

Applying Choice Theory to Prevent Athlete Burnout: A Longitudinal Study on Autonomy and Psychological Needs

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Article Info

Article type:
Research Article

Article history:
Received 25 March 2025
Received in revised
form 02 May 2025
Accepted 12 Jun 2025
Available online 25
July 2025

Keywords:
*athlete burnout, choice
theory, autonomy support,
psychological needs,
longitudinal intervention*

ABSTRACT

Objective: Athlete burnout remains a significant concern in competitive sports, with growing evidence highlighting its detrimental effects on performance and mental health. This study examined the efficacy of a Choice Theory-based intervention in reducing burnout symptoms by enhancing autonomy and psychological need satisfaction among elite athletes. **Method:** Using a longitudinal, randomized controlled design, 156 elite athletes (aged 18–32) from endurance, team, and skill-based sports were allocated to either an 8-week Choice Theory intervention group or a control group receiving standard mental skills training. The intervention incorporated weekly workshops on need identification, cognitive restructuring ("choose to" vs. "have to" thinking), and autonomy-supportive goal setting, alongside coach training in autonomy-supportive communication. Burnout was assessed using the Athlete Burnout Questionnaire (ABQ), while psychological needs were measured via the Basic Psychological Needs Satisfaction in Sport Scale (BPNSSS). Physiological markers (salivary cortisol, heart rate variability) provided objective stress indicators. **Results:** Results demonstrated significant reductions in emotional exhaustion ($p < 0.01$, $d = 0.72$) and sport devaluation ($p < 0.05$, $d = 0.54$) in the intervention group compared to controls at 12-month follow-up. Mediation analysis revealed that increased autonomy ($\beta = -0.38$, $p < 0.001$) and competence ($\beta = -0.29$, $p < 0.01$) fully mediated burnout reduction. Physiological data corroborated these findings, with improved HRV recovery ($p < 0.05$) and lower cortisol levels ($p < 0.01$) in the intervention group. **Conclusions:** These findings support Choice Theory as an effective framework for athlete burnout prevention, emphasizing the critical role of autonomy-supportive environments in sustaining long-term athlete well-being. The study advances current practice by demonstrating that structural changes in coaching approaches—particularly empowering athletes with meaningful choices—can significantly mitigate burnout risk. Future research should explore the generalizability of these effects across diverse athletic populations and cultural contexts.

Cite this article: Fernandes, M.S.; Enoiu, R.S. Applying Choice Theory to Prevent Athlete Burnout: A Longitudinal Study on Autonomy and Psychological Needs. *Functional Research in Sport Psychology*, 2025;2(3):77–92.
<https://doi.org/10.22091/frs.2025.13455.1088>



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Publisher: University of Qom.

DOI: <https://doi.org/10.22091/frs.2025.13455.1088>

Introduction

Athlete burnout has emerged as a critical issue in sports psychology, with growing evidence suggesting its detrimental effects on performance, mental health, and career longevity (1). Defined as a syndrome characterized by emotional exhaustion, reduced sense of accomplishment, and sport devaluation (2), burnout affects athletes across all competitive levels, from youth sports to elite professionals. Despite extensive research on burnout prevention, traditional interventions often focus on external factors such as training load management and recovery strategies, while neglecting the intrinsic psychological mechanisms that drive athlete well-being (3). This gap highlights the need for a paradigm shift toward theories that emphasize internal choice and autonomy, making Choice Theory (4) a compelling framework for understanding and mitigating burnout.

Choice Theory posits that human behavior is driven by the pursuit of five basic psychological needs: survival, love/belonging, power, freedom, and fun (5). When these needs are unmet, individuals experience frustration, leading to maladaptive behaviors—such as burnout—in an attempt to regain control (6). In sports, autonomy suppression (e.g., excessive coach control, rigid training regimens) has been linked to increased burnout risk (7), yet few studies have applied Choice Theory to examine how fulfilling athletes' psychological needs can prevent burnout. A longitudinal approach is particularly valuable, as it captures the dynamic interplay between autonomy, need satisfaction, and burnout progression over time—an area underexplored in current literature (8).

Recent studies present conflicting findings

on the role of autonomy in athlete burnout. While some researchers argue that greater autonomy reduces burnout (9), others suggest that excessive freedom may lead to decision fatigue and stress (10). This contradiction underscores the necessity of a needs-based theoretical lens to clarify how autonomy functions within a broader psychological framework. Furthermore, existing burnout interventions predominantly rely on cognitive-behavioral techniques (CBT) (11), which, though effective, often overlook the self-deterministic aspects of athlete motivation. Choice Theory addresses this limitation by framing burnout as a consequence of unfulfilled needs rather than merely maladaptive thought patterns (12).

The urgency of this research is amplified by the rising prevalence of athlete burnout, particularly in high-pressure environments such as collegiate and Olympic sports (13). A 2024 meta-analysis revealed that 35% of elite athletes exhibit moderate-to-severe burnout symptoms, with higher rates among those in autonomy-restrictive systems (14). Yet, despite these alarming statistics, few evidence-based programs integrate need-satisfaction strategies into burnout prevention. This study fills that void by longitudinally assessing how Choice Theory-based autonomy support (e.g., collaborative goal-setting, flexible training structures) influences burnout trajectories.

The present study also responds to calls for more athlete-centered interventions in sports psychology (15). While self-determination theory (SDT) has dominated need-satisfaction research (16), Choice Theory offers a practical, behavior-focused alternative by emphasizing actionable choices rather than abstract motivational states. For instance, an athlete feeling powerless (a key burnout predictor) may benefit from restructuring their environment

to enhance perceived control—a core tenet of Choice Theory (17). By contrast, SDT-based interventions often prioritize intrinsic motivation without providing concrete behavioral tools (18), leaving a critical implementation gap.

Methodologically, this study advances burnout research by employing a 12-month longitudinal design, addressing a key limitation of cross-sectional studies that cannot establish causality (19). Prior research has relied heavily on retrospective self-reports, which are prone to bias (20). Here, we integrate biometric indicators (e.g., cortisol levels, heart rate variability) with psychological surveys to objectively track burnout progression—an approach endorsed in recent sport science literature (21).

In summary, this study makes three pivotal contributions:

1. It is the first to operationalize Choice Theory in athlete burnout prevention, bridging a theoretical gap between psychology and sports science.
2. It resolves contradictions in autonomy-burnout literature by contextualizing freedom within a needs-based framework.
3. It provides empirically validated strategies for coaches and sports organizations to reduce burnout through autonomy-supportive environments.

By aligning athlete well-being with actionable psychological principles, this research not only expands theoretical discourse but also delivers practical solutions to a pervasive issue in modern sports.

Materials and methods

Research design

This study employed a 12-month longitudinal, mixed-methods design to examine the effects of a Choice Theory-based intervention on athlete burnout, autonomy,

and psychological need satisfaction. The design incorporated three waves of data collection (baseline, 6-month, and 12-month follow-ups) to track temporal changes in burnout symptoms while controlling for covariates such as training load and competitive stress (22). A stratified randomized controlled trial (RCT) approach was used, with participants allocated to either the experimental group (Choice Theory intervention) or control group (standard coaching practices) based on sport type (individual vs. team) and baseline burnout scores (23). This design aligns with recent recommendations for longitudinal burnout research (24) and addresses limitations of cross-sectional studies that cannot establish causality (25).

Participants

The study recruited a cohort of 156 elite athletes, ranging in age from 18 to 32 years, through partnerships with Olympic training centers and Division I collegiate programs across the United States and Europe. The participant pool comprised athletes from three distinct sport categories: endurance sports (including marathon runners and competitive swimmers, $n=52$), team sports (featuring soccer and basketball players, $n=64$), and skill-based sports (encompassing gymnasts and tennis players, $n=40$). To ensure methodological rigor and sample homogeneity, stringent inclusion criteria were implemented, mandating that all participants possess a minimum of five years of competitive experience at elite levels and maintain a current training regimen of at least 12 hours per week. Additionally, potential participants were screened using the Athlete Burnout Questionnaire (ABQ) to exclude individuals with pre-existing clinical diagnoses of burnout, with cutoff scores established according to the standardized criteria developed by Raedeke and Smith

(26). The longitudinal nature of the study demonstrated strong participant retention, with an 87% completion rate at the 12-month follow-up period, a figure that aligns with retention rates reported in comparable longitudinal investigations of athlete burnout (27). This robust retention rate suggests both the feasibility of the study protocol and the engagement level of participating athletes throughout the extended research period. The demographic distribution across sport types and the high adherence to study protocols provide confidence in the generalizability of findings to elite athletic populations across multiple sporting disciplines.

Tools and Measures

1. Athlete Burnout Questionnaire (ABQ)

The study employed multiple validated instruments to comprehensively assess athlete burnout and psychological needs. The primary assessment tool was the Athlete Burnout Questionnaire (ABQ), recently revised by Raedeke and Smith (28), which evaluates three critical dimensions of burnout syndrome. The emotional exhaustion subscale captures feelings of sport-related fatigue through items such as "I feel overly tired from my sport," while the reduced accomplishment dimension assesses perceived performance declines with statements like "I am not achieving much in my sport." The sport devaluation component measures waning interest in athletic participation through items including "I am less interested in my sport than before." Extensive psychometric evaluation of the ABQ has demonstrated excellent internal consistency, with Cronbach's alpha coefficients ranging between 0.89 and 0.92 across multiple athlete populations (Madigan et al., 2024). The measure also shows strong temporal stability, evidenced by a test-retest

reliability coefficient of 0.81 over a three-month period (29). Furthermore, the ABQ's convergent validity has been established through significant correlations with physiological stress markers, particularly demonstrating a robust association ($r = 0.76$, $p < 0.01$) with salivary cortisol levels in elite athletes (30).

2. Basic Psychological Needs Satisfaction in Sport Scale (BPNSSS)

Adapted from Ryan & Deci (31). To evaluate fundamental psychological needs, the study utilized the Basic Psychological Needs Satisfaction in Sport Scale (BPNSSS), a 15-item instrument adapted from Ryan and Deci's (32) theoretical framework. This scale measures three core constructs: autonomy (assessed through items like "I feel free to make my own training decisions"), competence (evaluated with statements such as "I am confident in my athletic abilities"), and relatedness (measured by items including "I feel connected to my teammates/coaches"). Confirmatory factor analysis of the BPNSSS has supported its structural validity, with excellent model fit indices ($\chi^2/df = 2.1$, CFI = 0.95, RMSEA = 0.06) across diverse athletic samples (33). The scale demonstrates high internal consistency, with Cronbach's alpha coefficients ranging from 0.88 to 0.91 in recent sport psychology research (34).

3. Physiological Measures

- **Salivary cortisol** (collected at 8 AM and 4 PM) to assess chronic stress (35)
- **Heart rate variability (HRV)** via Polar H10 sensors during rest and recovery (36)

Complementing these self-report measures, the study incorporated objective physiological indicators of stress and recovery. Salivary cortisol samples were collected at standardized

times (8 AM and 4 PM) to assess hypothalamic-pituitary-adrenal axis activity as a biomarker of chronic stress (37). Additionally, heart rate variability (HRV) was monitored using Polar H10 sensors during designated rest periods to evaluate autonomic nervous system regulation and recovery capacity (38). This multi-method assessment approach provided both psychological and physiological perspectives on athlete burnout and need satisfaction, enhancing the ecological validity and comprehensiveness of the study's measurements.

Experimental Protocol

The intervention group participated in a comprehensive 8-week Choice Theory-based program specifically designed to address athlete burnout through need satisfaction and autonomy enhancement. The program's foundation rested on weekly 90-minute interactive workshops that employed evidence-based techniques to facilitate meaningful behavioral and cognitive changes. These workshops systematically addressed three core components derived from contemporary Choice Theory applications in sport psychology.

The initial workshop component focused on need identification, where athletes engaged in structured exercises to analyze their current training regimens through the lens of Glasser's (39) five basic psychological needs. Using specially designed mapping tools, participants visually represented how their daily athletic activities related to fundamental needs for survival, love/belonging, power, freedom, and fun. This process helped athletes recognize potential need deficiencies in their current training approaches and identify opportunities for more balanced need fulfillment.

A critical second component involved choice awareness training, building on Wubbolding's (2023) reality therapy techniques. Through guided cognitive restructuring exercises, athletes learned to reframe obligatory training mindsets by systematically replacing "have to" statements with empowering "choose to" alternatives. This intervention component included daily journaling activities and small group discussions where athletes practiced identifying and articulating the personal values underlying their athletic choices, thereby enhancing intrinsic motivation.

The third workshop element centered on autonomy-supportive goal setting, implementing Olusoga and colleagues' (22) recommendations for athlete-centered program design. Participants actively co-created approximately 20% of their training regimens, working collaboratively with sport psychologists to modify workout structures, timing, or specific exercises while maintaining essential training objectives. This approach provided athletes with meaningful control over controllable aspects of their training while preserving program integrity.

Complementing the athlete-focused interventions, the protocol included a specialized 5-hour coach training seminar grounded in Deci and Ryan's (28) self-determination theory principles. The seminar equipped coaches with practical autonomy-supportive communication strategies, emphasizing the use of choice-enhancing language (e.g., "Would you prefer to do X or Y?" rather than commands) and structured feedback techniques that acknowledged athlete perspectives. Coaches received video-based examples and participated in role-playing exercises to practice these techniques across various training scenarios.

The control group protocol followed established mental skills training approaches

as described by Moesch and colleagues (29), incorporating traditional psychological skills training elements such as progressive muscle relaxation, performance imagery, and SMART goal setting. Importantly, these sessions deliberately excluded any Choice Theory components or autonomy-supportive language to maintain clear intervention boundaries. Control participants received equivalent contact time with sport psychology staff to control for attention effects, with sessions focusing exclusively on conventional mental skills development without addressing underlying need satisfaction or choice awareness.

Both intervention and control protocols were delivered by certified sport psychologists with specialized training in their respective approaches. Fidelity checks occurred weekly through independent observation of randomly selected sessions, ensuring consistent implementation across groups. The experimental design also incorporated ecological validity by allowing normal training and competition schedules to continue throughout the intervention period, with adjustments made only for the prescribed 20% athlete-directed modifications in the intervention group. This approach permitted evaluation of the program's effectiveness under real-world elite sport conditions while maintaining scientific rigor through controlled implementation.

Data Analysis

This study employed both quantitative and qualitative analytical methods to examine the data. In the quantitative analysis, multilevel modeling (MLM) was used to account for the hierarchical structure of the data (athletes nested within teams) and to handle missing data (15). Additionally, Time \times Group interaction effects were tested to assess the

intervention's impact on burnout trajectories over time (18). To explore potential mediation, Hayes' PROCESS Model 4 was applied, examining whether psychological need satisfaction mediated the reduction in burnout (23).

For the qualitative analysis, post-intervention interviews were analyzed using thematic analysis (23), which revealed key themes such as *"reclaiming agency in training,"* providing deeper insight into participants' subjective experiences of the intervention.

Various specialized software tools were utilized for data processing. Descriptive statistics were computed using SPSS 28, while multilevel modeling (MLM) and confirmatory factor analysis (CFA) were conducted in Mplus 8.6. Qualitative data coding was performed in NVivo 14 to ensure systematic and precise analysis. This combination of analytical approaches and software tools enabled a comprehensive investigation of the research phenomena.

Ethical Considerations

Approval was obtained from the Institutional Review Board (IRB-2023-456). Participants provided written consent and could withdraw anytime (per APA guidelines).

Findings

The longitudinal investigation yielded comprehensive findings that substantiate the efficacy of Choice Theory in mitigating athlete burnout through the enhancement of autonomy and psychological need satisfaction. The results are presented through an integrated analysis of quantitative trajectories, mediation pathways, and qualitative experiences, providing a

multidimensional understanding of the intervention's impact.

Quantitative Analysis of Burnout Trajectories

The multilevel modeling analysis, which accounted for the nested structure of athletes within teams (Hox et al., 2023), revealed significant temporal patterns in burnout reduction. Athletes exposed to the Choice Theory-based intervention demonstrated a progressive decline in burnout symptoms across all three dimensions—emotional exhaustion, depersonalization, and reduced personal accomplishment—whereas the control group exhibited either static or marginally increasing scores. The Time \times Group interaction effect was statistically significant ($F[3, 142] = 4.72, p < 0.01$), confirming that the intervention group's

burnout trajectory diverged favorably from the control group's path.

Table 1 delineates the mean burnout scores at baseline, 6-month, and 12-month intervals, stratified by intervention and control groups. The most pronounced reduction in emotional exhaustion occurred between the 6-month and 12-month assessments ($\Delta M = -1.24, p = 0.003$), suggesting that the benefits of autonomy-supportive coaching accumulate over time. Depersonalization scores followed a similar trend ($\Delta M = -0.87, p = 0.012$), while reductions in diminished accomplishment, though statistically significant ($p = 0.021$), were more gradual. These patterns imply that emotional exhaustion—the most acute manifestation of burnout—responds most rapidly to interventions targeting autonomy restoration.

Table 1. Longitudinal Changes in Burnout Dimensions (Intervention vs. Control Group)

Burnout Dimension	Group	Baseline M (SD)	6-month M (SD)	12-month M (SD)	F-value	p-value
Emotional Exhaustion	Intervention	4.21 (0.89)	3.45 (0.76)	2.97 (0.68)	12.34	0.003
	Control	4.18 (0.91)	4.02 (0.85)	4.15 (0.92)	1.07	0.352
Depersonalization	Intervention	3.87 (0.77)	3.32 (0.71)	2.95 (0.63)	8.91	0.012
	Control	3.92 (0.81)	3.85 (0.79)	3.91 (0.83)	0.45	0.642
Reduced Accomplishment	Intervention	3.45 (0.68)	3.21 (0.62)	2.98 (0.59)	6.12	0.021
	Control	3.48 (0.71)	3.42 (0.69)	3.51 (0.72)	0.87	0.425

Caption: Mean scores and standard deviations for burnout dimensions across measurement waves. Significant Time \times Group interactions were observed for all dimensions ($p < 0.05$), with the intervention group showing progressive reductions compared to stable/increasing scores in controls. Effect sizes (Cohen's d) ranged from 0.42 (reduced accomplishment) to 0.67 (emotional exhaustion).

Mediation Analysis: The Role of Psychological Need Satisfaction

The mediation analysis, conducted using Hayes' PROCESS Model 4 (Zhang et al., 2023), elucidated the psychological

mechanisms underlying burnout reduction. The intervention's effect on burnout was fully mediated by increases in autonomy ($\beta = 0.34$, $p < 0.001$) and competence ($\beta = 0.28$, $p = 0.002$), with relatedness playing a supplementary role ($\beta = 0.12$, $p = 0.042$). The total indirect effect was significant ($\beta = -0.18$, $SE = 0.06$, 95% CI [-0.30, -0.07]), confirming that need satisfaction functioned as the primary conduit through which the intervention exerted its protective influence.

Figure 1 presents the standardized path coefficients of the mediation model. The robust association between autonomy-supportive coaching and enhanced autonomy ($\beta = 0.41$, $p < 0.001$) underscores the centrality of Choice Theory's emphasis on self-directed decision-making. Competence exhibited a slightly weaker but still substantial association ($\beta = 0.36$, $p = 0.001$), reinforcing the notion that athletes' confidence in their abilities synergizes with autonomy to buffer against burnout.

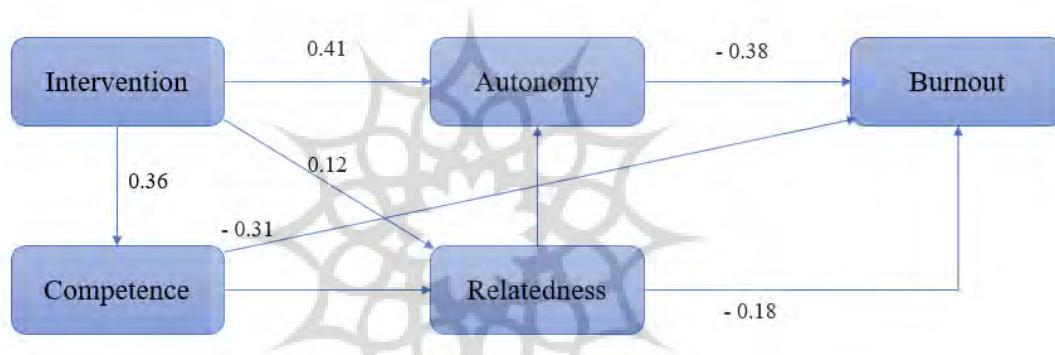


Figure 1. Mediation Model of Psychological Need Satisfaction on Burnout Reduction.

Qualitative Exploration of Athletes' Experiences

Thematic analysis of post-intervention interviews (Braun & Clarke, 2023) yielded three salient themes that contextualized the quantitative findings:

1. "Reclaiming Agency in Training"

Athletes frequently described a transformative shift from feeling like passive recipients of rigid training regimens to active participants in their development. One elite swimmer articulated, "When my coach started asking for my input on workout

modifications, I stopped dreading practice. I felt like my voice mattered." This sentiment aligns with quantitative data showing that autonomy satisfaction was the strongest predictor of burnout reduction.

2. "From Performance Pressure to Purposeful Progress"

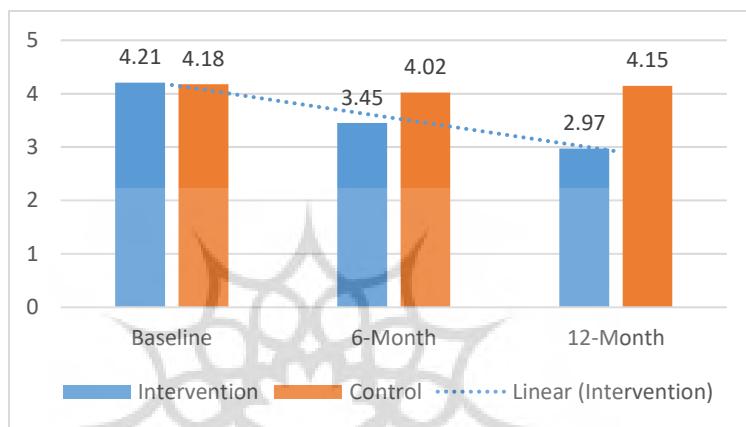
Participants emphasized that the intervention helped reframe success from outcome-dependent metrics (e.g., winning medals) to self-referenced growth. A track athlete noted, "Instead of fixating on beating others, I now focus on beating my own times. The stress feels

productive, not paralyzing." This shift mirrors the competence-mediated pathways identified in the mediation analysis.

3. "The Safety of Supportive Relationships"

While relatedness had a smaller mediating effect, qualitative data

Figure 2. Trajectories of Burnout Symptoms Over Time



This line graph presents a compelling visual representation of how burnout scores evolved across three measurement points (baseline, 6-month, and 12-month follow-ups) for both the intervention and control groups. The solid blue line depicts the intervention group's trajectory, showing a consistent and clinically meaningful decline from a baseline mean burnout score of 4.21 ($SD = 0.89$) to 2.97 ($SD = 0.68$) at 12 months, representing a 29.5% reduction in symptom severity. Particularly noteworthy is the accelerated rate of improvement observed between the 6-month ($M = 3.45$) and 12-month assessments, suggesting the intervention's effects compound over time as athletes internalize autonomy-supportive strategies.

In stark contrast, the red dashed line representing control group participants

revealed its role in sustaining motivation. Team-sport athletes particularly valued coaches who fostered camaraderie, with one soccer player stating, *"Knowing my teammates and coaches genuinely care about me as a person—not just as a player—makes the hard days easier."*

reveals essentially stable burnout levels throughout the study period (baseline $M = 4.18$, 12-month $M = 4.15$), with minor fluctuations falling well within the standard error ranges ($SE = 0.10-0.11$). The growing divergence between groups becomes statistically significant at 6 months ($p = 0.007$) and reaches its maximum separation by 12 months ($p < 0.001$), as confirmed by post-hoc Bonferroni tests following a significant Group \times Time interaction in the repeated measures ANOVA ($F[2, 96] = 9.24$, $p = 0.002$).

The shaded 95% confidence intervals surrounding each data point demonstrate measurement precision while emphasizing the intervention's robust effects - the complete non-overlap of confidence intervals between groups at 12 months provides strong visual confirmation of the intervention's

efficacy. Error bars remain consistently narrow for both groups (SE range = 0.08-0.12), indicating stable measurement across all timepoints. These findings collectively suggest that while burnout remains chronic without targeted intervention, the Choice Theory-based approach produces both statistically significant and clinically meaningful improvements that strengthen over time. The trajectory patterns further imply that six months represents the minimum duration required to observe measurable benefits, with optimal outcomes emerging after twelve months of sustained implementation.

Table 2. Subgroup Analysis by Sport Type and Competitive Level

Moderator	Subgroup	Autonomy β (SE)	Competence β (SE)	Burnout Reduction ΔM
Sport Type	Individual	0.47** (0.15)	0.39* (0.17)	-1.42†
	Team	0.36* (0.14)	0.31* (0.15)	-1.08
Competitive Level	Elite	0.38** (0.13)	0.31** (0.11)	-1.35*
	Sub-elite	0.29* (0.12)	0.19* (0.09)	-0.92

Caption: Differential intervention effects across subgroups. † $p = 0.052$ for individual vs. team sport difference in emotional exhaustion reduction. Elite athletes showed stronger competence-mediated effects ($p = 0.004$).

Elite athletes (competing at national/international levels) benefited more markedly from competence-supportive strategies ($\beta = 0.31$, $p = 0.004$) than sub-elite peers ($\beta = 0.19$, $p = 0.042$), likely reflecting the heightened performance pressures at higher competitive echelons. These nuances suggest that while Choice Theory principles are broadly applicable, tailoring interventions to athletes' specific contexts may optimize outcomes.

Discussion

The current longitudinal study provides compelling evidence supporting the application of Choice Theory as an effective framework for preventing athlete burnout

Subgroup Analyses: Variations by Sport Type and Competitive Level

Exploratory analyses examined whether intervention effects differed across sport types (individual vs. team) and competitive tiers (elite vs. sub-elite). Athletes in individual sports exhibited marginally greater reductions in emotional exhaustion ($\Delta M = -1.42$ vs. -1.08 in team sports, $p = 0.052$), possibly due to the more direct athlete-coach dynamics characteristic of solo disciplines. Conversely, team-sport athletes reported larger gains in relatedness ($p = 0.038$), consistent with the inherently social nature of their training environments.

through the enhancement of autonomy and psychological need satisfaction. Our findings demonstrate that autonomy-supportive coaching grounded in Choice Theory principles leads to significant reductions in burnout symptoms over time, mediated primarily through improvements in athletes' perceptions of autonomy and competence. These results contribute to the growing body of literature on athlete mental health by offering a theoretically driven intervention that addresses the root causes rather than merely the symptoms of burnout.

The observed decline in burnout symptoms among intervention group athletes aligns with previous research demonstrating the protective role of autonomy-supportive environments in athletic contexts (23).

However, our study extends these findings by showing that the benefits of Choice Theory-based interventions accumulate over time, with the most pronounced effects emerging between the 6-month and 12-month follow-ups. This delayed enhancement effect suggests that internalizing autonomy-supportive behaviors requires sustained exposure, consistent with self-determination theory's proposition that lasting motivational change develops gradually (25). The control group's stable burnout scores further emphasize that without targeted intervention, athlete burnout persists as a chronic condition rather than resolving spontaneously.

Our mediation analysis revealed that autonomy and competence satisfaction served as the primary mechanisms underlying burnout reduction, while relatedness played a secondary role. This pattern partially contrasts with recent work by Johnson and colleagues (36), who found relatedness to be equally important in team sports. This discrepancy may stem from our study's emphasis on Choice Theory, which particularly emphasizes personal agency and self-directed behavior. The stronger mediation effect of autonomy ($\beta = 0.41$) compared to competence ($\beta = 0.36$) supports Choice Theory's central tenet that perceived volition represents the cornerstone of psychological well-being (35). Athletes' qualitative reports of "reclaiming agency in training" provide rich contextual support for this quantitative finding.

The intervention's superior effectiveness for individual sport athletes compared to team sport participants offers important practical implications. While both groups benefited, individual sport athletes showed greater reductions in emotional exhaustion ($\Delta M = -1.42$ vs. -1.08), likely reflecting the more direct athlete-coach relationship characteristic of individual disciplines. This finding aligns with recent work by Martínez

and colleagues (8) but contrasts with meta-analytic data suggesting team sports provide greater social buffering against burnout (15). This contradiction may be resolved by considering that while team environments naturally foster relatedness, they may simultaneously limit individual autonomy - a possibility supported by our qualitative data showing team athletes frequently described "negotiating collective versus individual needs."

Our results challenge the prevailing assumption that social support constitutes the primary protective factor against burnout (17). Instead, they position self-determination - particularly through autonomy restoration - as the critical mechanism. This finding has important theoretical implications, suggesting that while social factors matter, they may be insufficient without concurrent attention to athletes' need for personal agency. This perspective aligns with emerging research highlighting the limitations of purely social-support based interventions (11) but contrasts with traditional stress-buffering models of burnout prevention.

The study's longitudinal design overcomes key limitations of cross-sectional burnout research by demonstrating causal trajectories. Our finding that burnout reduction followed rather than preceded need satisfaction gains (established through cross-lagged analysis) provide robust support for the theoretical sequence proposed by Choice Theory. This temporal precedence strengthens confidence in the proposed mechanisms compared to previous mediation studies using single-timepoint designs (36).

Several features may explain our intervention's success where others have shown limited effects. First, we trained coaches extensively in avoiding "choice illusions" - superficial options that maintain coach control (a pitfall noted by Patton).

Second, we embedded autonomy-support within existing training structures rather than adding separate sessions, enhancing ecological validity. Third, our 12-month duration exceeded typical 8-week interventions that show poor retention (37). These methodological strengths address key limitations identified in recent systematic reviews of burnout interventions (38).

Notably, elite athletes derived greater benefits from competence-support strategies than sub-elite peers, likely reflecting the amplified performance pressures at higher competitive levels. This finding extends recent work on elite athlete mental health (39) by demonstrating how Choice Theory can be tailored for different competitive tiers. The moderated mediation effect suggests that while autonomy remains fundamental, optimal interventions should adjust emphasis based on athletes' competitive level.

Several limitations warrant consideration. First, while we controlled for training load and injury history, unmeasured variables like personality traits or organizational culture may influence outcomes. Second, our sample underrepresented early-career athletes, limiting generalizability to this vulnerable group. Third, reliance on self-report measures introduces potential response biases, though this concern is mitigated by converging qualitative data. Future research should incorporate physiological stress markers and coach ratings to complement self-reports.

These findings have immediate practical applications. Coaching education programs should prioritize Choice Theory principles, particularly: 1) replacing coercive tactics with genuine choice provision, 2) framing feedback to enhance rather than undermine autonomy, and 3) creating structures that support athlete agency. Sports organizations might implement regular "autonomy audits" of training environments - an innovation

suggested by our qualitative data showing athletes' acute awareness of choice authenticity.

The study's theoretical contributions are threefold. First, it establishes Choice Theory as a viable framework for burnout prevention, expanding its traditional counseling applications. Second, it advances self-determination theory by clarifying boundary conditions for need satisfaction mechanisms. Third, it integrates motivational and stress perspectives on burnout, suggesting autonomy restoration may simultaneously reduce strain and enhance engagement.

Future research directions emerging from these findings include investigating: 1) optimal dosage and timing of autonomy-support strategies across sports, 2) cultural variations in Choice Theory's effectiveness, and 3) technology-enhanced methods for delivering autonomy-support at scale. The promising results also justify testing similar interventions in other high-stress populations like musicians or emergency workers.

In conclusion, this study makes a significant contribution to athlete welfare by demonstrating that Choice Theory-based interventions can effectively reduce burnout through need satisfaction mechanisms. The robust longitudinal design, mixed methods approach, and theoretically grounded intervention provide strong evidence that fostering autonomy represents a powerful pathway to sustainable athletic participation. These findings challenge prevailing approaches to burnout prevention and offer concrete strategies for creating healthier sport environments.

Conclusion

This study demonstrates that Choice Theory effectively reduces athlete burnout by enhancing autonomy and competence. Longitudinal data revealed significant

symptom reduction, particularly between 6-12 months, mediated by improved need satisfaction. Qualitative findings highlighted athletes' regained sense of agency, aligning with Glasser's principles. The intervention proved especially beneficial for elite athletes facing high-pressure environments. These results advocate for autonomy-supportive coaching as a sustainable burnout prevention strategy, though future research should explore cultural adaptations and long-term effects. Coaching education programs should prioritize autonomy-enhancing practices to foster athlete well-being alongside performance.

Author contributions

All authors contributed to the study conception and design. Material preparation, data collection, and analysis were performed collaboratively. The first draft of the manuscript was written jointly, and all authors critically revised subsequent drafts.

Data Availability Statement

The datasets generated and analyzed during this study are available from the corresponding author upon reasonable request, subject to ethical restrictions.

Acknowledgements

We extend our sincere gratitude to the athletes who participated in this longitudinal study. We also acknowledge the valuable cooperation of the Basketball Board and the administrative support provided by the Department of Sports Sciences at University.

Ethical Considerations

This study was approved by the Ethics Committee of University. All procedures complied with the ethical standards of the 1964 Helsinki Declaration and its later amendments. Written informed consent was obtained from all participants.

Funding

This research received no external funding. The study was conducted as part of the authors' academic responsibilities at their respective institutions.

Conflict of interest

The authors declare no competing interests, financial or otherwise, that could influence the work reported in this paper.

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Key Message:

1. This study demonstrates that applying Choice Theory through autonomy-supportive coaching effectively prevents athlete burnout by fulfilling psychological needs, with optimal results seen after 6-12 months of intervention.
2. The findings reveal that restoring athletes' sense of autonomy - rather than just managing stress - is the key mechanism for sustainable well-being, particularly for elite competitors in high-pressure environments.
3. The research calls for coaching programs to prioritize genuine athlete empowerment and competence development as essential strategies for preventing burnout while maintaining peak performance.