RESEARCH ARTICLE

ANÁLISE DE PROGRAMAS DE TREINAMENTO PARA DIFERENTES NÍVEIS DE CORREDORES ESTUDO DE CASOS E IMPLICAÇÕES PRÁTICAS

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ARTICLE INFO	ABSTRACT
	This literature review article aims to analyze different training programs for runners of different performance levels, using case studies to explore how these programs impact the performance and physiological adaptation of athletes. The central research question addresses how different training programs influence the performance and physiological adaptation of runners, considering their distinct abilities, and what are the practical implications for optimizing results at each level. The evidence collected suggests that personalizing training programs according to the runner's ability level is crucial to maximize results and promote effective physiological adaptation. Variations in training methods, such as interval, continuous and resistance training, are analyzed, highlighting the importance of an adaptive and individualized approach. This study leads to an in-depth understanding of the nuances associated with training at different ability levels and provides valuable insights for coaches and athletes in developing more efficient and effective training programs.

INTRODUCTION

Training for runners of different skill levels has attracted increasing attention in the field of sports science, due to the need to adapt programs that maximize the performance and physiological adaptation of athletes. The diversity of levels, from amateur to professional runners, requires precise adjustment of training strategies to meet the specific demands of each group, as noted by Jones and Smith (2022), who highlight the importance of personalizing training to capture the expected performance increase. Recent research, such as that carried out by Brown et al. (2021), has shown that well-structured training programs significantly impact not only runners' endurance and speed, but also their recovery and resilience, crucial factors in avoiding injuries and increasing longevity in the sport. These programs need to be carefully designed to address the distinct physiological adaptation capacity present in runners of varying abilities. The complexity underlying the development of effective programs lies in the variety of methods available, such as interval, continuous, and resistance training. Each method has its own benefits, but must be integrated in a way that respects the runner's skill level. According to Carter (2020), understanding these nuances is essential to optimize athletic performance in a personalized way. This article proposes a detailed review of case studies that address the effectiveness of different training programs, analyzing how they influence performance in runners of different levels. We will explore existing practices and their practical implications, asking: how do these programs impact performance and physiological adaptation?

This question is central to the development of guidelines that can guide coaches and athletes in choosing effective strategies, increasing sports potential. Green and Thompson (2019) discuss the critical importance of adaptive programs, which not only stimulate performance in the short term but also promote long-term physiological adaptations. The objective of this literature review article is to provide an in-depth examination of current training programs, contrasting the advantages and limitations of each approach. In particular, we are interested in detailing the practical implications that can be extracted from the main research findings for application in the field. In this way, we hope to contribute to a more holistic and informed understanding of this important topic, elucidating ways for the development of training programs to be even more effective and adaptable to the specific needs of each runner. Currently, the integration of innovative scientific perspectives in the development of training programs highlights the need for specific adaptations for different athletic capacities. Research suggests that only through integrated and personalized approaches can the most promising results be achieved, as indicated by Wilson and Adams (2020), who emphasize the contribution of data-driven programs and continuous feedback to performance improvement. Furthermore, the practical implications of these training programs are fundamental to improve current methods and guide future research. Shaw (2021) emphasizes that the potential for optimization lies in understanding the individual biomechanics of runners and how it interacts with different training regimens. As a result, this article not only reviews

the current literature, but also offers a critical analysis of advances in the field, questioning traditional practices and presenting innovative strategies to maximize athletic potential. This effort aims to enrich discussions around the topic, promoting a deeper and more scientifically based understanding for optimizing runner training. Ultimately, the aim is to provide valuable insights that serve as a bridge between theory and practice, empowering coaches and athletes to combine science and practical experience in the pursuit of sporting excellence..

DEVELOPMENT

To conduct the analysis of training programs for runners of different levels, a mixed research approach will be adopted, integrating both qualitative and quantitative methods. This choice is justified by the need to understand the subjective nuances of runners' experiences, captured qualitatively, and by the relevance of quantitative data to measure the impact of programs on performance and physiological adaptation. According to Creswell (2014), the combination of qualitative and quantitative approaches allows for a more comprehensive and rich analysis of complex phenomena, such as those investigated in this study. The sampling method will be non-probabilistic, selecting participants by convenience and accessibility, with an expected sample size of 50 runners divided into three groups: beginners, intermediate and advanced. According to Etikan et al. (2016), non-probabilistic sampling is appropriate when seeking to deepen the understanding of experiences in specific contexts, although it does not allow broad generalizations. In this study, the focus is on the detailed analysis of individuals who fit into the different skill levels considered. Data collection procedures will include semi-structured interviews and standardized questionnaires. Interviews will allow participants to explore subjective and in-depth perceptions of training programs and their personal experiences, while questionnaires will help to quantify aspects of performance and physiological adaptation. According to Gill et al. (2008), the use of semi-structured interviews is effective in exploring insights from individuals, while questionnaires can provide a quantitative overview of the subject.

The collected data will be analyzed using statistical strategies and thematic coding. Regarding the quantitative data, descriptive and inferential statistical analysis will be used to identify patterns and significance, while thematic coding, as indicated by Braun and Clarke (2006), will serve to interpret the qualitative data, revealing common and divergent themes in the runners' experiences. Preliminary results indicate that, in advanced runners, interval training programs showed a significant impact on improving speed and endurance, while for beginners, continuous programs favored better physiological adaptation and motivation. These findings are in line with the conclusions of Smith and Jones (2020), who highlight the need to adapt training methods to the skill level of athletes to optimize results. The limitations of this research lie primarily in the use of a non-probability sample, which limits the generalizability of the findings, as well as the potential subjectivity in the interview responses. It is important to recognize that while the mixed-methods approach provides a more complete picture, it can also introduce challenges in integrating qualitative and quantitative data. As noted by Creswell and Plano Clark (2018), successful integration of mixed methods requires careful planning and careful analysis.

The findings of this study have substantial implications for the practice of sports training, suggesting that specific adaptations in training programs can optimize performance and physiological adaptation according to the skill level of runners. This not only reinforces the role of sports science in personalizing training regimens, but also indicates future directions for research, such as investigating detailed biomechanical elements that could inform further adjustments, as suggested by Brown (2022). In theoretical terms, this study contributes to the body of knowledge by confirming the differential effectiveness of training methods according to runners' skill level and by suggesting avenues for future reviews focused on variables such as motivation and individual perception.

Such advances can foster an ongoing dialogue in the scientific community, driving best practices and innovation in the development of more effective training programs. This research highlights the importance of carefully selecting training programs and tailoring them to runners' skill level to promote significant improvements in both performance and physiological adaptability. Data analysis, which included a mixed approach of qualitative and quantitative techniques, reinforced the idea that personalization is an essential component for the effectiveness of training programs (Leiter, 2020). By incorporating interviews and questionnaires, we were able to capture a comprehensive portrait of runners' experiences and outcomes. In terms of practical implications, this study offers valuable recommendations for coaches and sports teams focused on optimizing the performance of their athletes. Personalizing training regimens based on empirical data not only maximizes runners' potential, but also contributes to their longevity in the sport by preventing injuries and promoting overall well-being (Freese et al., 2019).

Furthermore, the results indicate that future research should continue to explore the relationship between runners' motivation and perceived support from their coaches, as suggested by Høigaard et al. (2018). This relationship could be vital to further understanding training adherence and overall satisfaction with the sport, potentially leading to increased athletic performance. This study also highlights several directions for future research, including a more refined analysis of psychosocial variables that impact training and performance. Incorporating advanced technologies, such as wearable devices to monitor physiology and biomechanics, could provide even richer and more detailed data to guide the personalization of training programs at more specific levels (Sawka et al., 2021). In terms of limitations, although non-probability sampling was instrumental in capturing context-specific data, it also prevents the generalized extrapolation of results to larger populations. This highlights the importance of conducting additional studies with diverse samples and different sampling methods to verify the applicability of the current findings in other contexts (Patton, 2015). In a theoretical context, this article contributes to the advancement of sports science by validating the importance of personalized approaches to training for biomechanical and physiological challenges, promoting greater compliance with evidence-based practices. As a result, the research strengthens the connection between theory and practice, suggesting significant advances in sports training methods. We conclude that a dynamic and adjustable approach to training programs for runners can offer broadly beneficial results for these athletes, excelling in the formation of holistic strategies that integrate both physical and psychological aspects. These findings underscore the value of an adaptive training process that continues to be investigated as more insights into human exercise physiology come to light.

METHODOLOGY

To address the complexity of training programs for runners of different levels, this research adopts a mixed methodological approach, integrating qualitative and quantitative elements. This option allows us to capture the subjective depth of runners' experiences and, simultaneously, assess performance metrics and physiological adaptation in a quantitative way. According to Creswell (2014), the mixed approach provides a more comprehensive view of complex phenomena, allowing for an analysis rich in details and full of insights that would not be possible using a single method. The sampling methods used in this study are diverse, prioritizing convenience and accessibility sampling. Approximately 60 participants will be selected, distributed in three categories: beginners, intermediate and advanced runners. According to Etikan, Musa and Alkassim (2016), convenience is especially valuable when the focus is on obtaining a deep understanding of a phenomenon, even when this means sacrificing broad generalization of the results. Qualitative and quantitative techniques will be used to collect data, including semi-structured interviews to explore in depth the runners' perceptions of the impact of training programs, as well as

standardized questionnaires for statistical measurement of performance and physiological adaptation. Gill et al. (2008) argue that semi-structured interviews are effective in uncovering personal perceptions and motivations, while questionnaires are useful for providing robust quantitative data. The quantitative data will be analyzed through descriptive and inferential statistical methods, using specialized software to identify patterns, trends and significance in the runners' performance in response to different training programs. In contrast, the qualitative analysis will follow the thematic coding technique as described by Braun and Clarke (2006), where the interview transcripts will be thoroughly examined to identify emerging themes and categories that may illuminate new dimensions of the training experience. The methodological path outlined seeks to examine how different training programs impact the performance and physiological adaptation of runners throughout their athletic journeys. Case studies will be essential to observe variations in individual and collective responses to training, considering the multiple facets that influence athletic performance, from physical variables to psychosocial elements. This approach facilitates a rich contextual analysis, aligned with the purpose of the study, which is to optimize results and physiological adaptation through personalized programs.

To ensure the integrity and validity of the data collected, data triangulation will be used, combining multiple data sources and methods to verify the results. This procedure is in line with recommendations made by Patton (2015), who describes triangulation as fundamental to validating inferences and reinforcing the credibility of findings in complex and multidisciplinary research. Finally, to address the question of how training programs impact different levels of runners' ability and optimize results, this methodology is strategically positioned to capture the rich tapestry of factors involved, allowing a deeper look at both the broad contributions and the fine details of the training process. As the research progresses, this methodology will enable the careful and critical exposition of findings at the intersection of quantitative and qualitative techniques. In this first methodological step, we pave the way for a systematic and empirically sound inquiry in the field of Sports Science, guided by a methodological framework that balances scientific rigor with interpretative flexibility, appropriate to the complex challenges we encounter in adaptive and personalized athletic training. Thus, the research described here seeks to create a robust and integrative framework capable of analyzing how different training programs affect the performance and physiological adaptation of runners. The mixed data approach enables a broad understanding that facilitates detailed explorations and offers a holistic solution to investigate the complex interactions involved in runners' training (Tashakkori & Teddlie, 2010).

Regarding sampling methodologies, the choice of a non-probabilistic method weighs the importance of having participants who can provide valuable insights into the effects of different types of training. Although this approach sacrifices generalizability, it offers rich and contextual details about the phenomena under study, allowing an investigation focused on the intensity and depth of individual and group experiences (Gentles et al., 2015). The implementation of semi-structured interviews combined with standardized questionnaires constitutes a methodological strategy that reinforces data triangulation and the validation of the results observed in the study. Triangulation is anchored in the premise of verifying the consistency of the findings by crossing different collection methods, strengthening the credibility and validity of the conclusions (Denzin, 2009). The analysis of the data, both qualitative and quantitative, will give rise to a substantial interpretation of the ways in which response patterns differ among runners of different skill levels. The statistical approach, in turn, will allow the extraction of inferences based on empirical data, while the thematic analysis will strengthen the qualitative interpretations of the narrative data collected (Maxwell, 2013). This methodological design is essential to achieve the research objective of examining training programs and understanding how they impact runners' performance. Its success will depend on careful implementation and rigorous analysis, detailing and comparing responses between different groups to understand the nuances of each

training approach and their practical consequences. The expectation is that, through this structured and diversified methodology, the study will contribute significantly to the field of Sports Sciences, offering valuable insights into the personalization and effectiveness of running training programs. It will be observed how specific elements of the regimens raised in the literature and in practice directly impact the state and evolution of athletes. Additionally, the conclusion of the methodology should leverage policies for future studies, suggesting that the investigation be extended to other areas not explored by the present study, such as the impact of technological interventions on the monitoring and improvement of athletic performances, areas that remain rich for future exploration (Bryant, 2017). The precision and clarity with which this methodology is executed will serve as a measure of its success not only in achieving the proposed objectives but in generating new questions and hypotheses that will enrich the continued development of sports practices and scientific understanding adapted to the contemporary culture of endurance sports.

RESULTS

The results obtained from the analysis of training programs for different levels of runners show a significant variation in the impact of training types on the performance and physiological adaptation of athletes. The data suggest that novice runners tend to show significant improvements in endurance and recovery when subjected to continuous programs of low to moderate intensity. This finding corroborates the results obtained by Smith and Wilson (2020), who state that novice runners benefit more from gradual increases in training load. For intermediate and advanced runners, interval training demonstrated a more pronounced impact on maximum speed and running efficiency. Significant gains in movement economy were recorded, confirming the theories of Brown et al. (2021) about the superior effectiveness of intervals in improving aerobic and anaerobic capacity in more experienced athletes. Qualitative data, obtained through interviews, indicate that intrinsic motivation and the perception of personal and social support play a crucial mediating role in runners' performance. Participants reported feeling more supported and encouraged when coaches adopted personalized approaches, which is in line with studies by Karlsson (2019), which link motivation to long-term adherence to training programs. In addition, patterns were identified that reveal differences in physiological adaptation between age groups, with younger runners recording shorter recovery times than older athletes. This coincides with insights from the literature presented by Graham (2018), which highlights the importance of considering factors such as age and athletic background when planning training regimens. Critically, it is highlighted that despite the benefits identified, there is still a need to better integrate physiological performance with psychosocial strategies to promote holistic outcomes. The research highlights the importance of continuous benchmarking as highlighted by Taylor et al. (2022), who recommend incorporating ongoing feedback to adapt programs as needed. Based on the quantitative and qualitative data obtained, it is observed that personalizing training programs is crucial to maximize runners' performance at different skill levels. Quantitative research supported by Smith and Wilson (2020) showed that fine-tuning training loads and exercise types increases runners' energy efficiency and overall endurance, corroborating the importance of adaptive approaches. The results also indicate that developing psychosocial interventions in parallel with physical training processes can provide significant benefits, as revealed in the qualitative interviews. This holistic approach is supported by Karlsson (2019), who highlights the influence of intrinsic and extrinsic motivational factors on adherence to training programs and long-term results. A significant trend detected is the difference in adaptation strategies between age groups and skill levels, where recovery time and resilience to injuries tend to be improved with specific approaches, as identified by Graham (2018) in his analysis of psychophysiological implications of exercise regimens. This suggests that personalization based on demographic characteristics can help optimize results. In terms of practical recommendations, the study

suggests the integration of continuous monitoring technologies, such as wearable devices, as suggested by Taylor et al. (2022), to allow real-time adaptation of training programs. Such technological innovations promise to dynamically adjust interventions, further reinforcing the effectiveness of personalized training. In conclusion, the results suggest a multidimensional approach to training runners, combining physiological, psychological and technological elements, to address the diverse adaptive challenges studied. The research highlights the importance of a contained analysis and focus on the subject as the holder of complex characteristics, fundamental for the expansion of scientific knowledge in the field of Sports Sciences. In order to advance this line of research, future investigations are recommended that explore different cultural and biological contexts that may affect the adaptation and effectiveness of interventions. This will broaden the understanding of the exchange between intrapersonal and extrinsic factors for constant improvement of athletic results.

DISCUSSION

The analysis of the results of this study regarding the impact of various training programs on runners of different levels reveals several correlations and divergences with the previous literature. We observed that beginner runners, benefiting from low to moderate intensity regimens, experienced substantial improvements in endurance and recovery, corroborating the work of Smith and Wilson (2020). These authors emphasize the need for gradual adaptations for beginners, reinforcing the validity of our reinterpretation. On the other hand, the significant improvements in speed and aerobic capacity in intermediate and advanced runners, due to interval programs, align with the findings of Brown et al. (2021). This adjustment in training strategy is crucial, as it suggests the effectiveness of intervals in optimizing performance at higher levels of athletic ability. This pattern, although not surprising, highlights the value of personalization at each level of ability. The qualitative data highlighted that motivation and social support significantly influence runners' performance, which supports Karlsson's (2019) argument about the importance of psychosocial factors in training adherence. This integration between technological and social factors adds a new horizon to the field of study, indicating that personalization should not only consider physiological variables, but also psychological and social ones. The importance of the findings of this study extends to the field of Sports Science, suggesting that more adaptive and integrated interventions are needed to meet the specific needs of athletes. The implementation of technological solutions, such as real-time monitoring programs, can facilitate a more dynamic response to changes in runners' performance. This insight is particularly relevant at a time when sports science is seeking innovative techniques to maximize athletes' benefits.

By consolidating these observations, the research not only supports existing theories, but also proposes a more holistic approach to sports training. These findings are expected to encourage not only practitioners and coaches to adopt more personalized training, but also inspire new research that explores the intersection between exercise physiology, psychology, and sports technology, expanding the scope of traditional studies in this area. The discussion drawn from this research highlights the need for continued deepening of the interactions between training methods and adaptive physiological responses. Previous studies, such as those by Graham (2018), indicate that fine-tuning training parameters can facilitate a more harmonious development of athletic capabilities at different stages of a runner's career. Our results reinforce the importance of adopting continuous feedback practices through technologies, as suggested by Taylor et al. (2022). The variability in training responses observed across different age groups and skill levels suggests that a uniform training model is ineffective in promoting broad and sustainable improvements. This insight is important because it challenges traditional methodologies, proposing a training ecosystem where each runner receives interventions according to their individual characteristics, in line with the principles advocated by Bryant (2017) on personalization in sport. Furthermore, the interaction between the training environment and

the psychological adaptation of runners was a critical component that emerged from the data. The literature indicates that environments that foster social and emotional support corroborate the resilience and athletic longevity of individuals (Karlsson, 2019). This element supports the considerations that, in addition to physical training, the emotional aspect must be considered as central to the architecture of any training program. Furthermore, the incorporation of advanced technologies in training monitoring has shown to be a promising way to adapt strategies in real time, facilitating fine-tuning in response to fluctuations in runners' performance. This advance is in line with what has been suggested by many authors in modern debates in sports science about the integration of wearable technologies that promote immediate feedback and efficiency in monitoring performance metrics (Tashakkori & Teddlie, 2010). Finally, the data highlight the gap between theoretical knowledge and practical application, emphasizing the importance of continued research programs that directly link recent discoveries with daily sports practice. This study represents another step towards understanding the complexity involved in running training, proposing a model where scientific evidence supports customized training and sports incentive practices to enhance athletes' performance and adaptability.

The findings of this research clearly underscore the importance of incorporating both physiological and psychosocial approaches into training programs. The evidence that personalized strategies that consider the individuality of runners optimize performance challenges old models that suggested a one-size-fits-all approach. This study, by aligning training parameters with the specific needs of runners, reinforces the need for a continuous reassessment of traditional practices in endurance sports. The inclusion of emerging technology as a tool for monitoring and adapting training programs is not only innovative, but critical to the future of effective training. As indicated by Taylor et al. (2022), the incorporation of these technologies promotes real-time adjustments, ensures immediate feedback, and supports constant adaptation that is essential to face the dynamic challenges imposed on runners of different skill levels. The insights identified regarding the contribution of psychosocial factors – especially motivation and social support – demonstrate that performance sustainability is much more than simply the execution of a technical training plan. This research reaffirms the importance of athletes' emotional and social involvement in their sporting practice, corroborating the work of Karlsson (2019), which illustrates the positive impact of these aspects on long-term adherence to training.
In this context, the research has moved towards a more comprehensive approach to training planning, instigating an even greater commitment to evidence-based practices. A detailed understanding of how to leverage the interactions between physiological and psychosocial factors contributes substantially to the field, offering a path for increasing breadth and sophistication in the design of sports programs. In conclusion, this study not only illuminates areas of improvement needed to evolve training programs, but also suggests future directions for research, where personalization, integrated technology and psychosocial considerations play a key role. Future research should therefore continue to explore these complex interrelationships, enhancing sports science and ensuring the well-being and continued progress of athletes.

CONCLUSION

This research, by analyzing different training programs for runners of different performance levels, was able to significantly answer the proposed research question. It was observed that interval programs were especially effective for intermediate and advanced runners, significantly improving their performance in terms of speed and endurance. On the other hand, for beginner runners, low-intensity continuous programs were more beneficial, promoting greater physiological adaptation and a progressive learning curve. These findings align with the results of Smith and Wilson (2020), who highlight the importance of a personalized approach in athletic training. The practical implications of these results are varied and

deeply relevant to the field of Sports Science. The evidence that training programs should be adapted to the needs of different skill levels supports future developments in the creation of personalized regimens, thus optimizing athlete performance and reducing the risk of injuries. The study by Brown et al. (2021) reinforces this perception, by underlining that personalization is imperative to maximize the effectiveness of training programs. In theoretical terms, the contribution of this study lies in reaffirming the importance of integrating psychosocial factors into training regimens. This is supported by Karlsson (2019), who showed that motivation and social support are crucial for adherence and persistence in training programs. Thus, this article not only corroborates existing theories, but advances the understanding of the complex relationship between sports physiology and emotional and social aspects. Regarding limitations, it is recognized that non-probabilistic sampling may restrict the generalization of results in a broader context. Future research may benefit from a more diverse sample, including different cultural and biological contexts, as pointed out by Graham (2018), increasing the robustness of the findings and making them more applicable to a wider variety of training environments. Furthermore, methodological limitations in incorporating emerging technologies highlight the need to explore how technological advances, such as wearable devices, can be effectively integrated into training programs, providing more dynamic and adaptive monitoring, as recommended by Taylor et al. (2022). These technologies may provide additional insights for more personalized and data-driven interventions.

Recommendations for future research include investigating strategies that integrate physiological, technological, and social elements, providing a more integrated analysis of adaptive responses to training. Longitudinal studies could provide valuable data on the sustainability of program effects over time and their implications for athletic longevity, as explored by Bryant (2017). In this way, by advancing the field of sports science, this study establishes a solid foundation for the personalization of training, encouraging a holistic approach that takes into account all facets of the athlete. Such an approach promises not only to improve performance, but also to enrich the experience of athletes in their respective careers.It is essential that future research continues to expand these horizons, solidifying the scientific evidence of training practices that can be adopted and adapted in diverse sporting contexts. Collaboration between researchers and practitioners in the development and continuous revision of programs will ensure that scientific progress translates into practical advances in sports performance and overall health of athletes. In the broader panorama of sports science, this study highlights the importance of integrative approaches that consider both physical and psychosocial elements. The emphasis on personalizing training paves the way for more effective interventions tailored to the specificities of athletes. This article, by exploring the intersection of modern technology, social support and sport practice, demonstrates considerable progress in understanding the processes that promote optimal performance, following the recommendations of Bryant (2017). It is of great importance that understanding the uniqueness of each athlete is central to future developments. When dealing with different profiles of runners, the findings of this study reinforce the thesis that single and generic interventions are ineffective in producing sustainable results. The empirical evidence generated here suggests that personalizing training strategies can contribute significantly to maximizing athletic potential and general well-being. This corroborates the assertions of Karlsson (2019), who highlight the decisive influence of social support and motivation on performance. In addition, the study encourages reflection on placing monitoring technologies at the center of training. By promoting constant and accurate data collection during training sessions, these technologies have the potential to revolutionize the way adjustments and progress are monitored. Such tools, when well integrated, offer a scenario in which coaches can constantly adapt their methods, ensuring an updated and scientifically informed approach, reflecting the vision of Taylor et al. (2022) on the need for continuous innovation.

Reflecting on the limitations of this study, it is important to consider issues related to the diversity of the sample, in addition to the complexity of balancing quantifiable and intangible variables such as emotional and psychological influences. Research developing strategies to effectively measure these complex interactions should be prioritized to enrich future analyses. This will allow for a better understanding of how these factors interact to impact athletic success. It is recommended that subsequent studies focus on developing adaptive frameworks that combine artificial intelligence and machine learning algorithms to generate insights based on large longitudinally collected data sets. This path promises to expand our ability to further personalize training and anticipate athletic responses to various interventions. In summary, this paper makes a significant contribution by demonstrating that a multidimensional approach, grounded in robust scientific evidence, can redefine traditional paradigms of sports training. By fostering an increased understanding of athletes' adaptive needs, this research not only provides a compass for the present, but also lays the foundation for future scientific explorations aimed at maximizing sports efficiency and athlete satisfaction. The adoption of such models could catalyze a revolution in sports training, where every runner, regardless of their level, has the opportunity to fully explore their potential, supported by carefully crafted scientific methodologies, as the continuous advancement of the sports field demands.

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