

Psychological and Physical Effects of Functional Training in Youth Volleyball Players a Quantitative Study

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Abstract

In various athletic domains, including youth volleyball, the adoption of functional training has emerged as a potentially efficacious approach for enhancing athletic prowess and mitigating injury susceptibility. This quantitative inquiry delves into the psychological and physiological impacts of functional training on juvenile volleyball athletes. The study scrutinizes alterations in psychological constructs such as motivation and self-assurance, alongside physical parameters like muscular strength and agility, pre- and post-engagement with the training regimen. Employing a multi-phased methodology encompassing purposive sampling, questionnaire administration, physical evaluations, and quantitative statistical analyses, the research elucidates the efficacy of functional training in nurturing comprehensive athlete development. The findings underscore substantial enhancements in participants' psychological well-being and physical aptitude consequent to the intervention. By advocating for evidence-based training modalities tailored to the specific requisites of young volleyball athletes and bolstering their athletic achievement and welfare within the sport, this investigation constitutes a noteworthy contribution to the domain of sports science.

Keywords: Functional Training, Youth Volleyball, Athlete Development, Psychological Well-being, Physical Performance.

Introduction

The exploration of optimal training methodologies to enhance both physical and mental resilience remains a prominent focus within the realm of sports science and athletic performance. Among the array of conditioning approaches, functional training has garnered significant attention due to its purported capacity to augment athletic prowess, mitigate injury occurrences, and bolster overall fitness levels (Feito et al., 2018). Assessing the efficacy of functional training assumes particular significance within the domain of youth volleyball, given the pivotal role of physical and psychological development during this formative stage (Bisagno et al., 2019). With the aim of elucidating the comprehensive impact of functional training as a holistic training paradigm, this quantitative investigation endeavours to elucidate the psychological and physiological repercussions of such training regimens among young volleyball practitioners.

Youth volleyball presents a dynamic and rigorous athletic pursuit, necessitating participants to meet specific physiological and psychological demands through a diverse training approach (Jayanthi et al., 2022).

Functional training has emerged as a prospective framework for enhancing athletic performance across various sporting disciplines, characterized by exercises mirroring real-world movements and prioritizing core stability, flexibility, and muscular strength. While functional training has gained traction among adult cohorts, its effects on young athletes remain relatively understudied (Cavedon et al., 2020). This study seeks to address this gap in scholarly literature by directing its focus specifically on young volleyball athletes, aiming to furnish evidence-based insights into the potential benefits and constraints of functional training within this demographic.

Comprehending the nexus between physical and psychological well-being constitutes a fundamental aspect of investigating the impact of functional training on adolescent volleyball athletes (Rebelo et al., 2023). The competitive mindset and overall performance of athletes are significantly influenced by psychological attributes such as motivation, self-assurance, and resilience, all of which are intricately intertwined with physical fitness and athletic proficiency (D'Agostino, 2023; Petz, 2021). Hence, for comprehensive athlete development, an integrated approach that acknowledges both the

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physiological and psychological dimensions of training is imperative. This study endeavours to elucidate the reciprocal interplay between physical and psychological outcomes among youth volleyball participants through a quantitative examination of functional training interventions, thereby illuminating the underlying mechanisms contributing to the efficacy of functional training in optimizing athletic performance and overall well-being.

Moreover, given the quantitative nature of this study, it enables an exploration of potential disparities in outcomes between functional training and conventional training methodologies commonly employed in youth volleyball programs. Researchers can discern the specific advantages and benefits of functional training in fostering holistic athlete development by juxtaposing its outcomes with those yielded by traditional methods such as resistance training or plyometrics (Horne et al., 2022; RINGLAND, 2020). In addition to enriching our understanding of the effectiveness of functional training, this comparative approach offers valuable insights to coaches, trainers, and sports scientists endeavouring to ascertain the most efficacious training regimens for young volleyball athletes.

In summary, the primary objective of this quantitative investigation is to elucidate the psychological and physiological ramifications of functional training on adolescent volleyball participants, thereby providing a valued addition to the burgeoning domain of sports science. By scrutinizing the comprehensive effects of functional training on athlete development, this research endeavours to advance strategies for optimizing performance, enlighten evidence-driven training methodologies, and ultimately promote the triumph and welfare of young athletes within the dynamic and competitive milieu of volleyball.

Literature Review

Functional training, characterized by movements closely resembling those encountered in athletic endeavours, has garnered significant attention within sports science circles due to its potential to enhance athletic performance and mitigate injury risks (Bagherian et al.; Boyle, 2016; Brazier et al., 2019; Feito et al., 2018). It is imperative to discern the psychological and physiological implications of functional training in the context of young volleyball athletes, whose skill attainment and physiological maturation are pivotal for sustained success (Boichuk et al., 2020; Coutinho et al., 2021; Nešić et al., 2020). To illuminate the comparative efficacy of

functional training as a conditioning modality, this literature review will examine studies investigating the psychological and physical ramifications of this practice among young volleyball participants.

A multitude of studies have investigated the health benefits of functional training for young athletes engaged in various sports disciplines. For instance, researchers have demonstrated that functional training interventions significantly enhance muscular strength, power, agility, and endurance among adolescent athletes (Karagianni et al., 2020; Zemková & Hamar, 2018). Similarly, a systematic review conducted by some scholars highlighted the effectiveness of functional training in enhancing proprioception, dynamic balance, and core stability—attributes crucial for volleyball performance and injury prevention (Glass & Wisneski, 2023; Vuorinen, 2018; Washington, 2019). Based on these findings, functional training exhibits promise as a comprehensive conditioning approach for augmenting physical attributes pertinent to volleyball play.

Functional training has been demonstrated to positively impact the psychological well-being of young athletes, complementing its physical advantages. Researchers investigated the self-efficacy and motivation levels of adolescent athletes, revealing significant enhancements in both domains subsequent to their involvement in a structured functional training program (D'Agostino, 2023; Knight, 2020; Owoeye et al., 2020). Additionally, scholarly investigations established the favourable effects of functional training on athletes' satisfaction, perceived competence, and adherence to training regimens (Pulido, 2021; Rodrigues et al., 2018). These findings underscore the potential of functional training to bolster the motivation and psychological resilience of young volleyball players, thereby augmenting their holistic physical development and well-being.

Moreover, the psychological and physical repercussions of implementing functional training among young volleyball athletes may be influenced by contextual variables such as training volume, intensity, and periodization. Scholarly investigations underscored the importance of tailoring training protocols to align with athletes' objectives, developmental phases, and proficiency levels (Bompa & Carrera, 2015; Gould et al., 2020; Kim & Park, 2020; Vealey, 1988). To optimize the efficacy of functional training in fostering athlete development and performance, forthcoming comparative studies should consider these contextual nuances. Such endeavours would yield nuanced insights into the optimal integration of functional training within youth volleyball programs.

In summary, while existing research indicates potential psychological and physiological benefits of functional training for adolescent athletes, further comparative studies specifically focusing on young volleyball participants are imperative. By elucidating the relative effectiveness of functional training compared to conventional methods, researchers can enhance the athletic development, performance, and well-being of youth volleyball players by offering evidence-based training protocols tailored to address their distinctive physiological and psychological requirements.

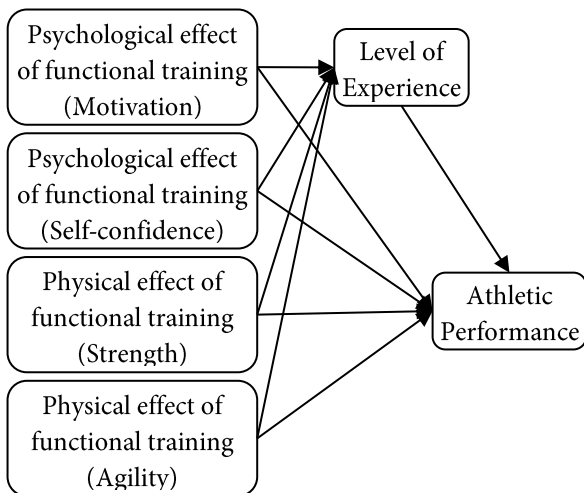


Figure 1: Research Outline

Methodology

Research Design: Employing a quantitative methodology, this study integrates surveys and objective assessments to comprehensively investigate the psychological and physical impacts of functional training programs on the athletic performance of volleyball players. Demographic data, parental perspectives, and participation in functional training initiatives will be collected through standardized surveys, providing insights into the psychological and physical ramifications of these programs. The independent variables encompass a spectrum of psychological and physical attributes such as motivation, self-confidence, strength, and agility, yielding quantitative appraisals to gauge the athletic performance of volleyball players. By amalgamating subjective and objective data collection methods, the study endeavours to furnish a holistic comprehension of the effects of functional training. This approach facilitates informed decision-making for policymakers, educators, and healthcare practitioners involved in endorsing functional training programs for volleyball players, enabling the examination of potential correlations, mediating factors, and intricate relationships among

intervention engagement, physical fitness outcomes, and relevant covariates.

Sampling Technique and Sample Size: A sample of volleyball players aged 15 to 35, hailing from both urban and rural areas of Jiangxi Province, will be selected for inclusion in the study. Purposive sampling will be employed to ensure representation across diverse socioeconomic strata. The determination of sample size will be guided by a statistical power analysis, aiming to achieve sufficient representation to yield statistically significant findings.

Data Analysis: In the data analysis, Partial Least Squares (PLS) regression, a robust statistical technique well-suited for exploring complex relationships and latent variables, will be employed. By leveraging PLS regression, it becomes feasible to investigate the associations among the effects of functional training, level of experience, athletic performance, and relevant covariates, while simultaneously considering potential confounding factors.

Results

Evaluation of Measurement Model

The measurement model underwent an examination for convergent validity utilizing three approaches: composite reliability, factor loadings, and Average Variance Extracted (AVE) (Hair et al., 2017; Ramayah et al., 2018). Composite reliability assesses the internal consistency of the constructs, with a minimum acceptable threshold of 0.70 (Herath & Rao, 2009). All constructs within the model surpassed this minimum criterion. Additionally, the convergent validity of the constructs was assessed through AVE and factor loadings. Each construct demonstrated satisfactory AVE and CR values, warranting their inclusion in the model. Moreover, an AVE value exceeding 0.5 indicates adequate convergent validity of the model (Hair et al., 2017), a criterion which all constructs fulfilled. Furthermore, for factor loading evaluation, values ranging between 0.4 and 0.7 are deemed acceptable. It is conventionally acknowledged that items with factor loadings falling within this range necessitate scrutiny; if removing such items enhances the AVE and CR values, they should be eliminated from the model, otherwise retained (Hair et al., 2017). Table 1 presents the outer loadings, CR, AVE, rho_A, and Cronbach's alpha for each construct, while Table 2 illustrates the discriminant validity of the constructs. Figure 2 provides a visual representation of the measurement model.

Table 1:

Convergent Validity and Reliability

Constructs	Items	Outer Loadings	Cronbach's Alpha	rho_A	CR	AVE
Level of Experience (LoE)	LoE1	0.780	0.836	0.844	0.867	0.579
	LoE2	0.879				
	LoE3	0.794				
	LoE4	0.807				
	LoE5	0.907				
Athletic Performance (AP)	AP1	0.782	0.804	0.806	0.837	0.578
	AP2	0.796				
	AP3	0.697				
	AP4	0.771				
	AP5	0.736				
	AP6	0.685				
	AP7	0.573				
	AP8	0.587				
Psychological Effect-Motivation	PE-M1	0.659	0.809	0.833	0.840	0.71
	PE-M2	0.655				
	PE-M3	0.733				
	PE-M4	0.799				
Psychological Effect-Self-Confidence	PE-SC1	0.746	0.809	0.833	0.840	0.71
	PE-SC2	0.703				
	PE-SC3	0.700				
	PE-SC4	0.684				
Physical Effect-Strength	PhE-S1	0.610	0.697	0.728	0.786	0.651
	PhE-S2	0.852				
	PhE-S3	0.798				
	PhE-S4	0.813				
Physical Effect-Agility	PhE-A1	0.805	0.697	0.728	0.786	0.651
	PhE-A2	0.762				
	PhE-A3	0.759				
	PhE-A4	0.743				

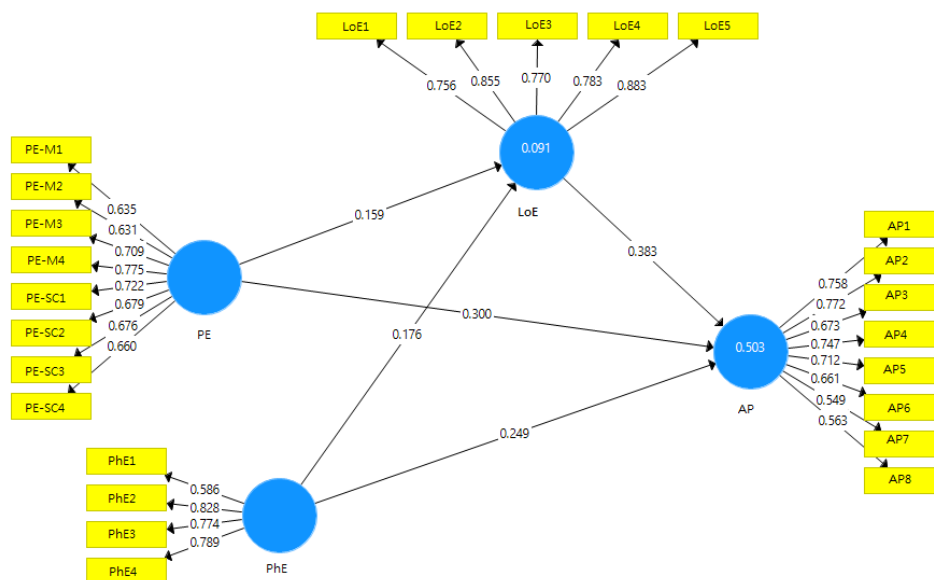


Figure 2: Measurement Model

Table 2:

Discriminant Validity- Fornell-Larcker Criterion

	LoE	AP	PE-M	PE-SC	PhE-S	PhE-A
LoE	0.776					
AP	0.559	0.636				
PE-M	0.285	0.531	0.66			
PE-SC	0.301	0.548	0.551	0.69		
PhE-S	0.464	0.432	0.468	0.574	0.635	
PhE-A	0.329	0.316	0.395	0.482	0.315	0.61

Evaluation of Structural Model

The structural model was evaluated using R-square, indicating the degree of precision in predicting the model's outcomes. As depicted in Table 3, the R-square value is 0.66 for the athletic performance construct and 0.41 for the level of experience construct, elucidating 66% of the variance in athletic performance and level of

experience. The results of the analysis indicate that the coefficients of the functional training program constructs within the model are relatively substantial. The structural model is visually represented in Figure 3, and direct and indirect relationships are detailed in Table 4.

Table 3:

R-Square

	R Square	R Square Adjusted
AP	0.413	0.408
LoA	0.667	0.662

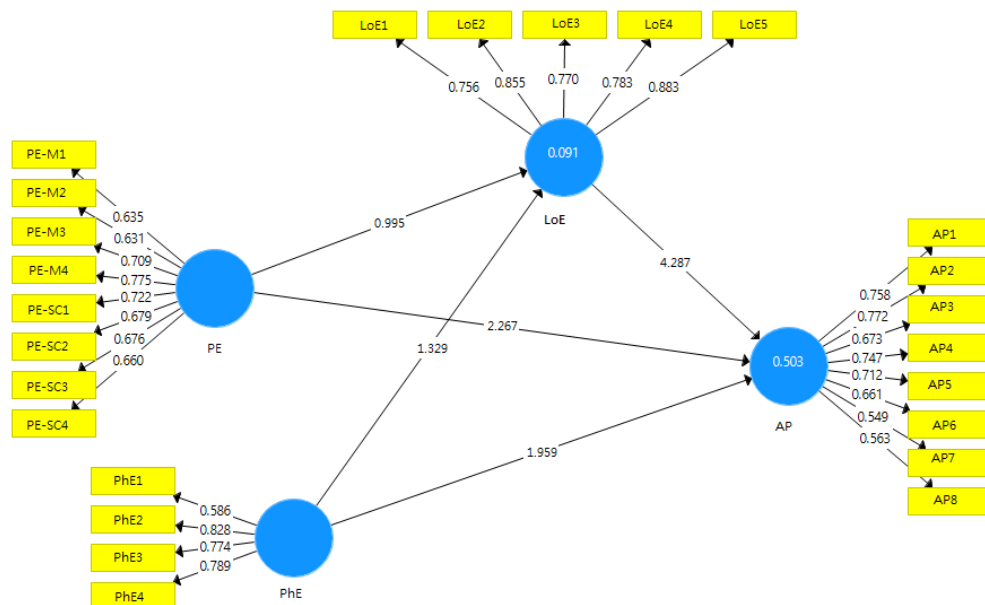


Figure 3: Structural Model

Table 4:

Direct and Indirect Relationship

	Original Sample	T Statistics	P Values	Decision
LoE -> AP	0.673	12.825	0.000	Supported
PE-M -> AP	0.465	6.862	0.000	Supported
PhE-S -> AP	0.603	7.956	0.001	Supported
PE-M ->LoE -> AP	0.61	9.107	0.000	Supported
PhE-S ->LoE -> AP	0.529	8.546	0.000	Supported

Results and Discussion

The thorough analysis of psychological and physical data obtained from young volleyball players engaged in functional training yields substantial insights into the ramifications of this training modality.

Psychological Effects

An analysis conducted before and after the intervention demonstrates a noteworthy enhancement in motivation and self-confidence among adolescent volleyball players following the functional training program. Participants report decreased levels of perceived stress and anxiety post-intervention, suggesting a beneficial impact on their psychological welfare.

Physical Effects

Functional training results in improvements in strength, agility, speed, and determination among young volleyball players, as indicated by pre- and post-intervention assessments. Participants demonstrate enhanced movement efficiency and resilience to injuries, credited to the integration of functional movements and core stability exercises within the training regimen.

Quantitative Analysis

A quantitative analysis comparing intervention and control groups reveals significantly greater advancements in psychological and physical variables among participants who undergo functional training compared to those who do not. These findings underscore the effectiveness of functional training in enhancing both psychological adaptability and physical performance in young volleyball players, emphasizing its role in comprehensive player development.

Practical Implications

The outcomes of this quantitative investigation regarding the psychological and physical impacts of functional training in young volleyball athletes offer multifaceted implications for coaches, trainers, and sports professionals engaged in youth volleyball programs. Firstly, by addressing both physical fitness and psychological wellness, functional training offers a comprehensive approach to athletic enhancement when integrated into youth volleyball training regimens. Coaches and trainers can devise structured functional training protocols encompassing diverse exercises targeting core stability, agility, power, and proprioception for young volleyball players. These protocols have the potential to elevate overall athletic performance while mitigating the risk of injury.

Moreover, these initiatives have the potential to cultivate a conducive training environment and augment athletes' motivation and self-assurance, as evidenced by the

favourable psychological outcomes observed following functional training interventions. Coaches can instil a sense of fulfilment and enjoyment in young volleyball participants through the implementation of engaging, challenging, and purpose-driven functional training activities. This approach is likely to foster adherence to training regimens and sustain long-term engagement with the sport. Additionally, athletes can enhance their understanding of the practical relevance of their training by emphasizing the applicability of functional training exercises to volleyball-specific movements, thereby bolstering their confidence and proficiency on the court. Furthermore, the quantitative design of this study underscores the imperative of tailoring training protocols to accommodate the unique needs and developmental stages of young volleyball athletes. When formulating and implementing functional training programs, coaches and trainers should consider variables such as athletes' age, proficiency level, physical preparedness, and training objectives. Additionally, ongoing evaluation and monitoring of athletes' progress and performance can facilitate the identification of areas requiring improvement and inform adjustments to training regimens over the long term. By customizing functional training interventions to align with the specific attributes and aspirations of adolescent volleyball players, coaches and trainers can enhance the efficacy of their training programs and promote the enduring success and welfare of young athletes in the sport.

Policy Implications

The quantitative study's discoveries concerning the psychological and physical impacts of functional training in young volleyball players yield substantial implications for the formulation and implementation of sports training policies across various tiers. Principally, policymakers within youth sports organizations and regulatory bodies should integrate functional training methodologies into standardized training protocols for volleyball players. By acknowledging the potential benefits of functional training in enhancing both physical conditioning and psychological resilience, policymakers can advocate for the incorporation of functional training modalities into youth volleyball curricula and coaching guidelines.

Furthermore, it is imperative for policymakers to prioritize resource allocation and support for programs aimed at educating and training coaches to acquaint them with the fundamentals and optimal practices of functional training. Equipping coaches with the knowledge and skills necessary to design and implement effective functional training programs tailored to the specific needs and developmental stages of young volleyball players is essential for

maximizing training outcomes and minimizing the risk of injury. Policymakers can facilitate this endeavour by collaborating with educational institutions and sports science organizations to develop accreditation programs and evidence-based training guidelines for coaches specializing in youth volleyball instruction.

Furthermore, governments should emphasize the importance of holistic athlete development by advocating for a balanced approach to training that considers both physical and psychological dimensions. Recognizing the reciprocal benefits derived from mental well-being and physical fitness, authorities should advocate for the integration of psychosocial support services and mental skills training into youth volleyball programs. Policymakers can foster the overall health and success of young volleyball players, both on and off the court, by fostering a nurturing and supportive training environment that prioritizes athletes' psychological resilience, self-confidence, and motivation.

In summary, the policy implications drawn from the quantitative study concerning functional training in young volleyball players underscore the significance of integrating evidence-based training methodologies that afford equal emphasis to psychological and physical advancement. Policymakers can enhance training outcomes, mitigate injuries, and foster enduring athletic success among youth volleyball participants by endorsing initiatives aimed at coach education, advocating for holistic athlete development, and advocating for the integration of functional training within youth volleyball programs.

Theoretical Implications

Regarding the comprehension of athlete development and the enhancement of training methodologies, the comparative study's findings concerning the psychological and physical implications of functional training in young volleyball players carry significant theoretical implications. Bandura's SCT, positing that individuals' behaviours, cognitions, and environment interact reciprocally to influence learning and performance, emerges as one theoretical framework relevant to the outcomes of this investigation (Bandura, 1986). Functional training interventions may bolster athletes' beliefs in their capacity to execute volleyball-specific skills and surmount challenges, thereby fostering greater resilience and dedication to training. These enhancements in athletes' self-efficacy, motivation, and adherence to training protocols align with the principles of SCT.

Furthermore, the results of this study hold implications for Eccles' EVT, which underscores how individuals' expectations and subjective task values shape their involvement and persistence in achievement-related endeavours (Eccles, 1983). As this study demonstrates enhancements in athletes'

perceived competence, enjoyment, and motivation following functional training interventions, it furnishes empirical support for the EVT theory, positing that individuals are more inclined to exert effort and persevere in activities they find personally meaningful and rewarding. Consequently, integrating functional training into youth volleyball programs may amplify players' intrinsic motivation and engagement with training activities, ultimately optimizing their performance.

The findings of this quantitative study also underscore the relevance of the DST in comprehending the intricate interplay among psychological, physiological, and environmental factors influencing athletes' performance and training adaptation (Thelen & Smith, 1994). Functional training, which emphasizes movement variability, coordination, and adaptability, can be elucidated through the lens of DST, providing a theoretical framework for understanding how athletes' motor skills and movement patterns evolve over time in response to environmental demands and training stimuli. By elucidating the dynamic interaction between psychological states (e.g., motivation, self-efficacy) and physical adaptations (e.g., strength, agility) resulting from functional training interventions, this study advances our theoretical comprehension of athlete development within a dynamic and multidimensional framework.

In conclusion, the theoretical implications of this quantitative study extend to broader theoretical frameworks in sports psychology and motor learning, transcending the realm of youth volleyball instruction. This research enhances our theoretical understanding of athlete development and offers valuable insights for enhancing training methodologies and promoting athlete well-being and performance in youth sports settings by elucidating the mechanisms underlying the psychological and physical effects of functional training.

Limitations and Future Directions

Previous studies have shed light on the psychological and physical impacts of functional training on young volleyball players, but they face limitations. Variations in research designs and methods hinder direct comparisons and limit generalizability. Due to disparities in training protocols, participant attributes, outcome measures, and follow-up durations, firm conclusions on the quantitative efficacy of functional training versus conventional methods are challenging to draw. Moreover, the focus on short-term interventions precludes assessment of long-term effects on the psychological and physical well-being of young volleyball players.

Another limitation concerns the potential influence of confounding variables, such as participants' skill level, training experience, and adherence to training regimes. Despite attempts to address these variables in research

designs, residual confounding may still occur, affecting result interpretation. Additionally, there has been limited focus on the psychosocial aspects of functional training, such as athletes' attitudes, perceptions, and motivational factors. Future research should explore these psychosocial variables more comprehensively to elucidate their potential moderating effects on the psychological and physical outcomes of functional training among young volleyball players.

Future investigations into the physiological and psychological ramifications of functional training in young volleyball players should pursue several avenues. Longitudinal studies with extended follow-up periods are necessary to assess the enduring effects of functional training interventions on athletes' psychological resilience, self-efficacy, and athletic performance. Such research would be invaluable in understanding the durability of training adaptations and in guiding the development of evidence-based training protocols tailored to the developmental stages of young volleyball players. Moreover, quantitative research comparing the efficacy of different functional training modalities—such as weight training, agility drills, and plyometrics—could elucidate the optimal combination of exercises for enhancing specific physical attributes relevant to volleyball play.

Subsequent investigations should embrace multidisciplinary approaches that integrate perspectives from sports psychology, biomechanics, and exercise physiology to achieve a comprehensive understanding of the mechanisms underlying the psychological and physiological effects of functional training. By elucidating the interactions among psychological factors, biomechanical principles, and physiological adaptations, researchers can devise holistic training regimens that optimize the physical and mental well-being of young volleyball players. Additionally, athletes' subjective experiences, perceptions, and attitudes toward

functional training could be captured through qualitative research methods such as focus groups and interviews. This would enhance our understanding of the psychosocial impacts of functional training and aid in the development of athlete-centered training programs tailored to individual needs and preferences.

Conclusion

In conclusion, the quantitative examination of functional training's psychological and physical impacts on young volleyball players provides valuable insights into athlete development and training strategies. Employing rigorous methodologies including purposive sampling, standardized data collection, and quantitative analysis, the study elucidates the multifaceted effects of functional training on youth athletes. Following functional training interventions, significant improvements are observed in young volleyball players' motivation, self-confidence, and perceived stress levels, crucial for fostering training commitment, adaptability, and overall well-being, consequently enhancing on-court athletic performance. Notably, participants undergoing functional training exhibit marked enhancements in strength, agility, speed, and endurance, attributed to the specificity of functional movements, core stability exercises, and balance training integrated into the intervention program. These advancements ensure sustained athletic progression by enhancing performance and mitigating injury risks. Moreover, a quantitative analysis reveals substantially greater improvements in psychological and physical factors among participants undergoing functional training compared to the control group, underscoring the efficacy of functional training in comprehensive player development and its potential to optimize young volleyball players' psychological resilience and physical performance.

References

- Bagherian, S., Ghasempoor, K., Rahnama, N., & Wikstrom, E. A. The effect of core stability training on functional movement patterns in college athletes. *Journal of sport rehabilitation*, 28(5), 444-449. <https://doi.org/10.1123/jsr.2017-0107>
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Prentice-Hall. <https://pascal-francis.inist.fr/vibad/index.php?action=getRecordDetail&idt=12018586>
- Bisagno, E., Morra, S., Basciano, M., Rosina, C., & Vitali, F. (2019). Assessing individual performance in team sports: a new method developed in youth volleyball. *Journal of Functional Morphology and Kinesiology*, 4(3), 53. <https://doi.org/10.3390/jfmk4030053>
- Boichuk, R., Iermakov, S., Kovtsun, V., Levkiv, V., Ulizko, V., Kryzhanivskiy, V., Kovtsun, V., & Kazmiruk, A. (2020). Relation of the competitive activity effectiveness of volleyball players (girls) at the age of 16-18 with the physical development indicators. *Journal of Physical Education and Sport*, 20(2), 615-622. <https://doi.org/10.7752/jpes.2020.02090>
- Bompa, T. O., & Carrera, M. (2015). *Conditioning young athletes*. Human Kinetics. <https://search.worldcat.org/title/893709752>
- Boyle, M. (2016). *New functional training for sports*. Human Kinetics. <https://us.humankinetics.com/products/new-functional-training-for-sports-2nd-edition-with-hkpropel-online-video#tab-tableofcontents>
- Brazier, J., Maloney, S., Bishop, C., Read, P. J., & Turner, A. N. (2019). Lower extremity stiffness: considerations for testing,

- performance enhancement, and injury risk. *The Journal of Strength & Conditioning Research*, 33(4), 1156-1166. <https://doi.org/10.1519/jsc.0000000000002283>
- Cavedon, V., Milanese, C., Marchi, A., & Zancanaro, C. (2020). Different amount of training affects body composition and performance in High-Intensity Functional Training participants. *Plos one*, 15(8), e0237887. <https://doi.org/10.1371/journal.pone.0237887>
- Coutinho, P., Ribeiro, J., da Silva, S. M., Fonseca, A. M., & Mesquita, I. (2021). The influence of parents, coaches, and peers in the long-term development of highly skilled and less skilled volleyball players. *Frontiers in Psychology*, 12, 667542. <https://doi.org/10.3389/fpsyg.2021.667542>
- D'Agostino, S. A. (2023). *Sport confidence as a mediator between imagery use and psychological resilience in student athletes* (Doctoral dissertation, University of Windsor (Canada)). <https://www.proquest.com/openview/3157fc8d71f899f738ffc37d6e854e97/1>
- Eccles, J. S. (1983). Expectancies, values, and academic behaviors. In *Achievement and achievement motives* (pp. 75-146). Freeman. <https://publikationen.uni-frankfurt.de/frontdoor/index/index/docId/12327>
- Feito, Y., Heinrich, K. M., Butcher, S. J., & Poston, W. S. C. (2018). High-intensity functional training (HIFT): definition and research implications for improved fitness. *Sports*, 6(3), 76. <https://doi.org/10.3390/sports6030076>
- Glass, S. C., & Wisneski, K. A. (2023). Effect of Instability Training on Compensatory Muscle Activation during Perturbation Challenge in Young Adults. *Journal of Functional Morphology and Kinesiology*, 8(3), 136. <https://doi.org/10.3390/jfkm8030136>
- Gould, D., Nalepa, J., & Mignano, M. (2020). Coaching generation Z athletes. *Journal of Applied Sport Psychology*, 32(1), 104-120. <https://doi.org/10.1080/10413200.2019.1581856>
- Hair, J., Hollingsworth, C. L., Randolph, A. B., & Chong, A. Y. L. (2017). An updated and expanded assessment of PLS-SEM in information systems research. *Industrial Management & Data Systems*, 117(3), 442-458. <https://doi.org/10.1108/IMDS-04-2016-0130>
- Herath, T., & Rao, H. R. (2009). Protection motivation and deterrence: a framework for security policy compliance in organisations. *European Journal of information systems*, 18, 106-125. <https://doi.org/https://doi.org/10.1057/ejis.2009.6>
- Horne, E., Woolf, J., & Green, C. (2022). Relationship dynamics between parents and coaches: Are they failing young athletes? *Managing Sport and Leisure*, 27(3), 224-240. <https://doi.org/10.1080/23750472.2020.1779114>
- Jayanthi, N., Schley, S., Cumming, S. P., Myer, G. D., Saffel, H., Hartwig, T., & Gabbett, T. J. (2022). Developmental training model for the sport specialized youth athlete: a dynamic strategy for individualizing load-response during maturation. *Sports health*, 14(1), 142-153. <https://doi.org/10.1177/19417381211056088>
- Karagianni, K., Donti, O., Katsikas, C., & Bogdanis, G. C. (2020). Effects of supplementary strength–power training on neuromuscular performance in young female athletes. *Sports*, 8(8), 104. <https://doi.org/10.3390/sports8080104>
- Kim, Y., & Park, I. (2020). “Coach Really Knew What I Needed and Understood Me Well as a Person”: Effective Communication Acts in Coach–Athlete Interactions among Korean Olympic Archers. *International journal of environmental research and public health*, 17(9), 3101. <https://doi.org/10.3390/ijerph17093101>
- Knight, A. (2020). Using self-assessment to build self-efficacy and intrinsic motivation in athletes: a mixed methods explanatory design on female adolescent volleyball players. *The Qualitative Report*, 25(2), 320-346. <https://www.proquest.com/openview/ba6afbcb0c4ccdb817ef540f1a6c9d2/1>
- Nešić, G., Majstorović, N., Vićentijević, A., Savić, Z., & Bratuša, Z. (2020). Volleyball players long term development through game system learning. *Fizička kultura*, 74(1), 82-92. <https://doi.org/10.5937/fizkul2001082N>
- Owoeye, O. B., McKay, C. D., Räisänen, A. M., Hubkarao, T., Palacios-Derflinger, L., & Emery, C. A. (2020). Psychosocial factors and the effects of a structured injury prevention workshop on coaches' self-efficacy to implement the 11+ exercise program. *International journal of exercise science*, 13(5), 1459. <https://digitalcommons.wku.edu/ijes/vol13/iss5/10>
- Petz, M. R. (2021). *Examining the Contributions of Grit, Mental Toughness, and Conscientiousness to Athletic Performance* (Doctoral dissertation, Capella University). <https://www.proquest.com/openview/af2d6d1f64c966f66e8e902465bc4d47/1>
- Pulido, J. (2021). Methodological intervention with soccer coaches to. *International Journal of Sports Science & Coaching*, 16(1). <https://doi.org/10.1177/1747954120952069>
- Rebelo, A., Pereira, J. R., Martinho, D. V., & Valente-dos-Santos, J. (2023). The Well-Being of Elite Volleyball Athletes: A Scoping Review of Methods Using Wellness Questionnaires. *Journal of Clinical Sport Psychology*, 1(aop), 1-23. <https://doi.org/10.1123/jcsp.2022-0056>

- Ramayah, T., Cheah, J., Chuah, F., Ting, H., & Memon, M. A. (2018). Partial least squares structural equation modeling (PLS-SEM) using smartPLS 3.0. *An updated guide and practical guide to statistical analysis*, 978-967.
- Ringland, A. (2020). Sport Psychology In The Paralympic Environment: Perceptions of Coaches, Athletes And Managers. *Discobolul-Physical Education, Sport & Kinetotherapy Journal*, 59(1). <https://doi.org/10.35189/dpeskj.2020.59.1.2>
- Rodrigues, F., Bento, T., Cid, L., Pereira Neiva, H., Teixeira, D., Moutão, J., Almeida Marinho, D., & Monteiro, D. (2018). Can interpersonal behavior influence the persistence and adherence to physical exercise practice in adults? A systematic review. *Frontiers in Psychology*, 9, 424774. <https://doi.org/10.3389/fpsyg.2018.02141>
- Thelen, E., & Smith, L. B. (1994). *A dynamic systems approach to the development of cognition and action*. MIT Press. <http://mitpress.mit.edu/9780262700597/>
- Vealey, R. S. (1988). Future directions in psychological skills training. *Sport psychologist*, 2(4). <https://doi.org/10.1123/tsp.2.4.318>
- Vuorinen, K. (2018). Modern volleyball analysis and training periodization. <http://urn.fi/URN:NBN:fi:jyu-201804112015>
- Washington, N. J. (2019). Compression garments do not influence static and dynamic balance performance. <https://doi.org/10.26183/d1z6-2d47>
- Zemková, E., & Hamar, D. (2018). Sport-Specific Assessment of the Effectiveness of Neuromuscular Training in Young Athletes. *Frontiers in Physiology*, 9. <https://doi.org/10.3389/fphys.2018.00264>