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# Acute Effects of Verbal Encouragement and Performance Feedback on Sprint, Agility, and Vertical Jump Performance in Young Female Handball Players

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## Abstract

This study investigated the acute effects of verbal encouragement and performance feedback on sprint, agility, and vertical jump performance in young female handball players. Twenty-seven female handball players (age: 16.04±1.43 years; height: 166.48±5.10 cm; weight: 54.52±4.16 kg; body mass index: 19.65±0.93 kg/m2) voluntarily participated in the study. The performance characteristics of participants were tested on three different non-consecutive days: no external stimulus (NES), performance feedback (PF), and verbal encouragement (VE). Sprint and agility performances were assessed using a photocell timing system, while vertical jump performance was measured using a contact mat. According to the analysis results, significant differences were observed in sprint, agility, and vertical jump performance under the different feedback conditions ($p<0.05$). The best performance in the 30-m sprint and Illinois Agility Test was observed under the VE condition (5.22±0.17 s and 17.11±0.11 s, respectively), whereas the greatest vertical jump height was observed under the PF condition (33.24±0.84 cm) ($p<0.05$). In conclusion, selecting different feedback strategies depending on the targeted performance components during performance evaluation and pre-match preparation in young female handball players can help achieve the targeted high-performance results.

**Keywords:** *external feedback, motor performance, team sports, female athletes, explosive power*

## Introduction

Handball is an intermittent team sport included in the Olympic program, characterized by fast-style offensive-defensive actions (Wagner, Finkenzeller, Würth, & Von Duvillard, 2014). In handball, players need to perform complex movements such as high-speed runs over short distances, sudden changes of direction, one-on-one challenges, and various offensive tactics, including passing, catching, and shooting, in order to create scoring opportunities. This versatile repertoire of movements makes handball a sport with high physiological demands and makes it difficult to identify factors affecting performance (Wagner et al., 2014). Indeed, the intensity constantly changes during the game, with athletes transitioning from walking to sprinting, and from rapid forward, backward, and sideways movements (Michalsik, Aagaard, & Madsen, 2012; Póvoas et al., 2012). Therefore, maintaining high game levels throughout the entire match (2 x 30 minutes) is crucial for both aerobic and anaerobic performance (Wagner et al., 2014). Furthermore, handball performance is shaped not only by physical capacity but also by the interaction of technical, tactical, psychological, and environmental factors (Wagner et al., 2014). In this context, the versatile nature of handball necessitates a comprehensive assessment approach to understand and optimize the performance development of young athletes (Sleamaker & Browning, 1996; Wagner et al., 2014).

The primary goal of sports performance research is to maximize physical and mental performance by identifying strategies that contribute to improved performance (Battinelli, 2007; McArdle, Katch, & Katch, 2010; Sleamaker & Browning, 1996). Even the smallest differences can be decisive for athletic success at the highest levels of competition, and the pursuit of new advantages remains crucial (Facer-Childs, Elise, Boiling, & Balanos, 2018). Over the years, many people have sought different ways to improve sports performance (Atan, 2013). Motivating an individual to exert maximum effort during training, competition, or any activity is never easy (Pacholek & Zemkova, 2022). Motivation, the driving force behind people's actions, desires, and needs, plays the biggest role in this process (Elliot & Covington, 2001). Motivation, which plays a critical role in influencing individuals' well-being and athletic performance (Setyobroto, 2001) and is considered one of the fundamental psychological factors in improving athletic performance (Fletcher & Sarkar, 2012; Gillet & Vallerand, 2016; Gómez-López, Granero-Gallegos, & Folgar, 2013; MacNamara, Button, & Collins 2010; Rabaz, Castuera, Suárez, González, & Arroyo, 2015), is defined as the interaction of internal and external forces that initiate, sustain, and strengthen individuals' participation in sports and physical activity (Shoxrux, 2023). Motivation, which can also be expressed as driving someone to do something (Ryan & Deci, 2000), is an important factor contributing to differences among individuals in terms of their short-term anaerobic energy production capacity (McArdle, Katch, & Katch, 2010).

During performance testing, there is a very strong relationship between success and intrinsic motivation. It is suggested that individuals who score higher than expected on these tests are more motivated (Rothman, Salovey, Turvey, & Fishkin, 1993). Furthermore, it is argued that performance can be influenced by external factors such as rewards (money, gifts, etc.) and praise (verbal praise), and that positive feedback from the environment can modulate test parameters, directly affecting athletes' performance (Azid et al., 2023; Brown, 2019; Omar-Fauzee et al., 2012; Ryan & Deci, 2000; Zaichkowsky, 1998). The concept of immediate performance emphasizes short-term performance improvements resulting from responses to motivational stimuli (Alkasasbeh & Akroush, 2025). This concept highlights how quickly an athlete can increase their effort and focus following external stimuli, which is considered a critical element in achieving timely competitive results (Liu, Yang, Bai, Chen, & Mo, 2022).

Motivation is a component that can affect physical performance and is widely accepted by athletes, coaches, sports psychologists, and the wider sports community as a key determinant of success or failure in sports (Deci & Ryan, 2000; Fletcher & Sarkar, 2012; Gillet & Vallerand, 2016; Orhan et al., 2025). Motivating athletes is known as a crucial aspect of coaching practice, and since motivated athletes are believed to be more likely to succeed, coaches often encourage athletes to work harder and use specific strategies to "motivate" them to achieve success (Ntoumanis & Mallett, 2014). In sports science, two commonly used feedback strategies are verbal encouragement (VE) and performance feedback (PF); VE refers to motivational verbal cues provided by coaches or researchers to sustain or increase effort, while PF involves providing athletes with immediate information about their performance outcomes. Previous studies have shown that VE can improve strength, endurance, and sprint performance (Romdhani et al., 2024; Sahli et al., 2024), while PF has been identified as a critical tool for enhancing motor learning and self-regulation in training (Niźnikowski et al., 2025; Otte, Davids, Millar, & Klatt, 2020). One such strategy is verbal encouragement (VE), commonly used to increase or maintain effort in athletes during maximal exercise tests (Ferguson, 2014; Halperin, Pyne, & Martin, 2015). Studies have indicated that VE (Verbal encouragement) positively contributes to performance improvement during change of direction, strength, and aerobic tests (Andreacci et al., 2002; Guyatt et al., 1984; Lee, Shin, Kim, & Park, 2021; Neto et al., 2015). Furthermore, the volume and word choice of VE have been shown to affect strength performance (McNair, Depledge, Brettkelly, & Stanley, 1996). Recent studies indicate that VE can improve sprint, change-of-direction, and jump performance, although its effects may vary according to the task and stimulus type (Kilit et al., 2024; Sahli et al., 2024). VE alone has not consistently improved strength or velocity-specific outcomes, whereas additional performance feedback may provide greater benefits (Lee et al., 2021; Miller et al., 2021; Rheese et al., 2021). These mixed findings support comparing the acute effects of VE and PF across explosive performance tasks.

Performance feedback is one of the methods widely used by coaches and researchers to improve performance in sports, providing athletes with information that will allow them to improve or maintain their performance (Ward, 2011). It is suggested that providing feedback can not only improve performance but also influence psychological processes, including increased motivation in strength and conditioning exercises (Weakley et al., 2020; Wilson et al., 2017, 2018). A study by Pacholek & Zemkova (2022) found that performance feedback resulted in an increase in acceleration, running speed, and lower and upper body explosive power in young adults.

Many studies have investigated the effect of selected external stimuli such as VE and PF on fitness tests or athletic performance (Guyatt et al., 1984; Halperin, Pyne, & Martin, 2015; McNair et al., 1996; Pacholek & Zemková, 2022). To our knowledge, there are no studies investigating the effect of different motivation techniques on short-duration and explosive movement patterns in young female handball players. Therefore, the aim of our study was to investigate the acute effect of different types of feedback on sprint, agility, and vertical jump performances in young female handball players. This aim is to emphasize the importance of using verbal encouragement and performance feedback as motivational tools in trained individuals by practitioners to achieve better performance results during short-duration and explosive movement patterns. It is hypothesized that all external stimuli (VE and PF) will have a greater effect on sprint, agility, and jump performance compared to the absence of external stimuli.

## Material and method

### *Participants*

Twenty-seven young female handball players (age: 16.04±1.43 years; height: 166.48±5.10 cm; body mass: 54.52±4.16 kg; body mass index: 19.65±0.93 kg/m²) recruited from the 1955 Batman Municipality Sports Club in Batman, Türkiye, voluntarily participated in the study and received no payment for their participation. The study group was determined using the G*Power (version 3.1.9.7 Germany) analysis program, and the power analysis result showed a sample size of 27 individuals (alpha =0.05; Power =0.8, effect size =0.64) (Sahli et al., 2024). Inclusion criteria for the study were: (i) have been actively involved in handball as a licensed player for at least two years; (ii) regularly participate in training and handball competitions; (iii) commit to fully participating in all tests to be administered within the scope of the research protocol; (iv) not have experienced any upper or lower body muscle injuries in the last six months; (v) not have any diagnosis of hearing loss; and (vi) not use any medication that could affect the study results. Furthermore, participants who regularly engage in strength and conditioning training were instructed not to increase the intensity, volume, or frequency of their exercise programs during the measurement period. Exclusion criteria included failure to complete any of the test protocols and the occurrence of a new injury during the study period. Participants were informed verbally and in writing about the study's purpose, test procedures, data collection process, and the associated risks and potential benefits of participation. They were also informed that they could withdraw from the study at any time and signed an informed consent form confirming their voluntary participation. The experimental protocol was approved by the Iğdır University Scientific Research and Publication Ethics Board (SRPEC Approval No: 50/25-12.2025), and procedures were followed in accordance with the Helsinki Declaration (1964).

### *Experimental approach to the problem*

The study employed a quasi-experimental crossover design in which all 27 participants completed each of the three experimental conditions: no external stimulus (NES), performance feedback (PF), and verbal encouragement (VE). Thus, each participant served as their own control. The acute effects of verbal encouragement (VE) and performance feedback (PF) on sprint, agility, and vertical jump performance were evaluated under three different conditions: no external stimulus (NES), performance feedback (PF), and verbal encouragement (VE). A 48-hour rest period was allowed between test sessions. This interval was implemented to minimize residual fatigue and ensure adequate physiological recovery between measurements. During the first session, participants performed the tests under standardized conditions without any external stimuli (control condition). In the subsequent two sessions, participants completed the tests under each of the two experimental conditions (VE and PF) in a randomized order. Each test period began with a general warm-up consisting of 10 minutes of low-intensity running at 40% of participants' maximum heart rate (HRmax) and 5 minutes of stretching exercises targeting both the upper and lower body. Prior to the data collection process, all participants took part in a familiarization session to minimize potential learning effects and ensure familiarity with the testing procedures. Performance tests were conducted in the following order: vertical jump, agility, and sprint. Recovery periods between tests were applied according to the principles of active (light-paced walking with mobilization movements targeting the upper and lower extremity joints) and complete rest. To eliminate wind resistance and adverse weather conditions, all tests were administered twice to participants in the gym, and the best test result was recorded for analysis. The best performance value obtained from two trials was used in the statistical analyses to minimize random measurement error and more accurately represent each participant's maximal performance capacity. This approach is a widely accepted method in physical performance testing (Currell & Jeukendrup, 2008). To standardize the amount and frequency of feedback, the test procedures and warm-up sessions were conducted by the same person. To ensure consistency in the experimental protocols and to minimize the effects of circadian rhythm on performance, all tests were administered during the same time interval of the day (09:00-11:00). Participants were instructed to abstain from alcohol and intense physical activity for at least 24 hours before each test session, from smoking for at least two hours, from the consumption of stimulants such as caffeine or energy drinks, and from eating within three hours of testing. The experimental design of the study is visually reported in Figure 1.

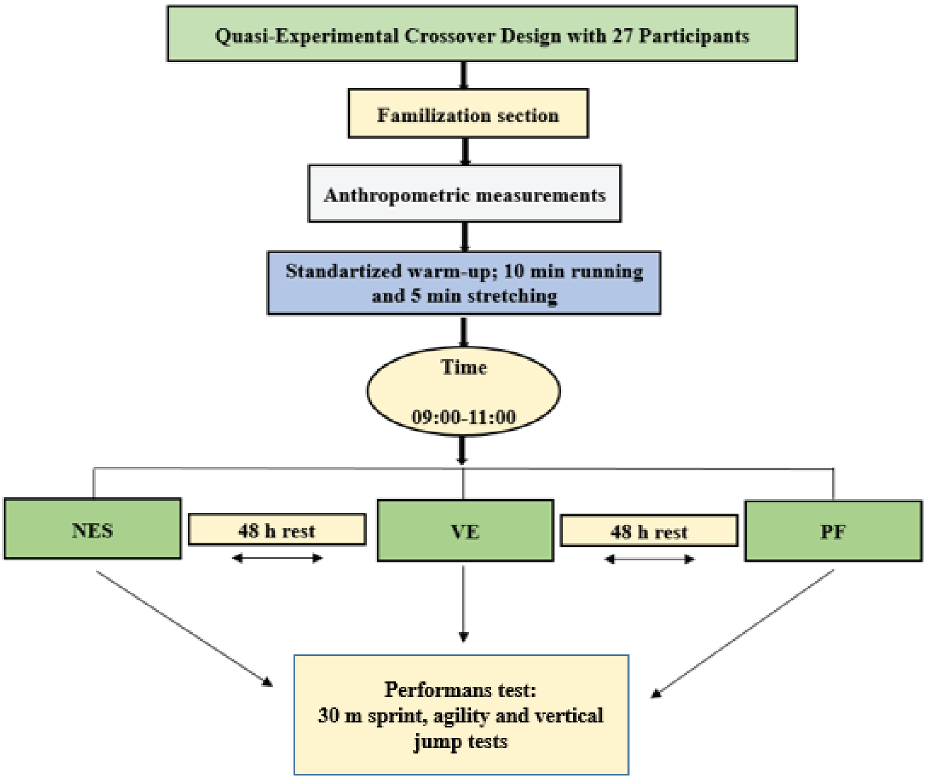


**Figure 1.** Schematic overview of the experimental design of the study.

The study comprises three experimental conditions: a condition with no external stimulus (NES), verbal encouragement (VE), and performance feedback (PF). In the NES condition, participants completed performance tests without receiving any external stimulus following a standard warm-up. In the VE condition, standard motivational phrases—such as "Come on, come on, come on!", "You can do better!", and "Excellent!"—were consistently used throughout the tests. In the PF condition, participants were provided with individualized verbal feedback before each test, based on their previous performance and correctable errors observed during the task.

### *Measurements*

### *Anthropometric characteristics*

Participants' height was measured with an accuracy of 0.01 cm by recording the distance in centimeters (cm) between the crown of the head and the soles of the feet using a wall-mounted stadiometer (Seca Corporation, Hamburg, Germany) in an anatomical position. Body weight was measured in kilograms (kg) with an accuracy of 0.01 kg using a digital body composition scale (Tanita BC418, Tokyo, Japan). All measurements were taken with participants' barefoot and wearing only shorts and a t-shirt. Body mass index (BMI) was calculated according to the formula for body weight and height (kg/m2).

### *Agility performance*

Agility was determined using the Illinois agility test designed by Getchell (1979) to assess athletes' acceleration, change-of-direction, and agility characteristics. Test completion time was recorded using a photocell timing system (Microgate S.r.l., Bolzano, Italy). Four cones (start, finish, and two turning points), each 2.5 meters away from the central cones, were used to define the test area (10 m long and 5 m wide) (Lennemann et al., 2013). Additionally, there are four more cones in the center of the test area, each with a 3.3-meter gap between them (Raya et al., 2013). The test includes 40-meter straight runs and 20-meter slalom (zigzag) runs between the cones, each with 180º turns every 10 meters (Mackenzie, 2005). Participants started the test lying prone behind the starting line with their hands on the ground at shoulder level when they heard the "start" command, and were instructed to run as fast as possible, follow a planned route, and slalom without knocking over or jumping over the cones (Fiorilli et al., 2017).

### *Sprint performance*

A 30-m sprint test was administered to evaluate the participants' sprint performance. Sprint time was recorded using a photocell timing system (Microgate S.r.l., Bolzano, Italy). Participants started the test from a stationary position at the starting line, aligned with the first photocell sensor, and were instructed to run to the finish line with maximum effort (Can, 2018).

### *Vertical jump performance*

The vertical jump height of the participants was measured using a jump mat (Microgate Jump Contact Mat, Microgate S.r.l., Italy). Before starting the jump test, participants took a standard starting position on the mat with their feet shoulder-width apart, then squatted to approximately 90° of knee flexion depth, and then jumped as high as possible (Pomares-Noguera et al., 2018). Participants were allowed to swing their arms during the jump. Soccer players were not allowed to take a step or run towards the finish line during the jump. During the measurement, jumps were considered invalid if the participant exhibited excessive (>45°) hip flexion during the time in the air, if the heels came close to the hip (gluteal) region due to excessive knee flexion, or if a full landing was not achieved on the contact mat (Kilding, Tunstall, & Kuzmic, 2008)

### *Statistical analysis*

Statistical analyses of the data were performed using the SPSS 27 software package (IBM SPSS Statistic, Chicago, USA). Mean and standard deviation values were reported for all data. The normality of the data distribution was examined using kurtosis and skewness values, and since the kurtosis-skewness values were between -2.5 and +2.5, the data were considered to exhibit a normal distribution (Tabachnick & Fidell, 2013). One-way ANOVA test with repeated measures was used to determine the effect of different protocols (NES, VE, PF) on the dependent variables (sprint, agility, and vertical jump). For variables with a significant main effect, Bonferroni-adjusted post hoc pairwise comparisons were performed to determine which protocols differed significantly from each other. Partial eta-squared ($\eta^2p$) was calculated for intergroup comparisons, and Cohen's d effect size (ES) was calculated for pairwise comparisons to examine the magnitude of the obtained differences. In interpreting effect sizes, the classification of $\eta^2p$ as small (<0.06), medium (0.06-0.149) or large (≥0.15) and Cohen's d as small (≥0.10), medium (≥0.30), or large (≥0.50) was used (Cohen 2013). Graphs were prepared using GraphPad Prism (10.6.1). In all analyses, the statistical significance level was accepted as $p<0.05$.

## Results

The participants' anthropometric characteristics, together with the descriptive statistics for the 30-m sprint, Illinois agility, and vertical jump performances under the three experimental conditions, are presented in Table 1. Data are expressed as mean ± standard deviation.

**Table 1.** Physical and performance characteristics of participants

| Variables | | N | Mean ($\bar{x}$) | Std. D. (±) |
|---|---|---|---|---|
| Age (year) | | 27 | 16.04 | 1.43 |
| Body mass (kg) | | 27 | 54.52 | 4.16 |
| Height (cm) | | 27 | 166.48 | 5.10 |
| BMI (kg/m2) | | 27 | 19.65 | 0.93 |
| | NES | 27 | 5.49 | 0.21 |
| 30 m Sprint (sec) | VE | 27 | 5.22 | 0.17 |
| | PF | 27 | 5.33 | 0.17 |
| | NES | 27 | 17.70 | 0.47 |
| Agility (sec) | VE | 27 | 17.11 | 0.54 |
| | PF | 27 | 17.31 | 0.48 |
| | NES | 27 | 31.25 | 1.58 |
| Vertical Jump (cm) | VE | 27 | 32.46 | 1.28 |
| | PF | 27 | 33.24 | 0.84 |

*NES:* no external stimulus; VE: verbal encourangement; PF: performance feedback

**Table 2.** Bonferroni Post hoc results

| Variables | Comparison | Mean Difference | 95% CI | p |
|---|---|---|---|---|
| | NES vs. VE | 0.272 | 0.19 to 0,35 | 0.001 |
| 30 m Sprint (sec) | NES vs. PF | 0.162 | 0.08 to 0,24 | 0.001 |
| | VE vs. PF | -0.110 | -0.18 to -0,05 | 0.001 |
| | NES vs. VE | 0.597 | 0.47 to 0,73 | 0.001 |
| Agility (sec) | NES vs. PF | 0.397 | 0.27 to 0,53 | 0.001 |
| | VE vs. PF | -0.200 | -0.32 to -0,08 | 0.001 |
| | NES vs. VE | -1.210 | -1.56 to -0,86 | 0.001 |
| Vertical Jump (cm) | NES vs. PF | -1.993 | -2.51 to -1,48 | 0.001 |
| | VE vs. PF | -0.783 | -1.20 to -0,36 | 0.001 |

A significant difference was observed in 30 m sprint performance (s) between NES, VE and PF protocols (F(2)=41.643; p=0.001; $\eta^2p=0.62$, arge effect). Sprint performance was significantly better in the VE protocol (5.22±0.17) compared to the NES (5.48±0.21; p=0.001; d=1.64, large effect), and PF (5.32±0.17; p=0.001; d=0.84, large effect) protocols (p<0.05, Figure 2). At the same time, a lower sprint time was detected in the PF protocol compared to the NES protocol (p<0.05; p=0.001; d=0.97, large effect).

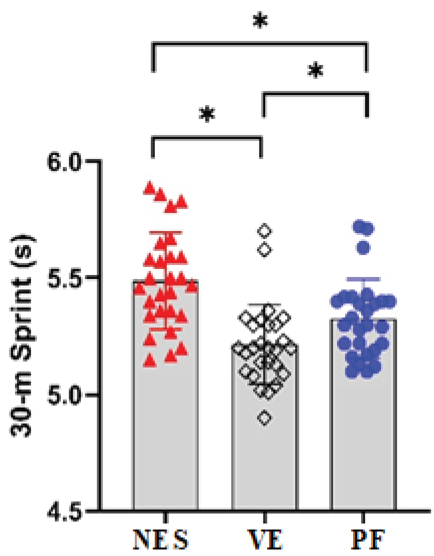


**Figure 2.** Sprint performance under three different conditions. NES - no external stimulus, VE - verbal encouragement, PF - performance feedback, *p<0.05.

The comparison of the agility performance (s) of female handball players according to the NES, VE and PF protocols is shown in Figure 3. According to the results of the one-way ANOVA in repeated measures, a significant difference was observed between the NES (17.70±0.09), VE (17.11±0.11) and PF (17.31±0.09) protocols (F(2)=75.721; p=0.001; $\eta^2p=0.74$, large effect). It was determined that agility performance was significantly lower in the VE protocol compared to the NES (p=0.001; d=2.26, large effect) and PF (p=0.001; d=0.83, large effect); and in the PF protocol compared to the NES (p=0.001; d=1.50, large effect) protocol (p<0.05, Figure 3).

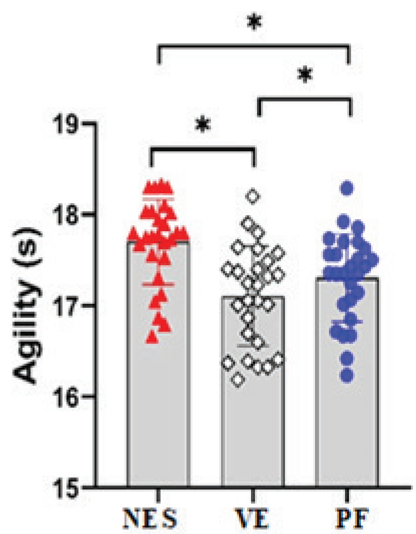


**Figure 3.** Agility performance under three different conditions. NES - no external stimulus, VE - verbal encouragement, PF - performance feedback, *p<0.05.

The vertical jump performance values (cm) of the participants differed significantly between the NES (31.25±1.58), VE (32.46±1.28) and PF (33.24±0.84) protocols (F(2)=69.965; p=0.001; $\eta^2p=0.73$, large effect). Significantly higher vertical jump values were obtained in the PF protocol compared to the NES and VE protocols (p=0.001, d=1.05, large effect; p=0.001, d=0.92, large effect; respectively). At the same time, the vertical jump values in the VE protocol were higher than those in the NES protocol (p<0.05; p=0.001, d=1.70, large effect; Figure 4).

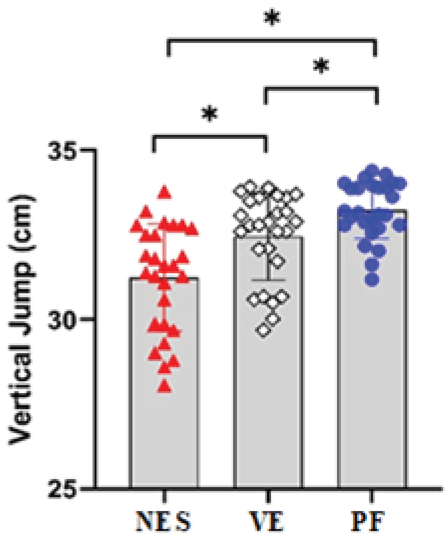


**Figure 4.** Jump performance under three different conditions. NES - no external stimulus, VE - verbal encouragement; PF - Performance feedback, *p<0.05.

## Discussion

This study aimed to investigate the effects of different feedback conditions (verbal encouragement and performance feedback) on some short-term and explosive performance parameters. The findings revealed that the presence of external stimuli significantly improved performance compared to the no external stimulus (NES). Specifically, the best performance in the 30 m sprint and agility tests was observed under verbal encouragement (VE), while performance feedback (PF) resulted in the highest level of performance in the vertical jump. These results indicate that different performance components are influenced by different motivational and cognitive mechanisms.

The finding that verbal encouragement (VE) resulted in the greatest improvements in 30-meter sprint and agility performance aligns with previous studies demonstrating the positive effects of verbal encouragement on performance in short-duration, high-intensity tasks. Pacholek & Zemková (2022) reported that while verbal encouragement improved vertical jump performance compared to a condition without external stimuli, the combined application of verbal encouragement and goal-oriented stimuli resulted in the greatest improvement in 30-meter sprint performance. Similarly, Sahli et al. (2024) demonstrated that verbal encouragement significantly improved 20-meter sprint and change-of-direction sprint performance compared to the condition without verbal encouragement. Likewise, Kilit et al. (2024) reported that coach encouragement significantly improved 20-meter sprint, T-drill agility, and countermovement jump performance in young tennis players compared with the no-encouragement condition. Furthermore, Bougrine et al. (2025) reported that verbal encouragement significantly enhanced sprint and agility performance, including 5-m, 10-m, and 20-m sprint tests, as well as the modified T-test and Illinois agility test, compared with the control condition in young soccer players. Collectively, these findings support the effectiveness of verbal encouragement in enhancing speed-, agility-, and explosive power-related performance during maximal-effort tasks.

However, the beneficial effects of verbal encouragement are not consistently observed across all types of physical performance. In contrast to the present findings, Hammami et al. (2023) found no significant difference in 30-meter sprint performance between the verbal encouragement and control conditions in adolescent female students, although verbal encouragement improved agility and jumping performance. This contrasting sprint result may reflect differences in participant characteristics, training status, sport-specific demands, testing procedures, and the content, frequency, and delivery of VE.

The finding that PF produced superior vertical jump performance compared with the NES and VE conditions highlights the potential importance of adapting feedback content to the technical demands of the task. This finding is consistent with the study by García-Ramos et al. (2023), which reported that providing outcome information regarding jump height improved vertical jump performance and increased variables related to force, speed, and power. Similarly, Keller et al. (2015) determined that augmented feedback resulted in superior counter-movement jump performance compared to intrinsic and extrinsic focus conditions. Although the forms of feedback used in these studies differed from the individualized verbal feedback applied in the present study, the findings support the view that task-related performance information can acutely improve jump performance. However, Bakhshinejad et al. (2025) reported that augmented feedback had no significant effect on vertical jump height. Differences in the type, timing, and frequency of feedback, as well as participant characteristics and test protocols, may explain the inconsistent results between studies.

Vertical jump performance depends not only on lower extremity muscle strength but also on technical components such as the timing of force production, joint angles, and arm-leg coordination (Baus et al., 2020; Cormie et al., 2011). In this context, although vertical jump height is strongly associated with lower-extremity muscle power, jump performance also reflects movement efficiency and neuromuscular coordination—both of which can be influenced by the nature and content of performance feedback (Cormie et al., 2011). In this context, individualized PF may have helped the participants adjust their movement technique and use their force-production capacity more effectively.Furthermore, it is suggested that feedback on the outcome of the movement can support external attention focus, enabling the movement to be performed more automatically and efficiently (Wulf, 2013).

When the findings are considered together, it appears that the effects of external stimuli may be task-specific. VE may be more effective in sprint and agility performance by increasing support for effort and movement, while individualized PF may be more effective in vertical jump performance by providing specific information that supports more efficient movement execution. This difference may explain the categories of the most effective records according to performance tests.

The fact that NES resulted in the lowest performance values in all tests once again highlights the importance of coach or researcher intervention in routine testing and training settings. This finding suggests that athletes' intrinsic motivation to exert maximum effort on their own may not be sufficient outside of a competitive environment. This is a critical point, especially in terms of the validity of data collected in physical fitness tests or laboratory settings. A systematic review and meta-analysis study by Weakley et al. (2023) to investigate the effect of feedback on resistance training performance and adaptations systematically presented evidence that feedback in resistance training improves performance. In the mentioned study, it is emphasized that the absence of a standardized verbal encouragement or feedback procedure in the test protocol may affect the reliability and comparability of the results. Additionally, this aligns with calls for stimuli to be a potential confounding factor in performance measurements and to be controlled for or reported in research designs (Halperin et al., 2015).

This study has several limitations. First, this study included only young female handball players, thereby restricting the generalizability of the findings to other age groups, sexes, or sport disciplines. Second, the long-term effects of feedback on learning and performance adaptations were not examined. Furthermore, studies examining the effect of a combination of VE and PF may reveal the synergistic potential of both strategies that can be applied. Finally, this study was examined only the effects of feedback on athletic performance. Future studies examining the effects of different feedback interventions on physiological (e.g., heart rate variability, muscle activation) and psychological (e.g., perceived exertion, self-efficacy) mechanisms may contribute to a clearer understanding of the processes underlying the observed effects.

## Conclusion

This study demonstrated that different types of feedback were associated with distinct acute effects on the physical performance of young female handball players. While verbal encouragement was associated with best performance in 30-meter sprint and agility performance, performance feedback was linked to the greatest improvement in vertical jump performance. In contrast, the condition involving no feedback yielded the lowest performance values across all tests. These findings suggest that the effectiveness of extrinsic feedback may depend on the physical demands of the task being performed. Therefore, selecting feedback strategies appropriate for the specific performance component being targeted could be beneficial during training and performance assessments.

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**Conflict of Interest**
The authors declare that they have no conflict of interest.

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