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Systematic Review

The Effect of Ecological Approaches on Tactical Performance in Volleyball: A Systematic Review

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Abstract: Interventions based on improving athletes' adaptive capacity to game environment conditions have been widely developed in sports science. The objective of this study was to systematically review the scientific literature on interventions and applications, from an ecological perspective, for the tactical performance of volleyball players. A systematic search was conducted in five electronic scientific databases in accordance with PRISMA guidelines: Web of Science (WOS), PubMed (Medline), Scopus, SportDiscus and Google Scholar. A total of eight studies met the inclusion criteria, all published after 2014. The risk of bias and main characteristics of the articles in different contexts were assessed. Particular attention was paid to recording data related to the characteristics of manipulation or the timing of the intervention. The results showed that these approaches influenced tactical variables in volleyball game situations. In this sense, short-session interventions with small-sided games and modifications of structural elements aid athletes' self-regulation in different environments. Furthermore, results show that this approach allows for improvements in individual and collective tactical behavior. Based on the data analyzed, we recommend the use of ecological tasks, based on representative and modified practices that promote player adaptation, as a methodological tool in the volleyball training process.

Keywords: volleyball players; tactical performance analysis; ecological dynamics; conditioning manipulation; systematic revies

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1. Introduction

In the field of sport science environment, studies aimed at understanding the interactions between athletes within complex practice environments highlight significant implications for the training and performance of athletes [1]. Several authors have already raised the need to reconceptualize perceptual activity and decision-making [2,3] to explain the complex and varied phenomena of cognition according to context [4]. Therefore, this perspective considers the ecological constraints that influence the functional and emergent process of decision-making [5].

From the theoretical framework of ecological dynamics, it is proposed to reconceptualize the performer–environment system as the unit of analysis in order to understand behavior by considering that possibilities for action persist, emerge and dissolve due to the relationship between the two [5]. This systemic and nonlinear methodological approach emphasizes laws at an ecological scale and the symmetrical conditions of nature which imply the detection of environmental information used to guide behavior [6].

In team sports, such as volleyball, athletes are required to continuously co-adapt their actions according to information. Also, they have to perceive opportunities in game complexes, collective group tactics and the game actions of opponents and teammates in order to ensure their functional collective behavior [7,8]. In fact, tactical behavior is considered as an active and continuous process of searching for and exploring relevant environmental information based on intentional adaptations to the constraints of each game situation [5,9]. In essence, cognition arises from the relationship between the organism and the environment. Regarding this point, an integrated view of cognition that underlies ecological dynamics allows practitioners to explain individual and group decision-making [10,11].

In this sense, athletes' perceptual capacity is fundamental to guessing and detecting environmental information. Gibson [12] emphasized the ecological approach to the study of perception, arguing that individuals directly perceive their possibilities and opportunities for action based on what the environment offers or requires. During game interactions, the possibilities offered by the performance environment and its different sources of information invite players to perform certain actions and not others [13]. According to this approach, the athlete must be deeply engaged with the environment in order to self-regulate their activity during performance. Through various interactions, the athlete can (re)organize the functionality of goal-directed actions [14].

In team sports, an individual player's selection of effective actions can trigger adaptive behaviors in other teammates and opponents [15]. As players connect with each other, they are better able to detect shared information for action [6]. According to this approach, players' performance in team sports will depend on their ability to self-regulate according to competitive demands, which involves being tactically autonomous athletes [16]. Cognition influences sport performance, and moreover, it is continuously shaped by the interactions that develop between players in the same game [17].

Coaches should consider learning designs that place athlete–environment interactions at the focal point of the learning process in order to promote creative and self-regulated solutions to game problems [18]. From an ecological perspective, practitioners have shown an increased interest in the last few years in understanding and implementing pedagogical approaches, such as the Constraint-Led Approach (CLA) and Nonlinear Pedagogy (NLP). These approaches are based on ecological dynamics and consider the environment as fundamental [19]. NLP, as a pedagogical approach, can consider the Constraint-Based Approach (CLA) as a methodological framework to assist learners in developing and exploring a functional relationship with a performance environment [20]. It also involves the strategic manipulation of task constraints to promote the emergence and development of adaptive behaviors in sport that are consistent with the proposed objectives [21–23]. The strategic manipulation of task-relevant constraints is crucial for promoting the emergence and development of adaptive behaviors in sport that are consistent with the proposed goals [17].

The highlighted information constraints can be designed into a practical activity that simulates the competitive performance environment. [1]. Small-sided games (SSGs) are designed as modified, restricted games that alter the structural dynamics of formal competition. They are closely related to the management of task constraints aimed at improving performance in team sports, as they facilitate decision-making by incorporating information constraints [24]. This methodology requires athletes to adapt to contexts modified by coaches through designs with more compact spaces and greater interaction between athletes [25]. These games consider the ecology of the game in their design and can be considered an effective tool for improving tactical behavior.

Team sports have undergone a paradigm shift within the framework of open and complex systems, allowing for richer interpretations of both games and their training [8]. In this regard, an ecological model to support sport science and competition preparation can facilitate the contextualized design of training and practice for athletes and teams [26]. Research by Pizarro et al. [27] and Práxedes et al. [28] shows how designing intervention programs based on an ecological perspective, using NLP, can lead to improvements in the tactical behavior of young soccer players in different offensive and defensive actions. To this end, they designed interventions using small-sided and conditional games (SSCGs; modified games in small spaces with a reduced number of players and modified rules) that sought to improve skills and experience acquisition in team sports by representing perception–action relationships like those required for competitive performance.

In these studies, the authors emphasize the need for further research in this area to establish a framework that provides scientific and practical knowledge for coaches. In this sense, in volleyball, these types of approaches have not been addressed at the intervention level as much as in soccer. Specifically, volleyball is characterized by its fast and dynamic pace, with complex tactical interactions [29]. The nature of the game in this sport, unlike other team sports (e.g., a net sport where players cannot catch the ball), results in frequent exchanges of possession that require players to respond with continuous decision-making [30]. These characteristics position volleyball as a sport in which players must be active in their behavior and decisions depending on the environmental conditions at any given time.

To date, no review has been conducted that presents the current state of the literature on the effect of ecologically manipulated game contexts or intervention programs based on an ecological perspective on volleyball players' tactical behavior. Therefore, a systematic review of this research topic was deemed necessary. This systematic review aimed to examine specific studies and address the need to understand the effects of applications of an ecological perspective on tactical behavior in an open-skill sport such as volleyball.

2. Materials and Methods

In this review, procedures from previous review and meta-analysis studies were used [29,31]. Further, we considered reporting standards and guidelines according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) [32]. This systematic review was registered with the International Prospective Register of Systematic Reviews (PROSPERO; CRD42024516984).

2.1. Inclusion and Exclusion Criteria

In order to select the manuscripts included in the present study, the following inclusion criteria were used: (1) all articles pertained to the sport of volleyball; (2) the studies were based on research, training programs or similar for tactical behavior from the ecological perspective; (3) aspects of participants' tactical behaviors variables were evaluated; (4) the articles were original research with practical applications; (5) the manuscripts had English or Spanish versions; (6) the articles were published from 2014 to 2024. In addition, the bibliographies of the included articles and the different publications of the selected authors were manually reviewed to identify additional suitable studies.

On the other hand, the following exclusion criteria were established: (1) studies that assessed tactical knowledge; (2) studies using a cognitive approach; (3); abstracts or communications to conferences, doctoral theses, books or book sections.

2.2. Research Strategy

The systematic literature search was carried out using the PRISMA guidelines in Web of Science (WOS), PubMed (Medline), Scopus, SPORTDiscus and Google Scholar. The search was performed considering articles published in the last 10 years from 2024 (2014–2024). The following syntax, in two different languages (English and Spanish), was used for the search process: ("volleyball") AND ("decision making") AND ("game performance" OR "synchronization" OR "adjustment") AND ("practical approach" OR "intervention" OR "experimental" OR "quasi-experimental") AND ("nonlinear pedagogy" OR "conditioned games" OR "small-sided games" OR "constraint led-approach" OR "simplified games").

2.3. Study Selection and Data Collection

The selection was conducted following the PRISMA guidelines. First, the retrieved studies were imported into Rayyan software (Rayyan Systems Inc). Subsequently, two of the authors (A.R.-G., M.C.S) performed duplicate removal and the initial screening (titles and abstracts) of the results identified by the search strategy. This process was carried out on the Rayyan platform. Nonrelevant studies were initially excluded by screening titles and abstracts and downloading the full texts of potentially suitable articles, and then unadjusted studies were excluded after reading the full text. In the case of disagreement between the two authors, a third author was consulted (A.M.D.). Finally, to determine the most important characteristics of the selected studies, data were extracted using the PICOS approach.

2.4. Assessment of Risk of Bias

Different tools were used to assess the risk of bias and methodological quality of the included studies according to the nature of the studies. For cross-sectional studies, the Appraisal Tool for Cross-Sectional Studies (AXIS) [33] includes 20 items to be answered with "yes", "no" or "don't know". These items report the methodological quality and risk of bias in cross-sectional studies. In detail, items 1 and 2 assess the suitability of the study design, items 3, 4, 5, 6 and 7 assess selection bias, items 8 and 9 assess measurement bias, items 10, 11, 12, 13, 14, 15 and 16 assess reporting bias, and finally, items 17, 18, 19 and 20 assess the presence of possible confounding factors that could hinder the interpretation of the study's results. AXIS offers the user the opportunity to evaluate each individual aspect of the study design to obtain an overall assessment of the study's quality.

For the assessment of risk of bias in non-randomized controlled and quasi-experimental studies, we used the Evidence Project's risk of bias tool [34], which is a simple and reliable tool that evaluates study design in items 1, 2 and 3, items 4, 5 and 6 assess bias that may affect the equivalence of the groups or the external validity of results, and finally, items 7 and 8 assess the potential bias from the differences between the groups at the start of the study. Among the advantages of this tool is its applicability to a variety of study designs, from randomized trials to various types of observational and quasi-experimental studies. It is relatively easy to use and interpret and can be applied to a variety of review topics without adaptation, facilitating comparability across reviews.

Adjusting the risk of bias according to the type of study provided more accurate information among the variety of selected studies.

3. Results

3.1. Study Selection

Figure 1 (PRISMA flow diagram) shows the process carried out during the systematic review for the selection of the different studies. The initial search, using the syntax detailed above, identified a total of 646 articles from the following electronic databases: WOS (1), PubMed (0), Scopus (1), SportDiscus (1) and Google Scholar (643). A total of 33 articles were eliminated for being duplicates, and 299 were discarded for not being journal articles or being written in another language. Another 264 were discarded for not being related to the sport of volleyball and therefore assigned as irrelevant. Of the remaining 50, 20 were not applicable to the required context, 17 did not consider variables related to tactical behavior, 5 were not studies with a practical application/intervention developed with players and 2 did not focus on treatment from an ecological perspective. Based on these exclusions, six studies were included in the review, along with another two studies referred to in bibliographic analysis and other studies by the analyzed author, generating a total of eight studies considered in the present review (Figure 1).

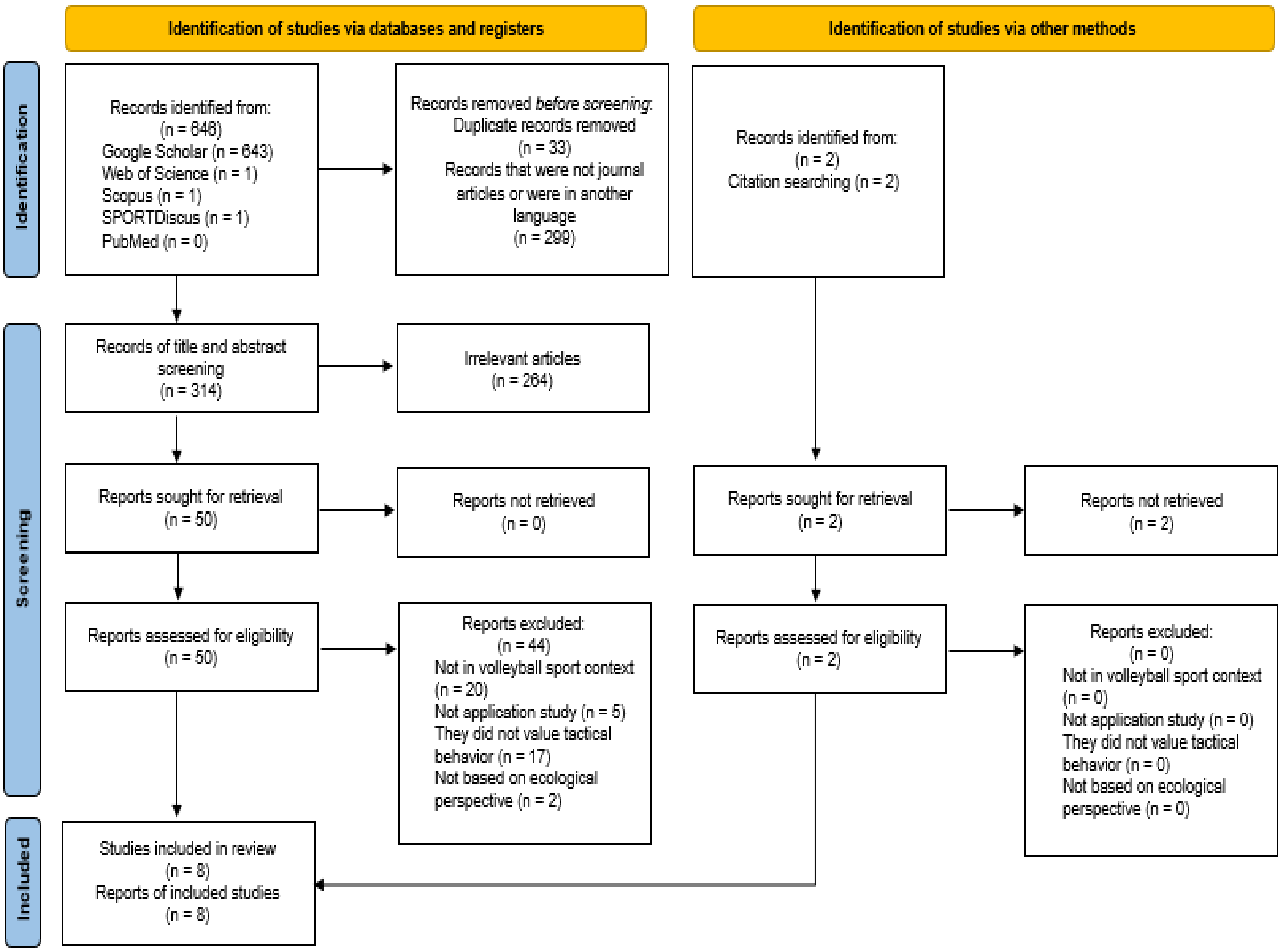

Figure 1. PRISMA flow diagram.

3.2. Study Characteristics

According to PICOS, Table 1 summarizes the main characteristics of the reviewed studies' participants (P) and study design (S), as well as additional information on the included studies (findings in tactical behavior variables). A summary of the intervention characteristics (I) and outcome measures (O), based on the PICOS methodology, as well as additional characteristics of the included studies (task constraints, tactical action analyzed and measurement instruments) are presented in Table 2.

Table 1. Characteristics of participants, study design and findings.

Study	Desing	Participants (Number and Age)	Level of Play (Practice Experience)	Findings on Tactical Behavior Variables
Ramos et al. (2020) [35]	QE	15 females (14–15 years)	At least 1 year	Team synchronization: 3° AR cycle with more complex tactical organizations; index of (re)achievement of functional synchrony, greater than in 2° AR cycle
Rocha, De Oliveira Castro et al. (2020) [36]	CS	16 males (M: 12.2 ± 0.5 years)	M: 1.2 ± 0.8 years	DM: 2 vs. 2 on 4.6 × 4.6 m and 5.2 × 5.2 m; higher DM scores compared to situations with different area-per-player ratios; overall results among observed actions
Rocha, Freire et al. (2020) [37]	CS	12 males (M: 16.7 ± 1.5 years)	M: 3.2 ± 1.2 years	DM showed better results in general actions in SIT2 compared to SIT1; overall results among observed actions
De Oliveira Castro, Praça et al. (2022) [38]	NRCT	44 males: EG (M: 16.3 ± 1.2 years), CG (M: 16.4 ± 0.7 years)	EG: M: 4.0 ± 1.9 years, CG: M: 3.8 ± 1.4 years	DM: SPC DM improved in EG athletes compared to CG after 12 sessions and post-intervention
Rodrigues et al. (2022) [39]	CS	16 males (M: 12.2 ± 0.5 years)	M: 1.2 ± 0.8 years	DM: 2 vs. 2 on 4.6 × 4.6 m and 5.2 × 5.2 m; higher DM scores than in situations with different area/player ratios; overall results among observed actions
Ramos et al. (2024) [40]	QE	15 females (14–15 years)	At least 1 year	DM: Significant differences observed between M1 and M4 time points, before and after intervetion, regarding timing tendencies at blocking line and defensive line
Moura et al. (2024) [41]	CS	8 females (M: 22.63 ± 7.22 years)	Professional volleyball players (M: 4.50 ± 2.32 years)	DM: Association observed between network height and DM in relation to actions included in SPC; Lower net height associated with poorer decision-making
Palao et al. (2024) [42]	QE	29 females (M: 13.4 ± 0.68 years)	M: 3.21 ± 0.85 years	Team game phase quality: In situations with manipulations, higher rates of appropriate initial and final defensive positions were observed before opponent's attack

Notes: QE: quasi-experimental; CS: cross-sectional; NRCT: non-randomized controlled; M: mean; EG: experimental group; CG: control group; DM: decision-making; SPC: Specific Performance per Component (serve, reception, setting, attack, blocking and defense).

Table 2. Characteristics of interventions and outcome measures.

Study	Task Design Manipulation	Duration of Application	Outcome Actions	Instruments
Ramos et al. (2020) [35]	Manipulations of rules, space, scoring methods, attacking contexts, tactical principles	35 weeks; 143 sessions; 120 min/session	Collective synchronization trends	Software: TACTO vs8.0 [43] and 2D-DLT [44]
Rocha, De Oliveira Castro et al. (2020) [36]	Court size and number of players	1 week; 3 sessions (2/3 matches per day)	DM in passing, setting and attacking.	IAD-VB Decision-making [45]
Rocha, Freire et al. (2020) [37]	Court size, dimensions and number of players	1 week; 2 sessions (2 competitive matches per day)	DM in reception, attack, setting	IAD-VB Decision-making [45]
De Oliveira Castro, Praça et al. (2022) [38]	SSG with task constraints to emphasize tactical cues	24 sessions	DM (SPC components)	IAD-VB Decision-making [45]

Table 2. *Cont.*

Study	Task Design Manipulation	Duration of Application	Outcome Actions	Instruments
Rodrigues et al. (2022) [39]	Court size and number of players	1 week; 3 sessions (3 matches per conditions)	DM in defense, setting and attack	IAD-VB Decision-making [45]
Ramos et al. (2024) [40]	Manipulations of rules, space, scoring, attacking contexts and tactical principles	35 weeks; 143 sessions 120 min/session	Collective synchronization trends	Software: TACTO vs8.0 [43] and 2D-DLT [44]
Moura et al. (2024) [41]	Court size, number of players and net heights	1 week; 1 session; (3 games per court size)	DM (SPC components)	IAD-VB Decision-making [45]
Palao et al. (2024) [42]	Court size, net height, type of serve and rule modifications	9 matches (3 total tournaments, 2 per team)	Tactical team actions SPC	Direct observation and expert frecuency counts

Notes: DM: decision-making; SPC: Specific Performance per Component (serve, reception, setting, attack, blocking and defense); DLT: Direct Linear Transformation.

In the different studies, there were a total of 155 participants. Of these, 23 were distributed in experimental groups, 21 in control groups and 111 in single-application groups. Only one of the studies was conducted with professional female volleyball athletes.

3.3. Risk of Bias

Table 3 shows the methodological quality assessment of the cross-sectional studies. Overall, all the studies were considered in terms of methodological quality. However, there was a potential risk of bias due to the lack of justification of the sample sizes and the lack of information on non-replenishers.

Table 3. Risk of bias according to AXIS.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Rocha, De Oliveira Castro et al. (2020) [36]	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	N	N	Y	Y	Y	N	N	Y
Rocha, Freire et al. (2020) [37]	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	N	N	Y	Y	Y	N	N	Y
Rodrigues et al. (2022) [39]	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	N	Y
Moura et al. (2024) [41]	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	N	Y
Palao et al. (2024) [42]	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	N	Y

Note: Y: yes; N: no.

Table 4 shows that there was a potential risk of bias due to the randomization of allocation and selection. As expected, participants were not randomly selected due to the characteristics of the target population. Furthermore, it must be considered that Ramos' studies did not have control groups.

Table 4. Risk of bias according to Evidence Project's risk of bias tool.

	1	2	3	4	5	6	7	8
Ramos et al. (2020) [35]	Y	N	Y	N	N	N	Y	N/A
De Oliveira Castro, Praça et al. (2022) [38]	Y	Y	Y	N	N	Y	Y	Y
Ramos et al. (2024) [40]	Y	N	Y	N	N	N	Y	N/A

Note: Y: yes; N: no; N/A: not applicable.

3.4. Interventions

Next, we summarize the following details of the decision-making training programs/interventions in order to better understand the two types of studies that have considered applying ecological contexts in volleyball training on tactical behavior, according to the results of the review: duration, number of training sessions and type of decision-making training programs/interventions.

The cross-sectional studies focused on assessing the acute effect of implementing ecological contexts, and were characterized by intervals of one to three training sessions [36,37,39,41]. Palao et al. [42] did not specify the weeks of implementation or the specific number of sessions.

In the study by Rocha, De Oliveira Castro et al. [36] players were grouped into pairs, using classification as a criterion for their constitution based on the evaluation of experienced volleyball coaches. Each pair played between two and three matches per day over three days, with a minimum interval of 48 h between each session and a minimum of 10 min between each match. Specifically, players participated in competitive matches on courts of different dimensions: 3.0 × 3.0 m (9 m^2), 4.0 × 4.0 m (16 m^2), 4.6 × 4.6 m (21.16 m^2) and 5.2 × 5.2 m (27.04 m^2).

In the study by Rocha, Freire et al. [37] players were grouped into pairs using the assessment of experienced volleyball coaches. Each pair played two matches on the first day of the intervention with a minimum of a 10 min interval, and two matches on the second day of the intervention with a 48 h interval. The matches were played on 9-square-meter courts with different configurations. On the first day, SIT1 was played on a 3.0 m × 3.0 m court, while on the second day, the SIT2 test was played on a 2.0 m × 4.5 m court.

In the study by Rodrigues et al. [39] players were grouped into pairs to participate in three competitive matches for each designed task situation. Six matches were played by the pairs over three days, with a minimum interval of 48 h between each session. The matches' durations were five minutes, with a minimum interval of 10 min between each match. The order of the matches was randomized within each session. Consecutive matches were not repeated in the same situation. This resulted in a total of six matches in each design against different opponents. Specifically, the players played competitive matches on courts of different dimensions: 3.0 × 3.0 m (9 m^2), 4.0 × 4.0 m (16 m^2), 4.6 × 4.6 m (21.16 m^2) and 5.2 × 5.2 m (27.04 m^2).

In the study by Moura et al. [41] players were grouped into teams according to the volleyball coach's criteria. The initial order of the teams' matches was randomized. All athletes played at the lowest net, then at the official net and finally at the highest net. The study was carried out in one day, and four matches were played at the three different net heights: in women's volleyball, the minimum height requirement for participation is 2.15 m. For senior women's volleyball, the official height is 2.24 m. However, 2.33 m is a height that exceeds the official requirement.

In the study by Palao et al. [42] players were divided into teams in a round robin competition system. The teams went through their standard game and warm-up routines. The competition system was round robin. The order of the confrontations was the same in the different tournaments. A total of nine matches were played in the three tournaments, with three matches in each (two matches per team and tournament).

On the other hand, the non-randomized controlled and quasi-experimental studies, aiming to improve after longer intervention programs, ranged from 24 to 143 sessions (a full season) [35,40]. De Oliveira Castro, Praça et al. [38] did not specify the weeks of implementation or the duration of each session.

De Oliveira Castro, Praça et al. [38] implemented a training intervention program to improve technical and tactical performance over 24 sessions. Specifically, each player participated in a series of exercises designed to improve their overall performance. These exercises included a range of activities, including warm-up tasks, tactical training (focusing on coordination, integration of tactical and technical elements and effective decision-making), technical training (automation, variation and stabilization), game volume and exposure to formal game situations. These comprehensive sessions were carefully designed to address each player's individual needs and improve their overall skill.

In the study by Ramos et al. [35] players underwent a season-long intervention to improve their collective tactical action related to collective tendency synchronization. The intervention was delivered four times per week for a total of 143 sessions. Each session lasted 120 min. On average, the participants participated in four training sessions (two hours each) and one competitive match per week. Six match sequences (two per match) were randomly selected for analysis, and the same operator digitized player data trajectories, with 3 (matches) $\times$ 2 (set moments) $\times$ 2 (court direction) repeated measures.

Finally, Ramos et al. [40] applied a season-long intervention to improve collective tactical action, referred to as collective tendency synchronization. The intervention consisted of a program delivered four times per week, for a total of 143 training sessions. Each session lasted 120 min. During the season, 143 training sessions and 32 official matches were conducted. Four official matches were selected for analysis, one per AR cycle. Eight match sequences (two per match) were randomly selected, and the players' motion trajectories were re-digitized by the same operator.

3.5. Outcome Measures

Table 1 shows the findings on tactical behavior variables from the selected studies. All of them applied ecological training contexts with volleyball players at different categories and levels and assessed their effect on tactical behavior. Table 2 summarizes the main methodological characteristics of each intervention or exposure. The results obtained regarding tactical behavior are detailed below, differentiating between the cross-sectional and longitudinal studies.

3.5.1. Outcome Measures in Selected Cross-Sectional Studies

To evaluate volleyball players' decision-making, four of the articles used the Volleyball Technical–Tactical Performance Evaluation Instrument (VB-IAD) [45].

In Rocha, De Oliveira Castro et al. [36] chi-square tests (χ^2) and one-way ANOVA with a Bonferroni post hoc test were applied. Significant associations were found in passing (χ^2 = 94.625; $p < 0.001$; Φ = 0.31) and positioning (χ^2 = 15.229; $p < 0.002$; Φ = 0.15), but not in attack. More elaborate decisions, such as anticipating or directing the ball into tactical zones, were associated with greater spatial dimensions, while undirected actions predominated in tight spaces. In Rocha, Freire et al. [37] chi-square tests, Student's t test for independent samples and phi effect size calculation (Φ) were applied. Significant associations were found between playing condition and decision-making in receiving (χ^2 = 14.57; $p < 0.001$; Φ = 0.25) and attacking (χ^2 = 36.08; $p < 0.001$; Φ = 0.41), with no association in setting (χ^2 = 0.22; $p > 0.05$). More functional decisions were again associated with the wider field condition (4.5 $\times$ 2.0 m). In the study by Rodrigues et al. [39] repeated measures ANOVA, chi-square with effect size (Φ) and social network analysis (SNA). Significant associations were observed in defensive decision-making (χ^2 = 156.856; $p < 0.001$; Φ = 0.31) and offensive decision-making (χ^2 = 22.189; $p < 0.001$; Φ = 0.13). More complex tactical decisions were positively associated with larger fields. Furthermore, the ARS revealed that in these larger spatial contexts, decisions played a more relevant role within collective behavior. Finally, in Moura et al. [41] three net heights (2.15 m, 2.24 m, 2.33 m) were manipulated with professional athletes. Chi-square tests were applied with Cramer's V as the effect size. A significant association was found between decision-making and net height (χ^2 = 13.066; p = 0.011; V = 0.368). The 2.15 m net was associated with a more favorable decision-making profile, with a lower proportion of inappropriate decisions (31.58%) and a higher proportion of appropriate decisions (36.84%).

A single study evaluated a group's tactical behavior through direct observation (a trained observer in match analysis and volleyball) of the players' positions on the court in the initial–final defense positions. In this study, Palao et al. [42] applied comparison of means tests. The Modified Rules Tournament 2 condition (2.00 m net, 8 × 8 m court, 6 players, double serve) presented the highest quality in the team phases (mean = 4.43; $p < 0.05$), significantly outperforming the control tournament (mean = 3.68).

3.5.2. Outcome Measures in Selected Longitudinal Studies

De Oliveira Castro, Praça et al. [33] was the only one study to implement a structured intervention with an experimental group (EG) and a control group (CG). A repeated measures ANOVA with the Bonferroni post hoc test was applied. Significant effects were observed for group (F (1,20) = 14.111; p = 0.001), time (F (1,20) = 12.582; $p < 0.001$) and the group × time interaction (F (1,20) = 6.698; p = 0.003). The EG showed a significant progressive improvement in decision-making above the CG after 12 sessions and after the end of the intervention. In this study, the Volleyball Technical-Tactical Performance Evaluation Instrument (VB-IAD) [45] was used.

On the other hand, two articles considered collective synchronization tendencies at the longitudinal and lateral levels using TACTO vs8.0 software, projecting the center of gravity to 2D virtual coordinates [43,44].

Ramos [35] used a different assessment instrument in his two studies, as he was the only author to analyze the evolution of collective tactical behavior throughout a season. In his first study, he applied the Cluster Phase Method (CPM) to analyze lateral and longitudinal synchronization between player lines. A 3 × 2 × 2 repeated measures ANOVA was applied, which identified significant differences in lateral (F (1,945) = 710.909; $p < 0.001$; ηp^2 = 0.02) and longitudinal (F (1,970) = 737.711; $p < 0.001$; ηp^2 = 0.02) synchronization. Synchrony decreased in the second cycle (ρ = 0.72 lateral; ρ = 0.68 longitudinal) and recovered in the third (ρ = 0.88 and 0.83, respectively), reflecting a process of functional reorganization following the introduction of greater tactical complexity.

In his second study, Ramos [40] applied a 4 × 1 repeated measures ANOVA to compare cluster width in the blocking and defensive lines across four matches (M1 to M4). In the second cycle (M2), after introducing greater tactical complexity, a significant decrease in synchronization was recorded, reaching 0.79 ± 0.08 in blocking (F (3,000) = 376.375; $p < 0.001$; ηp^2 = 0.09) and 0.82 ± 0.07 in defense (F (3,000) = 1760.551; $p < 0.001$; ηp^2 = 0.31). Subsequently, in the third cycle (M3), the team showed a progressive recovery of synchrony values, with 0.85 ± 0.06 in blocking and 0.89 ± 0.05 in defense, indicating a process of functional collective adjustment. Finally, in the fourth cycle (M4), the team achieved its highest synchronization values under complex tactical conditions, with 0.95 ± 0.04 in blocking and 0.96 ± 0.03 in defending. These results are consistent with those of the previous study regarding collective (re)synchronization.

4. Discussion

The present study systematically reviewed the scientific literature on the effects of game context manipulations and intervention programs based on an ecological perspective of the tactical behavior of volleyball players at both the individual and collective level. To our knowledge, this is the first systematic review to address this objective using a rigorous and widely accepted methodological framework.

The analysis of the current evidence reveals that exposure to ecologically manipulated game contexts (one to three sessions, with manipulations of basic structural elements of the game in SSGs or modified tournaments) and conditions produces acute effects on players' tactical behavior (at different competitive levels and age ranges, but primarily in players under 18 years of age).

Furthermore, intervention programs based on an ecological perspective (with CLA through task-based manipulations that guide behavior and/or consideration of nonlinear pedagogical principles) have demonstrated the potential to improve individual and collective tactical behavior (at different competitive levels and age ranges, but primarily in players under 18 years of age). These effects depend on the specific task constraints applied during training, the action or beginning of the game and the duration of the intervention. Consequently, the findings suggest that implementing ecological training and designing tasks with meaningful manipulations that promote interaction with dynamic performance environments can support the development of players' adaptive and autonomous tactical behavior.

4.1. Effect of Ecological Perspective in Cross-Sectional Studies

Of the articles reviewed in this study, five examined the effect of designs with task manipulations in small-sided games (SSGs) or in modified games on tactical behavior and game dynamics. This methodology encourages athletes to adapt to the modified contexts established by their coach. These modified contexts are characterized by their implementation in more compact spaces, a greater frequency of action and greater interaction between athletes [25].

After examining the tactical responses obtained from SSGs with modifications to the number of players and size of the field, different configurations and manipulations have different effects on decision-making. Research suggests that larger courts with more action per player tend to result in higher tactical skill scores [36,39]. For example, Rocha, De Oliveira Castro et al. [36] found that dimensions between 10.5 m^2 to 13.5 m^2 favored higher scores in tactical elements such as decision-making in passing and setting. Rodrigues et al. [39] observed that courts with dimensions ranging from 10.5 m^2 to 13.5 m^2 favored higher scores in the tactical elements, such as decision-making, in defense, setting and attacking. In addition, manipulating court size allows for the changing of its shape or structure. In this context, Rocha, Freire et al. [37] compared the effects of different court formats and found that rectangular courts favored higher scores in the tactical aspects of receiving, defending and attacking compared to square courts. These findings are consistent with the notion that small-sided game scenarios with a higher proportion of court space per participant increase the effectiveness of action at the tactical level [46,47].

Another potential manipulation in SSG volleyball is net height, which may alter the dynamics of the game. According to Gil-Arias et al. [48] changing the relationship between the player and the equipment that configures the game (such as the net height) can cause changes in game actions. In this scenario, Palao et al. [42] compared the effects of different game formats and reported that those with restrictions on court dimensions, actions and net height showed better values in defensive positions, both initial and final. Moura et al. [41] observed that net height was associated with the decision component in a 4 vs. 4 SSG with net restrictions. This manipulation may therefore influence the complexity of the decision-making process in professional players.

The results suggest that different task manipulations lead to different acute effects at the tactical level. In this sense, emergent behaviors in small-sided games (SSGs) depend on game configurations. Therefore, this manipulation can influence the complexity of the decision-making process in professional players, and game manipulations are expected to affect dynamic game strategies and the tactical–technical elements used to solve different game problems [49]. In this sense, the application of SSGs in volleyball as a training method is being considered by researchers [31]. The knowledge generated seeks to provide insight into manipulations to all stakeholders involved in training, including coaches.

4.2. Effect of Ecological Perspective in Longitudinal Studies

Three other studies focused on improving volleyball players' tactical behavior through intervention programs based on pedagogical strategies and the fundamental principles of the ecological perspective. Considering the results of De Oliveira Castro, Praça et al. [38], it can be observed that training programs with SSGs and task constraints, which emphasize the diversion of attention to promote creativity and adaptive flexibility, lead to improvements in individual decision-making compared to traditional training. According to Dias [50], exposing individuals to training situations in which they can explore multiple situations and adapt to the variability of actions in the context allows for more effective development when experiencing these situations.

Ramos' studies, focused on improving collective tactical skills, have considered the collective synchronization of the team as essential in defensive action. Both approaches have emphasized an ecological approach to task design, utilizing key CLA principles and considering nonlinear pedagogical principles. At the manipulation level, following the recommendations of Travassos et al. [9], these authors implemented designs constrained by the consideration of specific rules, incentive scenarios, or scoring based on strategic objectives (e.g., extra points for positive contacts in double blocks, double rewards in attack zone 3 during counterattacks, or a scoring system using elastic bands on the net antennas). In the search for improvement between two very distant timelines, they considered the application of a fundamental nonlinear pedagogical principle, such as the tactical complexity principle. By designing strictly considering the tactical complexity principle under significant ecological constraints, the co-adaptation of the information channels that support the self-organizing properties of the system is allowed [51].

In this case, the teams' results show that exposure to ecological contexts over time and with a view to achieving specific tactical goals can improve individual and collective performance in volleyball players. In addition to the methodological component, another possible reason for the study's results could be the duration of the intervention programs, which included more sessions than the minimum established and recommended by similar studies [28,52]. In this sense, prolonged exposure to representative practice tasks allows athletes to access the most important sources of information for adequate performance [13]. Furthermore, the review of these studies reveals a trend in intervention programs targeting tactical or technical–tactical variables in volleyball. This trend seeks to consider the key foundations of the ecological perspective for training, focused on the design of representative, manipulated and variability-enhancing tasks, along with its hybridization with other theoretical models [35,38].

In addition, the review highlights a trend in the approach used in studies seeking to improve tactical behavior. This trend seeks to consider the key foundations of the ecological perspective in the design of representative and manipulated tasks, along with their hybridization with other theoretical models. Although different, they may share some theoretical concepts or principles [53] or allow for the integration of implicit and explicit teaching–learning methods to emphasize the tactical problem [31].

4.3. Limitations of Existing Studies and This Review

This systematic review had several limitations. Most of the included trials did not include a placebo group to control for the expectancy effect of the intervention. As a result, a meta-analysis of multiple studies was not possible. The literature review was conducted in only two languages, Spanish and English, which meant that there was a high risk of excluding other relevant articles written in other languages. In addition, our review focused primarily on ecological training for tactical behavior and ignored training related to tactical reflection and understanding, tactical knowledge.

4.4. Practical Application of Training and Future Research

Based on these results, by redefining their understanding of the learning process, coaches will be able to implement better learning designs that give them the freedom to explore and self-regulate in unexplored areas of their emerging performance landscapes [14]. In this sense, coaches must be aware of the tactical difficulty of each game action and the effects of task constraints in order to design appropriate training environments. Conejero et al. [54] emphasized that future research should compare the effects of training programs based on the ecological perspective with other perspectives, such as the cognitive one; however, before our study, there has been no research that has begun to analyze this area. While the results show the different effects of this approach on tactical behavior, at the level of acute and prolonged effects, more intervention studies are needed to increase the quality of the evidence.

5. Conclusions

The use of individual and collective tactical behavior training, based on an ecological perspective, is recommended to achieve positive effects on adaptive tactical behavior in volleyball. This approach can be applied in specific tasks with contextual and representative manipulations (cross-sectional studies) or in intervention programs that consider manipulations and pedagogical design principles (longitudinal studies, such as non-randomized controlled trials and quasi-experimental studies). These results will be useful for volleyball coaches as they emphasize the usefulness of these methodological approaches when included as a main component or as a complement to other forms of volleyball training to optimize individual adaptive decision-making and the reorganization of collective synchronization tendencies.

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References

1. Woods, C.T.; McKeown, I.; O'Sullivan, M.; Robertson, S.; Davids, K. Theory to practice: Performance preparation models in contemporary high-level sport guided by an ecological dynamics framework. *Sports Med. Open* **2020**, *6*, 36. [CrossRef] [PubMed]
2. Davids, K.; Handford, C.; Williams, M. The natural physical alternative to cognitive theories of motor behaviour: An invitation for interdisciplinary research in sports science? *J. Sports Sci.* **1994**, *12*, 495–528. [CrossRef] [PubMed]
3. Turvey, M.T.; Shaw, R.E. Toward an ecological physics and a physical psychology. In *The Science of the Mind*; Solso, R.L., Massaro, D.W., Eds.; Oxford University Press: Oxford, UK, 1995; pp. 144–170. [CrossRef]

4. Reed, E.S. *Encountering the World: Toward an Ecological Psychology*; Oxford University Press: Oxford, UK, 1996.
5. Araújo, D.; Davids, K.; Hristovski, R. The ecological dynamics of decision making in sport. *Psychol. Sport Exerc.* **2006**, *7*, 653–676. [CrossRef]
6. Araújo, D.; Brito, H.; Carrilho, D. Team decision-making behavior: An ecological dynamics approach. *Asian J. Sport Exerc. Psychol.* **2023**, *3*, 24–29. [CrossRef]
7. Chow, J.Y.; Davids, K.; Button, C.; Renshaw, I. *Nonlinear Pedagogy in Skill Acquisition: An Introduction*, 2nd ed.; Routledge: New York, NY, USA, 2021.
8. Ureña Espa, A.; Moreno Arroyo, M.P. Definición de los componentes del juego en voleibol desde un enfoque sistémico. *Retos* **2024**, *57*, 570–580. [CrossRef]
9. Travassos, B.; Duarte, R.; Vilar, L.; Davids, K.; Duarte, A. Practice task design in team sports: Representativeness enhanced by increasing opportunities for action. *J. Sports Sci.* **2012**, *30*, 1447–1454. [CrossRef]
10. Araújo, D.; Davids, K. Team synergies in sport: Theory and measures. *Front. Psychol.* **2016**, *7*, 149. [CrossRef]
11. Carrilho, D.; Santos Couceiro, M.; Brito, J.; Figueiredo, P.; Lopes, R.J.; Duarte, A. Using optical tracking system data to measure team synergic behavior: Synchronization of player-ball-goal angles in a football match. *Sensors* **2020**, *20*, 4990. [CrossRef]
12. Gibson, J.J. *The Ecological Approach to Visual Perception: Classic Edition*; Houghton Mifflin: Boston, MA, USA, 1979.
13. Withagen, R.; Araújo, D.; De Poel, H.J. Inviting affordances and agency. *New Ideas Psychol.* **2017**, *45*, 11–18. [CrossRef]
14. Woods, C.T.; Rudd, J.; Robertson, S.; Davids, K. Wayfinding: How ecological perspectives of navigating dynamic environments can enrich our understanding of the learner and the learning process in sport. *Sports Med. Open* **2020**, *6*, 51. [CrossRef]
15. Silva, P.; Garganta, J.; Araújo, D.; Davids, K.; Paulo, A. Shared knowledge or shared affordances? insights from an ecological dynamics approach to team coordination in sports. *Sports Med.* **2013**, *43*, 765–772. [CrossRef] [PubMed]
16. O'Sullivan, M.; Woods, C.T.; Vaughan, J.; Davids, K. Towards a contemporary player learning in development framework for sports practitioners. *Int. J. Sports Sci. Coach.* **2021**, *16*, 1214–1222. [CrossRef]
17. Correia, V.; Carvalho, J.; Araújo, D.; Pereira, E.; Davids, K. Principles of nonlinear pedagogy in sport practice. *Phys. Educ. Sport Pedagog.* **2019**, *24*, 117–132. [CrossRef]
18. Woods, C.T.; McKeown, I.; Rothwell, M.; Davids, K. Sport practitioners as sport ecology designers: How ecological dynamics has progressively changed perceptions of skill "acquisition" in the sporting habitat. *Front. Psychol.* **2020**, *11*, 654. [CrossRef]
19. Chow, J.Y.; Button, C.; Lee, M.C.Y.; Morris, C.; Shuttleworth, R. Advice from "pracademics" of how to apply ecological dynamics theory to practice design. *Front. Sports Act. Living* **2023**, *5*, 1192332. [CrossRef]
20. Renshaw, I.; Chow, J.Y. A constraint-led approach to sport and physical education pedagogy. *Phys. Educ. Sport Pedagog.* **2019**, *24*, 103–116. [CrossRef]
21. Chow, J.Y.; Davids, K.; Button, C.; Shuttleworth, R.; Renshaw, I.; Araujo, D. Nonlinear pedagogy: A constraints-led framework for understanding emergence of game play and movement skills. *Nonlinear Dyn. Psychol. Life Sci.* **2006**, *10*, 71–103.
22. Renshaw, I.; Chow, J.Y.; Davids, K.; Hammond, J. A constraints-led perspective to understanding skill acquisition and game play: A basis for integration of motor learning theory and physical education praxis? *Phys. Educ. Sport Pedagog.* **2010**, *15*, 117–137. [CrossRef]
23. Renshaw, I.; Araújo, D.; Button, C.; Chow, J.Y.; Davids, K.; Moy, B. Why the constraints-led approach is not teaching games for understanding: A clarification. *Phys. Educ. Sport Pedagog.* **2015**, *21*, 459–480. [CrossRef]
24. Davids, K.; Araújo, D.; Correia, V.; Vilar, L. How small-sided and conditioned games enhance acquisition of movement and decision-making skills. *Exerc. Sport Sci. Rev.* **2013**, *41*, 154–161. [CrossRef]
25. Clemente, F.M. Bibliometric analysis of scientific production in small-sided games. *Hum. Mov.* **2023**, *24*, 1–17. [CrossRef]
26. Davids, K.; Otte, F.; Rothwell, M. Adopting an ecological perspective on skill performance and learning in sport. *Eur. J. Hum. Mov.* **2021**, *46*. [CrossRef]
27. Pizarro, D.; Práxedes, A.; Travassos, B.; Del Villar, F.; Moreno, A. The effects of a nonlinear pedagogy training program in the technical-tactical behaviour of youth futsal players. *Int. J. Sports Sci. Coach.* **2019**, *14*, 15–23. [CrossRef]
28. Práxedes, A.; Del Villar, F.; Moreno, A.; Davids, K. Effects of a nonlinear pedagogy intervention programme on the emergent tactical behaviours of youth footballers. *Phys. Educ. Sport Pedagog.* **2019**, *24*, 332–343. [CrossRef]
29. Zhu, R.; Zheng, M.; Liu, S.; Cao, C. Effects of Perceptual-Cognitive Training on Anticipation and Decision-Making Skills in Team Sports: A Systematic Review and Meta-Analysis. *Behav. Sci.* **2024**, *14*, 919. [CrossRef]
30. Denardi, R.A.; Clavijo, F.A.; De Oliveira, D.T.; Travassos, B.; Tano, G.; Corrêa, U. The volleyball setter's decision-making on attacking. *Int. J. Perform. Anal. Sport* **2017**, *17*, 442–457. [CrossRef]
31. De Oliveira Castro, H.; Laporta, L.; Lima, R.; Clemente, F. Small-sided games in volleyball: A systematic review of the state of the art. *Biol. Sport* **2022**, *39*, 995–1010. [CrossRef]
32. Moher, D.; Shamseer, L.; Clarke, M.; Ghersi, D.; Liberati, A. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. *Syst. Rev.* **2015**, *4*, 1. [CrossRef]

33. Downes, M.J.; Brennan, M.L.; Williams, H.C.; Dean, R.S. Development of a critical appraisal tool to assess the quality of cross-sectional studies (AXIS). *BMJ Open* **2016**, *6*, e011458. [CrossRef]
34. Kennedy, C.E.; Fonner, V.A.; Armstrong, K.A.; Denison, J.A.; Yeh, P.T.; O'Reilly, K.R.; Sweat, M.D. The Evidence Project risk of bias tool: Assessing study rigor for both randomized and non-randomized intervention studies. *Syst. Rev.* **2019**, *8*, 3. [CrossRef]
35. Ramos, A.; Coutinho, P.; Ribeiro, J.; Fernandes, O.; Davids, K.; Mesquita, I. Increasing tactical complexity to enhance the synchronisation of collective behaviours: An action-research study throughout a competitive volleyball season. *J. Sports Sci.* **2020**, *38*, 2611–2619. [CrossRef] [PubMed]
36. Rocha, A.C.R.; De Oliveira Castro, H.; Freire, A.B.; Mitre, G.P.; Fonseca, F.; Lima, C.O.; Costa, G.D. Analysis of the small-sided games in volleyball: An ecological approach. *Rev. Bras. Cineantropom. Desempenho Hum.* **2020**, *22*, e70184. [CrossRef]
37. Rocha, A.C.R.; Freire, A.B.; Silva, J.; Martins, L.; Maia, M.P.; Mitre, G.P.; De Oliveira Castro, H.; Costa, G.P. How context influences the tactical-technical behavior of learners: The case of volleyball. *Rev. Bras. Cineantropom. Desempenho Hum.* **2020**, *22*, e59461. [CrossRef]
38. De Oliveira Castro, H.; Praça, G.M.; Mesquita, I.M.; Alfonso, J.; De Conti, T.G.; Moreno, M.P.; Morales, J.C.; Greco, P.J. The impact of pendular model on decision-making and tactical-technical performance of U18 male volleyball players. *Int. J. Sports Sci. Coach.* **2022**, *17*, 792–803. [CrossRef]
39. Rodrigues, J.C.M.; Rocha, A.C.R.; Barbosa Lira, C.A.; Figueiredo, L.; Cilela Lima, C.; Laporta, L.; De Conti, T. How small-sided games' court dimensions affect tactical-technical behavior in beginner volleyball athletes. *Int. J. Sports Sci. Coach.* **2022**, *17*, 1385–1395. [CrossRef]
40. Ramos, A.; Davids, K.; Coutinho, P.; Mesquita, I. Tracking relations between development of tactical knowledge and tactical behaviour: A season-long action research study. *Phys. Educ. Sport. Pedagog.* **2024**, *29*, 346–360. [CrossRef]
41. de Moura, R.R.D.S.; Rodrigues, M.C.J.; Lima, R.F.; Figueiredo, L.; Silva, F.E.; Freitas, F.N.; Ribas, S.; Costa, G.D.C.; De Oliveira Castro, H. Manipulating net height in volleyball small-sided games: Effects on professional female athletes' tactical-technical performance. *Rev. Bras. Ciênc. Esporte* **2024**, *46*, e20240009. [CrossRef]
42. Palao, J.M.; Ureña, A.; Moreno, M.P.; Ortega-Toro, E. Effect of changes in the net height, court size, and serve limitations on technical-tactical, physical, and psychological aspects of U-14 female volleyball matches. *Front. Psychol.* **2024**, *14*, 1341297. [CrossRef]
43. Fernandes, O.; Folgado, H.; Duarte, R.; Malta, P. Validation of the tool for applied and contextual time-series observation. *Int. J. Sport Psychol.* **2010**, *41*, 63–64.
44. Duarte, R.; Araújo, D.; Fernandes, O. Capturing complex human behaviors in representative sports contexts with a single camera. *Medicina* **2010**, *46*, 408. [CrossRef]
45. Collet, C.; Nascimento, J.V.D.; Ramos, V.; Stefanello, J.M. Construction and validation of a technical-tactical performance evaluation instrument in volleyball. *Rev. Bras. Cineantropom. Desempenho Hum.* **2011**, *13*, 43–51. [CrossRef]
46. Giatsis, G.; Papadopoulou, S.; Dimitrov, P.; Lykesas, G. Comparison of beach volleyball team performance parameters after a reduction in the court's dimensions. *Int. J. Volleyb. Res.* **2003**, *6*, 2–5.
47. Giatsis, G.; Papadopoulou, S. Effects of reduction in dimensions of the court on timing characteristics for men's beach volleyball matches. *Int. J. Volleyb. Res.* **2003**, *6*, 6–9.
48. Gil-Arias, A.; Moreno Arroyo, M.P.; Claver, F.; Moreno, A.; Del Villar, F. Manipulation of the task constraints in Physical Education: A proposal from nonlinear pedagogy. *Retos* **2016**, *29*, 22–27. [CrossRef]
49. Serra-Olivares, J.; Clemente, F.M.; González-Víllora, S. Tactical expertise assessment in youth football using representative tasks. *SpringerPlus* **2016**, *5*, 1301. [CrossRef]
50. Dias, G.; Mendes, P.C.; Coelho, J.; Gamma, J.M.; Sousa, R.; Menayo, R.; Fuentes, J.P. Cognition and action: An ecological perspective in sport. *Eur. J. Hum. Mov.* **2015**, *34*, 137–147.
51. Balagué, N.; Torrents, C.; Hristovski, R.; Davids, K.; Araújo, D. Overview of complex systems in sport. *J. Syst. Sci. Complex.* **2013**, *26*, 4–13. [CrossRef]
52. Harvey, S.; Cushion, C.J.; Wegis, H.M.; Massa-Gonzalez, A. Teaching games for understanding in American high-school soccer: A quantitative data analysis using the game performance assessment instrument. *Phys. Educ. Sport Pedagog.* **2010**, *15*, 29–54. [CrossRef]
53. Godbout, P.; Gréhaigne, J.F. Revisiting the tactical-decision learning model. *Quest* **2020**, *72*, 430–447. [CrossRef]
54. Conejero, M.; Prado Serenini, A.L.; Fernández-Echeverría, C.; Collado-Mateo, D.; Moreno Arroyo, M.P. The effect of decision training, from a cognitive perspective, on decision-making in volleyball: A Systematic Review and Meta-Analysis. *Int. J. Environ. Res. Public Health* **2020**, *17*, 3628. [CrossRef]