

## Are men more aggressive than women? Exploring gender dynamics in traditional sporting games for gender equity education

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### Abstract:

**Introduction:** Traditional sporting games (TSGs) such as Bear, Guardian, and Hunter are effective pedagogical tools for challenging gender stereotypes by encouraging motor aggressiveness across genders. However, the impact of gender and socio-affective relationships on motor aggressiveness at the level of sociomotor roles remains unexplored. Because roles dictate the type of aggressiveness participants can exhibit, this study investigates their influence. Specifically, it examines how gender and socio-affective relationships affect motor aggressiveness in the Hunter role. **Methods:** A total of 35,524 observational records were collected during gameplay of Bear, Guardian, and Hunter involving 10 undergraduate participants. Motor aggressiveness was assessed through systematic observation, with data reliability ensured via Generalizability Theory. Socio-affective relationships were measured using sociometric questionnaires. The data were analyzed through social network analysis and contingency tables to explore the associations between gender, gender relationships, sociomotor roles, and motor aggressiveness. **Results:** Male Hunters hit more frequently and exhibited more aggressive behaviors, whereas females delivered hits with greater force. Both genders showed higher aggressiveness toward female Guardians. The Bear's gender did not affect motor aggressiveness. Positive cross-gender relationships were associated with increased displacement aggressiveness but decreased hitting aggressiveness. **Discussion:** The findings demonstrate that all genders engaged in aggressive motor behaviors, with female participants more often performing the most forceful hits—challenging stereotypes and questioning dominant gender norms. Additionally, positive cross-gender relationships moderated motor aggressiveness, underscoring the importance of social dynamics in educational settings. **Conclusions:** These results offer valuable insights for educators and researchers aiming to promote gender equity through TSGs, highlighting the influence of gender, socio-affective relationships, and sociomotor roles.

**Keywords:** Physical Education, Motor Praxiology, Aggressiveness, Sociometry, Masculinity, Femininity

### Introduction

#### *Traditional Sporting Games for Gender Equity Education*

Promoting gender equity in education is a major contemporary challenge. Hegemonic masculinity and femininity establish rigid norms about what it means to be a man or woman, creating standards that judge and penalize those who do not conform, thereby reinforcing stereotypes that obstruct equity (Barton & Huebner, 2020; Connor et al., 2021; Messerschmidt, 2018; Schippers, 2007). These dominant gender ideals lead individuals of different genders to perceive and experience the same situations differently, underscoring the need to address gender diversity effectively (Sánchez-Alvarez et al., 2019). In response, UNESCO (2022) advocates for an education system that challenges these gender hegemonies, dismantles stereotypes, and embraces diversity—highlighting the critical role of teacher training in achieving these objectives.

According to performativity theory (Butler, 2009), gender is not an inherent trait but something enacted through behaviors. Gender identity, shaped by dominant hegemonic masculinity and femininity, shifts when individuals engage in actions not traditionally associated with their gender. When men adopt feminized behaviors and women take on masculinized actions, they challenge cultural norms, break stereotypes, and foster more diverse gender identities (Connor et al., 2021). Furthermore, because gender influences how people respond to the same situations—including in educational settings—it is essential for educators to understand these dynamics to create inclusive and effective learning environments for all (Păuțu et al., 2024).

Traditional sporting games (TSGs) offer an ideal setting for promoting gender equity education (Lavega-Burgués et al., 2022a). According to motor praxeology theory (Parlebas, 2020), each TSG possesses a unique internal logic—a set of rules and structures that govern and shape the motor behaviors in the game. This internal logic, expressed through the rules, defines the conditions and norms participants must adhere to, resulting in specific motor behaviors. Each of these behaviors fosters distinctive, experiential, and multidimensional learning

by simultaneously engaging the emotional, relational, cognitive, and physical dimensions of the individual (Lavega-Burgués et al., 2022b).

Motor praxeology forms the foundation of motor conducts education (Lavega-Burgués, 2018), offering an effective, evidence-based strategy for physical education that addresses the needs of both current and future teachers. By examining the internal logic of games, educators can select those best suited to encourage motor behaviors that align with specific learning objectives. When motor conducts education incorporates a gender perspective, it creates learning environments tailored to gender diversity and promotes performative motor behaviors that challenge gender stereotypes and hegemonic norms (Mallén-Lacambra et al., 2024). Therefore, motor conducts education serves as an ideal approach for advancing gender equity in education.

Recent research has revealed that different genders experience distinct emotions depending on the type of motor game (Alcaraz-Muñoz et al., 2023; Niubò-Solé et al., 2022). Hegemonic gender constructs shape how players of various genders emotionally respond to different game situations (Sánchez-Alvarez et al., 2019). However, no study to date has explored the influence of gender on other dimensions, such as the cognitive dimension (Raffi-Menegaldo et al., 2024). Each TSG serves as a decision-making laboratory, where players must navigate challenges posed by the game's internal logic (Parlebas, 2020). These decisions engage the cognitive dimension, drawing on both motor and social intelligence as players consider how to interact with others. Exploring the cognitive dimension allows educators to assess how the motor conducts in a TSG either reinforce or challenge gender constructs, by observing whether individuals exhibit behaviors traditionally associated with their gender.

### ***Teaching Motor Aggressiveness***

Among the various decisions involved in executing motor conduct, motor aggressiveness refers to the physical interactions of direct hostile opposition permitted in the game (Dugas, 2011). Aggressive motor behaviors, traditionally associated with masculinity (Metcalf, 2018), offer a valuable learning opportunity to promote gender equity by allowing non-male participants to express aggressiveness, thereby challenging hegemonic gender norms and stereotypes. However, educators often worry that motor aggressiveness may reinforce negative gender stereotypes and exacerbate inequalities (Ross & Shinew, 2008), contribute to verbal and physical harm (Alia et al., 2021), disrupt the flow of the session (Vigne & Bodin, 2012), provoke conflicts and violence (Stanger et al., 2012), and create an unsafe, exclusionary environment for those uncomfortable with such aggressiveness, particularly women (Capolino, 2021).

Motor aggressiveness is not inherently negative (Dugas, 2011). On the contrary, it offers valuable learning opportunities by allowing aggressive behaviors to be constructively channeled and transformed in a controlled educational environment (Vigne & Bodin, 2012). Loyer et al. (2015) showed that TSGs involving motor aggressiveness help students effectively manage their emotions, leading to a reduction of violence beyond the game context. This ability to navigate conflicts and challenging situations constructively is essential for fostering positive coexistence and advancing gender equity. Motor games that combine cooperation and opposition—where players have both teammates and opponents—provide ideal settings for educating motor aggressiveness (Alia et al., 2021; Loyer et al., 2015; Stanger et al., 2012, 2017; Warden et al., 2009). In these games, men tend to display higher levels of aggressiveness (Alia et al., 2021; Stanger et al., 2017), influenced by the dominance and competition associated with hegemonic masculinity (Connor et al., 2021; Messerschmidt, 2018). In contrast, hegemonic femininity emphasizes empathy and care in women, promoting stereotypes of lower aggressiveness and skill (Barton & Huebner, 2020; Stanger et al., 2017; Capolino, 2021; Metcalf, 2018). Furthermore, positive cross-gender relationships have been shown to reduce levels of motor aggressiveness (Stanger et al., 2017; Vigne & Bodin, 2012). Therefore, to effectively educate motor aggressiveness, educators must consider not only the internal logic of the game but also the gender and gender dynamics among participants (Ramón-Otero et al., 2023).

Certain TSGs, characterized by features such as role-changing, non-competitive, and non-hierarchical structures, promote positive motor aggressiveness education more effectively than institutionalized sports. In contrast, competitive sports—particularly combat sports—may have detrimental effects on social behavior owing to motor aggressiveness (Collard, 2004; Ross & Shinew, 2008; Alia et al., 2021; Stanger et al., 2012; Capolino, 2021). Previous research has primarily examined motor aggressiveness in cooperation–opposition sports but has often overlooked the influence of specific game roles. Sociomotor roles define the rights and prohibitions that shape motor behaviors (Parlebas, 2020), resulting in variations in motor aggressiveness depending on the role (Lavega-Burgués et al., 2023). Despite their importance, few studies have explored the educational impact of these roles.

Understanding how gender and gender relationships influence motor aggressiveness in specific roles is essential for designing interventions that address gender-specific dynamics and challenge stereotypes and hegemonic norms (Lavega-Burgués, 2018; Mallén-Lacambra et al., 2024). This study focused on evaluating the aggressive motor behaviors of the Hunter role in the Bear, Guardian, and Hunter TSG—a cooperation–opposition game where the Hunter attempts to hit a defenseless Bear, who is protected by a Guardian.

### ***Traditional Sporting Game: Bear, Guardian, and Hunter***

The Bear, Guardian, and Hunter is a TSG characterized by motor aggressiveness, cooperation, opposition, and three distinct roles: Bear, Guardian, and Hunter (Vigne & Bodin, 2012). Each role encourages different motor behaviors, shaping the decisions players make according to their assigned role (Lavega-Burgués et al., 2023). In this game, the Bear sits on the ground, connected to the Guardian by a rope, unable to defend against the Hunters' hits or assist the Guardian. The Guardian, tethered to the Bear, protects the Bear by striking the Hunters with a handkerchief to repel them. The Hunters, equipped with handkerchiefs, attempt to hit the Bear while avoiding the Guardian. When the Guardian successfully hits a Hunter, the roles rotate: the Hunter becomes the Bear, the Bear becomes the Guardian, and the Guardian becomes a Hunter. These frequent role changes allow each player to experience all roles, engaging in a variety of motor behaviors that promote diverse experiential learning. The game ends when players become fatigued, another activity is planned, or other external conditions arise.



**Figure 1:** Roles in the traditional sporting game: Bear, Guardian, and Hunter

The objective of this study was to examine how gender and gender relationships affect the aggressive motor behaviors of Hunters in the TSG Bear, Guardian, and Hunter. This research highlights the importance of educating individuals on managing aggressive contexts to promote gender equity. It emphasizes the importance of game roles, gender dynamics, and the potential of motor behaviors to challenge and dismantle stereotypes and hegemonic gender norms.

## **Materials and methods**

### ***Participants and Procedure***

The study involved 10 university students (5 women and 5 men;  $M = 20.6$  years,  $SD = 0.8$ ) enrolled in the Physical Activity and Sport Science bachelor's program at the National Institute of Physical Education of Catalonia (INEFC) and the University of Lleida, Spain. Researchers performed a quasi-experimental study using observational methods in a naturalistic setting. Participants were grouped together and played the Bear, Guardian, and Hunter TSG for 8 min, following the protocols established by the Motor Action Research Group (GIAM). The study adhered to the Declaration of Helsinki and received approval from the Ethics and Clinical Research Committee of the University of Lleida (IRB code: 09/CEICGC/2020).

### ***Instruments***

#### ***Sociometric Questionnaire***

To assess socio-affective relationships prior to the intervention, participants completed a sociometric questionnaire using a peer nomination method that allowed unlimited, directed, and weighted nominations (Avramidis et al., 2017; Molina et al., 2020). To ensure privacy, participants were separated while completing the questionnaire. They were informed that their responses would remain confidential and would be used to shape group formation for a meaningful, non-competitive, leisure-oriented final course activity, encouraging honest and motivated answers. These methodological approaches, recommended by Parlebas (1992), were essential for capturing genuine positive and negative socio-affective networks (Mamas et al., 2023) and minimizing the risk of instrumental or interest-driven responses. Participants responded to two key questions: "With whom would you like to share the great final activity?" and "With whom would you not like to share the great final activity?"

#### ***Observational Measures***

This study used a one-time, idiographic, multidimensional, intra-session observational design (Anguera et al., 2011). This approach allowed for an in-depth characterization of participants' behaviors in a single session, without the need for longitudinal data. The idiographic focus facilitated the examination of individual differences, while the multidimensional aspect captured the complexity of the observed phenomena.

In the GIAM, a mixed *ad hoc* registration system was developed using exhaustive and mutually exclusive categories (Chacón-Moscoso et al., 2019). As detailed in Table 1, the observation instrument initially comprised seven broad criteria—role, orientation—displacement, distance, handkerchief preparation, hitting action, hitting type, and striking intensity—encompassing a total of 21 categories. After identifying all relevant categories across the variables to be observed, a detailed observer manual was created, outlining the categories and degrees of freedom (Table 1).

**Table 1:** Observational categories of motor aggressiveness

| Variables                       | Initial Categories | Description                                                                           | Final Categories             |
|---------------------------------|--------------------|---------------------------------------------------------------------------------------|------------------------------|
| Role                            | Bear               | Player seated at the center of the circle, connected to the guardian by a rope        | Bear                         |
|                                 | Guardian           | Player connected to the bear by a rope, tasked with protecting the bear               | Guardian                     |
|                                 | Hunter             | Player attempting to touch the bear with the handkerchief while avoiding the guardian | Hunter                       |
|                                 | Role Transition    | Moment when the guardian touches a hunter, and player roles change                    |                              |
| Displacement Orientation        | Forward            | Player moves forward.                                                                 | Forward                      |
|                                 | Side               | Player moves sideways across the circle                                               | Side                         |
|                                 | Backward           | Player moves backwards.                                                               | Backward                     |
|                                 | No Movement        | Player remains active but stationary, inside the space with the bear, hitting it      | No move                      |
| Distance                        | Resting            | Player remains still in the same playing space                                        |                              |
|                                 | Short              | Player is inside the circle.                                                          | Short                        |
|                                 | Medium             | Player is outside the circle, one step away from entering.                            | Medium                       |
| Hitting Action                  | Long               | Player is outside the circle, more than one step away from entering.                  | Long                         |
|                                 | No Hit             | Player does not attempt to hit the bear with the handkerchief.                        | No Hit                       |
|                                 | Single Hit         | Player hits the bear with the handkerchief (with or without contact).                 |                              |
| Hitting Intensity               | Multiple Hits      | Player repeatedly hits the bear with the handkerchief.                                |                              |
|                                 | Energetic          | Handkerchief movement is fast and tense.                                              | Energetic /                  |
|                                 | Soft               | Handkerchief movement is slow and gentle, caressing the bear.                         | Soft Hit                     |
| Preparation of the Handkerchief | Preparation        | Player twirls the handkerchief to tighten it.                                         |                              |
|                                 | No Preparation     | Player does not prepare the handkerchief.                                             | Preparation / No preparation |
| Hitting Type                    | Armed              | The executing arm is placed at the side or behind the body in preparation for a hit.  |                              |
|                                 | Unarmed            | The executing arm remains in front of the body during hit preparation.                |                              |

The game was recorded from an overhead perspective using Sony Handycam cameras (model DCR-SX21), facilitating later observational analysis. Motor conduct in the game was coded using the free Lince Plus software (Soto-Fernández et al., 2022), which allows synchronized display and coding of recorded footage. To ensure data quality, multiple training sessions were held with members of the GIAM research group, during which the observation instrument's criteria and categories were finalized through team consensus. For assessing interobserver reliability, four pairs of observers—each selected for being GIAM members with at least two years of experience in systematic observation—coded the motor conduct of a single participant during eight minutes of gameplay.

Measurement quality was assessed using Generalizability Theory (Blanco-Villaseñor & Escolano-Pérez, 2017). The "Category" facet [C] accounted for a high percentage of variance (99.207%), while no variance was attributed to the "Observers" facet [O] (0%). The interaction between facets showed a residual variance of 0.793% ([C][O]). Additionally, Pearson correlation coefficients between observers exceeded 0.98, confirming the reliability of the data. After collecting 35,524 observational records, categories with low frequencies or limited additional value were combined to simplify statistical analysis and interpretation, resulting in 5 variables and 14 categories (Table 1). Specifically, *Multiple Hits* were grouped under the *Hit* category, distinguishing between *soft* and *energetic hits* based on intensity. *Hitting Type* (*Armed* and *Unarmed*) and *Preparation of the Handkerchief* were merged into a single *Preparation* category, encompassing preparatory aggressive motor behaviors. *Resting* and *No Movement* were combined to represent the absence of movement. *Role transitions* were classified as *Hunter* because the observed transitions involved no actual change of role.

#### Data Analysis

Researchers analyzed the sociometric data using Ucinet version 6.770 software (Borgatti et al., 2002). They calculated the individual E–I index for both positive (elections) and negative (rejections) nominations to measure the relative density of same-gender versus cross-gender relationships, thereby assessing gender-based relationship preferences. The E–I index results were categorized as follows: preference for other genders (values between 0.21 and 1), preference for the same gender (values between –1 and –0.2), balanced or equal preference (values between –0.19 and 0.2), and no nominations made (null E–I index). These categorical classifications

were then cross-tabulated with role- and gender-related variables—specifically the gender of Hunters, Bears, and Guardians—as well as the gender orientation of acceptance or rejection by Hunters and Bears. The likelihood ratio Chi-square test ( $\chi^2LR$ ) and *Cramér's V* ( $V$ ) were used to evaluate statistical significance and the strength of association between variables, respectively. Additionally, frequencies, row percentages, and adjusted standardized residuals ( $z$ -scores) were calculated for each cell in the contingency tables to further explore category relationships. A  $p$ -value of .05 or lower in the  $\chi^2LR$  test was considered indicative of a statistically significant association. For *Cramér's V*, values were interpreted as follows: <0.10 negligible, 0.10–0.20 weak, 0.20–0.40 moderate, 0.40–0.60 relatively strong, 0.60–0.80 strong, and  $\geq 0.80$  very strong association (Kotlik & Williams, 2003; Rea & Parker, 2005). Adjusted standardized residuals with absolute values  $\geq 1.96$  were considered statistically significant at  $p \leq .05$ , indicating significant relationships between categories (Sánchez-Carrión, 1999). All analyses were performed using R Studio version 2024.04.2 (Posit Software, PBC, 2024).

## Results

### Hit Type and Gender

The type of hits performed by Hunters differed significantly according to Hunter gender ( $\chi^2LR = 58.253$ ,  $p < .001$ , *Cramér's V* = 0.171). Female Hunters chose not to hit more frequently (86.3%) than male Hunters (80.1%), but delivered more energetic hits (5.6% vs. 2.5%). In contrast, males executed more soft hits (15.6%) compared to females (8.0%) and prepared more hits (1.7%) compared to females (0.0%). Hunters also engaged in significantly more preparatory behaviors when paired with a female Guardian (1.6%) than with a male Guardian (0.3%), suggesting greater readiness for motor aggressiveness.

However, the Guardian's gender had minimal impact on the types of hits, with Hunters hitting at similar rates whether the Guardian was male (84.0%) or female (82.9%). When the Guardian was male, Hunters performed slightly more soft hits (11.6%) than when the Guardian was female (11.0%). In contrast, Hunters delivered marginally more energetic hits (4.6%) with a female Guardian compared to a male Guardian (4.1%). The absence of significant differences in hitting behavior based on Guardian gender suggests that female Guardians were as effective as males in protecting the Bear. Additionally, Hunter aggressiveness remained consistent regardless of the Bear's gender, with no significant differences observed.

### Hit Type and Gender Acceptance

The E–I Index of gender acceptance for Hunters revealed significant differences in hit type ( $\chi^2LR = 99.579$ ,  $p < .001$ , *Cramér's V* = 0.163). Hunters who predominantly accepted same-gender peers performed fewer energetic hits (1.0%) compared to those with balanced acceptance of different genders (1.6%) and those who preferred other genders (0.0%).

Hunters with balanced acceptance across all genders executed more soft hits (14.4%) than other groups, while those favoring other genders tended to avoid hitting altogether (9.7%). In contrast, the Bears' E–I Index of gender acceptance showed no significant effect on Hunters' aggressive motor behavior, indicating that Hunters' actions were consistent regardless of the Bear's gender-based acceptance levels.

### Hit Type and Gender Rejection

The E–I Index of gender rejection for Hunters also revealed significant differences in hit type ( $\chi^2LR = 61.299$ ,  $p < .001$ , *Cramér's V* = 0.111). Hunters who showed balanced rejection across all genders tended to avoid hitting (9.7%). Those who predominantly rejected other genders hit the most, mainly using soft hits (12.3%) but also energetic hits (6.2%).

Individuals with no rejections hit more than those with balanced rejections but less than those rejecting other genders; most of their hits were soft (1.9%) compared to 1.8% energetic hits. The Bears' E–I Index of gender rejection had no significant impact on Hunters' aggressive motor behavior, indicating that Hunters acted consistently regardless of whether the Bear tended to reject more or fewer individuals of a particular gender.

**Table 2:** Effects of gender, role, and relational orientation on hit type

| Variables     | Categories | Total<br>( <i>n</i> ) | No hit<br>( <i>n</i> ) | Preparation<br>( <i>n</i> ) | Soft hit<br>( <i>n</i> ) | Energetic<br>hit ( <i>n</i> ) | $\chi^2LR$ | $pLR$ | <i>Cramér's V</i> |
|---------------|------------|-----------------------|------------------------|-----------------------------|--------------------------|-------------------------------|------------|-------|-------------------|
|               |            | 1810<br>(100%)        | 1513<br>(83.6%)        | 14<br>(0.77%)               | 206<br>(11.38%)          | 77<br>(4.25%)                 |            |       |                   |
| Hunter Gender | Woman      | 1009<br>(55.7%)       | 871<br>(86.3%)         | 0<br>(0.0%)                 | 81<br>(8.0%)             | 57<br>(5.6%)                  | 58.253     | <.001 | .171              |
|               | Man        | 801<br>(44.3%)        | 642<br>(80.1%)         | 14<br>(1.7%)                | 125<br>(15.6%)           | 20<br>(2.5%)                  |            |       |                   |
| Bear Gender   | Woman      | 665<br>(36.7%)        | 560<br>(84.2%)         | 7<br>(1.1%)                 | 76<br>(11.4%)            | 22<br>(3.3%)                  | 3.366      | .338  | .043              |
|               | Man        | 1145<br>(63.3%)       | 953<br>(83.2%)         | 7<br>(0.6%)                 | 130<br>(11.4%)           | 55<br>(4.8%)                  |            |       |                   |

|                                      |                       |                 |                 |              |                |              |        |       |      |
|--------------------------------------|-----------------------|-----------------|-----------------|--------------|----------------|--------------|--------|-------|------|
| Guardian Gender                      | Woman                 | 636<br>(35.1%)  | 527<br>(82.9%)  | 10<br>(1.6%) | 70<br>(11.0%)  | 29<br>(4.6%) | 8.027  | .045  | .068 |
|                                      | Man                   | 1174<br>(64.9%) | 986<br>(84.0%)  | 4<br>(0.3%)  | 136<br>(11.6%) | 48<br>(4.1%) |        |       |      |
| Hunter Gender Acceptance Orientation | Same gender           | 610<br>(33.7%)  | 497<br>(81.5%)  | 8<br>(1.3%)  | 44<br>(7.2%)   | 61<br>(1.0%) | 99.579 | <.001 | .163 |
|                                      | Equally oriented      | 985<br>(54.4%)  | 821<br>(83.4%)  | 6<br>(0.6%)  | 142<br>(14.4%) | 16<br>(1.6%) |        |       |      |
|                                      | Other genders         | 215<br>(11.9%)  | 195<br>(9.7%)   | 0<br>(0.0%)  | 20<br>(9.3%)   | 0<br>(0.0%)  |        |       |      |
|                                      | Equally oriented      | 428<br>(23.6%)  | 388<br>(9.7%)   | 0<br>(0.0%)  | 39<br>(9.1%)   | 1<br>(0.2%)  |        |       |      |
| Hunter Gender Rejection Orientation  | Other genders         | 1162<br>(64.2%) | 933<br>(8.3%)   | 14<br>(1.2%) | 143<br>(12.3%) | 72<br>(6.2%) | 61.299 | <.001 | .111 |
|                                      | No rejections emitted | 220<br>(12.2%)  | 192<br>(87.3%)  | 0<br>(0.0%)  | 24<br>(1.9%)   | 4<br>(1.8%)  |        |       |      |
|                                      | Same gender           | 1006<br>(55.6%) | 834<br>(82.9%)  | 5<br>(0.5%)  | 128<br>(12.7%) | 39<br>(3.9%) |        |       |      |
|                                      | Equally oriented      | 649<br>(35.9%)  | 555<br>(85.5%)  | 8<br>(1.2%)  | 56<br>(8.6%)   | 30<br>(4.6%) |        |       |      |
| Bear Gender Acceptance Orientation   | Other genders         | 155<br>(8.6%)   | 124<br>(8.0%)   | 1<br>(0.6%)  | 22<br>(14.2%)  | 8<br>(5.2%)  | 11.335 | .082  | .078 |
|                                      | Equally oriented      | 211<br>(11.7%)  | 174<br>(82.5%)  | 1<br>(0.5%)  | 26<br>(12.3%)  | 10<br>(4.7%) |        |       |      |
|                                      | Other genders         | 1530<br>(84.5)  | 1279<br>(83.6%) | 12<br>(0.8%) | 174<br>(11.4%) | 65<br>(4.2%) |        |       |      |
|                                      | No rejections emitted | 69<br>(3.8%)    | 60<br>(87.0%)   | 1<br>(1.4%)  | 6<br>(8.7%)    | 2<br>(2.9%)  |        |       |      |
| Bear Gender Rejection Orientation    | Equally oriented      | 211<br>(11.7%)  | 174<br>(82.5%)  | 1<br>(0.5%)  | 26<br>(12.3%)  | 10<br>(4.7%) | 1.819  | .936  | .022 |
|                                      | Other genders         | 1530<br>(84.5)  | 1279<br>(83.6%) | 12<br>(0.8%) | 174<br>(11.4%) | 65<br>(4.2%) |        |       |      |
|                                      | No rejections emitted | 69<br>(3.8%)    | 60<br>(87.0%)   | 1<br>(1.4%)  | 6<br>(8.7%)    | 2<br>(2.9%)  |        |       |      |
|                                      | Equally oriented      | 211<br>(11.7%)  | 174<br>(82.5%)  | 1<br>(0.5%)  | 26<br>(12.3%)  | 10<br>(4.7%) |        |       |      |

#### **Hunter-to-Bear Distance and Gender**

Hunter gender significantly influenced the distance maintained from the Bear ( $\chi^2 LR = 38.494$ ,  $p < .001$ , *Cramér's V* = 0.146). Female Hunters more often kept a medium distance (47.3%) compared to male Hunters (38.1%), whereas males positioned themselves more frequently at a short distance (52.7%) than females (38.5%).

The Guardian's gender also affected the Hunters' distance ( $\chi^2 LR = 9.138$ ,  $p = 0.010$ , *Cramér's V* = 0.071). Hunters tended to stay closer when the Guardian was female (49.5%) than when the Guardian was male (42.2%), where maintaining a medium distance was slightly more common (45.1%). The Bear's gender had no impact on the Hunters' positioning, indicating equally aggressive proximity regardless of whether the Bear was male or female.

#### **Distance and Gender Choice**

The E-I Index of gender acceptance for Hunters revealed significant differences in the distance maintained ( $\chi^2 LR = 65.329$ ,  $p < .001$ , *Cramér's V* = 0.137). Hunters who accepted all genders equally tended to keep a short distance more often (51.6%), while those who primarily accepted other genders maintained medium distances more frequently (54.9%). Hunters who predominantly accepted same-gender peers were more likely to maintain a long distance compared to others (18.9%). In contrast, the E-I Index of gender acceptance for the Guardian and the Bear showed no significant impact on Hunters' aggressive positioning, indicating that Hunters maintained similarly aggressive distances regardless of the Guardian's or Bear's gender-based acceptance levels.

#### **Distance and Gender Rejection**

The E-I Index of gender rejection among Hunters revealed significant differences in the distance they maintained from the Bear ( $\chi^2 LR = 35.678$ ,  $p < .001$ , *Cramér's V* = 0.099). Hunters who showed balanced rejection toward all genders more frequently maintained a medium distance (54.7%) compared to those who predominantly rejected their own gender (38.6%) or other genders (45.0%). Hunters who mainly rejected other genders tended to stay at a short distance more often (47.5%). Individuals with no rejections maintained short (45.5%) and medium distances (45.0%) in similar proportions.

The E-I Index of gender rejection for both the Guardian and the Bear had no significant effect on Hunters' aggressive positioning, indicating that Hunters adopted similarly aggressive distances regardless of the Guardian's or Bear's patterns of gender rejection.

**Table 3:** Effects of gender, role, and relational orientation on hunter-to-bear distance

|                                      |                       | Total ( <i>n</i> ) | Long ( <i>n</i> ) | Medium ( <i>n</i> ) | Short ( <i>n</i> ) |               |          |                   |
|--------------------------------------|-----------------------|--------------------|-------------------|---------------------|--------------------|---------------|----------|-------------------|
| Variables                            | Categories            | 1810<br>(100%)     | 218<br>(12.0%)    | 782<br>(43.2%)      | 810<br>(44.8%)     | $\chi^2_{LR}$ | $p_{LR}$ | Cramér's <i>V</i> |
| Hunter Gender                        | Woman                 | 1009<br>(55.7%)    | 144<br>(14.3%)    | 477<br>(47.3%)      | 388<br>(38.5%)     | 38.494        | <.001    | .146              |
|                                      | Man                   | 801<br>(44.3%)     | 74<br>(9.2%)      | 305<br>(38.1%)      | 422<br>(52.7%)     |               |          |                   |
| Bear Gender                          | Woman                 | 665<br>(36.7%)     | 70<br>(1.5%)      | 298<br>(44.8%)      | 297<br>(44.7%)     | 2.678         | .262     | .038              |
|                                      | Man                   | 1145<br>(63.3%)    | 148<br>(12.9%)    | 484<br>(42.3%)      | 513<br>(44.8%)     |               |          |                   |
| Guardian Gender                      | Woman                 | 636<br>(35.1%)     | 68<br>(1.7%)      | 253<br>(39.8%)      | 315<br>(49.5%)     | 9.138         | .010     | .071              |
|                                      | Man                   | 1174<br>(64.9%)    | 150<br>(12.8%)    | 529<br>(45.1%)      | 495<br>(42.2%)     |               |          |                   |
| Hunter Gender Acceptance Orientation | Same gender           | 610<br>(33.7%)     | 115<br>(18.9%)    | 272<br>(44.6%)      | 223<br>(36.6%)     | 65.329        | <.001    | .137              |
|                                      | Equally oriented      | 985<br>(54.4%)     | 85<br>(8.6%)      | 392<br>(39.8%)      | 508<br>(51.6%)     |               |          |                   |
|                                      | Other genders         | 215<br>(11.9%)     | 18<br>(8.4%)      | 118<br>(54.9%)      | 79<br>(36.7%)      |               |          |                   |
|                                      |                       |                    |                   |                     |                    |               |          |                   |
| Hunter Gender Rejection Orientation  | Equally oriented      | 428<br>(23.6%)     | 36<br>(8.4%)      | 234<br>(54.7%)      | 158<br>(36.9%)     | 35.678        | <.001    | .099              |
|                                      | Other genders         | 1162<br>(64.2%)    | 161<br>(13.9%)    | 449<br>(38.6%)      | 552<br>(47.5%)     |               |          |                   |
|                                      | No rejections emitted | 220<br>(12.2%)     | 21<br>(9.5%)      | 99<br>(45.0%)       | 100<br>(45.5%)     |               |          |                   |
| Bear Gender Acceptance Orientation   | Same gender           | 1006<br>(55.6%)    | 138<br>(13.7%)    | 427<br>(42.4%)      | 441<br>(43.8%)     | 9.212         | .056     | .050              |
|                                      | Equally oriented      | 649<br>(35.9%)     | 66<br>(1.2%)      | 295<br>(45.5%)      | 288<br>(44.4%)     |               |          |                   |
|                                      | Other genders         | 155<br>(8.6%)      | 14<br>(9.0%)      | 60<br>(38.7%)       | 81<br>(52.3%)      |               |          |                   |
| Bear Gender Rejection Orientation    | Equally oriented      | 211<br>(11.7%)     | 23<br>(1.9%)      | 90<br>(42.7%)       | 98<br>(46.4%)      | 4.345         | .361     | .034              |
|                                      | Other genders         | 1530<br>(84.5%)    | 190<br>(12.4%)    | 666<br>(43.5%)      | 674<br>(44.1%)     |               |          |                   |
|                                      | No rejections emitted | 69<br>(3.8%)       | 5<br>(7.2%)       | 26<br>(37.7%)       | 38<br>(55.1%)      |               |          |                   |

### ***Hunter Displacement and Gender***

The gender of any role did not influence the Hunters' displacement, indicating they moved with the same level of aggressiveness regardless of their own gender or that of other players.

### ***Displacement and Gender Acceptance***

No significant differences were found in the displacement of Hunters according to the E–I Index of gender acceptance, indicating that Hunters displayed equal levels of aggressiveness regardless of whether their acceptance was directed toward their own gender or other genders.

### ***Displacement and Gender Rejection***

Significant differences were observed in the displacement of Hunters based on the E–I Index of gender rejection (Table 5) ( $\chi^2_{LR} = 13.711$ ,  $p = 0.033$ , Cramér's *V* = 0.061).

Hunters who showed balanced rejection across all genders tended to move forward more often (31.5%) and remained stationary less frequently (32.5%), indicating greater displacement aggressiveness compared to those who primarily rejected individuals of their own gender or other genders.

**Table 4:** Effects of gender, role, and relational orientation on hunter displacement

| Variables                                  | Categories               | Total<br>(n)<br>(100%) | Backward<br>(n)<br>(21.1%) | No<br>movement<br>(n)<br>(38.79%) | Side<br>(n)<br>(1.55%) | Forward<br>(n)<br>(29.53%) | $\chi^2 LR$ | pLR  | Cramér's<br>V |
|--------------------------------------------|--------------------------|------------------------|----------------------------|-----------------------------------|------------------------|----------------------------|-------------|------|---------------|
| Hunter Gender                              | Woman                    | 1009<br>(55.7%)        | 208<br>(2.6%)              | 381<br>(37.8%)                    | 116<br>(11.5%)         | 304<br>(3.1%)              | 3.07        | .381 | .041          |
|                                            | Man                      | 801<br>(44.3%)         | 174<br>(21.7%)             | 321<br>(4.1%)                     | 75<br>(9.4%)           | 231<br>(28.8%)             |             |      |               |
| Bear Gender                                | Woman                    | 665<br>(36.7%)         | 136<br>(2.5%)              | 269<br>(4.5%)                     | 80<br>(12.0%)          | 180<br>(27.1%)             | 5.334       | .149 | .054          |
|                                            | Man                      | 1145<br>(63.3%)        | 246<br>(21.5%)             | 433<br>(37.8%)                    | 111<br>(9.7%)          | 355<br>(31.0%)             |             |      |               |
| Guardian Gender                            | Woman                    | 636<br>(35.1%)         | 122<br>(19.2%)             | 237<br>(37.3%)                    | 71<br>(11.2%)          | 206<br>(32.4%)             | 5.300       | .151 | .054          |
|                                            | Man                      | 1174<br>(64.9%)        | 260<br>(22.1%)             | 465<br>(39.6%)                    | 120<br>(1.2%)          | 329<br>(28.0%)             |             |      |               |
| Hunter Gender<br>Acceptance<br>Orientation | Same gender              | 610<br>(33.7%)         | 116<br>(19.0%)             | 245<br>(4.2%)                     | 61<br>(1.0%)           | 188<br>(3.8%)              | 6.716       | .348 | .043          |
|                                            | Equally<br>oriented      | 985<br>(54.4%)         | 213<br>(21.6%)             | 387<br>(39.3%)                    | 106<br>(1.8%)          | 279<br>(28.3%)             |             |      |               |
|                                            | Other genders            | 215<br>(11.9%)         | 53<br>(24.7%)              | 70<br>(32.6%)                     | 24<br>(11.2%)          | 68<br>(31.6%)              |             |      |               |
| Hunter Gender<br>Rejection Orientation     | Equally<br>oriented      | 428<br>(23.6%)         | 106<br>(24.8%)             | 139<br>(32.5%)                    | 48<br>(11.2%)          | 135<br>(31.5%)             | 13.711      | .033 | .061          |
|                                            | Other genders            | 1162<br>(64.2%)        | 227<br>(19.5%)             | 473<br>(4.7%)                     | 127<br>(1.9%)          | 335<br>(28.8%)             |             |      |               |
|                                            | No rejections<br>emitted | 220<br>(12.2%)         | 49<br>(22.3%)              | 90<br>(4.9%)                      | 16<br>(7.3%)           | 65<br>(29.5%)              |             |      |               |
| Bear Gender<br>Acceptance<br>Orientation   | Same gender              | 1006<br>(55.6%)        | 219<br>(21.8%)             | 377<br>(37.5%)                    | 118<br>(11.7%)         | 292<br>(29.0%)             | 6.070       | .415 | .041          |
|                                            | Equally<br>oriented      | 649<br>(35.9%)         | 135<br>(2.8%)              | 264<br>(4.7%)                     | 56<br>(8.6%)           | 194<br>(29.9%)             |             |      |               |
|                                            | Other genders            | 155<br>(8.6%)          | 28<br>(18.1%)              | 61<br>(39.4%)                     | 17<br>(11.0%)          | 49<br>(31.6%)              |             |      |               |
| Bear Gender<br>Rejection Orientation       | Equally<br>oriented      | 211<br>(11.7%)         | 46<br>(21.8%)              | 80<br>(37.9%)                     | 22<br>(1.4%)           | 63<br>(29.9%)              | .829        | .991 | .015          |
|                                            | Other genders            | 1530<br>(84.5%)        | 319<br>(2.8%)              | 596<br>(39.0%)                    | 163<br>(1.7%)          | 452<br>(29.5%)             |             |      |               |
|                                            | No rejections<br>emitted | 69<br>(3.8%)           | 17<br>(24.6%)              | 26<br>(37.7%)                     | 6<br>(8.7%)            | 20<br>(29.0%)              |             |      |               |

## Discussion

This study evaluated how players' gender and their gender relationships influenced the aggressive motor behaviors of Hunters in the TSG Bear, Guardian, and Hunter. The findings showed that both player gender and gender relationships significantly affected the Hunters' aggressive motor conduct during the game. Individuals who predominantly rejected other genders or mainly accepted people of their own gender exhibited higher levels of motor aggressiveness. While men generally displayed greater motor aggressiveness across multiple measures, women more frequently performed the most aggressive behavior by energetically hitting the Bear. The frequency of hits was similar regardless of whether the Guardian was male or female; however, Hunters adopted more aggressive positions and preparatory behaviors when the Guardian was female. This suggests that male and female Guardians were equally effective at protecting the Bear, although female Guardians faced a more aggressive environment.

## Gender Effects

The findings suggested that cultural gender constructs affected motor aggressiveness (Capolino, 2021; Stanger et al., 2017). Hegemonic masculinity, which dictates the correct way to be a man, encourages more aggressive, competitive, and dominant behaviors, potentially explaining the higher frequency of total hits, hit preparations, and aggressive positioning observed (Connor et al., 2021; Messerschmidt, 2018). These results align with previous research showing that men exhibit more frequent aggressive actions in cooperation-opposition sports contexts (Alia et al., 2021; Stanger et al., 2017). Notably, women delivered energetic hits to the

Bear more often than men, demonstrating the most aggressive motor behavior. This finding contradicts previous research and challenges traditional gender stereotypes, suggesting that women may exhibit greater aggressiveness than men in certain metrics (Barton & Huebner, 2020). According to performativity theory (Butler, 2009), when individuals display behaviors not typically associated with their gender, they actively challenge hegemonic gender norms and disrupt stereotypes. TSGs such as Bear, Guardian, and Hunter provide a practical and effective setting to promote gender equity.

Hunters adopted more aggressive positions and prepared their handkerchiefs more frequently against female Guardians, indicating that both men and women perceived female Guardians as less effective defenders, which led them to take greater risks and act more aggressively. These findings align with research showing that women are often viewed as less capable in sports owing to gender stereotypes (Capolino, 2021; Metcalfe, 2018). However, despite facing harsher aggressiveness, female Guardians defended as effectively as their male counterparts, with no significant difference in the number of hits received by the Bear, thereby challenging the stereotype that men are more effective athletes than women (Warden et al., 2009). While the results suggest that Guardians of both genders were equally efficient in protecting the Bear, the motor behavior of the Guardians was not specifically analyzed. Future research should investigate the motor conduct of those in the Guardian role.

The gender of the Bear did not affect motor aggressiveness, disputing stereotypes that portray women as more vulnerable and needing different treatment. This suggests the game encourages interactions between aggressors and recipients that are free from gender biases, although some stereotypes remained between Hunters and Guardians. These results highlight the importance of roles in motor games because each role carries distinct responsibilities and challenges that influence motor behaviors and shape learning outcomes (Lavega-Burgués et al., 2023). Moreover, the findings demonstrate the potential of TSG roles to advance gender equity. Future research should explore how performative motor behaviors impact constructions of masculinities, femininities, and gender stereotypes, as well as examine the learning outcomes associated with roles in this and other games (Camarasa et al., 2023; Ros-Gamón et al., 2021).

### ***Effects of Gender Relationships***

The results showed that gender relationships affected motor aggressiveness. Hunters who preferred interacting with individuals of their own gender delivered the most forceful hits. In contrast, Hunters who embraced all genders equally maintained closer distances and applied gentler hits. These inclusive Hunters positioned themselves nearest to the Bear, achieving a high frequency of hits and successfully meeting the game's objective. However, when showing motor aggressiveness through hitting, they exhibited minimal aggressiveness toward the Bear. These findings indicate that inclusive and empathetic interactions help regulate motor aggressiveness levels (Stanger et al., 2017; Vigne & Bodin, 2012) because individuals who feel more accepted are less motivated to assert dominance (Barton & Huebner, 2020).

Hunters who rejected other genders positioned themselves closer to the Bear and struck more frequently—both energetically and softly—compared to those who showed rejection regardless of gender. These findings align with research showing that low group cohesion increases aggressiveness levels (García-Pérez et al., 2016), with gender-based rejection further amplifying aggressiveness as individuals attempt to assert their value and status in the group (Barton & Huebner, 2020). Future research should explore whether negative dynamics based on gender provoke greater aggressiveness than other types of negative group dynamics. Additionally, homophily—the tendency to relate positively to people of the same gender (Mamas & Goldan, 2024)—was associated with fewer instances of same-gender rejection.

The Bear's gender relationships did not exhibit significant differences, indicating that interactions based on gender did not affect aggressive motor behaviors in this role. These results support the idea that role, rather than gender dynamics, influences motor conduct (Lavega-Burgués et al., 2023). In contrast, for the Guardian and Hunter roles, relationships with the same or different genders have a greater impact. Therefore, future studies should prioritize examining the effects of specific roles instead of analyzing the overall influence of the motor game.

### **Conclusions**

This study demonstrated that gender and gender relationships significantly affected motor aggressiveness. Gender-inclusive environments showed lower levels of aggressiveness, and TSGs encouraged performative motor behaviors that had the potential to break down gender stereotypes and challenge dominant notions of masculinity and femininity. Compared to conventional sports settings, TSGs may be more effective in promoting gender equity and managing motor aggressiveness because these findings contradict common conclusions in existing sports research. Additionally, the influence of gender and gender relationships differed depending on the role played, indicating varied learning experiences across roles. Therefore, future research should prioritize assessing outcomes specific to each role rather than focusing only on the overall impact of the game. A key strength of this study lies in its ecological validity because it was performed in natural conditions. However, the small sample size limits the generalizability of the results, and the use of observational data introduces the risk of observer bias. Future research could use additional methodologies to reinforce these findings and investigate

other aspects of motor conduct, including emotional, organic, and relational dimensions. It would also be important to evaluate the specific effects of TSGs on masculinities, femininities, and gender stereotypes, as well as how other indicators of group socio-affective acceptance and rejection influence motor behavior. Incorporating qualitative methods could offer a deeper understanding of players' subjective experiences. The findings have significant implications for the educational community, aiding educators and researchers in understanding how TSGs, roles, gender, and gender-related socio-affective dynamics contribute to promoting gender equity. Educators need to acknowledge these factors to foster learning environments that embrace gender diversity and actively challenge gender stereotypes and hegemonic norms. Integrating TSGs such as Bear, Guardian, and Hunter into the curriculum supports education for gender equity by highlighting the importance of gender dynamics in each role.

#### Conflicts of interest:

The authors declare no conflict of interest.

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