

Research article

ChatGPT Generated Training Plans for Runners are not Rated Optimal by Coaching Experts, but Increase in Quality with Additional Input Information

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Abstract

ChatGPT may be used by runners to generate training plans to enhance performance or health aspects. However, the quality of ChatGPT generated training plans based on different input information is unknown. The objective of the study was to evaluate ChatGPT-generated six-week training plans for runners based on different input information granularity. Three training plans were generated by ChatGPT using different input information granularity. 22 quality criteria for training plans were drawn from the literature and used to evaluate training plans by coaching experts on a 1-5 Likert Scale. A Friedman test assessed significant differences in quality between training plans. For training plans 1, 2 and 3, a median rating of <3 was given 19, 11, and 1 times, a median rating of 3 was given 3, 5, and 8 times and a median rating of >3 was given 0, 6, 13 times, respectively. Training plan 1 received significantly lower ratings compared to training plan 2 for 3 criteria, and 15 times significantly lower ratings compared to training plan 3 ($p < 0.05$). Training plan 2 received significantly lower ratings ($p < 0.05$) compared to plan 3 for 9 criteria. ChatGPT generated plans are ranked sub-optimally by coaching experts, although the quality increases when more input information are provided. An understanding of aspects relevant to programming distance running training is important, and we advise avoiding the use of ChatGPT generated training plans without an expert coach's feedback.

Key words: Artificial intelligence, data-informed training, digital health, digital training, innovation, individualization, mHealth, technology.

Introduction

Running is a popular sport and leisure-time physical activity across the globe and among different age groups (Hulsteen et al., 2017). Adhering to a well-designed and evidence-informed training plan is crucial to increase the likelihood of optimal biomechanical, psychological and physiological adaptations aimed to improve running performance (Düking et al., 2020b), and to decrease the likelihood of (overuse) injuries and adverse health effects. Yet, the majority of runners especially at a novice level, either do not have sophisticated knowledge on how to design (evidence-informed) training plans or lack access to coaches

providing individually tailored training plans (Vos et al., 2016).

To overcome these limitations, Artificial Intelligence (AI) might be one solution to provide individuals with training plans at large scale. ChatGPT is one AI software (more specifically a large language model) which has gained widespread attention and reached 100 million users within 64 days following its release on November 30, 2022 (Hu, 2023). It is designed to engage in interactive conversations with users, providing human-like responses based on the input it receives. ChatGPT utilizes deep learning techniques to process and generate responses, and has been trained on a large dataset of human conversations. This allows the AI to understand and generate natural language text.

The availability of advanced AI capabilities has spread from a few skilled experts to a wide range of people, leading to the discovery of various unforeseen applications. Currently, there is ongoing research to assess the effectiveness of ChatGPT in healthcare applications (Ayers et al., 2023; Lukac et al., 2023; Tsui et al., 2023). One area of investigation focuses on its ability to deliver compassionate and reliable responses to patients seeking medical information. For instance, a recent study evaluated ChatGPT's capacity to offer empathetic and accurate answers to healthcare-related inquiries (Ayers et al., 2023). This investigation involved comparing ChatGPT's answers with responses provided by physicians on a public social media forum and showed that ChatGPT generated quality and empathetic responses (Ayers et al., 2023). Another study examined the proficiency of ChatGPT in addressing inquiries related to common eye symptoms. The findings indicated that eight out of ten responses generated by ChatGPT received high ratings in terms of accuracy and relevance (Tsui et al., 2023). The study also highlighted that while AI applications such as ChatGPT are not rated optimal by experts at present, they hold promise for integration into clinical practice to alleviate the increasing burden and costs associated with healthcare services (Tsui et al., 2023).

Similarly, many novice runners (which lack access to professional coaches) interested in improving their

Table 1. Relevant aspects when designing a training plan and corresponding rating scale which was used to evaluate ChatGPT generated training plans

Relevant aspects when designing a training plan		Rating					Not Applicable	Comment
		Bad		Good				
		1	2	3	4	5		
Primary Aspects	Rate the overall training plan							
	Rate the advice given to screen for individuals at increased risk for adverse exercise-related events such as cardiovascular, pulmonary, and metabolic diseases as well as other conditions							
	Rate the defined goal							
	Rate the overall testing procedure							
	Rate the testing procedure of the training plan regarding...							
	...assessment of the initial performance status							
	...assessment of individual training variables							
	...assessment of training effects (e.g. performance, physiological, subjective, biomechanical, cognitive measures)							
	Rate the overall monitoring procedure							
	Rate the monitoring procedure of the training plan regarding...							
	...assessment of internal load (e.g. via heart rate, subjective markers)							
	...assessment of external load (e.g. via covered distance, speed)							
	...assessment of contextual factors (e.g. environmental temperature, hypoxia)							
	Rate the training type							
	Rate the training volume							
	Rate the training intensity							
	Rate the training frequency							
Rate the progression of training volume								
Rate the progression of training intensity								
Rate the progression of training frequency								
Secondary Aspects	Rate the included nutritional aspects							
	Rate the included recovery aspects							
	Rate the included psychological skills							
	Rate the skill acquisition							

endurance capacity may turn to ChatGPT seeking advice regarding training plans. However, it is currently unknown if training plans generated by ChatGPT are appropriate and in-line with recent scientific evidence, and if the AI-derived training plans differ based on provided input information granularity. Therefore, the aim of this research was to investigate the quality of running training plans generated by ChatGPT, and investigate quality differences based on provided input information.

Methods

Participants

To evaluate ChatGPT derived training plans, we followed the example of other studies performed e.g. in the medical field (Ayers et al., 2023; Lukac et al., 2023; Seth et al., 2023). We engaged experienced coaches to assess the provided training plans on the aspects outlined below on a 1 to 5 Likert Scale. Table 1 shows the rating questions and scale.

To rate the training plans, each coach had to have at least a Master’s degree in sports science, and at least 5 years of endurance coaching experience of at least Tier 2 “Trained/Developmental” athletes, as defined by a recently published framework (McKay et al., 2022). The study was approved by the Faculty’s Exercise Science and Training Ethical Committee of the University of Würzburg

(EV2023/7-2609) and performed in accordance with the Declaration of Helsinki. Coaches gave their informed consent to participate in the study.

Quality assessment of ChatGPT generated training plans

Different aspects have to be considered when assessing quality of training plans which might differ according to the underlying model or framework, the specific population and their characteristics (e.g. training status, health condition, age), sport-specific aims, and the timeframe for which the training plan is supposed to be (e.g. an individual training session, weeks, months, or years) (Jeffries et al., 2021; Morton et al., 1990; Borresen and Lambert, 2009; Mujika et al., 2018; Grosser et al., 1986; Ferrauti and Remmert, 2020; American College of Sports Medicine, 2013; Gronwald et al., 2020; Sperlich and Holmberg, 2017; Platen and Schaar, 2003).

Acknowledging these differences, the *primary aspects* recommended in the literature when designing training plans for novice runners include:

1. Screening for individuals at increased risk for adverse exercise-related events, such as cardiovascular, pulmonary, and metabolic related diseases, as well as other conditions (e.g., pregnancy, orthopedic injury) (American College of Sports Medicine, 2013; Platen

- and Schaar, 2003)
2. Definition of a goal (American College of Sports Medicine, 2013; Ferrauti and Remmert, 2020; Platen and Schaar, 2003),
 3. Definition of a reliable and valid testing procedure to assess initial performance status, to derive individual training variables (e.g. heart rate at the first ventilatory/lactate threshold), and to define training effects (e.g. performance, physiological, subjective, biomechanical or cognitive measures) (American College of Sports Medicine, 2013; Ferrauti and Remmert, 2020; Currell and Jeukendrup, 2008; Platen and Schaar, 2003; Jeffries et al., 2021),
 4. Use of a reliable and valid monitoring strategy (Currell and Jeukendrup, 2008; Ferrauti et al., 2020), which may include internal load (e.g. heart rate), external load (e.g. covered distance), and/or contextual factors (e.g. environmental temperature, hypoxia) (Jeffries et al., 2021; Sperlich and Holmberg, 2017),
 5. Definition of training type (e.g. high-volume training, high intensity interval training, strength training) and specific training variables including but not limited to frequency, intensity, and volume (American College of Sports Medicine, 2013; Garber et al., 2011; Ferrauti and Remmert, 2020; Platen and Schaar, 2003). Additional considerations may incorporate strategic variation of volume, intensity and frequency (i.e. type of periodization) (Mujika et al., 2018). Periodization gains importance when training is planned with increased training sessions on a long term or with a specific competitive aim,
 6. The progression of training over time (American College of Sports Medicine, 2013).

Next to these primary training related aspects, *secondary aspects* may be considered when prescribing (evidence-informed) training plans such as:

1. Nutritional aspects (e.g. carbohydrates intake, hydration) (Achten et al., 2004; Burke et al., 2011; Kerksick et al., 2017),
2. Recovery procedures (e.g. sleep) (Walsh et al., 2021),
3. Psychological skills (e.g. motivation, pain and fatigue management) (Mujika et al., 2018), and
4. Skill acquisition aspects (e.g. running technique) (Krabak et al., 2019)

To keep a narrow research scope, in this study our main focus was on assessing primary aspect, and less emphasis was on the evaluation of secondary aspects.

ChatGPT input

As users interact with ChatGPT using chat prompts, we assume that the input provided by runners to generate a training plan will vary like any other conversation. Depending on factors such as the runner's education around training procedures or own training history, some may provide minimal information, while others may be more detailed (e.g. with details about their training status and history, goals, and time availability). To accommodate this diversity in the input information, we developed three distinct initial questions. Our goal was to create these questions based on

the varying levels of knowledge that people possess regarding training. Some individuals may ask basic questions about training plans, while others more knowledgeable in this area may ask specific enquiries and provide more detailed information. As a starting point, we employed a fictional 20 year old male runner aiming to use ChatGPT to generate his running training plan.

The initial questions for ChatGPT to obtain the three training plans were:

1. Please provide me with a running training plan for the next 6 weeks.
2. I am a 20 year old male who runs 2 times a week. Each run is 8 kilometers long and takes me about 30 - 40 minutes to complete. I have a smartwatch. I would like to increase my running performance. Please provide me with a running training plan for the next 6 weeks.
3. I am a 20 year old male who runs 2 times a weeks since one year. Each run is 8 kilometers long and takes me about 30 - 40 minutes to complete. My mean heart rate during these runs is around 155 - 170 beats per minute. I do not do other sports and I do perform only long runs and no high intensity interval training sessions or similar. I have no health issues. My goal is to increase my running performance by 3 - 5% in the next 6 weeks. I have access to a breathing gas analyzer and a treadmill for performance tests. For monitoring purposes, I do have access to a smartwatch which can track my heart rate and covered distance during runs, as well as environmental temperature. Please provide me with a running training plan for the next 6 weeks.

Since users interact with ChatGPT using chat prompts, we incorporated check-backs to allow ChatGPT to improve responses to each inquiry for a training plan. These check-backs were designed to anticipate the questions that someone using ChatGPT to create training plans would ask. For instance, the question in 1) was not elaborated upon through check-backs, while multiple check-backs were permitted for 3) to fine-tune the training plan. The complete conversation with ChatGPT is available in the Appendix (Table 3, Table 4 and Table 5). We used ChatGPT (Version 3.0.1) to generate training plans on May 23, 2023 without any additional usage of plug-ins to the software.

Statistical Analysis

We calculated descriptive statistics for the Likert scores on all rated items for each question. To test for significant differences in all rated items between the training plans, a Friedmann Test with Bonferroni Correction was performed. Significance level was set to $p < 0.05$. Fleiss' Kappa was calculated to assess inter-rater reliability (Fleiss, 1971). All statistical analysis was performed in SPSS, Version 28 (IBM, New York, USA).

Results

A total of 10 raters (age: 33 ± 5 years; 4 with a PhD, 6 with a Master's degree in Sports Science) with 7 ± 2 years of coaching experience in endurance-based sports participated. Raters had coached runners from Tier 2

Table 2. Descriptive analysis (median and range) and results of the significance testing comparing different training plans generated by ChatGPT. Likert-Scale Ratings were from 1 (“bad”) to 5 (“good”) with 0 indicating “not applicable”.

		Median (Range)			Significance Testing		
		TP 1	TP 2	TP 3	TP 1 vs TP 2	TP 1 vs TP 3	TP 2 vs TP 3
Primary Aspects	Overall training plan	2 (2)	3 (3)	4 (2)	0.005	0.003	1.0
	Health Screening	2 (3)	2 (3)	3 (3)	1.0	0.312	0.952
	Defined goal	0 (3)	4 (2)	4 (3)	0.022	0.002	1.0
	Overall testing procedure	0 (0)	0 (0)	4 (3)	1.0	0.004	0.004
	Testing procedure regarding initial performance status	0 (0)	0 (0)	4 (4)	1.00	0.004	0.004
	Testing procedure regarding assessment of individual training variables	0 (0)	0 (0)	3 (3)	1.00	0.004	0.004
	Testing procedure regarding assessment of training effects	0 (0)	0 (0)	3 (3)	1.00	0.004	0.004
	Overall monitoring procedure	0 (1)	1 (3)	4 (3)	1.00	0.002	0.03
	Monitoring procedure regarding assessment of internal load	0 (0)	3 (4)	4 (2)	0.135	0.00	0.135
	Monitoring procedure regarding assessment of external load	0 (2)	3 (4)	4 (2)	0.101	0.00	0.221
	Monitoring procedure regarding assessment of contextual factors	0 (0)	0 (0)	3 (4)	1.00	0.004	0.004
	Training type	3 (4)	3 (3)	5 (3)	1.00	0.297	0.377
	Training volume	3 (3)	4 (1)	4 (3)	0.656	0.101	1.00
	Training intensity	1 (5)	4 (2)	4 (3)	0.076	0.042	1.00
	Training frequency	3 (3)	4 (2)	3 (4)	1.00	0.055	0.377
	Progression of training volume	3 (4)	4 (2)	2 (3)	1.00	0.101	0.656
	Progression of training intensity	1 (3)	3 (4)	4 (2)	0.042	0.004	1.00
	Progression of training frequency	3 (2)	4 (5)	3 (3)	1.00	0.791	1.00
Summary	< 3	n = 15	n = 7	n = 1			
Median	3	n = 3	n = 5	n = 6			
Rating	> 3	n = 0	n = 6	n = 11			
Secondary Aspects	Nutritional aspects	0 (0)	1 (4)	4 (2)	0.438	0.00	0.042
	Recovery aspects	2 (3)	3 (3)	4 (4)	0.281	0.057	1.00
	Psychological skills	0 (0)	0 (0)	3 (4)	1.00	0.004	0.004
	Skill Acquisition	0 (0)	0 (0)	3 (4)	1.00	0.008	0.008
Summary	> 3	n = 4	n = 4	n = 0			
Median	3	n = 0	n = 0	n = 2			
Rating	> 3	n = 0	n = 0	n = 2			

Bold numbers comparing different training plans indicate significant differences ($p < 0.05$).

“Trained/Developmental” ($n = 4$), Tier 3 “Highly Trained/National Level” ($n = 2$), Tier 4 “Elite/International Level” ($n = 2$) and Tier 5 “World Class Level” ($n = 2$) according to a published framework (McKay et al., 2022). For training plan 1, 2 and 3, Fleiss’ Kappa was 0.43 ($p = 0.00$), 0.247 ($p = 0.00$) and 0.00 ($p = 0.00$). Descriptive statistics and results for significance testing can be found in Table 2.

For the question “rate the overall training plan”, training plan 1, 2, and 3 received a median rating of 2, 3, and 4 on the 5-point Likert scale. Training plan 1 differed significantly from training plan 2 ($p = 0.005$) and training plan 3 ($p = 0.003$), while training plan 2 was non significantly ($p = 1.0$) different from training plan 3 for this question. For training plans 1, 2 and 3, a median rating of <3 was given 19, 11, and 1 times, a median rating of 3 was given 3, 5, and 8 times and a median rating of >3 was given 0, 6, 13 times, respectively. Training plan 1 received significantly lower ratings ($p < 0.05$) compared to plan 2 for 3 criteria, and 15 times significantly lower ratings compared to training plan 3. Training plan 2 received significantly lower ratings ($p < 0.05$) compared to plan 3 for 9 criteria (Figure 1).

Discussion

Runners often lack access to evidence-informed training plans or access to well-educated coaches. With the rising availability of artificial intelligence tools such as ChatGPT, runners will therefore likely seek advice from these technologies to advice on their training program. Therefore, we evaluated three six-week ChatGPT-generated training plans for runners based on different granularity of input information. We found that the quality of training plans provided by ChatGPT differed based on the granularity of input information, with less input information resulting in lower Likert-Scale ratings compared to more input information. We showed that Training Plan 1 had significantly lower median ratings on the 5-point Likert-Scale on the question “rate the overall training plan” compared to Training Plan 2 ($p = 0.005$) and Training Plan 3 ($p = 0.003$).

Detailed interpretation of input information granularity on ChatGPT generated training plans

Training plan 3 (most input information granularity) significantly outperformed training plan 1 (least input information granularity) on 15 out of 22 criteria ($p < 0.05$),

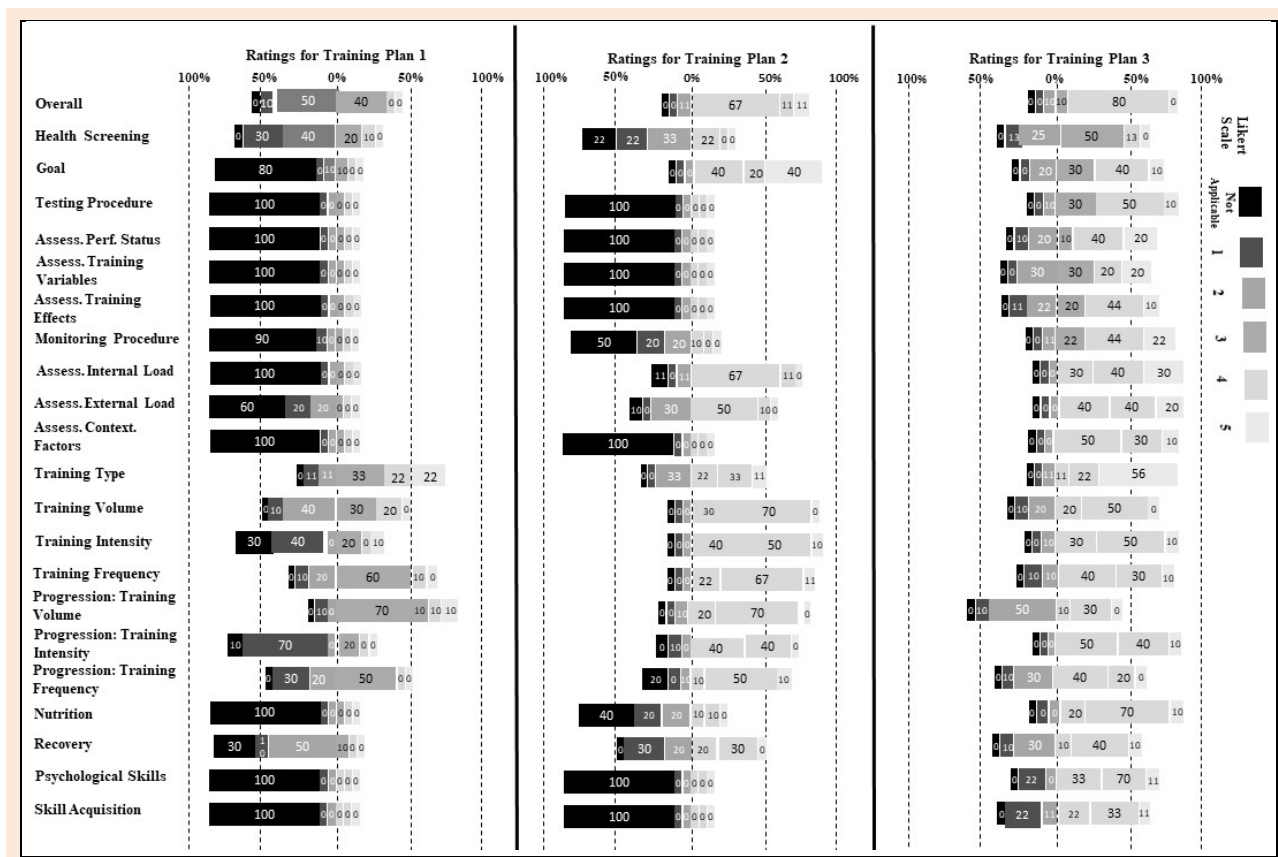


Figure 1. Likert Scale Ratings of coaching experts (n=10) of Training Plan 1, 2 and 3 which are generated by ChatGPT. Numbers represent percentages of ratings for the respective Likert Scale Rating

and training plan 2 (medium input information granularity) outperformed training plan 1 on 9 out of 22 criteria ($p < 0.05$). Importantly, even the training plan with the most input information (Training Plan 3) only received a median neutral ranking (“3”) for the following criteria: health screening, testing procedures (regarding the definition of training variables and evaluation of training effects), monitoring of contextual factors, prescribed and progression of training frequency, and training of psychological skills and skill acquisition. Moreover, only a median rating of lower than neutral (below 3) was given in regard to progression of volume. These results suggest that even the herein best rated training plan can be improved and is not rated optimal by coaching experts.

The quality of the training plan was found to be dependent on the provided input information granularity. Consequently, users that provides more information receive more detailed training recommendations. Although ChatGPT produced responses, it did not ask feedback questions as a coach typically would during practice. These questions serve the purpose of obtaining additional information for evidence-based decision making, thereby refining the training plans and tailoring them to individual needs. For instance, raters noticed that in training plan 3 training variables were increased too rapidly, therefore violating the individual progression and potentially elevating the risk of running-related injuries. When experienced coaches design and monitor training plans, they typically communicate with the runner directly, asking questions about their preferences and willingness to take certain

risks, or whether they desire a significant increase in training outcome for potential performance improvements, although this may raise the likelihood of injuries. By posing such questions, a coach likely establishes a more suitable training plan aligned with the athlete's objectives. Additionally, coaches may enquire about the athlete's need or preference for nutritional or recovery guidance, allowing for the provision of relevant recommendations. These questions serve as valuable guidance for novice runners and most likely enhance adaptation and performance as long as they are provided, followed, and adjusted accurately. However, due to the absence of direct enquires, the training plans provided by ChatGPT offered limited or no information pertaining to these crucial aspects. Consequently, when generating training plans with ChatGPT, the users' knowledge to input relevant information determines the AI-system output, and this could impair its usefulness for less-educated and/or novice athletes.

Incorporating evidence-based information and individual data into ChatGPT

Currently, the source code of ChatGPT is not publicly available and the sources (e.g. peer-reviewed articles, blogs, webpages etc.) that feed the ChatGPT algorithm are unknown. Other studies suggest that ChatGPT processes both non-academic and academic sources and that it does not differentiate between sources of information based on their level of evidence (Alser and Waisberg, 2023). The heterogenous quality level of the processed AI-information might be one reason limiting comprehensiveness or

accuracy of the provided responses by ChatGPT. For example, there are numerous blogs about the benefits of applying a cool-down post-exercise and these may have been used by ChatGPT in training plan 2 to recommend active recovery as an effective recovery modality. Yet, current evidence does not support a cool-down for effective recovery (van Hooren and Peake, 2018; Wiewelhove et al., 2018). Therefore, common misconceptions that are prevalent in non-scientific articles (e.g. blogs) may also be used as advice by ChatGPT. A previously raised concern was that its responses can appear confident and convincing (Seth et al., 2023). The convincing responses may result in unconditional trust in ChatGPT generated responses, potentially causing friction in a coach-athlete relationship. To overcome this issue, it may be beneficial if ChatGPT could automatically provide both scientifically trustworthy citations and an evidence ranking for its answers (e.g. based on an evidence-pyramid) (Schünemann et al., 2003).

Currently, ChatGPT is based on information provided by literature of all sources and does not individualize training prescription except for incorporating the user's information provided in the chat window. However, with wearable technologies such as smartwatches or smart patches collecting individual data (e.g., heart rate, blood pressure, sleep related parameter) more continuously, conveniently, with increasingly reliability and validity (Düking et al., 2020a; Sola et al., 2022; Vybornova et al., 2021; Altini and Kinnunen, 2021), and with a growing number of athletes having access to such technologies, individual information on physiological parameters is increasingly available. Arguably, the integration of such information into algorithms such as those used by ChatGPT may result in more individualized and improved training plans.

Educating runners and coaches on the use of large language models such as ChatGPT

We would like to highlight that ChatGPT is just one large language model runners and coaches are confronted with. Other large language models in various stages of development include BioGPT (Massachusetts Institute of Technology, Boston, MA, USA), Google Bard (Google, Mountainview, CA, USA), Sparrow (Deepmind AI, London, UK), Pangu Alpha (Huawei, Shenzhen, China), and Megatron Turing MLG (Nvidia, Santa Clara, CA, USA) (Li et al., 2023). Given the development and availability of these technologies and its fast adoption rate, we assume this type of technology will, at least in some form, be used for generating training plans. To benefit from the technological advancement around artificial intelligence while ensuring scientific trustworthiness to optimally enhance runners' health and performance, runners must be educated in the strengths, weaknesses, opportunities, and threats of AI for training plans prescription, and must have knowledge around exercise and training to implement such technologies beneficially.

Strengths, Limitations and Future Research

This study evaluated three different training plans generated by ChatGPT based on varying levels of input information granularity. This procedure allowed for a compre-

hensive assessment on how training plans quality differed based on the amount of information provided. Moreover, training plans were evaluated by coaching experts who possessed well-educated backgrounds and extensive experience in the field.

This study is limited to the ChatGPT version on May 23, 2023. Due to the rapid advancements in this domain, it is possible that newer iterations of ChatGPT may yield more precise outcomes for training plans and should be investigated. The interrater reliability exhibited a decrease from Training Plan 1 to Training Plans 2 and 3, despite the raters possessing well-educated backgrounds and extensive experience. This decline in interrater reliability can potentially be attributed to the absence of a universally accepted and evidence-informed consensus regarding the criteria defining an optimal training plan (e.g. (Foster et al., 2022; Burnley et al., 2022)). Additionally, the individual coaching style of each rater plays a significant role in this context. For instance, empirical evidence suggests that a cautious approach to training progression is advisable to mitigate the risk of injuries. Nevertheless, there remains a lack of evidence-informed consensus on the precise definition of a "too rapid" progression and the practical methodologies for calculating load progression (Schwellnus et al., 2016; Soligard et al., 2016; Impellizzeri et al., 2020). The determination of load progression is further influenced by the unique coaching styles and the athlete's training status, and it usually originates from a coach-athlete discussion. It is imperative to acknowledge that the notably poor interrater reliability observed in the assessment of Training Plan 3 represents a limitation in the present analysis. This emphasizes the importance of exercising caution when applying training plans generated by ChatGPT, particularly for novice runners, to minimize potential adverse health outcomes. In practice the involvement of multiple raters, such as experienced coaches, in the evaluation of ChatGPT derived training plans is advisable to enhance their quality and safety.

Future investigations should focus on evaluating the effect of training plans generated by ChatGPT (or similar AI systems) compared to traditionally formulated plans by certified coaches of different levels. Additionally, further research is required to examine the interaction effects between coaches and ChatGPT (or similar AI) to address queries regarding time efficiency in generating training plans and related aspects. In addition to designing training plans, there are other important factors that runners should consider if they want to improve their health and/or performance. These factors include motivation, training monitoring, and frequent adjustments to the plan, and other aspects that are typically handled by coaches. ChatGPT is currently not able to provide assistance with these factors and consequently cannot fully replace coaches.

Conclusion

We showed that the quality of training plans for novice runners generated by ChatGPT is dependent on the provided input information granularity, and consequently on the user's knowledge about planning of running training. Importantly, even the best performing training program

included suggestions that are not rated optimal and lack evidence-informed planning, demonstrating potential for improvement. Based on our results, we cannot recommend to employ ChatGPT generate training plans in practice for runners, without checking the correctness of provided recommendations. Nevertheless, it may assist in designing training plans for well-informed individuals.

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Key points

- Artificial Intelligence such as “ChatGPT” may be used by (novice) runners to generate training plans e.g. due to a lack of access to highly qualified coaches, yet the quality of such training plans is currently unknown.
- ChatGPT generated training plans increase in ratings by coaching experts if more input information is provided, yet are not rated optimal
- ChatGPT can provide recommendations for training plans, but does currently not cover many aspects which are relevant in a coach-athlete relationship such as motivation, monitoring, and training plan adjustments

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Appendix

Table 3. Inserted question and response generated response by ChatGPT; Little input information provided.

Inserted Question by Human	Response Generated by ChatGPT																																																															
<p>Please provide me with a running training plan or the next 6 weeks. Please provide it as a table</p>	<p>Sure! Here's a sample running training plan for the next 6 weeks, divided into three phases: Base Building, Strength Building, and Tapering. Please note that this is just a general plan, and it's always a good idea to consult with a coach or medical professional before starting any new training program. The plan assumes you have a reasonable fitness level and can comfortably run at least 2-3 miles without any issues.</p> <table border="1" data-bbox="352 1272 1406 1576"> <thead> <tr> <th>Week</th> <th>Phase</th> <th>Monday</th> <th>Tuesday</th> <th>Wednesday</th> <th>Thursday</th> <th>Friday</th> <th>Saturday</th> <th>Sunday</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Base Building</td> <td>Rest or XT</td> <td>3 miles</td> <td>2 miles</td> <td>Rest or XT</td> <td>3 miles</td> <td>4 miles</td> <td>Rest</td> </tr> <tr> <td>2</td> <td>Base Building</td> <td>Rest or XT</td> <td>3 miles</td> <td>3 miles</td> <td>Rest or XT</td> <td>4 miles</td> <td>5 miles</td> <td>Rest</td> </tr> <tr> <td>3</td> <td>Base Building</td> <td>Rest or XT</td> <td>3 miles</td> <td>3 miles</td> <td>Rest or XT</td> <td>4 miles</td> <td>6 miles</td> <td>Rest</td> </tr> <tr> <td>4</td> <td>Strength Building</td> <td>Rest or XT</td> <td>3 miles</td> <td>3 miles</td> <td>Rest or XT</td> <td>5 miles</td> <td>7 miles</td> <td>Rest</td> </tr> <tr> <td>5</td> <td>Strength Building</td> <td>Rest or XT</td> <td>4 miles</td> <td>3 miles</td> <td>Rest or XT</td> <td>5 miles</td> <td>8 miles</td> <td>Rest</td> </tr> <tr> <td>6</td> <td>Tapering</td> <td>Rest or XT</td> <td>3 miles</td> <td>2 miles</td> <td>Rest or XT</td> <td>3 miles</td> <td>Race or Rest</td> <td>Rest</td> </tr> </tbody> </table> <p>Note: Rest or XT refers to taking a day off from running or engaging in cross-training activities such as cycling, swimming, or yoga for active recovery. "Miles" refers to the distance you should aim to run on that particular day. XT stands for cross-training. It's important to gradually increase your mileage and intensity during the training plan to avoid overexertion and reduce the risk of injury. You can adjust the distances based on your current fitness level and goals. Remember to listen to your body and make any necessary adjustments to the plan if you experience fatigue, pain, or any other issues. Happy running!</p>	Week	Phase	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	1	Base Building	Rest or XT	3 miles	2 miles	Rest or XT	3 miles	4 miles	Rest	2	Base Building	Rest or XT	3 miles	3 miles	Rest or XT	4 miles	5 miles	Rest	3	Base Building	Rest or XT	3 miles	3 miles	Rest or XT	4 miles	6 miles	Rest	4	Strength Building	Rest or XT	3 miles	3 miles	Rest or XT	5 miles	7 miles	Rest	5	Strength Building	Rest or XT	4 miles	3 miles	Rest or XT	5 miles	8 miles	Rest	6	Tapering	Rest or XT	3 miles	2 miles	Rest or XT	3 miles	Race or Rest	Rest
Week	Phase	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday																																																								
1	Base Building	Rest or XT	3 miles	2 miles	Rest or XT	3 miles	4 miles	Rest																																																								
2	Base Building	Rest or XT	3 miles	3 miles	Rest or XT	4 miles	5 miles	Rest																																																								
3	Base Building	Rest or XT	3 miles	3 miles	Rest or XT	4 miles	6 miles	Rest																																																								
4	Strength Building	Rest or XT	3 miles	3 miles	Rest or XT	5 miles	7 miles	Rest																																																								
5	Strength Building	Rest or XT	4 miles	3 miles	Rest or XT	5 miles	8 miles	Rest																																																								
6	Tapering	Rest or XT	3 miles	2 miles	Rest or XT	3 miles	Race or Rest	Rest																																																								

Table 4. Inserted questions and response generated response by ChatGPT; Medium input information provided

Inserted Question by Human	Response Generated by ChatGPT																												
<p>I am a 20 year old male who runs 2 times a week. Each run is 8 kilometers long and takes me about 40-45 minutes to complete. I have a smartwatch. I would like to increase my running performance. Please provide me with a running training plan for the next 6 weeks. I can potentially train on 3 times per week. Please provide it as a table.</p>	<p>Here's a suggested running training plan for the next 6 weeks, designed to help you increase your running performance by 3-5%. The plan includes three key elements: building endurance, improving speed, and incorporating recovery days. Please note that this plan assumes you are already comfortable with running 8 kilometers and have no health issues. Adjust the distances and intensities according to your fitness level and listen to your body throughout the training process.</p> <table border="1" data-bbox="355 450 1425 651"> <thead> <tr> <th>Week</th> <th>Endurance Run (Distance)</th> <th>Speed/Interval Training</th> <th>Recovery Run (Distance)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>8 km</td> <td>Rest</td> <td>6 km</td> </tr> <tr> <td>2</td> <td>8 km</td> <td>4x400m intervals</td> <td>6 km</td> </tr> <tr> <td>3</td> <td>9 km</td> <td>5x400m intervals</td> <td>6 km</td> </tr> <tr> <td>4</td> <td>9 km</td> <td>6x400m intervals</td> <td>6 km</td> </tr> <tr> <td>5</td> <td>10 km</td> <td>4x800m intervals</td> <td>6 km</td> </tr> <tr> <td>6</td> <td>10 km</td> <td>5x800m intervals</td> <td>6 km</td> </tr> </tbody> </table> <p>Here's a breakdown of each type of run: Endurance Run: This is your regular run at a moderate pace to build and maintain your endurance. Aim to complete the 8 kilometers comfortably. Focus on maintaining a consistent pace, and if possible, gradually increase your speed over time. Speed/Interval Training: These sessions will help improve your running speed and increase your cardiovascular fitness. Perform the intervals at a higher intensity, aiming for a heart rate of around 170-180 beats per minute. Start with 400-meter intervals, running at a faster pace than your endurance runs, and then recover with an easy jog or walk for the same distance. Repeat the intervals as indicated in the table, gradually increasing the number of intervals over the weeks. Recovery Run: These runs are meant to help your body recover and adapt to the training. Keep a relaxed pace during these runs to allow your body to recover from the higher intensity sessions. The distance for recovery runs is slightly shorter than your regular runs to reduce stress on your body while maintaining an active routine. Remember to warm up before each run with dynamic stretches and cool down afterward with static stretches. Pay attention to your body's signals and adjust the pace or distance if needed. Rest and recovery are essential, so make sure to include rest days in your training schedule. In addition to the provided plan, it's important to maintain a balanced diet, stay hydrated, and get sufficient sleep to support your training and overall performance. Good luck with your running goals!</p>	Week	Endurance Run (Distance)	Speed/Interval Training	Recovery Run (Distance)	1	8 km	Rest	6 km	2	8 km	4x400m intervals	6 km	3	9 km	5x400m intervals	6 km	4	9 km	6x400m intervals	6 km	5	10 km	4x800m intervals	6 km	6	10 km	5x800m intervals	6 km
Week	Endurance Run (Distance)	Speed/Interval Training	Recovery Run (Distance)																										
1	8 km	Rest	6 km																										
2	8 km	4x400m intervals	6 km																										
3	9 km	5x400m intervals	6 km																										
4	9 km	6x400m intervals	6 km																										
5	10 km	4x800m intervals	6 km																										
6	10 km	5x800m intervals	6 km																										
<p>at what heart rate should I perform my endurance runs?</p>	<p>During your endurance runs, you should aim to maintain a heart rate that is moderate and sustainable for the duration of the run. Given your current fitness level and the goal of increasing performance, a heart rate range of around 140-150 beats per minute (BPM) would be appropriate. This heart rate range ensures that you're working at a challenging yet manageable intensity, allowing you to build endurance without pushing yourself too hard. It's important to note that heart rate can vary among individuals, so it's recommended to use the heart rate range as a general guideline and adjust it based on your personal comfort level and perceived effort. To find the appropriate heart rate range, you can use the "talk test" as a rough guide. During your endurance runs, you should be able to carry on a conversation without excessive breathlessness. If you're struggling to speak in full sentences, your heart rate might be too high, and you should consider slowing down the pace slightly. Remember, it's always beneficial to listen to your body and make adjustments accordingly. If you feel excessively fatigued or experience any discomfort, it's important to slow down, take a break, or consult with a healthcare professional if necessary.</p>																												

Table 5. Inserted question and response generated response by ChatGPT; Much input information provided

Inserted Question by Human	Response Generated by ChatGPT
<p>I am a 20 year old male who runs 2 times a weeks since one year. Each run is 8 kilometers long and takes me about 40-45 minutes to complete. My mean heart rate during these runs is around 155-170 beats per minute. I do not do other sports and I do perform only long runs and no high intensity interval training sessions or similar. I have no health issues. I have access to a breathing gas analyzer and a treadmill for performance tests. For monitoring purposes, I do have access to a smartwatch which can track my heart rate and covered distance during runs, as well as environmental temperature. What would be a reasonable goal which I can achieve with respect to running performance in the next 6 weeks and please provide me with training plan for it. Please provide it as a table.</p>	<p>Based on your current running routine and fitness level, a reasonable goal for the next 6 weeks could be to improve your speed and endurance. With consistent training and gradual progression, you can aim to decrease your average running time for the 8-kilometer distance.</p> <p>Here's a suggested training plan for the next 6 weeks. The plan gradually increases your running volume and incorporates some speed work to improve your performance. Please note that it's always recommended to consult with a professional trainer or sports physician before starting a new training plan, especially if you have any underlying health conditions.</p> <p>Training Plan for the Next 6 Weeks:</p> <p>Week 1:</p> <p>Day 1: Easy Run (6 km) at a comfortable pace. Day 2: Rest or cross-training (e.g., cycling, swimming, or strength training). Day 3: Interval Training - 6 x 400 meters at a faster pace with 2-minute recovery jogs in between. Day 4: Rest or cross-training. Day 5: Easy Run (8 km) at a comfortable pace. Day 6: Rest or cross-training. Day 7: Long Run (10 km) at a conversational pace.</p> <p>Week 2:</p> <p>Day 1: Easy Run (6 km) at a comfortable pace. Day 2: Rest or cross-training. Day 3: Fartlek Training - 30-minute run incorporating faster bursts (1-2 minutes) and recovery periods. Day 4: Rest or cross-training. Day 5: Easy Run (8 km) at a comfortable pace. Day 6: Rest or cross-training. Day 7: Long Run (12 km) at a conversational pace.</p> <p>Week 3:</p> <p>Day 1: Easy Run (6 km) at a comfortable pace. Day 2: Rest or cross-training. Day 3: Tempo Run - 5 km at a comfortably hard pace (slightly faster than your usual pace). Day 4: Rest or cross-training. Day 5: Easy Run (8 km) at a comfortable pace. Day 6: Rest or cross-training. Day 7: Long Run (14 km) at a conversational pace.</p> <p>Week 4:</p> <p>Day 1: Easy Run (6 km) at a comfortable pace. Day 2: Rest or cross-training. Day 3: Interval Training - 8 x 400 meters at a faster pace with 2-minute recovery jogs in between. Day 4: Rest or cross-training. Day 5: Easy Run (8 km) at a comfortable pace. Day 6: Rest or cross-training. Day 7: Long Run (16 km) at a conversational pace.</p> <p>Week 5:</p> <p>Day 1: Easy Run (6 km) at a comfortable pace. Day 2: Rest or cross-training. Day 3: Fartlek Training - 40-minute run incorporating faster bursts (1-2 minutes) and recovery periods. Day 4: Rest or cross-training. Day 5: Easy Run (8 km) at a comfortable pace. Day 6: Rest or cross-training. Day 7: Long Run (18 km) at a conversational pace.</p> <p>Week 6:</p> <p>Day 1: Easy Run (6 km) at a comfortable pace. Day 2: Rest or cross-training. Day 3: Tempo Run - 6 km at a comfortably hard pace. Day 4: Rest or cross-training. Day 5: Easy Run (8 km) at a comfortable pace. Day 6: Rest or cross-training</p>

Table 5. Continue...

Inserted Question by Human	Response Generated by ChatGPT				
please provide the training plan as a table	Apologies for the previous format. Here's the training plan presented as a table:				
	Week	Day	Training Type	Distance	Pace
	1	1	Easy Run	6 km	Comfortable pace
		2	Rest/Cross-training	-	-
		3	Interval Training	6 x 400m	Faster pace
		4	Rest/Cross-training	-	-
		5	Easy Run	8 km	Comfortable pace
		6	Rest/Cross-training	-	-
		7	Long Run	10 km	Conversational pace
	2	1	Easy Run	6 km	Comfortable pace
		2	Rest/Cross-training	-	-
		3	Fartlek Training	30 minutes	Varied pace
		4	Rest/Cross-training	-	-
		5	Easy Run	8 km	Comfortable pace
		6	Rest/Cross-training	-	-
		7	Long Run	12 km	Conversational pace
	3	1	Easy Run	6 km	Comfortable pace
		2	Rest/Cross-training	-	-
		3	Tempo Run	5 km	Comfortably hard pace
		4	Rest/Cross-training	-	-
		5	Easy Run	8 km	Comfortable pace
		6	Rest/Cross-training	-	-
		7	Long Run	14 km	Conversational pace
	4	1	Easy Run	6 km	Comfortable pace
		2	Rest/Cross-training	-	-
		3	Interval Training	8 x 400m	Faster pace
		4	Rest/Cross-training	-	-
		5	Easy Run	8 km	Comfortable pace
		6	Rest/Cross-training	-	-
		7	Long Run	16 km	Conversational pace
	5	1	Easy Run	6 km	Comfortable pace
		2	Rest/Cross-training	-	-
		3	Fartlek Training	40 minutes	Varied pace
		4	Rest/Cross-training	-	-
		5	Easy Run	8 km	Comfortable pace
		6	Rest/Cross-training	-	-
		7	Long Run	18 km	Conversational pace
	6	1	Easy Run	6 km	Comfortable pace
		2	Rest/Cross-training	-	-
		3	Tempo Run	6 km	Comfortably hard pace
		4	Rest/Cross-training	-	-
		5	Easy Run	8 km	Comfortable pace
		6	Rest/Cross-training	-	-
		7	Long Run	20 km	Conversational pace

Table 5. Continue...

Inserted Question by Human	Response Generated by ChatGPT
by how much can I improve my 8 kilometer distance running time by this training plan?	<p>The extent of improvement in your 8-kilometer running time will depend on various factors such as your current fitness level, genetics, consistency with training, nutrition, and recovery. While it's challenging to provide an exact prediction, with a structured training plan like the one suggested, you can expect to see noticeable improvements in your running performance over the course of six weeks.</p> <p>By incorporating different types of training, including interval training, tempo runs, and long runs, you'll be targeting different aspects of your fitness, such as speed, endurance, and lactate threshold. This variety in training can help improve your overall running efficiency and performance.</p> <p>Consistency is key when it comes to seeing progress. By following the training plan consistently, gradually increasing your training volume, and giving your body adequate rest and recovery, you should be able to see improvements in your running time for the 8-kilometer distance.</p> <p>It's important to set realistic expectations and be patient with your progress. The rate of improvement can vary from person to person. Some individuals may experience significant gains in a short period, while others may see more gradual improvements. Monitor your progress, track your running times, and celebrate the smaller milestones along the way.</p>
What kind of tests can I perform to test my running performance and to derive training variables such as heart rate thresholds which I can use to guide my training?	<p>To test your running performance and derive training variables, you can consider the following tests:</p> <p>Maximal Oxygen Consumption (VO2 max) Test: This test measures your aerobic capacity, which is an important indicator of endurance performance. It can be performed on a treadmill or using an outdoor track. During the test, your oxygen consumption and heart rate will be measured while gradually increasing the intensity until exhaustion. The results can provide insights into your cardiovascular fitness and help determine training zones.</p> <p>Lactate Threshold Test: This test helps identify the intensity at which lactate begins to accumulate in your muscles, indicating the point at which fatigue sets in. It can be performed on a treadmill or track. By taking blood samples at different exercise intensities and analyzing the lactate levels, you can determine your lactate threshold heart rate or pace. This information can guide your training by identifying optimal training zones.</p> <p>Running Economy Test: This test assesses how efficiently your body utilizes oxygen while running at a given pace. It can be performed by measuring oxygen consumption and heart rate while maintaining a steady running pace on a treadmill. Improving running economy can lead to better endurance and performance.</p> <p>Time Trial: A time trial is a practical and straightforward test that involves running a set distance (e.g., 5 km) as fast as possible. This test can be performed periodically to track improvements in your running speed and assess your overall fitness.</p> <p>Heart Rate Variability (HRV) Analysis: HRV is the variation in time intervals between consecutive heartbeats. By monitoring HRV over time, you can gain insights into your autonomic nervous system and recovery status. Various apps and devices can help measure and analyze HRV, providing information on when to push harder or take it easy during training.</p> <p>These tests can provide valuable data to determine training variables such as heart rate thresholds, training zones, and optimal paces. It's important to note that some tests, such as VO2 max and lactate threshold tests, may require specialized equipment or the assistance of a trained professional. Consulting with a sports scientist, coach, or exercise physiologist can help you design and interpret these tests accurately.</p>
what can I do to monitor internal and external load parameters during my training and what can I do to monitor contextual factors such as environmental temperature during my training and during my everyday-life?	<p>To monitor internal and external load parameters during your training, as well as contextual factors such as environmental temperature, you can utilize the following methods and tools:</p> <p>Internal Load Parameters:</p> <p>Heart Rate Monitoring: Utilize your smartwatch or chest strap heart rate monitor during your runs to track your heart rate. This can provide insights into your cardiovascular response and exertion levels.</p> <p>Perceived Exertion (RPE): Use the Borg Rating of Perceived Exertion scale to subjectively rate your perceived effort during training sessions. This can give you an indication of the intensity of your workouts.</p> <p>External Load Parameters:</p> <p>Distance and Speed Tracking: Your smartwatch can track the distance covered and pace during your runs. This allows you to monitor changes in speed and distance over time.</p> <p>GPS Tracking: Use GPS-enabled devices or smartphone apps to track your routes, elevation changes, and map your training runs.</p> <p>Running Power Meters: Consider using a running power meter that measures your power output while running. This can provide additional insights into your external load and effort.</p>

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	<p>Contextual Factors:</p> <p>Environmental Temperature Monitoring: Some smartwatches or fitness apps provide real-time weather information, including temperature, which can help you monitor the environmental conditions during your runs.</p> <p>Weather Apps: Utilize weather apps on your smartphone to check temperature, humidity, and weather conditions before heading out for a run.</p> <p>Thermal Clothing: During colder weather, wear appropriate thermal clothing to protect yourself from low temperatures.</p> <p>Hydration Monitoring: Keep track of your fluid intake during training, particularly in hot and humid conditions, to ensure proper hydration.</p> <p>By monitoring internal and external load parameters and considering contextual factors like environmental temperature, you can gain insights into the impact of various factors on your training performance, adapt your training accordingly, and make informed decisions about pacing, recovery, and training adjustments.</p>
<p>at which heart rate should I perform the runs in the training plan you provided?</p>	<p>To determine the target heart rate for your runs in the training plan, it's important to establish your individual heart rate zones based on your maximum heart rate (MHR) and lactate threshold heart rate (LTHR). Here's a general guideline for the different training zones:</p> <p>Easy/Recovery Runs: These runs should be done at a comfortable pace, where you can hold a conversation easily. The target heart rate for easy runs is typically around 60-70% of your maximum heart rate or below your lactate threshold heart rate.</p> <p>Interval Training: During interval sessions, aim to reach higher intensities. The target heart rate for interval training can vary depending on the specific workout, but it generally falls within 80-90% of your maximum heart rate.</p> <p>Tempo Runs: Tempo runs are performed at a comfortably hard pace, just below your lactate threshold. The target heart rate for tempo runs is typically around 85-90% of your maximum heart rate or close to your lactate threshold heart rate.</p> <p>Long Runs: Long runs are done at a conversational pace to build endurance. The target heart rate for long runs is usually around 70-80% of your maximum heart rate or below your lactate threshold heart rate.</p> <p>Keep in mind that these heart rate ranges are general guidelines, and individual variations can occur. It's recommended to consult with a professional trainer or sports physician to determine your specific heart rate zones through a comprehensive assessment, such as a lactate threshold test or VO2 max test.</p> <p>Using your smartwatch or chest strap heart rate monitor, you can track your heart rate during runs and ensure you're within the target heart rate zone for the respective training sessions as outlined in the training plan. Adjust the pace accordingly to maintain the desired heart rate range for each type of run.</p>
<p>are there nutritional aspects I need to consider for this training plan?</p>	<p>Yes, nutrition plays a vital role in supporting your training plan and optimizing your running performance. Here are some key nutritional aspects to consider:</p> <p>Sufficient Caloric Intake: Make sure you're consuming enough calories to meet the energy demands of your training. Calculate your estimated daily caloric needs based on your age, gender, weight, height, and activity level. Aim for a balanced diet that includes carbohydrates, protein, and healthy fats.</p> <p>Carbohydrates for Energy: Carbohydrates are the primary fuel source for endurance exercise. Prioritize complex carbohydrates such as whole grains, fruits, vegetables, and legumes to provide sustained energy. Ensure an adequate carbohydrate intake before and after your runs to replenish glycogen stores.</p> <p>Protein for Muscle Repair: Protein is crucial for muscle repair and recovery. Include lean sources of protein in your meals such as poultry, fish, lean meats, dairy products, eggs, legumes, and plant-based protein sources. Aim for a balanced protein intake throughout the day.</p> <p>Hydration: Proper hydration is essential for optimal performance. Drink water regularly throughout the day and ensure you're adequately hydrated before, during, and after your runs. Monitor your fluid intake and consider electrolyte-rich fluids for longer or more intense workouts.</p> <p>Timing of Meals and Snacks: Plan your meals and snacks strategically around your training sessions. Have a pre-run meal/snack containing carbohydrates and a small amount of protein about 1-2 hours before your run. After your run, consume a post-workout snack or meal containing carbohydrates and protein to support recovery.</p> <p>Nutrient Timing: Pay attention to nutrient timing to maximize your training benefits. Consuming carbohydrates and protein within the first 30-60 minutes after your run can help replenish glycogen stores and promote muscle recovery.</p> <p>Micronutrients: Ensure you're getting an adequate intake of vitamins and minerals from a variety of fruits, vegetables, and whole foods. These nutrients are essential for overall health, energy production, and immune function.</p>

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<p>what can I do to improve recovery between training sessions?</p>	<p>Individual Needs: Remember that individual nutritional needs may vary, and it's beneficial to consult with a registered dietitian or sports nutritionist who can provide personalized guidance based on your specific requirements and goals.</p> <p>By focusing on proper nutrition, you can support your training, optimize your performance, promote recovery, and maintain overall health and well-being.</p> <p>Improving recovery between training sessions is crucial for optimizing performance and reducing the risk of overuse injuries. Here are some strategies to enhance your recovery:</p> <p>Adequate Rest and Sleep: Prioritize getting enough sleep and rest days. Aim for 7-9 hours of quality sleep each night to facilitate tissue repair, hormone balance, and overall recovery.</p> <p>Active Recovery: Engage in light activities such as gentle stretching, yoga, or low-intensity cross-training (e.g., cycling, swimming) on rest days. This promotes blood flow, aids in muscle recovery, and helps reduce muscle soreness.</p> <p>Nutrition for Recovery: Consume a balanced post-workout meal or snack within 30-60 minutes after exercise. It should include carbohydrates to replenish glycogen stores, protein to support muscle repair, and fluids to rehydrate. Also, maintain a well-rounded diet with adequate calories and macronutrients to support recovery.</p> <p>Hydration: Proper hydration is essential for recovery. Drink water regularly throughout the day and monitor your fluid intake during and after exercise. Consider electrolyte-rich fluids or sports drinks for longer or more intense workouts.</p> <p>Foam Rolling and Self-Massage: Use foam rollers, massage balls, or other self-massage tools to target tight or sore muscles. This can help release muscle tension, improve circulation, and promote recovery.</p> <p>Contrast Water Therapy: Alternating between cold and warm water immersion or applying cold packs followed by warm compresses can help reduce inflammation, improve circulation, and alleviate muscle soreness.</p> <p>Compression Garments: Consider wearing compression socks, tights, or sleeves post-workout. Compression clothing can help improve blood flow, reduce muscle vibration, and facilitate recovery.</p> <p>Stress Management: Incorporate stress management techniques such as meditation, deep breathing exercises, or relaxation techniques to reduce overall stress levels and promote recovery.</p> <p>Listen to Your Body: Pay attention to your body's signals and adjust your training as needed. If you're feeling excessively fatigued or experiencing pain, allow for additional rest or modify your training intensity or duration.</p> <p>Professional Support: Consider consulting with a sports therapist, physiotherapist, or athletic trainer who can provide personalized advice, recovery modalities, and injury prevention strategies.</p> <p>Remember that recovery is an individual process, and it may vary depending on factors such as training intensity, duration, and your body's response. Prioritize recovery as an essential component of your training plan to promote long-term progress and reduce the risk of overtraining.</p>
<p>which of these recovery procedures have shown to have the biggest effect in runners?</p>	<p>The effectiveness of recovery procedures can vary among individuals, and there is no one-size-fits-all approach. However, some recovery procedures have shown promising benefits for runners. Here are a few strategies that have been supported by research and have been commonly recommended:</p> <p>Sleep: Sufficient sleep is crucial for recovery and overall performance. Quality sleep enhances tissue repair, hormone balance, and cognitive function. Adequate sleep duration and sleep quality have been consistently associated with improved athletic performance and recovery.</p> <p>Nutrition: Proper nutrition, including adequate post-workout fueling, is essential for optimal recovery. Consuming a balanced meal or snack containing carbohydrates and protein within the first hour after exercise helps replenish glycogen stores and supports muscle repair and growth.</p> <p>Active Recovery: Engaging in low-intensity activities on rest days, such as light jogging, cycling, or swimming, can promote blood flow, reduce muscle stiffness, and enhance recovery. Active recovery aids in flushing out metabolic waste products and supporting the repair process.</p> <p>Compression Garments: Wearing compression garments, such as socks, sleeves, or tights, has been reported to improve recovery in some runners. They can enhance blood flow, reduce muscle vibration, and decrease perceived muscle soreness. Compression garments may be particularly beneficial during and after long-distance running or high-intensity workouts.</p>

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	<p>Foam Rolling: Foam rolling and self-myofascial release techniques have gained popularity in recent years. Rolling over tight or sore muscles with a foam roller helps release muscle tension, increase flexibility, and improve blood circulation. Foam rolling can be an effective tool for reducing delayed onset muscle soreness (DOMS) and improving range of motion.</p> <p>It's important to note that the effectiveness of these recovery procedures can vary based on individual factors and the specific context of training. Some runners may find certain strategies more beneficial than others. Experimenting with different recovery methods and listening to your body's response can help you identify which strategies work best for you. Additionally, seeking advice from a sports therapist, physiotherapist, or sports nutritionist who can assess your individual needs and provide tailored recommendations can be valuable for optimizing recovery and performance.</p>
<p>what are psychological skills to improve my running performance and how can I do this?</p>	<p>Psychological skills play a significant role in improving running performance. Here are some key psychological skills that can benefit runners:</p> <p>Goal Setting: Set clear and specific goals for your running. Goals provide direction, motivation, and a sense of purpose. Make sure your goals are challenging yet realistic, and break them down into short-term and long-term objectives. Regularly review and adjust your goals as needed.</p> <p>Positive Self-Talk: Cultivate a positive and supportive inner dialogue. Replace negative or self-defeating thoughts with positive and encouraging statements. Use affirmations, visualization, and constructive self-talk to boost confidence and maintain focus during training and races.</p> <p>Mental Imagery: Practice mental imagery or visualization techniques. Visualize yourself performing well, running with ease, and achieving your goals. Imagine the sensations, sights, and sounds associated with successful running. Mental imagery can enhance confidence, reduce anxiety, and improve performance.</p> <p>Attention Control: Develop the ability to focus and direct your attention effectively during training and races. Practice concentration exercises and learn to tune out distractions. Utilize strategies such as focusing on your breathing, form, or specific landmarks to maintain attention and stay present.</p> <p>Pre-race Routine: Establish a pre-race routine to help you get in the right mindset before competitions. This routine may include specific warm-up exercises, visualization, positive self-talk, and calming techniques. Consistency in your pre-race routine can help reduce anxiety and enhance mental preparedness.</p> <p>Stress Management: Develop stress management techniques to cope with pre-race nerves and other stressors. This may involve deep breathing exercises, meditation, progressive muscle relaxation, or engaging in activities that help you relax and unwind. Effective stress management can enhance focus and performance.</p> <p>Resilience and Coping Strategies: Develop resilience to overcome setbacks and challenges. Learn effective coping strategies for managing race-day pressure, setbacks, or difficult training sessions. Build a support network of coaches, teammates, or friends who can provide encouragement and assistance.</p> <p>Mindfulness: Practice mindfulness techniques to cultivate present-moment awareness and non-judgmental acceptance. Being fully present during training runs and races can improve focus, performance, and enjoyment of the running experience.</p> <p>Reflective Practice: Regularly reflect on your training and races. Evaluate your strengths, areas for improvement, and lessons learned. This reflective practice can help you adjust your training approach, set new goals, and build resilience.</p> <p>Seek Professional Help: If you're struggling with mental barriers, performance anxiety, or other psychological challenges, consider seeking the assistance of a sports psychologist or mental performance coach. They can provide specific strategies tailored to your needs and help you develop a strong mental game.</p> <p>Incorporating these psychological skills into your training and competition routine takes practice and consistency. Experiment with different techniques, find what works best for you, and make them an integral part of your overall training plan.</p>
<p>What are the most importance aspects of a good running technique and how can I improve these aspects?</p>	<p>A good running technique is essential for efficiency, injury prevention, and optimal performance. Here are some key aspects of a good running technique and tips to improve them:</p> <p>Posture and Alignment: Maintain an upright posture with a slight forward lean from the ankles. Avoid excessive leaning forward or backward. Keep your head aligned with your spine, looking forward rather than down. Engage your core muscles to stabilize your torso and pelvis.</p> <p>Arm Swing: Maintain relaxed and controlled arm swings, with your arms bent at approximately 90 degrees.</p>

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Inserted Question by Human	Response Generated by ChatGPT
	<p>Swing your arms forward and backward, not across your body. Avoid excessive shoulder rotation or tension. Your arms should assist in propelling you forward.</p> <p>Stride Length and Cadence: Aim for a stride length that is comfortable and efficient for you. Avoid overstriding (landing with your foot too far in front of your body) or taking short, choppy steps. Increase your cadence (steps per minute) to a range of 170-180 or higher. This can help promote a more efficient and faster running form.</p> <p>Foot Strike: Aim for a midfoot or forefoot strike, where your foot lands beneath your center of mass. Avoid heavy heel striking, where your foot lands with excessive force in front of your body. However, some runners naturally have a slight heel-to-toe transition.</p> <p>Arm-Leg Coordination: Coordinate your arm swings with your leg movements. As your right leg moves forward, your left arm should swing forward and vice versa. This coordination helps maintain balance, stability, and efficient forward momentum.</p> <p>Cadence Drills and Form Exercises: Practice cadence drills by running to a metronome or using apps that provide a cadence beat. Gradually increase your cadence to improve turnover and reduce overstriding. Incorporate form exercises and drills such as high knees, butt kicks, and bounding to enhance your running technique and reinforce proper alignment and movement patterns.</p> <p>Video Analysis: Have someone record a video of your running form from different angles (side, front, and back). Analyze the video to identify any areas where you can make improvements or seek feedback from a running coach or expert.</p> <p>Strength and Mobility Training: Include strength and mobility exercises in your training routine to improve muscle imbalances, stability, and range of motion. Focus on exercises that target the core, glutes, hips, and leg muscles, such as squats, lunges, planks, and single-leg exercises.</p> <p>Gradual Progression: Make gradual changes to your running technique. Trying to make too many adjustments at once can be overwhelming and lead to inefficiencies or injury. Focus on one aspect at a time, practice it consistently, and then move on to another area of improvement.</p> <p>Seek Professional Guidance: Consider working with a running coach or a qualified running expert who can provide personalized guidance, feedback, and drills specific to your needs and goals. Improving your running technique takes time, practice, and patience. Be mindful of your form during training runs, gradually incorporate changes, and aim for a natural and efficient running style that works best for your body.</p>