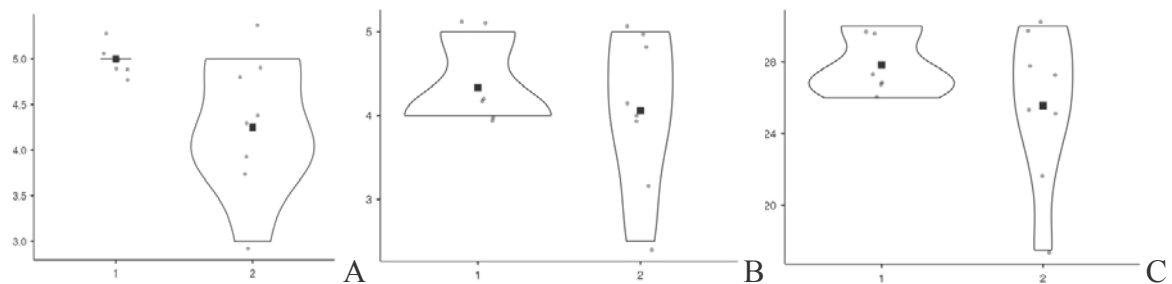


Regarding self-efficacy, Figure 1 illustrates the distribution of values among male and female athletes in diagram form (Figure 1).

Figure 1
Violin plot of self-efficacy by gender

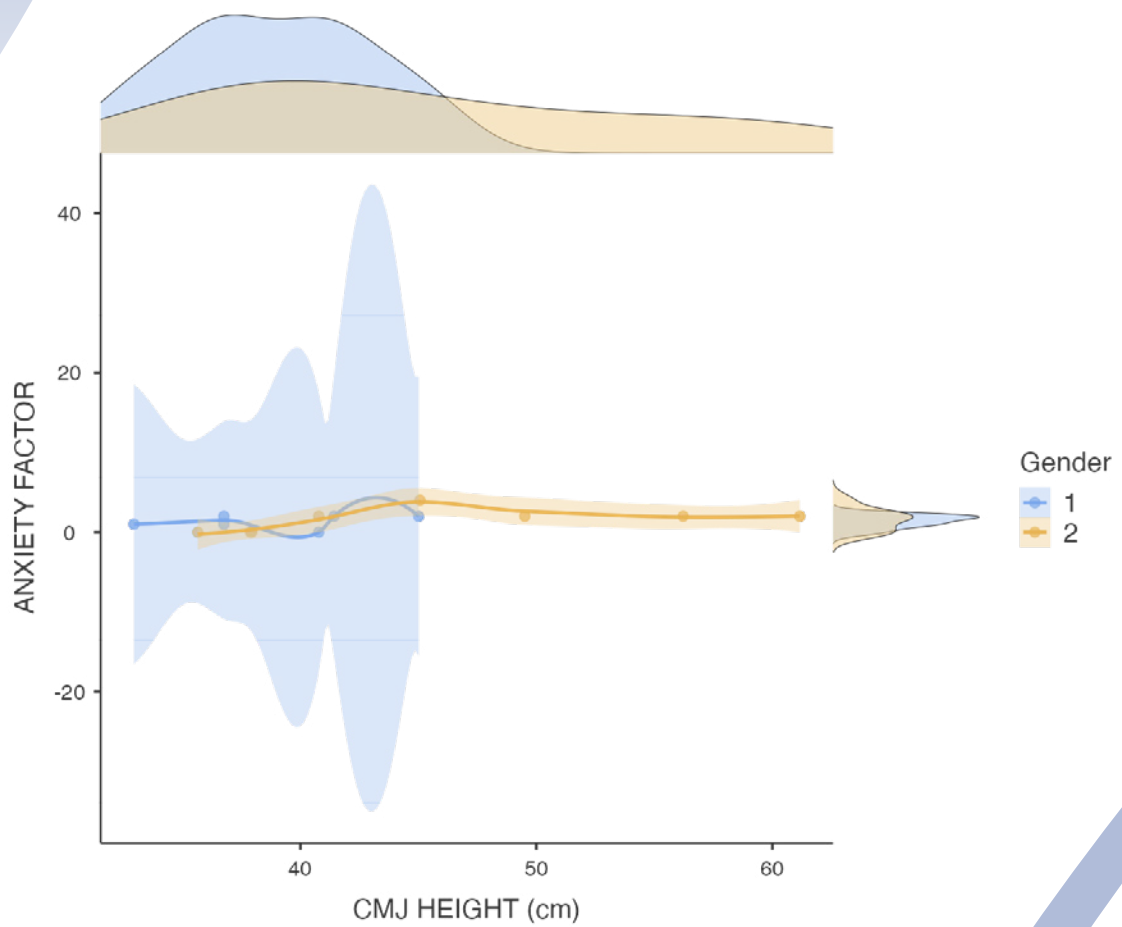


Notes. 1 = males; 2 = females; A = Self-efficacy to jump safely between 20 and 40 centimeters; B = Self-efficacy to jump safely over 40 centimeters; C = Total self-efficacy.

Regarding self-efficacy, significant gender differences were found only in relation to the safety of jumping between 21 and 40 cm (males = 5.00 ± 0.00 , females = 4.00 ± 0.70 , $p = .02$, $d = .62$). No significant differences were observed for self-efficacy in jumping over 40 centimeters (males = 4.00 ± 0.51 , females = 4.00 ± 0.94 , $p = .72$, $d = .12$) or for total self-efficacy (males = 27.80 ± 1.72 , females = 25.60 ± 4.24 , $p = .85$, $d = .31$).

Furthermore, the variables of countermovement jump (CMJ) were examined in relation to mood profile and self-efficacy. Figure 2 illustrates the differences between male and female athletes in terms of CMJ height and the anxiety factor of the mood state (Figure 2).

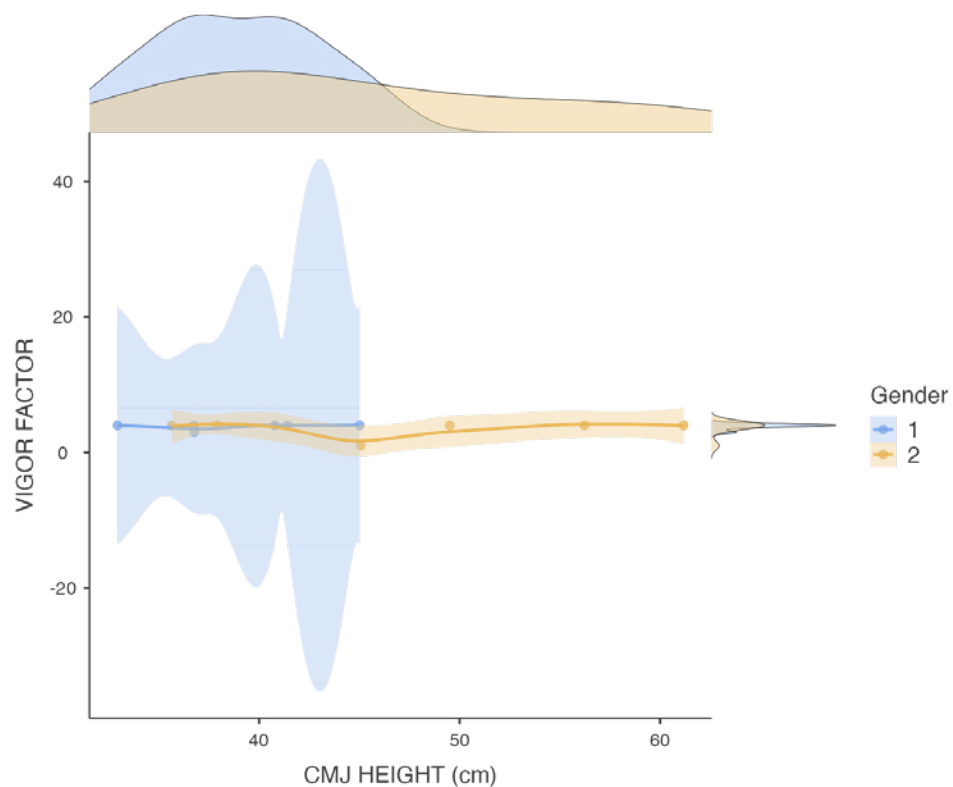
Figure 2
Dispersion of CMJ height in relation to the anxiety factor among genders



Notes. 1 = males; 2 = females

On the other hand, the dispersion of CMJ height in relation to the vigor factor of the POMS can be observed among genders (Figure 3).

Figure 3
Dispersion of CMJ height in relation to the vigor factor among genders



Notes. 1 = males; 2 = females

DISCUSSION

The aim of this study was to provide a description of conditional variables in a CMJ, mood profile, self-efficacy, and the leg-hip height index among athletes from the Cuban national athletics' pre-selection team, differentiated by gender. To the best of our knowledge, this is the first study to assess performance factors through vertical jumping using CMJ, mood profile, and self-efficacy in Cuban track and field athletes. The main findings suggest that both male and female athletes present a similar competitive sports profile, with no significant differences observed.

Proper interpretation of the information provided by the CMJ reflects the analysis of strength levels (McLean *et al.*, 2011), training status (Gathercole *et al.*, 2015), and even

athlete fatigue (Armada-Cortés *et al.*, 2022). This is due to its close relationship with other metabolic variables such as lactate and ammonia accumulation, as well as mechanical variables like loss of speed (Balsalobre-Fernández *et al.*, 2015), among others. Previous studies have established that among the indicators measured by the test, the average jump height represents the main reference. In a meta-analysis that included 151 articles, 85.4% of them used the maximum CMJ height, 13.2% used the average height, and 1.3% used both. However, the average CMJ height was found to be more sensitive than the maximum height in detecting fatigue and supercompensation (Claudino *et al.*, 2012). In our study, although women showed higher results than men in specific CMJ-derived variables, these differences were not statistically significant ($p > .05$). However, the effect size suggests that gender has a small to moderate effect on height ($d = .43$), flight time ($d = .41$), velocity ($d = .41$), strength ($d = .43$), and power ($d = .43$) variables. These findings contradict those reported in the literature (Davies *et al.*, 2018). One possible explanation for the lack of differences in this case may lie in what was described by Cuba-Dorado *et al.* (2022), who found no differences in muscle contractile properties between male and female triathlon athletes through tensiomyography analysis.

Furthermore, our sample consisted of the Cuban national athletics pre-selection team, with a mean age of 16.33 ± 0.77 years for males and 16.13 ± 0.92 years for females. At these ages, the developmental factor towards adulthood seems to be a determinant for the analysis of CMJ-derived variables, as reflected in the study by Bassa *et al.* (2012).

In terms of the mood profile, no significant differences were found between men and women in the analysis performed using the Profile of Mood States (POMS) ($p > .05$), with a small effect size for gender ($d < .2$). However, there was a greater trend towards vigor in men compared to women. Our data align with recent findings by Reynoso-Sánchez *et al.* (2021), who found a higher vigor factor in young Mexican athletes. However, the same did not apply to the anxiety factor, where women showed a higher but not significant value compared to men ($p = .44$, $d = .06$).

Regarding self-efficacy, our results showed significant differences between men and women in terms of their confidence in achieving a jump height between 21 and 40 centimeters using the CMJ ($p = .02$, $d = .62$). These findings can be related to those explained by Di Fronso *et al.* (2013), who found an increase in self-efficacy in men compared to women during the preparation phases in basketball players. In our study, we observed significant differences only for jumps between 21-40 centimeters. This can be considered as a sub-phase for subsequent jumps over 40 centimeters, where no significant differences were found ($p > .05$). One possible response to help athletes

find strategies that satisfy their psychological needs of self-efficacy may be addressed by [Isorna-Folgar et al. \(2022\)](#), who recently found an effective cognitive intervention program for rowers from the Spanish national junior team.

On the other hand, our results suggest that the association between tension-related anxiety and performance indicators related to jump height may be decisive in finding specific profiles in male and female athletes in Cuban athletics. ([Lane et al., 2001](#)) analyzed the relationship between mood profile and sports performance. An important finding to consider is that the anxiety factor correlates positively with performance. Our results demonstrate the dispersion between anxiety and jump height, although they do not reflect significant differences between genders ($p > .05$). The correct interpretation of the relationship between anxiety and performance found in this intensive study ([Rice et al., 2019](#)) requires a return to the essential theoretical assumptions that correspond to models dealing with anxiety. Yerkes & Dodson's Inverted U Hypothesis argues for the existence of an optimal level of activation or arousal to achieve maximum performance ([Yerkes & Dodson, 1908](#)). Activation presupposes an energetic state of the organism that allows for a particular function, such as a state of readiness for action. This state depends on stimulus conditions ([Pozo et al., 2013](#)) and can vary depending on the autonomic nervous system. The value of anxiety factors related to jump performance found in this study can be interpreted under this premise, as the nervous system predisposes the athlete based on the performance goal. In our case, the goal was to jump as high as possible using the CMJ and to determine the athlete's confidence at different heights. ([Sanchez et al., 2010](#)) demonstrated higher levels of anxiety and their relationship to performance. The researchers concluded that the psychological state preceding competition seems to be an important factor in its success.

Another model that addresses the relationship between anxiety and performance is the Individual Zone of Optimal Functioning (IZOF) model ([Hanin, 1995](#)). This model assumes a functional relationship between emotion and optimal performance and aims to predict emotional quality in relation to the performer's previous emotional state. The model takes into account different performance outcomes of quality and associated emotional intensity. The development of this method is the first step toward developing models that consider the multidimensionality of interactive traits and emotional structures. [De Andrade et al. \(2019\)](#) applied this model to elite athletes and found an association between anxiety related to exercise performance and self-efficacy. In this sense, proper management of anxiety may be related to better control

of emotional intelligence in individuals engaged in physical activity (Castro-Sánchez *et al.*, 2022).

Finally, the relationship between vigor and jump height was also analyzed in the present study. In the observed dispersion, it is interesting to consider the vigor mood factor before performing a motor gesture related to athlete performance, such as CMJ jump height. In a recent meta-analysis, (Lochbaum *et al.*, 2021) discussed the relationship between athlete mood profile and exercise performance. These authors emphasized the importance of understanding the mood profile of an athlete and its relationship to sports performance, providing an integrated view using the POMS scale as a predictor of athlete performance. According to our results, men exhibited higher levels of vigor than women. Despite finding an increase in the vigor factor, the jump height results were higher in women, although not statistically significant ($p > .05$). One possible explanation for the relationship between mood profile control and sports performance could be the increased likelihood of sports injury (Van Wilgen *et al.*, 2010). Jump landings can be associated with sports injuries, and gender differences have been observed from a kinematic and kinetic perspective (Sañudo *et al.*, 2012). Although the present study did not assess the relative risk of injury, it appears crucial to control the vigor factor of the mood profile during sports tests such as the CMJ, not only due to its association with injuries (Van Wilgen *et al.*, 2010), but also its relationship with test performance (Lochbaum *et al.*, 2021).

CONCLUSIONS

Both male and female athletes showed relatively similar performance, although a moderate gender effect on jump variables was observed for women. Regarding mood factors, there were no significant differences. However, men exhibited significantly higher self-confidence values than women to reach heights between 21 and 40 cm. Finally, associations were found between the anxiety factor and CMJ height, as well as the vigor factor and CMJ height. This study suggests that the association between tension-related anxiety and performance indicators related to jump height may play a crucial role in determining specific profiles in Cuban athletes of both sexes. Our comprehensive analysis contributes to understanding gender differences in performance factors. These findings provide valuable insights for future research and athlete development strategies.

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AUTHOR´S CONTRIBUTION STATEMENT

Author 1 participated in the conceptualization (lead), research, methodological design, data curation, writing of the manuscript (lead). Author 2 participated in conceptualization (support), data analysis (support), project management (support), review (support) and editing of the final manuscript. Author 3 participated in the drafting of the manuscript (support) and data analysis (lead). Author 4 participated in project management (lead) and revision (lead). All the authors participated in the preparation of this article.