acceptable, though, as cases where disagreements took place were discussed until each trademark observation was housed in the appropriate category, following the process of Pedersen et al. (2024). Although 72% agreement may be low for more in-depth content analyses, the true benefit of this result was the ability to discuss the vague brand marks in the dataset to ensure they were categorized correctly. Disagreements fully revolved around a lack of knowledge by either one of the coders regarding the specific brand elements of a certain athlete, such as a nickname, component of their image, or marketing campaign being utilized. After educating the other coder on these practices/rationales, agreements on categorization were easily met. The results of the analysis provided insights into RQ4. The categories that were observed to house the most frequent trademark activity regarding the 41 NBA athletes with a logo, were the categories of athlete logo ($n = 25$; 61%), catchphrase ($n = 17$; 41%), other (e.g., business, restaurant; $n = 16$; 39%), nickname, ($n = 15$; 37%), name ($n = 12$; 29%), and foundation ($n = 3$; 7%). Additionally, 11 of the 41 (27%) athletes had their personal logo trademarked by their endorser.

Discussion

The current investigation provides insights into athlete brand protection, specifically in the NBA. Situations where athletes clash with former endorsers and subsequently dispute various aspects of the athlete brand, while few, are important. The results indicate that experience, or number of years professionally competing, was not associated with trademark utilization. This may mean that younger athletes are being instructed to work on, are beginning to understand, or just have more access to, trademark registration. Utilizing the tool of trademark registration early on in their career, even before more advanced stages of their brand lifecycle (Hasaan et al., 2019), warrants further investigation into this phenomenon. There have already been instances where athletes in different sports, and even athletes in the same sport, have produced very similar looking brand marks (McCann, 2024; Pedersen et al., 2024). Trademarks will play a crucial role in the future brand landscape as athletes fight to protect the marks, names, and catchphrases that best represent and are tied to their brand.

A significant positive relationship was also discovered between athletes with higher salaries and number of followers (specifically on X) and protection their brand marks. Paired with the previous finding, this may indicate that rich and famous athletes, regardless of age, are the most likely to protect their brand. While it is important for all athletes to protect their brands, it may be even more consequential for athletes with a smaller following and/or less money to do so. For athletes with smaller fanbases, protecting a brand through the act of registered trademarks can ensure that a valuable avenue for additional revenue (e.g., if the logo/name/catchphrase is used on merchandise or another profitable piece of inventory) is protected.

The findings of the content analysis also reveal the predominant usage of trademarking personal athlete logos. However, when examining this finding in the context of the 90 other athletes with a logo that do not have a trademark, within this dataset there looks to be a lacking emphasis on preparing brand marks to be protected in the marketplace. When stripping away the 11 athletes that have their trademark owned by their endorser (for which each endorser uses the logo on either shoes or apparel), only 14 athletes out of the roughly 540 in the NBA have chosen to federally protect the value of this form of branded intellectual property. Although it is difficult to ascertain the level of effort many athletes (or athlete brand managers) devote to the athlete brand, this may be an indicator that points to the significant opportunity and growth that can be had by athletes that devote more time, effort, and money to specific brand building and brand protecting strategies.

Further examination into this phenomenon through the testing of various hypotheses is needed before any truly practical advice can be given concerning this data. However, the United States Patent and Trademark Office (USPTO) permits the filing of “intent to use” trademark applications, enabling athletes to secure trademarks for their names, slogans, and related elements even if these have not yet been utilized in commerce. To proceed with such applications, applicants need only demonstrate a “good faith intent” to use the marks in commerce and subsequently commence their use. This practice facilitates the comprehensive protection of personal brands. Moreover, athletes should strategically leverage their trademarks to maximize revenue potential. For instance, Michael Jordan, one of the greatest NBA players of all time, has achieved substantial financial success post-career, amassing significant wealth through his brand. Consequently, it may be advisable for both current and future athletes to initiate trademark registrations for their names and associated marks at the earliest opportunity.

Limitations and Future Research

While the NBA provides the best opportunity to examine athlete brand marks as a collective group (Pedersen & Williams, 2022), the sample was small. Conducting the study when even more athletes and brands utilize officially registered trademarks would be valuable. Additionally, the language in the

contracts between the endorser and the athlete are private commodities and therefore may entail certain uses or ownership agreements not known to the public. Finally, future research should look to further evaluate related questions regarding athlete brand mark ownership and protection. Qualitative examinations may prove most beneficial in this regard, as more in-depth information and rationales may not be revealed through quantitative examinations. Utilizing similar studies in other sports may provide useful evidence as well, given that Roger Federer had a similar dispute with Nike to Kawhi Leonard, though he plays tennis not basketball.

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Parental Priorities and Performance Pathways: Analyzing the Influence of Pseudoscientific Beliefs in Youth Sport Development

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Abstract

This study explores how parental beliefs shaped by popular frameworks like deliberate practice and the *10,000-hour rule* influence youth sport experiences. Findings reveal parents' strong endorsement of structured, high-intensity training correlates with increased involvement but not necessarily sustainable practice or participation. Such beliefs may be associated with greater parental management, which may have implications for child autonomy and intrinsic motivation, essential for long-term engagement and wellbeing. The study highlights a cultural tension where performance-driven approaches overshadow developmental needs like play, creativity, and emotional growth. Despite widespread parental belief in sport's life-skill benefits, actual internalization by children remains limited. These results call for a reframing of youth sport practice, emphasizing exploration, autonomy, and holistic development over rigid performance metrics. The findings support shifts toward autonomy-supportive coaching and balanced sport ecologies that nurture resilience, curiosity, and identity, ultimately promoting sustained athlete growth and wellbeing beyond mere achievement.

Keywords: youth athlete development, performance culture, deliberate practice, golf

Introduction

The opportunity for businesses and brands to become regional, national, or even international entities has never been greater than it currently is, given the proliferation of social media and advances in certain technologies (e.g., digital marketing, supply chain). With the growth in both the quality and quantity of nationally relevant brands, the need for federal protection regarding brand marks has also grown. In 2000,

there were over one million active trademark registrations in the U.S. Comparatively, there were over 3.25 million active trademark registrations in 2024, more than 600 thousand than even four years prior (Gerben, 2024). It is evident that many business entities recognize the crowded marketplace in which they operate within, and understand the benefits of utilizing federally registered trademarks to protect the most salient visual elements of their brand, their logos and brand marks (Park et al., 2013).

Over the past two decades, the theory of deliberate practice pioneered by psychologist K. Anders Ericsson has significantly influenced scholarly discourse on talent development, skill acquisition, and expert performance. At its foundation, the theory asserts that exceptional achievement is not primarily a function of innate ability but rather the product of sustained, effortful, and highly structured practice over an extended period (Ericsson et al., 1993). In this framework, deliberate practice is defined as a goal-directed, feedback-informed activity that pushes the learner just beyond their current level of competence, conducted with the specific aim of improvement.

Ericsson's empirical contributions challenged long-standing beliefs about natural talent, reframing expertise not as an inborn trait but as a developmental outcome shaped by environment, opportunity, and effort. His findings emphasized the importance of access to high-quality instruction, early and consistent engagement in domain-specific activities, and the presence of motivational and social support systems (Ericsson et al., 2018). This paradigm shift redirected attention from fixed notions of *giftedness* toward dynamic experience-driven models of performance. Public interest in Ericsson's research grew exponentially following the publication of Malcolm Gladwell's *Outliers* (2008), which popularized the so-called *10,000-hour rule*. According to Gladwell's (2008) interpretation, mastery in any domain could be achieved through the accumulation of approximately 10,000 hours of focused practice. While this heuristic effectively communicated the importance of effort to a broad audience, it also introduced significant oversimplifications. Notably, it failed to capture the conditional, domain-specific nature of Ericsson et al.'s (2018) work and neglected critical variables such as instruction quality, individual differences, and developmental timing (Macnamara et al., 2014). The widespread adoption of this simplified narrative has had particular resonance in youth sport culture. Parents, coaches, and administrators often interpret success as the predictable outcome of intense, repetitive training fueled by grit, sacrifice, and early specialization. Within this logic, athletic talent is treated as a resource to be engineered through careful planning and sustained exertion, frequently at the expense of developmental balance and psychological wellbeing (Bailey & Collins, 2013; Côté et al., 2009). Such beliefs have contributed to the proliferation of year-round training regimens, early talent identification programs, and high-pressure environments that may undermine long-term athletic development and personal growth.

This study presents a focused case analysis aimed at critically interrogating this dominant framework. Specifically, it investigates the extent to which parents of young athletes subscribe to the belief that athletic success is primarily determined by deliberate practice and perseverance. Through an interdisciplinary lens that integrates developmental psychology, sport pedagogy, and sociocultural theory, the research explores how lay interpretations – and often misinterpretations – of psychological science have shaped parental expectations and youth sport programming. The paper is structured in two main sections. The first offers a comprehensive literature review that traces the diffusion of simplified or pseudo-scientific ideas about talent, effort, and expertise. This section examines how key empirical findings have been translated into reductive cultural narratives, often disconnected from the original research contexts. Particular attention is paid to how performance metrics, competitive norms, and neoliberal ideals around individual responsibility have contributed to a belief system in which effort is perceived as both the necessary and sufficient condition for success (Kane et al., 2021; Karlsson et al., 2023). The second section provides an empirically grounded counternarrative. Drawing on insights from longitudinal studies and developmental science, we outline what parents genuinely need to understand to support healthy, sustainable, and age-appropriate athletic development in their children. This includes

a discussion of multisport participation, autonomy-supportive coaching, motivation theory, and the importance of psychosocial wellbeing in the cultivation of long-term athletic engagement (Fraser-Thomas et al., 2008; Ryan & Deci, 2000).

To guide the empirical portion of this study, the following research questions were developed:

RQ1: To what extent do parents of junior golfers endorse beliefs associated with popularized interpretations of deliberate practice and the 10,000-hour rule?

RQ2: How are parental beliefs associated with reported parenting behaviors related to youth sport participation (e.g., practice structure, tournament attendance, training oversight)?

RQ3: Are parental beliefs regarding structured practice associated with parent perceptions of child psychological traits, such as grit?

Given the exploratory nature of this study and the limited sample size, no directional hypotheses were specified. Instead, the study aims to identify patterns of association that may inform future research on parental belief systems and youth sport development. Ultimately, this investigation sought to illuminate the double-edged nature of cultural narratives surrounding grit, effort, and deliberate practice. While such narratives may promote perseverance and goal orientation, they can also foster unrealistic expectations, overtraining, and burnout, especially when applied uncritically in the context of youth sport. By contrasting popularized interpretations of deliberate practice with a more nuanced evidence-based understanding of child and adolescent development, this study aimed to reframe the discourse around athletic excellence.

Rather than conceiving youth sport as a linear, quantifiable path to mastery, this paper advocates for a more holistic perspective, one that values balance, intrinsic motivation, psychological safety, and the complex contextual realities that shape athletic trajectories. Junior golf provides a particularly relevant context in which to examine parental belief systems about deliberate practice and structured training. Unlike many youth team sports, golf development frequently involves individualized coaching, significant financial investment, and high levels of parental logistical support. These structural characteristics may intensify parental involvement in practice scheduling, tournament participation, and coaching decisions. As a result, junior golf offers a useful case study for examining how popularized narratives about deliberate practice and skill accumulation may translate into parenting behaviors within youth sport environments.

Literature Review

The Rise of Misapplied Developmental Models in Youth Sport

Over the past several decades, the popular understanding of youth athletic development has been shaped more by culturally resonant myths and reductive heuristics than by empirically grounded developmental science (Williams & Hodges, 2005). Central among these is the Long-Term Athlete Development (LTAD) model, widely adopted in institutional sport planning across North America and Europe. Originally conceptualized within state-run sport systems – particularly in the Soviet Union – LTAD functioned as a national policy framework aimed at maximizing elite athletic output (Lloyd et al., 2015). Balyi et al.'s (2013) version of the model, with its discrete stages (e.g., FUNdamentals, Training to Train, Training to Compete, Training to Win), offered a seemingly coherent developmental roadmap. However, the transposition of LTAD from elite athlete pathways to general youth sport contexts has led to a range of developmental mismatches and misapplications (Farrow & Buszard, 2017; Varghese et al., 2022). This misapplication reflects a broader cultural tendency to frame childhood as a phase to be optimized rather

than experienced. In increasingly competitive and commercialized youth sport ecosystems, LTAD is frequently interpreted as a rigid, prescriptive sequence rather than a flexible guide adaptable to individual needs. The linear logic of *early investment equals future success* dovetails with dominant societal ideologies emphasizing performance, meritocracy, and quantifiable achievement (Twenge & Campbell, 2009). As a result, youth sport has been recast as a proving ground not only for child talent but for parental competence and aspiration.

This cultural shift must be situated within changing parental ideologies, particularly those shaped by rising fears about child safety and declining social trust. In response, parents increasingly sought adult-supervised, institutionalized settings as safer alternatives. Youth sport – with its boundaries, coaches, and credentialing – offered a seemingly secure and socially sanctioned developmental space (Spaaij & Schulenkorf, 2014). Parental participation in these systems is not merely logistical but deeply ideological. Structured sport came to symbolize both safety and self-actualization – sites where children could be kept away from perceived threats while simultaneously cultivating discipline, character, and upward mobility.

The scientific veneer to these parental practices arrived in the form of K. Anders Ericsson's theory of deliberate practice. His landmark study on violinists concluded that expert performance was primarily the result of sustained, effortful, and targeted practice rather than innate talent (Ericsson et al., 1993). The suggestion that elite musicians had accumulated around 10,000 hours of such practice by early adulthood became an alluring metric. Gladwell (2008) further amplified this idea for popular audiences, coining the now-infamous *10,000-hour rule*. Yet, this simplification belied the complexity of Ericsson's et al.'s (1993) findings. In turning a probabilistic trend into a deterministic formula, Gladwell (2008) overlooked significant individual variability and the myriad sociocultural and psychological variables mediating performance (Hambrick et al., 2020). Parents, already primed by cultural narratives of control and optimization, readily adopted this metric as a developmental target. Correspondingly, training hours became both the currency and the moral proof of good parenting.

However, empirical scrutiny has steadily undermined the universality and determinism of the deliberate practice model. Gobet and Campitelli's (2007) study of chess players revealed a wide variation in the hours required to reach master-level proficiency – ranging from 3,016 to 23,608 hours – an eightfold difference that highlights the influence of factors beyond practice alone. Their correlation between deliberate practice and skill level ($r = .42$) represents only a moderate relationship. Further, Macnamara et al.'s (2014) meta-analysis across multiple domains found that deliberate practice accounted for just 1% of variance in elite-level performance in sport. These findings suggest that while practice is necessary, it is far from sufficient. Factors such as genetics, socioeconomic access, psychological resilience, emotional support systems, and even sheer chance play crucial roles in shaping developmental trajectories.

Coaching Gaps and the Transmission of Misconceptions

Ironically, many coaches – the supposed translators of developmental science – lack a robust understanding of skill acquisition theory themselves. In fact, extant research has found significant gaps in coaches' comprehension of motor learning principles, particularly among those working in golf and other early-specialization sports (Grecic & Collins, 2012; Grecic et al., 2013). Without a firm grasp of developmental science, even well-meaning coaches often reproduce simplified or outdated models, further entrenching misinformation within both coaching and parental communities (Reade et al., 2010). The appeal of the grit narrative which positions success as a function of self-discipline, effort, and delayed gratification persists not because it is scientifically sound, but because it resonates with broader cultural values of personal responsibility and moral worth (Brylinsky, 2010; Duckworth & Quinn, 2009). For many

parents, promoting grit through rigorous sport participation is not just about optimizing their child's potential but performing virtue through effort.

The Commercialization of Pseudoscience

The proliferation of the deliberate practice myth has also been materially incentivized by the rapid commercialization of youth sport. In 2025, the youth sport industry in the United States was valued at \$40 billion, encompassing specialized training academies, private coaching, showcases, and elite travel teams (Drape & Belson, 2025). Many of these enterprises cite decontextualized or oversimplified scientific findings to market services, reinforcing pseudoscientific narratives while profiting from parental anxieties. Consequently, pseudoscience is no longer just a set of mistaken beliefs. Rather, it has become embedded within the economic and institutional architecture of youth athletic development. The very structures that shape children's sporting experiences are often misaligned with evidence-based developmental principles and may even incentivize approaches that are psychologically and physically detrimental.

In contrast to these reductionist models, a growing body of research from developmental psychology, sport pedagogy, and educational theory underscores the centrality of autonomy, intrinsic motivation, and unstructured play in promoting long-term engagement and well-being (Gray et al., 2023; Wulf & Shea, 2002). These dimensions, historically marginalized in performance-centric discourses, are now recognized as foundational to healthy development. Gray et al.'s (2023) summary review presented compelling evidence that the erosion of self-directed play has contributed to rising anxiety, depression, and emotional dysregulation in youth sports. Similarly, Twenge and Park (2017) identified the displacement of autonomous activity by adult-organized programming as a key factor in declining adolescent mental health. Even structured interventions intended to help children may backfire when misaligned with developmental needs. Historical research also illustrates that well-intentioned interventions can produce unintended developmental consequences, as research demonstrates structured mentorship programs often do not produce expected developmental benefits and, in some cases, are associated with detrimental long-term outcomes (McCord, 1978, 2007). Such research underscores the importance of aligning youth interventions with developmental principles, shifting from assumptions that increased parental involvement improves outcomes.

Youth Sport Design and Parenting

A growing number of studies now emphasize the need for Positive Youth Development (PYD) frameworks that prioritize holistic growth over performance metrics. These models emphasize life skills, community belonging, and self-efficacy, outcomes that are less tangible but more predictive of long-term success and wellbeing (Grecic & Collins, 2012). Upenieks et al.'s (2024) longitudinal study of nearly 4,000 participants demonstrated that sustained voluntary sport participation in adolescence is associated with improved adult mental health. Critically, those who dropped out early citing pressure, burnout, or lack of enjoyment experienced significantly poorer outcomes. These findings reinforce that participation alone is insufficient. The conditions under which youth engage with sport – namely autonomy, joy, and intrinsic motivation – are essential. In response, scholars have argued for a redefinition of supportive parenting in youth sport. Rather than managing performance, parents should prioritize emotional attunement, encourage exploratory learning, and support identity formation (Kramers et al., 2023). Children are not linear systems to be optimized through inputs of time and money but rather dynamic and adaptive individuals whose development is shaped by complex interactions between biology, environment, and personal meaning-making (Bandura, 1965; Rotter, 1966).

The prevailing models of youth athletic development – fueled by pseudoscience, cultural anxiety, and commercial interests – have led to the widespread adoption of practices that often undermine the very

goals they aim to achieve. The myth of the 10,000-hour rule, the valorization of grit, and the misapplication of LTAD have created a youth sport culture that prioritizes performance at the expense of psychological wellbeing. A growing interdisciplinary consensus calls for a paradigmatic shift. The most reliable predictors of athletic and personal success are not repetition or regimentation, but autonomy-supportive relationships, meaningful engagement, and self-regulated exploration (Bandura, 1965; Mischel & Ebbsen, 1970). Moving beyond simplistic and deterministic models toward more nuanced, evidence-based frameworks is critical to not only supporting athletic excellence, but to safeguarding the developmental integrity and human potential of the children who pursue it.

Methodology

This study utilized a cross-sectional survey design to explore the relationship between parental beliefs about youth sport development and specific parenting behaviors related to their children's involvement in competitive junior golf. Conducted in collaboration with the Southern Texas Section of the Professional Golfers' Association (PGA) during the Spring of 2024, the research employed a digital survey format to enable broad and asynchronous participation. This approach minimized access barriers for a geographically dispersed population and is a common methodology in sport psychology and education research for identifying correlational trends at a single point in time (Creswell & Creswell, 2017). The participants comprised parents or legal guardians of junior golfers actively engaged in the Southern Texas PGA's youth development programs. Recruitment occurred via an email invitation sent through the organization's official parent mailing list. Eligibility criteria required respondents to be at least 18 years old and to have a child currently enrolled in competitive junior golf. A total of 48 parents completed the survey in entirety and were included in the final analysis. Participation was voluntary and uncompensated.

Data Collection

Data collection was conducted through a modified 22-item online questionnaire developed by the research team in consultation with experts in sport psychology and youth athletic development. Hosted on a secure *Qualtrics* platform, the survey remained open for four weeks. The instrument incorporated both closed-ended and Likert-scale items to assess constructs relevant to the study including parental beliefs about talent development, parenting behaviors related to sport involvement (e.g., frequency of attendance at competitions and practice sessions, training oversight, financial investment in coaching or equipment), perceptions of child traits such as grit and motivation (adapted from the Grit-S scale; Duckworth & Quinn, 2009), and demographic characteristics (e.g., parent gender, age, race/ethnicity, marital status, education, household income, former athlete status – defined as competitive sports participation beyond high school). Parental beliefs around talent development were solicited with reference to popular psychological frameworks such as Gladwell's (2008) 10,000-hour rule and Ericsson et al.'s (1993) theory of deliberate practice. The survey was pilot tested with five parents from a similar youth sport organization to ensure clarity and face validity, resulting in minor revisions to improve item wording and layout before formal distribution.

Data Analysis

Descriptive statistics summarized demographic variables and baseline characteristics. Pearson product-moment correlation coefficients were computed to examine relationships between parental beliefs and reported behaviors. Dependent variables included children's weekly training hours, frequency of parental involvement in practices and tournaments, psychological traits of the child (e.g., grit), and the financial and logistical support provided by parents. All analyses were conducted using SPSS Version 28.0, with a significance threshold set at $p < .05$. In cases of non-normal distribution, Spearman's rho was used as

a non-parametric alternative. Participation was entirely voluntary, with electronic informed consent obtained prior to survey commencement. Participants were informed of their right to withdraw at any time without penalty. No personally identifiable information was collected, and all data were anonymized to ensure confidentiality.

Results

This study analyzed responses from a sample of 48 parents of junior golfers affiliated with the Southern Texas PGA. Statistical models were adjusted for demographic covariates, including parent gender, age, race/ethnicity, marital status, education level, and former athlete status. The results below summarize the observed correlations between specific parental beliefs and parenting behaviors relevant to their child's sport development. A further summary of findings can be found in Table 1.

Table 1

Summary of Key Findings

Parental Belief	Behavioral Outcome	<i>r</i>	<i>p</i>
Deliberate Practice	Weekly practice hours	.33	<.05
Deliberate Practice	Tournament attendance	.27	<.05
Deliberate Practice	Training oversight	.35	<.05
Daily Training	Practice hours	.28	<.05
Daily Training	Tournament attendance	.40	<.01

Parental Beliefs & Practice Behaviors

Analysis of parental beliefs and their relationship to practice behaviors revealed several nuanced patterns. In terms of the number of practice days per week, most parental beliefs demonstrated weak or inconsistent associations. However, two specific beliefs reached statistical significance. Parents who believed that hiring a private golf coach is necessary were more likely to report a higher number of weekly practice days ($r = 0.17$, $p < .05$). In contrast, those who held the belief that daily training guarantees success were paradoxically associated with fewer weekly practice days ($r = -0.23$, $p < .05$). This counterintuitive finding may reflect a disconnect between aspirational belief and logistical or emotional realities, such as overscheduling, time constraints, or early signs of athlete burnout (Fraser-Thomas et al., 2008).

When examining weekly hours of practice, stronger associations emerged. Parents who endorsed the concept of deliberate practice, as outlined by Gladwell (2008) and rooted in Ericsson et al.'s (1993) foundational work, were significantly more likely to report higher weekly practice hours ($r = 0.33$, $p < .05$). Similarly, belief in daily training also correlated positively with time invested in practice ($r = 0.28$, $p < .05$).

These findings indicate that endorsement of structured, consistent, and effortful training aligns with greater time investment from children, supporting previous research on the behavioral manifestations of deliberate practice ideology (Macnamara et al., 2014).

Parental attendance at training sessions showed modest but positive correlations with belief in deliberate practice ($r = 0.19$) and the value of hiring a private coach ($r = 0.17$). While not statistically significant, these trends suggest that parents who emphasize expert guidance and structured training are more likely to be present during practice sessions, reinforcing a hands-on developmental approach. Stronger associations were observed in relation to tournament attendance. Parents who endorsed the key message of Gladwell (2008) were significantly more likely to attend tournaments ($r = 0.27, p < .05$), as were those who believed in the necessity of daily training ($r = 0.40, p < .01$). This pattern suggests that parents who equate success with repetitive, high-effort engagement are more likely to seek out competitive environments, potentially viewing tournaments as markers of developmental progress (Bailey & Collins, 2013).

Active parental oversight of training was positively correlated with multiple belief systems. Specifically, belief in deliberate practice ($r = 0.35, p < .05$), belief in the value of playing many tournaments ($r = 0.37, p < .05$), and belief in daily training ($r = 0.27, p < .05$) all predicted higher levels of parental involvement in planning or supervising training sessions. These results suggest that structured, performance-oriented belief systems often translate into more directive parenting styles in the athletic context. Finally, parent-reported child grit scores were significantly associated with several parental beliefs. Positive correlations were found with belief in deliberate practice ($r = 0.37, p < .05$), hiring a private coach ($r = 0.35, p < .05$), and daily training ($r = 0.37, p < .05$). These findings suggest an association between parental belief systems and parent-reported child perseverance. This aligns with existing literature linking high parental expectations and structured support to the emergence of psychological resilience (Duckworth & Quinn, 2009; Ryan & Deci, 2000). However, it is important to note that causality cannot be inferred from these correlations alone.

Interpretation of Specific Beliefs & Behavioral Outcomes

Moving beyond isolated correlations, the study also examined how individual beliefs functioned within larger systems of parenting logic. The belief in Gladwell's (2008) *10,000-hour rule* was significantly associated with greater parental attendance at tournaments ($r = 0.27, p < .05$). This suggests that parents who believe success is primarily the result of accumulated hours of practice may view competitive exposure as integral to development. However, this belief was not significantly correlated with other behavioral metrics (e.g., training frequency, grit), suggesting a possible disconnect between ideology and applied parenting strategy.

General resonance with the themes of Gladwell (2008) without specific endorsement of the 10,000-hour principle did not predict any significant behavioral outcomes. This finding reflects a broader phenomenon in the public understanding of research, wherein affective agreement with psychological theories often fails to translate into concrete action or implementation. In contrast, belief in deliberate practice was the most behaviorally consistent and integrated belief across all measures. This belief was significantly correlated with increased weekly practice hours, tournament attendance, parental training oversight, and child grit. These patterns reflect the cohesive logic of deliberate practice as originally theorized by Ericsson et al. (1993; i.e., goal-directed, feedback-rich, effortful repetition). However, while structured involvement can foster developmental gains, it may also carry risks of overregulation and diminished child autonomy if not tempered by attention to intrinsic motivation and psychological wellbeing (Ryan & Deci, 2000).

The belief that children should play many tournaments correlated positively with parental oversight of

training ($r = 0.37, p < .05$) but exhibited a slight negative correlation with child grit ($r = -0.12$). This may indicate that an overemphasis on competitive exposure, rather than skill development or enjoyment, could undermine intrinsic motivation or heighten performance anxiety, particularly in younger athletes (Côté et al., 2009). Belief in the value of hiring a private coach was associated with more frequent practice days ($r = 0.17, p < .05$), increased parental attendance at training sessions ($r = 0.17$), and higher grit scores in children ($r = 0.35, p < .05$). This aligns with models of high-investment parenting, in which external expertise is mobilized as a developmental resource (Kane et al., 2021). However, the long-term outcomes of such strategies likely depend on the child's emotional experience and sense of agency within these externally structured systems.

Finally, belief in daily training exhibited the most consistent and wide-ranging behavioral effects. It was positively associated with greater weekly practice hours, tournament attendance, parental oversight of training, and child grit. Interestingly, it was negatively associated with the number of practice days per week ($r = -0.23, p < .05$). This paradox may reflect the tension between rigid expectations and lived realities, where parents committed to daily training ideals may find them difficult to sustain, leading to overcompensation in intensity or eventual disengagement. This dissonance highlights a recurring theme in intensive parenting: that rigid belief systems can clash with children's developmental needs and limit flexibility in family routines (Fraser-Thomas et al., 2008; Côté et al., 2009).

Discussion

This study set out to examine how parental beliefs about youth athletic development – particularly those influenced by popular psychological frameworks such as deliberate practice and the 10,000-hour rule – shape parenting behaviors and, by extension, youth sport experiences. The findings reveal a landscape shaped not only by parental aspirations, but also by cultural narratives that prioritize optimization, competition, and performance over developmental coherence. While the theory of deliberate practice (Ericsson et al., 1993) offered a paradigm-shifting view of expertise grounded in structured, goal-directed effort, its popular translation has often been reductive. What began as a nuanced model of expert performance has, in many circles, been distilled into a rigid formula that achievement is a simple function of accumulated hours (Gladwell, 2008). Our data suggest that this belief, although widespread, is frequently misapplied in youth sport settings, particularly by well-intentioned parents who translate it into managerial approaches to their children's training.

Parent participants in this study who strongly endorsed beliefs in daily training, frequent competition, and the necessity of private coaching were significantly more likely to take an active role in structuring their child's athletic routines. These behaviors included overseeing training, attending competitions, and making deliberate efforts to increase practice intensity. On the surface, such involvement may appear supportive or even beneficial. However, the correlational patterns revealed underlying tensions. Although these beliefs were linked to increased child grit, a marker of perseverance, they were not consistently associated with sustainable practice habits or greater frequency of participation. In fact, the belief in daily training was negatively correlated with the actual number of weekly practice days, suggesting a gap between aspiration and reality, possibly due to athlete fatigue, overscheduling, or motivational decline (Fraser-Thomas et al., 2008). In addition, high-performance belief systems appear to extend beyond structured practice to broader parental behaviors. Parents who strongly endorsed performance-oriented narratives were more likely to assume control over tournament schedules, psychological framing, and training logistics. While such involvement may reflect deep commitment, it also introduces the risk of over-parenting, where adult agendas overshadow child autonomy (Grolnick, 2002). Developmental science has repeatedly emphasized that autonomy-supportive environments foster motivation, wellbeing,

and resilience, while controlling contexts tend to produce anxiety, disengagement, and eventual dropout (Côté et al., 2009; Ryan & Deci, 2000).

These findings resonate with broader critiques of the industrialized youth sport model. As Smoll and Smith (2011) argued, when sport becomes a vehicle for adult ambition rather than a space for child growth, its developmental value erodes. The overemphasis on structured, adult-led activities can displace critical components of learning (i.e., play, creativity, peer relationships, intrinsic motivation). Indeed, play is not simply a recreational activity; it is a core mechanism of cognitive, emotional, and social development (Burdette & Whitaker, 2005). Yet, in many contemporary sport environments play has been subordinated to performance and curiosity has been supplanted by compliance. The data from this study also highlights a broader cultural contradiction. While many of the parents surveyed likely experienced relatively unstructured, play-based childhoods, they now find themselves adopting hyper-structured, performance-driven strategies in an effort to *protect* their children's future. This contradiction reflects a kind of developmental dissonance as the intention to support often manifests as pressure, and the pursuit of excellence increasingly overrides a child's own interests or developmental needs.

Recent national data reinforces this observation. The 2024 survey conducted by First Tee and The Harris Poll found that while 93% of parents believe sport helps children acquire life skills, significantly fewer report that their children have actually internalized such values. Only 45% of parents, for example, believe their children have learned honesty through sport while 42% cite work ethic, 39% creativity, 34% open-mindedness, and just 23% curiosity. These gaps reflect a disconnect between aspirations and outcomes, a disconnect that mirrors the patterns observed in this study. Parents may pursue performance-enhancing strategies with the intention of fostering character and success, but in doing so they may inadvertently suppress the very qualities they hope to cultivate. This discrepancy is not merely anecdotal. It signals a larger paradigm in need of reconsideration. A developmental model that equates structure with support and time with progress risks becoming self-defeating. While structure and effort are undeniably important, their developmental value is contingent upon context, meaning, and emotional climate. As Bronfenbrenner (1979) emphasized, development unfolds within interdependent systems (i.e., home, school, peer group, community), each of which is shaped by distinct values, expectations, and relationships. When those systems prioritize outcomes over experience, they compromise the holistic growth of the child.

Accordingly, this study calls for a reframing of what practice means in youth sport. Instead of viewing practice as purely instrumental (i.e., a path to mastery defined by repetition and output), it must be reconceptualized as a space for exploration, self-discovery, and relational growth. Practice should not only hone skills but also nurture emotional resilience, curiosity, intrinsic motivation, and the social competencies that define mature athletes and well-rounded individuals (Light & Harvey, 2017). This reframing is not merely theoretical. It has practical implications for coaches, program administrators, and parents. Programs that prioritize long-term development over short-term performance tend to produce more sustained engagement and lower dropout rates (Côté et al., 2009). Autonomy-supportive coaching practices, peer-led training opportunities, and the intentional inclusion of free play are all empirically supported interventions that promote athlete well-being (Deci & Ryan, 2000; Fraser-Thomas et al., 2008).

Practical Implications

The present findings have several implications for youth sport stakeholders. Primarily, coach education programs would benefit from addressing common misconceptions surrounding deliberate practice and talent development. Providing coaches with clearer frameworks for communicating developmentally appropriate training expectations to parents could reduce pressure for excessive practice or tournament participation. Correspondingly, parent education initiatives within youth sport organizations could assist

in helping families better understand the role of enjoyment and diversified activity in long-term youth athletic development. Workshops or informational materials could clarify that structured practice is only one component of a healthy developmental environment. Sport governing bodies may consider integrating these insights into program design and policy frameworks as developmental models emphasizing balanced participation and athlete autonomy help mitigate pressures associated with performance-oriented parenting cultures.

The implications of this study also align with a growing policy shift. In response to widespread concerns about burnout, overtraining, and early specialization, numerous national sport bodies now advocate for models such as Long-Term Athlete Development (LTAD) and Positive Youth Development through Sport (PYD-S), which emphasize age-appropriate training, psychological safety, and holistic wellbeing (Balyi & Hamilton, 2004; Holt et al., 2017). The findings here support these models, suggesting that performance-centric beliefs may lead to high involvement but also carry developmental risks. Rather than pursuing narrow pathways to elite success, families and sport organizations must embrace a more inclusive and balanced developmental ecology, one that treats young athletes not as products to be optimized but as people to be understood, supported, and inspired.

Limitations

Several limitations should be considered when interpreting the findings of this study. The sample size ($n = 48$) limits the statistical power of the analyses and increases the likelihood that observed correlations may be unstable or sensitive to sample characteristics. As a result, the findings should be interpreted as exploratory rather than definitive. In addition, the study focuses exclusively on parents of junior golfers within one regional PGA youth development system. Youth golf possesses structural characteristics that distinguish it from many other youth sports, including higher financial barriers to entry, greater reliance on private coaching, and individualized competition structures. These features shape parental beliefs and behaviors in ways that differ from team-based sports or lower-cost participation environments. Consequently, the generalizability of these findings to broader youth sport populations should be approached with caution. All key measures were based on parent self-reporting—including assessments of parenting behavior and perceptions of children's psychological traits—introducing potential risks of common method bias and social desirability effects. Future studies would benefit from incorporating multi-informant designs (e.g., athlete self-report, coach assessments) or behavioral observation. Given the cross-sectional design of this study, the ability to draw conclusions about developmental processes or long-term outcomes is also limited. Longitudinal designs would better illuminate how parental belief systems influence youth sport trajectories over time.

Conclusion & Future Research

The findings of this study highlight a fundamental contradiction at the center of contemporary youth sport. The ongoing dominance of high-intensity, structured training paradigms often derived from the logic of deliberate practice (Ericsson et al., 1993) persists in spite of growing evidence that such approaches are increasingly misaligned with the lived developmental needs of children. While the deliberate practice framework was once heralded as a roadmap to excellence, our data suggests it may no longer be tenable either in principle or in application. Rather than refining developmental outcomes, the observed patterns may reflect tensions between performance-oriented parenting beliefs and the lived experiences of youth athletes. These patterns are not simply logistical inefficiencies, but symptoms of a deeper systemic malaise characterized by over-scheduling, reduced autonomy, and an erosion of intrinsic motivation (Gray et al., 2023; Macnamara et al., 2014). Our findings reinforce what a growing body of scholarship has long argued – that youth development cannot be reduced to inputs and outputs, nor can success be engineered through volume alone (Hambrick et al., 2020; Wulf & Shea, 2002). The mechanistic framing

of youth athletes as malleable performers in pursuit of elite status has obscured the psychosocial costs incurred along the way, particularly the narrowing of children's agency, emotional resilience, and capacity for joy in and through sport.

This tension is particularly evident in the strong association found between parental belief in deliberate practice and increased oversight and control. While such involvement is often framed as supportive, our data suggests it may encroach upon the developmental foundations of autonomy and intrinsic motivation – both of which are essential for sustained engagement and well-being (Ryan & Deci, 2000). This over-management risks transforming sport into a site of obligation rather than opportunity, narrowing the developmental benefits it purports to provide. The First Tee and Harris Poll's (2024) survey offers further validation of this trend, revealing widespread parental unease not with sport itself, but with the culture of relentless optimization that has come to dominate it. Although 93% of surveyed parents believe sport promotes vital life skills, far fewer report that their children are actually acquiring them (First Tee & The Harris Poll, 2024). This gap between aspiration and outcome reflects a broader disillusionment. After nearly two decades of chasing the 10,000-hour ideal, families are increasingly questioning whether the sacrifices of time, money, and childhood experience are yielding the promised developmental returns. In retrospect, the deliberate practice model popularized in both academic literature and mainstream culture has functioned less as a scientific framework than as a cultural script. It offered certainty in a world increasingly defined by ambiguity and provided parents a sense of agency amid competitive educational and athletic landscapes (Gladwell, 2008; Spaaij & Schulenkorf, 2014). Yet as with all scripts, its power lies in repetition, not reflection. What emerges now is a need not for more practice, but for deeper questioning.

To meaningfully reimagine the youth sport landscape, future research must move beyond reductionist models of skill acquisition and examine the broader developmental ecologies in which sport is embedded. This includes attending to the psychological, social, and emotional contexts that shape children's experiences, not merely their performance outputs. Emerging research in developmental psychology and sport pedagogy underscores the importance of autonomy-supportive environments, play-based learning, and peer-driven engagement as key predictors of both participation and personal growth (Gray et al., 2023; Upenieks et al., 2024). In addition, more work is needed to understand how parenting beliefs are socially transmitted, culturally reinforced, and institutionally incentivized. Scholars should investigate how economic pressures, media narratives, and commercial sport enterprises shape parental decision-making and developmental expectations (Macnamara et al., 2014). Longitudinal research could also provide insight into how youth athletes' experiences in different sport ecologies influence adult outcomes (e.g., mental health, life satisfaction, the internalization of values). Qualitative inquiry may be especially useful in illuminating the lived contradictions and adaptive strategies of families navigating high-performance sport cultures. Understanding the meaning-making processes of children and parents alike will be essential for designing interventions that honor complexity and promote sustainable engagement.

Ultimately, this study adds to a growing body of evidence calling for a fundamental reevaluation of how success is conceptualized and cultivated in youth sport. The path forward is not merely a matter of refining existing training protocols, but of shifting the underlying assumptions that drive them. Children are not raw material to be optimized through repetition. Rather, they are dynamic, self-organizing individuals whose flourishing depends on environments rich in joy, autonomy, and meaningful relationships (Bandura, 1965; Rotter, 1966). Rather than pursuing excellence through mechanized models of training, future sport systems must foreground the full spectrum of human development. This includes cultivating curiosity alongside competence, resilience alongside rigor, and identity alongside achievement. Only by centering these values can youth sport fulfill its broader promise, not merely as a performance pipeline, but as a formative space for becoming.

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Sensory Stimuli and Crash Imagery in F1's Risk Marketing

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Abstract

F1's one marketing tactic is to promote risk that stimulates spectators' sensory experience. This strategy appeals to spectators' tendency toward sensation-seeking. One intense sensory experience arises from imagining car crashes and collisions, involving multi-sensory imagery that combines diverse types of sensory stimuli. Retrieving cross-sectional data collected at the Korea F1 Grand Prix, this study identified F1 spectators' multi-sensory imagery of car crashes as a valid factor. The study then tested a model in which spectators' perceived sensations through five senses affected multi-sensory imagery, and the imagery, in turn, affected arousal, satisfaction, and intentions to revisit. The results suggest that racing-related sensations significantly influenced their multi-sensory imagery, whereas service-related sensations did not. As risk marketing is controversial, the F1-hosting committee should properly leverage the marketing potential of car crashes, especially in the market where F1 racing is growing.

Keywords: multi-sensory imagery, five senses, risk marketing, sensory experience, Formula One, car crashes

Introduction

F1's recent surge in popularity is partly due to the influx of films and shows, such as Netflix's "F1: Drive to Survive" and the movie "F1," featuring Brad Pitt (Cava, 2025; Hawes, 2024). Also, the US market's additions of Miami and Las Vegas bolstered F1's social media presence, successfully attracting young and female consumers to the sport (Cartwright, 2025). As a result, managing F1's marketing efforts has become even more important.

Korea hosted four F1 events from 2010 to 2013 in Yeongam, a rural area in the southern province. However, they suddenly relinquished hosting the event (Wise, 2013). Several domestic factors contributing to the event's failure included the remote location of the racing track, a limited motorsport culture, and inadequate management by the racing organization (The Chosun Daily, 2010). The primary challenge for Korea's F1 event was financial difficulties (SBS News, 2015), largely due to limited popularity and interest in F1 among Koreans and a low number of domestic event attendees. With the growing popularity of F1, Incheon, South Korea, has formed an F1-hosting committee to resume the race. However, they have faced controversy and criticism (Park, 2025), primarily stemming from the sudden halt of Korea's F1 history. Korea's F1 failures were bound to the contexts specific to the country's underdeveloped sport. To attract a larger domestic fan base, marketing strategies should be tailored to context, not translated from other successful cases. Consequently, research is needed to develop marketing strategies that are applicable to the context of F1 development in Korea. The 2013 F1 Grand Prix was the last opportunity for Korean F1 spectators' live experience to be captured for market research. It remains relevant to the current Korean F1 market.

While the global success of F1 is attributed to several factors, one compelling contributor is F1's rich array of sensory stimuli—watching high-speed racing cars, hearing the roar of engines, and smelling burning tires and oils, to name a few (Chung, 2020; Chung et al., 2015, 2016). Sensory stimuli are loaded on different sensory organs, leading to a physical process known as sensation. Spectators perceive sensations in combination with their cognition and psychological characteristics (Foley & Bates, 2019). Research indicates that spectators' perceptions of the quality and intensity of sensory stimuli significantly impact their emotions, behaviors, and overall experience (Chung, 2020, 2023; Chung & Lee, 2025; Chung et al., 2015, 2016). Sensory marketing is a strategy that engages consumers' five senses—see, hear, smell, touch, and taste (Krishna, 2012). Such marketing—also known as “marketing on five senses”—effectively enhances spectators' evaluations of their experiences by stimulating the relevant senses and satisfying their sensation-seeking tendency. Incheon F1's marketing should spark excitement and anticipation for sensations they have never experienced, vividly illustrating the sensational live experience.

Consumers often engage in their sensory imagery while perceiving sensory stimuli. This process involves mental imagery, where consumers imagine various types of sensory stimuli based on their prior experiences or exposure to similar stimuli (Elder & Krishna, 2024). Multi-sensory imagery is as critical to sensory marketing as live sensory stimuli spark consumers' excitement and arousal in response to specific sensory inputs (Chung et al., 2025). F1 spectators' imagination of car crashes and wrecks during races is a prime example of multi-sensory imagery. Since witnessing high-speed car crashes is a rare occurrence in their daily lives, imagining such incidents plays a significant role in triggering their arousal. This study designates this form of multisensory imagery as F1 spectators' Sixth Sense, defined as an intuitive, sensation-seeking imagination that is predominantly characteristic of F1 spectators. Whereas sensory imagery typically involves input from the five senses, the Sixth Sense integrates spectators' intuitions with their multisensory imagery related to car crashes. It serves as a tool to market car crashes to F1 spectators' intuition and imagination, which is more effective in developing the F1 market base.

Building on this newly developed concept that reflects the intuitive characteristics of F1 spectators, the current study aims to examine the mediating effect of multi-sensory imagery on the relationship between five sensory stimuli and spectators' outcomes. Several studies have suggested that consumers' sensory stimuli shape multisensory imagery (e.g., Chung & Lee, 2025; Lee et al., 2012). F1 spectators are sensualized by each of the five senses, and their perception of the stimuli affects multisensory imagery, generating the following hypotheses.

H1-5: F1 spectators' sensory stimuli in each of the five senses positively affect their multisensory imagery.

Numerous studies have found that consumers' sensory imagery is related to their evaluations of experiences, emotions, and behaviors (Kim et al., 2021). Based on this, the study develops the hypotheses as follows:

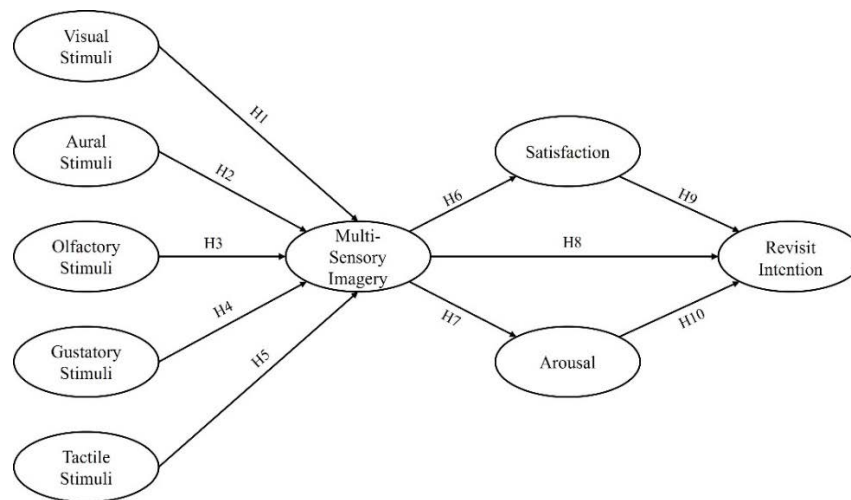
H6-8: F1 spectators' multisensory imagery positively affects their satisfaction, arousal, and race revisit intentions.

H9-10: F1 spectators' satisfaction and arousal positively affect their revisit intentions.

These hypotheses are illustrated in Figure 1.

Figure 1

Research Design



Testing these hypotheses reveals the role of multisensory imagery of car crashes in marketing F1 for an underdeveloped market, such as Korea. The study also highlights the potential of car crash marketing to promote F1 in Korea.

Methodology

Samples and Data Collection

To offer practical, evidence-based marketing insights that can be implemented even before the event, cross-sectional data were collected during the 2013 Formula One Korea Grand Prix. The data are particularly valuable for informing pre-event marketing strategies, given that the event is no longer held. Also, it offers insights into domestic spectators' sensory stimuli and multi-sensory imagery of racing. While F1's international market has been rapidly changing, its market conditions in Korea remain similar to those of a decade ago. Therefore, the data from the 2013 Korean F1 generates marketing implications applicable to the Korean F1 market, without translating cases from other successful F1 races.

Researchers divided the entire grandstand into seven sections, and each researcher was assigned to one section and given 50 surveys. Surveys were administered during the race to capture spectators' fully immersive live stimuli and characteristics. The survey took approximately 5 minutes to complete.

After removing missing and incomplete surveys, a total of 330 questionnaires were collected (a 94% response rate). Of them, 204 (61.8%) were males, and 126 (38.2%) were females. The participants' average age was 33.1. Specifically, 41.3% ($n = 136$) were in their 20s, followed by the groups of 30s (30.4%, $n = 100$) and 40s (13.1%, $n = 43$). Most participants (59.4%, $n = 196$) held a bachelor's degree as their highest level of education. While 33% of the participants ($n = 109$) had prior experience spectating motorsport, 67% ($n = 221$) made their first visit to watch car racing.

Measures

The survey's questionnaires consist of three parts: (1) perceived sensation on five senses (Chung et al., 2015, 2016; Lee et al., 2012, 2013), (2) multi-sensory imagery (Chung et al., 2025), and (3) outcomes of sensory stimuli (Bradley & Lang, 1994; Oliver, 2010; Yoshida & James, 2010). All items were measured on a 7-point Likert-type scale ranging from 1 (not at all) to 7 (very much). The original survey questions were translated into Korean. Linguistic equivalence was maintained by following the International Test Commission's guidelines (2017). Table 1 includes the descriptions, descriptive statistics, and reliability of all items.

Table 1

Item Descriptions, Descriptive Statistics, and Reliability

Constructs (α)	Items (M/SD)	Item-to-total Correlations	Interitem Correlations
<i>To what degree do you perceive the stimuli of...</i>			
Visual Sensation (.74)	seeing a racing car's design (5.94/1.29)	.62	
	seeing racers' outfit (5.80/1.20)	.65	.49
	seeing pit crews' movement (6.25/1.05)	.46	
Aural Sensation (.67)	hearing spectators' cheering (4.73/1.72)	.51	
	hearing game announcement (4.37/1.56)	.51	.51
Olfactory Sensation (.86)	smelling track's asphalt (4.48/1.75)	.60	
	smelling burning oil (4.41/1.70)	.82	.67
	smelling burning tires (4.29/1.69)	.78	
Gustatory Sensation (.91)	tasting various food and drinks (3.00/1.63)	.79	
	tasting quality food (3.24/1.79)	.87	.78
	tasting the concession's food and drinks (3.32/1.77)	.82	
Tactile	seating in a chair (3.46/1.61)	.64	.53

Sensation (.77)	spatial arrangement in spectating (3.29/1.66)	.67	
	a packed crowd (4.10/1.70)	.53	
<i>To what degree do you imagine...</i>			
Multisensory	seeing crashes among racing cars (5.16/1.77)	.58	
Imagery (.74)	hearing racing car crashes (4.91/1.77)	.68	.48
	blasting sound of crashes (5.73/1.48)	.44	
<i>To what degree are you satisfied with...</i>			
Satisfaction (.85)	the experience (4.68/1.71)	.76	
	the decision to attend the event (4.92/1.58)	.81	.66
	the excitement of the experience (4.08/1.67)	.60	
<i>To what degree are you aroused by...</i>			
Arousal (.92)	the experience (5.69/1.30)	.86	
	the stimulation (5.59/1.37)	.80	.79
	the excitement (5.75/1.26)	.85	
<i>To what degree do you intend to revisit...</i>			
Revisit Intention (.92)	this event (4.99/1.63)	.80	
	this event among sporting events (4.62/1.69)	.89	.80
	this event among all events (4.64/1.66)	.85	

Data Analysis

An Exploratory Factor Analysis (EFA) was first conducted to determine whether the observed data were adequately loaded onto the corresponding constructs. Next, Confirmatory Factor Analysis (CFA) was employed to ascertain the structure of the constructs. Lastly, Structural Equation Modeling (SEM) was employed to estimate the path coefficients and their significance for each path in the study.

Results

Exploratory Factor Analysis and Confirmatory Factor Analysis

In the EFA, a total of 26 items over 9 constructs were included for a varimax rotation solution. The analysis resulted in the loading of 78.73%, accounting for 9 constructs. All items were categorized into a corresponding construct as initially designed. Table 2 explains more details of EFA.

Table 2

Exploratory Factor Analysis

	A	B	C	D	E	F	G	H	I
Arousal (A)	.87 .85 .81								
Revisit Intention (B)		.90 .86 .79							
Gustatory Sensation (C)			.93 .89 .87						
Olfactory Sensation (D)				.89 .88 .68					
Satisfaction (E)					.88 .87 .66				
Tactile Sensation (F)						.86 .81 .72			
Visual Sensation (G)							.86 .85 .57		
Multisensory Imagery (H)								.88 .83 .50	
Aural Sensation (I)									.83 .81

Cumulative Loading	10.5 5	20.6 2	30.6 2	39.9 6	48.9 8	57.1 3	64.9 6	72.7 3	78.73
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After conducting EFA, CFA was performed and revealed an acceptable fit, $\chi^2 = 608.40$, $df = 263$, Normed $\chi^2 = 2.31$, $p < .001$, RMSEA = .06, SRMR = .09, CFI = .93, and IFI = .93 (Schreiber et al., 2006). The analysis achieved the construct's convergent validity by three indicators (Fornell & Larcker, 1981). First, the construct's average variance extracted (AVE) exceeded the threshold, ranging from .57 to .80. Second, the construct's composite reliability (CR) surpassed the criteria of .70, ranging from .79 to .93. Third, all the standardized loadings of each construct were significant, ranging from .57 to .94. Therefore, convergent validity was established. In terms of discriminant validity, all the constructs' squared correlations were less than the lowest AVE of .57 (Fornell & Larcker, 1981), thereby indicating the presence of discriminant validity.

Comprehensive Model Testing

The proposed model revealed an acceptable fit, $\chi^2 = 727.95/279$, $p < .001$, CFI = .91, IFI = .91, TLI = .90, RMSEA = .07. SEM revealed that all hypotheses were supported, except for H4 and H5. Each construct's standardized coefficient and explained variance are addressed in Figure 2. Also, all direct, indirect, and total effects and their significances are described in Table 3.

Figure 2

Model Testing Results

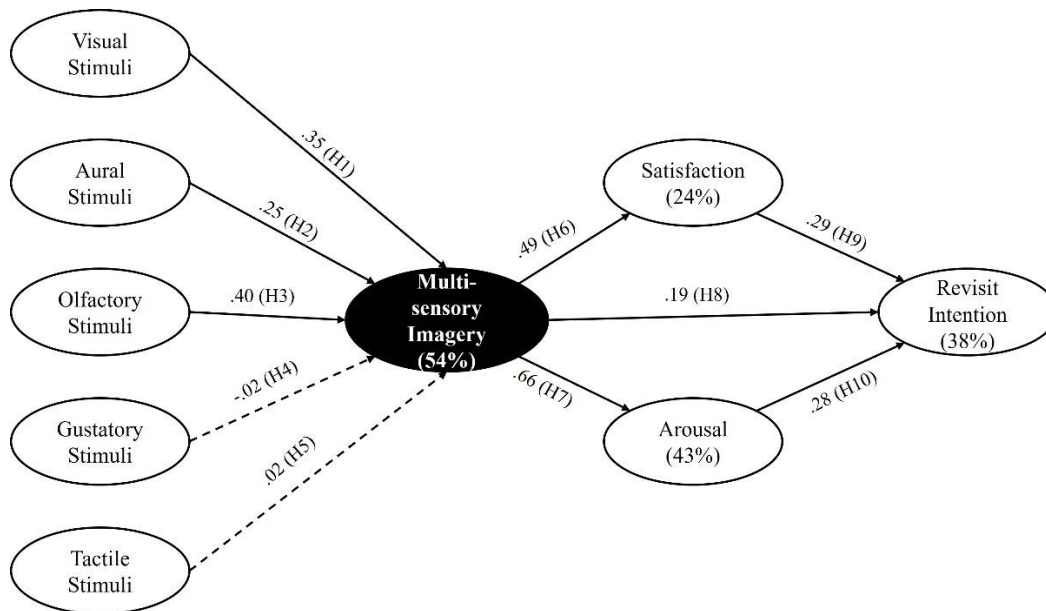


Table 3*Direct, Indirect, and Total Effects*

	Direct Effect	Indirect Effect	Total Effect
On Multi-sensory Imagery			
Visual Stimuli	.35*	-	.35*
Aural Stimuli	.25**	-	.25**
Olfactory Stimuli	.40*	-	.40*
Gustatory Stimuli	-.02****	-	-.02****
Tactile Stimuli	.02****	-	.02****
On Satisfaction			
Multi-sensory Imagery	.49*	-	.49*
Visual Stimuli	-	.17*	.17*
Aural Stimuli	-	.12**	.12**
Olfactory Stimuli	-	.20*	.20*
Gustatory Stimuli	-	-.01****	-.01****
Tactile Stimuli	-	.01****	.01****
On Arousal			
Multi-sensory Imagery	.66*	-	.66*
Visual Stimuli	-	.23*	.23*
Aural Stimuli	-	.16**	.16**
Olfactory Stimuli	-	.26*	.26*
Gustatory Stimuli	-	-.01****	-.01****
Tactile Stimuli	-	.01****	.01****
On Revisit Intention			
Multi-sensory Imagery	.19***	.33*	.52*
Satisfaction	.29*	-	.29*
Arousal	.28**	-	.28*
Visual Stimuli	-	.18*	.18*
Aural Stimuli	-	.13**	.13**
Olfactory Stimuli	-	.21*	.21*
Gustatory Stimuli	-	-.01****	-.01****
Tactile Stimuli	-	.01****	.01****

* $p < .001$ ** $p < .01$ *** $p < .05$ ****not significant

Discussion

The results indicated that F1 spectators' multi-sensory imagery plays a role in transmitting sensory stimuli into their live experience. Specifically, racing-related stimuli (visual, aural, and olfactory) affected multi-sensory imagery. Olfactory stimuli had the greatest impact on multi-sensory imagery, followed by visual and aural stimuli. Service-related stimuli (gustatory and tactile) presented dynamics different from those of racing-related stimuli, not significantly affecting multi-sensory imagery. This finding is consistent with several previous studies that examined the live experience of motorsport spectators (Chung et al., 2015, 2016).

Multi-sensory imagery affected arousal and satisfaction, thus impacting revisit intentions, indicating its effective mediating role between racing-related stimuli and characteristics reflecting the quality of experience. This result confirms that car crash imagery is a valid aspect of the live experience and that it plays a crucial role in shaping F1 spectators' experience. Specifically, spectators are exposed to stimuli

and properly treat them in accordance with their nature. Also, as defined as the Sixth Sense, the crash of multisensory imagery concerns spectators' intuitive nature, which is related to a sensation-seeking tendency. Those findings suggest that sensory stimuli processing and multisensory imagery are stable mechanisms in the context of F1.

Despite its potential to tap into spectators' sensation-seeking tendencies, F1 promoters face the challenge of marketing car crash imagery responsibly. Promoting safety risks often attracts criticism and controversy, which can lead to backlash against the sport (Boyle, 2010; Jenkins, 2010; Pope & Williams, 2011). Therefore, F1 marketers must be cautious when dealing with car crashes and associated risks. By adopting a carefully calibrated approach, they can leverage the inherent drama and tension of competitive racing while shifting the focus toward technological innovation and driver skill.

F1 promoters should develop marketing materials to stimulate sensory imagery by leveraging sensory stimuli. For example, the visual components include the images of flying debris and sparks. Dramatic camera angles of a crash and slow-motion footage can heighten excitement and the desire to experience it live. Sounds are as crucial to sensory imagery as visual factors are. Roaring car engines and attendees' excited reactions are examples of auditory components. Given the decisive role of olfactory stimuli, F1 promoters need to be innovative in marketing and delivering such intangible stimuli. This task is challenging because smelling burnt tire and fuel is confined to a specific racing track. Several consumer behavior studies have suggested that smelling is critical to lived experience and memory, underscoring its role in the immersive experience (Krishna, 2012; Herz, 2004; Morrin & Ratneshwar, 2003). F1 promoters can incorporate recent technologies into their marketing to feature the scent or use storytelling to link the smelling experience with sensory imagery (Lwin & Morrin, 2012; Spence, 2020).

The study provides several practical implications as follows: First, marketing should position crashes not as dangers and accidents but as thrilling drama of speedy racing and drivers. Also, the drivers' resilience can be a featured narrative after being involved in crashes (Turner, 2017). Second, the marketing message should highlight F1's high-stakes nature while reassuring that the risks are controlled by advanced technology and stringent safety measures (Miller, 2012). For example, marketing can feature the coordination and quick reactions of safety crew members, as well as the sport's rigorous crash tests. Lastly, risk marketing should avoid overemphasizing crashes or employing sensationalism to increase viewership or social media engagement. Instead, marketing should accurately present crashes without glorifying danger or risk. Presentations should provide a comprehensive context, explaining the effectiveness of safety measures following a crash and detailing driver recovery processes.

Limitations and Future Study

This study utilized cross-sectional data from the 2013 Korean F1 to develop context-specific marketing strategies. However, the F1 market and its environment have evolved over the past decade. Although the Korean domestic market has not experienced significant changes since 2013, shifts in F1 media coverage and global popularity are likely to have influenced Korean consumers. Consequently, the practical implications of this study should be interpreted with caution.

Future research should employ designs that examine temporal effects on F1 consumers. Longitudinal and experimental approaches may uncover the effects of prior cues and sensations on multisensory imagery, which are not accessible through cross-sectional designs.

Conclusion

In case of Incheon, South Korea, attempting to host F1, they have faced criticism and concerns about the event's long-term sustainability, particularly given the financial shortcomings of past events. The study introduces the concept of F1's *Sixth Sense*, defined as spectators' intuitive imagery of car crashes, and

offers practical recommendations for utilizing this imagery to enhance the overall sensory experience. It is recommended that F1 promoters market this imagery ethically and responsibly. Effective marketing strategies can emphasize F1's advancements in safety, the resilience of its drivers, and the distinctive sensory experiences available exclusively at the racing circuit.

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