

1 **Are some sports riskier than others? An investigation into child athlete experiences of**
2 **interpersonal violence in relation to sport type and gender**

3

4

Abstract

5 Interpersonal violence in sport has serious consequences for athletes, sports organisations,
6 and society at large. Despite recent advances in safeguarding sport participants from
7 interpersonal violence, empirical evidence regarding its prevalence and risk factors across
8 different sports remains scarce. In this study, we investigated differences in the prevalence
9 of interpersonal violence among a convenience sample of 9,989 adults from six European
10 countries who participated in organised sport before age 18. Utilising binary logistic
11 regression analyses and CHAID regression tree analyses, we examined variations in reported
12 experiences of neglect, psychological, physical, non-contact sexual, and contact sexual forms
13 of interpersonal violence based on gender and three sport classifications: type of sport
14 (individual vs. team), sports attire (non-revealing vs. body-fitting/revealing), and weight-
15 sensitivity (less weight-sensitive vs. weight-sensitive sports). Men participating in team sports
16 reported significantly higher levels of victimisation across all types of interpersonal violence.
17 Women in sports with non-revealing attire and men in less weight-sensitive sports also
18 reported higher prevalence rates. The study underscores the need for nuanced
19 understandings of interpersonal violence characteristics and dynamics across different sports.
20 Insights into the factors influencing victimisation enable tailored prevention and response
21 strategies to be developed to better address the needs of athletes and sport organisations.

22

Keywords: abuse, risk, victimisation, sport disciplines, sport type

23

24 Interpersonal violence against athletes represents a pressing concern, with up to eight out of
25 ten sport participants reporting at least one experience before age 18 (Tuakli-Wosornu et al.,
26 2024). It encompasses a spectrum of harmful behaviours from neglect and psychological
27 abuse to physical and sexual violence (Mountjoy et al., 2016). Despite increased recognition
28 of this issue and efforts to address it through research, policy, and practice, significant gaps
29 persist in understanding the prevalence and determinants of interpersonal violence across
30 different sport settings. This study contributes to filling these gaps by investigating the risk
31 factors in children's experiences of interpersonal violence in relation to sport type and
32 gender.

33 Article 19 of the United Nations Convention on the Rights of the Child defines violence as all
34 forms of physical or mental violence, injury or abuse, neglect or negligent treatment,
35 maltreatment or exploitation, including sexual abuse, while in the care of parent(s), legal
36 guardian(s) or any other person *in loco parentis* (United Nations, 1989). Interpersonal
37 violence involves the intentional use of physical force or power against other people by an
38 individual or small group of individuals in the family or community context. It can occur online
39 or in person, be perpetrated by different actors, and take different forms: psychological
40 violence, neglect, physical violence, and sexual violence (comprising non-contact and contact
41 forms) (Krug et al., 2002; Tuakli-Wosornu et al., 2024).

42 The importance of addressing interpersonal violence in sport cannot be overstated. Beyond
43 its potential short- and long-term physical and psychological impacts on individual athletes
44 (e.g., Alexander et al., 2023; Tuakli-Wosornu et al., 2024; Vertommen et al., 2018), such
45 violence undermines the integrity and ethos of sporting communities, perpetuating harmful
46 dynamics that can have far-reaching consequences. Moreover, the existence of interpersonal

47 violence in sport and the high prevalence with which it has been found to occur in sport
48 (Tuakli-Wosornu et al., 2024) underscores the urgency of understanding the risk factors that
49 contribute to (child) athletes' victimisation and developing effective strategies to prevent and
50 respond to such incidents.

51 **Review of the literature**

52 There is a limited but growing body of research on interpersonal violence in sport, with much
53 of the focus centred on specific forms (e.g., predominantly sexual abuse), specific age groups
54 (e.g., children), or particular sports contexts (e.g., elite-level competition), with a geographical
55 concentration in Europe and North America (Hartill et al., 2021; Ohlert et al., 2021; Parent et
56 al., 2022; Parent and Vaillancourt-Morel, 2021; Schipper-van Veldhoven et al., 2022;
57 Vertommen et al., 2016, 2022; Willson et al., 2022). Fewer studies exist from Asia, Oceania,
58 and Africa (Ahmed et al., 2018; McPherson et al., 2015; Pankowiak et al., 2023; Rintaugu et
59 al., 2014; Tuakli-Wosornu et al., 2024; Van Niekerk and Rzygula, 2011; Yabe et al., 2019), and
60 no peer-reviewed investigations have been identified from South America. Prevalence
61 reporting in the literature primarily focuses on lifetime occurrences (e.g., Ahmed et al., 2018;
62 Chroni and Fasting, 2009; Demers et al., 2021; Fasting et al., 2014; Hartill et al., 2021;
63 Marsollier et al., 2021; Ohlert et al., 2021; Pankowiak et al., 2023; Parent et al., 2022; Rintaugu
64 et al., 2014; Schipper-van Veldhoven et al., 2022; Vertommen et al., 2022; Willson et al.,
65 2022). Across studies, the total prevalence of interpersonal violence towards sport
66 participants ranges from 44% to 86%, often measured by experiencing at least one event
67 (during a lifetime or before the age of 18). While retrospective lifetime estimates produce an
68 overall picture of the magnitude of people's experiences of interpersonal violence in sport,
69 past year (or past six months, or past month) incidence estimates (i.e., the number of new

70 experiences in a shorter, more recent time frame) can better inform safeguarding strategies
71 as they more accurately paint a picture of the current situation, and provide a starting point
72 for monitoring, longitudinal trend analyses, and efficacy evaluations of prevention strategies.

73 Studies show prevalence estimates ranging from 0.5% to 78% for sexual violence, the most
74 well-documented form of interpersonal violence towards athletes (Tuakli-Wosornu et al.,
75 2024). Incidence of sexual violence within the past year ranges from 0.4% to 14% (Parent et
76 al., 2016; Sølvsberg et al., 2022). The wide estimate range is due to the inconsistency in
77 terminology related to sexual violence, including contact and non-contact behaviours as well
78 as sexual harassment and abuse experience (Lang et al., 2023; Vertommen and Parent, 2020).

79 Regarding psychological violence, prevalence rates range between 21% and 79%, with one
80 study reporting a past year incidence estimate of 15% for verbal abuse from coaches towards
81 athletes (Yabe et al., 2019). Studies combining psychological violence with neglect suggest
82 prevalence estimates of 76%, 81%, and 68%, respectively (Pankowiak et al., 2023; Parent et
83 al., 2022; Vertommen et al., 2022). Physical violence and neglect exhibit prevalence estimates
84 ranging from 4% to 66% and 27% to 69%, respectively (Tuakli-Wosornu et al., 2024). For a
85 comprehensive review of the literature on prevalence rates for interpersonal violence in
86 sport, we refer to the 2024 IOC Consensus Statement on Interpersonal Violence and
87 Safeguarding Athletes in Sport (Tuakli-Wosornu et al., 2024).

88 *Identifying risk factors*

89 *Gender.* The increased attention paid to interpersonal violence in youth sport has prompted
90 research into various types of victimisation and the risks factors across different sports
91 contexts. Several prevalence studies include a comparison in prevalence estimates based on

92 the gender of affected individuals. While most studies show higher reported experiences for
93 girls, a recent study conducted in six European countries with over 10,000 participants
94 consistently showed elevated exposure among boys for all forms of interpersonal violence
95 (Hartill et al., 2023). Others did not find gender differences in overall estimates (Parent et al.,
96 2016; Vertommen et al., 2016). These contradictory findings may indicate that experiences of
97 interpersonal violence in sport are gendered, with men/boys and women/girls experiencing
98 different types of violent behaviour even where overall prevalence rates for each form of
99 violence remain similar (Alexander et al., 2011).

100 *Individual characteristics.* Elevated exposure to interpersonal violence is also reported in
101 various sport participant subgroups, including among LGBTQ+ individuals, para-athletes, and
102 those belonging to an ethnic minority group (Alexander et al., 2011; Ohlert et al., 2018; Parent
103 et al., 2016; Vertommen et al., 2016). Research investigating the reasons for this elevated
104 exposure or how risks could be mitigated in sport is minimal.

105 *High-performance sports.* Higher levels of competition and a higher number of weekly training
106 hours, particularly at elite sport levels, have been identified as sport-specific risk factors
107 associated with increased likelihood of interpersonal violence (Marracho et al., 2021; Parent
108 and Vaillancourt-Morel, 2021; Tuakli-Wosornu et al., 2024; Vertommen et al., 2022). Varying
109 levels of pressure from peers, coaches, parents, and entourage members are experienced by
110 athletes, based on their competitive level, with most influence and power given to authority
111 figures in high-performance (youth) sport (Tuakli-Wosornu et al., 2024). However, several
112 reports demonstrate a high prevalence of interpersonal violence in grassroots sport
113 (Pankowiak et al., 2023; Parent et al., 2016; Vertommen et al., 2022), thus requiring detection,
114 prevention, and response measures at all levels.

115 *Sport type and classifications.* Investigations into reporting of interpersonal violence towards
116 athletes in different sport types have yielded mixed findings. Some studies, such as Daignault
117 et al. (2023) and Fasting et al. (2004), found no significant differences in reports of exposure
118 to different forms of interpersonal violence between athletes in individual and team sports.
119 Other work, such as Cheever and Eisenberg (2020), suggests that team sport involvement may
120 be a risk factor for sexual violence perpetration and victimisation.

121 Next to elevated risk in team sports, it is often assumed there is an increased risk for
122 interpersonal violence in certain types of sport (e.g., those with body revealing attire or where
123 one-to-one coaching is common). Empirical evidence supporting these associations is scant,
124 and the factors underlying the variations in interpersonal violence prevalence across sports
125 remain poorly understood. A study involving Norwegian female elite athletes found no
126 significant differences in the levels of reported sexual harassment - a sexual form of
127 interpersonal violence - between athletes in sports with various degrees of clothing covering
128 the body (a little (e.g. distance running), moderate (e.g., basketball), a lot of coverage (e.g.,
129 fencing)) (Fasting et al., 2004). However, media coverage emphasizes that athletes experience
130 high levels of sexualisation in sports where revealing sports attire is the norm (BBC Sport,
131 2021; The New York Times, 2021), and studies exploring body image and disordered eating
132 emphasize that wearing revealing uniforms may negatively impact athletes' body image
133 (Dantas et al., 2018; Torres-McGehee et al., 2012), potentially increasing their vulnerability to
134 internalising body-related comments and sexualized behaviours. In addition, previous
135 research indicates that participants in weight-class sports are more likely to experience
136 weight-related maltreatment (Boudreault et al., 2022) and athletes in aesthetic sports
137 experience body shaming - a form of emotional abuse (Willson and Kerr, 2022).

138 Empirical evidence of the tentative assumption of increased risk in certain sports and/or sport
139 participant subgroups is lacking. However, our study addresses this gap by examining
140 whether factors such as sport participants' gender, type of sport (team vs individual), sports
141 attire (revealing vs non-revealing), and/or the sports' level of weight sensitivity influence the
142 frequency of (child) athletes' reported experiences of interpersonal violence in sport, and
143 thus should be considered risk factors.

144

145 **Methods**

146 **Participants**

147 This study consists of a convenience sample of adults aged 18-30 who participated in
148 organised sport before age 18. The sample was provided by Ipsos MORI (IM). Power
149 considerations led to a sample size of 1,472 respondents in each partner country (Austria,
150 Belgium, Germany, Romania, Spain, United Kingdom) who completed an online questionnaire
151 (described below). Two samples were taken in Belgium: one with Dutch-speaking citizens
152 living in Flanders, and one with French-speaking citizens living in Wallonia or Brussels. Two
153 responses (one from a participant in the UK and one from Romania) were deleted due to
154 incoherent responses. The final sample was therefore 10,302 individuals.

155

156 **Instrument**

157 Data was collected via an online questionnaire developed for this study within the [REDACTED]
158 [REDACTED] and based on previous studies (Alexander
159 et al., 2011; Vertommen et al., 2016). The 'Interpersonal Violence against Children in Sport

160 questionnaire' (IVACS-Q) started with a set of demographic (i.e., gender, age, sexual
161 orientation, ethnic background), and sport-related (e.g., number of sports played, sport
162 discipline, highest competitive level,) questions. Up to five sports could be chosen from a
163 dropdown-menu with 157 different sport disciplines listed alphabetically. Participants were
164 not asked to rank sports but were instructed to select the sports they most frequently
165 participated in before age 18. The following section was structured around the four main
166 forms of interpersonal violence: 1) neglect, 2) psychological violence, 3) physical violence, and
167 4) sexual violence. Sexual violence was sub-divided into *contact sexual violence* and *non-*
168 *contact sexual violence* [REDACTED]. A total of 35 items were developed,
169 grouped into five categories: *neglect* (6 items), *psychological violence* (9 items), *physical*
170 *violence* (5 items), *non-contact sexual violence* (9 items), and *contact sexual violence* (6 items).
171 Each item took the form of a statement of a scenario, for example, *I was instructed or forced*
172 *to do exercise as a form of punishment*. Respondents were able to indicate whether the
173 experience happened 'within sport', 'outside sport', or 'both within and outside'; further
174 options were 'no, this has not happened to me', 'don't know', and 'prefer not to say'.
175 Respondents who indicated that they had experienced at least one incident of interpersonal
176 violence within sport were categorised as having experienced interpersonal violence (i.e., low
177 threshold measure). The instrument showed satisfactory psychometric properties
178 [REDACTED]

179

180 **Procedure**

181 *Sampling and data collection*

182 Sampling and data collection were performed by IM. IM screened panel members aged 18-
183 30 for participation in organised sport before age 18. Interlocking quotas were set by gender
184 and age-group (18-24 and 25-30 years-old), with the aim of reaching an equal distribution
185 across the four categories. The questionnaire was deployed between 22 October – 14
186 December 2020, until the net response of 1,472 was achieved in all contexts. The average
187 time for reaching the desired quota was 13 days. A final sample of 5,079 men ($n=2,561$ 18-24
188 years; $n=2,518$ 25-30 years) and 5,152 women ($n=2,576$ in each age group) was achieved.
189 Detailed information on the procedure and overall findings of the study can be found in [REDACTED]

190 [REDACTED].

191

192 *Sport category classifications*

193 For the purpose of this paper, we focused on the first sport selected by each participant from
194 the list we provided, which we took to be the sport they considered most important and/or
195 were most frequently involved in. Among the participants who selected a first sport, 63% also
196 selected one or more additional sports. All sports were classified by the authors according to
197 type of sport (individual sports vs. team sports), sports attire (not revealing vs. body
198 fitting/revealing body shape or skin), and weight-sensitivity (less weight-sensitive sports vs.
199 weight-sensitive sports). The classification of type of sports and sports attire was determined
200 by how athletes in each sport compete, i.e. whether the sport is played individually or in
201 teams during competitions, and the type of sports attire worn in competition/matches (see
202 Table 1 in supplementary material).

203 The categories for type of sport and sports attire were inspired by Fasting et al. (2004), as this
204 is the first and only study to date exploring experiences of sexual harassment and abuse

205 according to different sport classifications. Fasting et al. also explored two additional
206 categorisations: gender culture and gender structure. Due to the international dataset in the
207 current study, with assumed diversity between the countries in gender statistics and gender
208 culture in each sport, we decided to only include the classifications type of sport and sports
209 attire. The categorisation of weight-sensitivity was based on Martinsen and Sundgot-Borgen
210 (2013), which is a frequently used sport categorisation in the field of sports medicine and
211 eating disorders research.

212 *Type of sport:* Individual sports were defined as sports that may be executed alone, meaning
213 sports that do not require another person to train or compete with (not counting opponents),
214 e.g., swimming, tennis, gymnastics (Pluhar et al., 2019). Team sports were defined as sports
215 that cannot be carried out alone, that require one or more people to train/compete with (not
216 counting opponents), and that require working together towards a common goal, e.g.,
217 football, basketball, volleyball. Sports that are mostly played individually but occasionally
218 have team competitions or relays were categorised as individual sports (e.g., tennis, cross-
219 country skiing).

220 *Sport attire:* Revealing attire was defined as clothing that is tight fitting to the body, reveals
221 the body's shape, and/or reveals a lot of skin (e.g., dance, swimming, gymnastics) (Fasting et
222 al., 2004). For sports consisting of several disciplines (e.g., athletics, modern pentathlon),
223 sports attire was categorised as revealing if one or more disciplines wore revealing attire. All
224 other sports were defined as sports with non-revealing attire. The categorisation was based
225 on a subjective assessment by the authors of each sport's attire in international competitions,
226 hence possible differences between countries were not considered. Sports attire that fit into
227 a grey area were discussed between the authors to reach a common agreement. We did not

228 differentiate based on whether or not the attire is visible for others during competition (e.g.,
229 as in bobsled where athletes sit in a sled).

230 *Weight-sensitivity:* Weight-sensitive sports were defined as aesthetic sports (e.g., gymnastics,
231 figure skating), weight class sports (e.g., judo, karate), and gravitational sports including
232 technical gravitational sports (e.g., climbing, ski jumping), and endurance sports (e.g.,
233 swimming, cycling) (Martinsen and Sundgot-Borgen, 2013; Sundgot-Borgen et al., 2013).
234 Sports consisting of several disciplines (e.g., dance, modern pentathlon) were categorised as
235 weight-sensitive if one or more disciplines could be classified as weight-sensitive. All other
236 sports were categorised as less weight-sensitive sports, including ball games (e.g., football,
237 basketball), technical sports (e.g., fencing, archery), power sports (e.g., rugby, American
238 football), and other sports (e.g., exercise and fitness, hiking) (Martinsen and Sundgot-Borgen,
239 2013).

240

241 **Statistical analyses**

242 Participants who did not report a sport discipline were excluded from all analyses ($n=313$),
243 meaning that the analyses were performed on complete cases ($n=9,989$). Chi-square Tests of
244 Independence were used to examine gender differences in type of sports, sports attire, and
245 weight sensitivity. To examine main effects of the independent variables (type of sport, sports
246 attire, weight-sensitivity, and gender) on experience of different types of interpersonal
247 violence, we used binary logistic regression analyses with odds ratio (95 % CI) as a measure
248 of effect size. We used CHAID (Chi-squared Automatic Interaction Detection; see e.g., (Lemon
249 et al., 2003)), a type of decision tree used in supervised learning to identify, in addition to
250 possible main effects, significant combinations of predictor variable levels (type of sport,

251 sports attire, weight-sensitivity, and gender) when predicting the categorical outcome (the
252 types of IV), thus effectively capturing interactions between independent variables. The
253 Bonferroni correction was applied to the p-values in CHAID to control for the increased risk
254 of Type I errors (false positives) when multiple tests are conducted simultaneously setting
255 nominal alpha at 5% level. Robustness of findings was further secured by applying tenfold
256 cross-validation with a stopping rule of minimally 100 cases in parent nodes and at least 50
257 cases in child nodes. SPSS version 28.0 (IBM, Armonk, New York, USA) was used for all
258 statistical analyses. Participants who reported “in another way” or “prefer not to answer” on
259 the gender variable were excluded from the regression tree analyses due to a low number of
260 participants resulting in lack of statistical power ($n=70$).

261 As all participants listed at least one sport, the participants were classified based on the first
262 sport they listed only. While questionnaire design did not allow to link experiences of
263 interpersonal violence directly to the first sport listed, a cross-check of the regression trees
264 was performed by also adding the variables type of sport, sports attire, and sport attire for
265 the sport the participants’ selected as their second sport (if indicated).

266

267 **Ethics**

268 The study was approved by university research ethics committees in each partner country.
269 Information on the study, its content, withdrawal procedures etc. was provided at the start of
270 the survey, with participants asked to consent to access the questionnaire. The questionnaire
271 was anonymous and voluntary. A “prefer not to say”-option was included for questions
272 covering potentially harmful experiences. A list of counselling and support services specific to
273 each partner country was provided throughout the questionnaire and on completion.

274

275 **Results**276 **Sample characteristics**

277 The study sample consisted of 9,989 adults between ages 18 and 30, with an average age of
278 24.4 years (SD=3.7 years). The gender distribution was 49.6% men, 49.7% women, while 0.7%
279 identified their gender in another way or preferred not to say (gender-diverse or undisclosed).

280 The three most frequently selected sports by men were football ($n=2,468$, 49.8%), basketball
281 ($n=373$, 7.5%), and tennis ($n=238$, 4.8%). Among women, dance ($n=782$, 15.7%) swimming
282 ($n=469$, 9.4%), and football ($n=447$, 9.0%) were most common. For gender-diverse
283 participants, the most frequently selected sports were football ($n=14$, 20.0%), swimming ($n=8$,
284 11.4%), dance ($n=6$, 8.6%), and basketball ($n=6$, 8.6%). Men were more active in team sports,
285 sports with non-revealing attire, and less weight-sensitive sports, compared to women and
286 gender-diverse participants (see Table 1). Competition level achieved varied from
287 recreational ($n=3992$, 40.0%) to local ($n=3464$, 34.7%), regional ($n=1625$, 16.3%), national
288 ($n=710$, 7.1%), an international ($n=198$, 2.0%). Significantly more women reported
289 participating in recreational sport before the age of 18, compared to men (49.8% vs. 30.2%,
290 $\chi^2=412.364$, $df=8$, $p<.001$).

291

292 *Table 1. Distribution of type of sport, sports attire, and weight-sensitivity, separated by gender.*

293 *Presented as n (%).*

Sport categorisation	Men (n=4,953)	Women (n=4,966)	Gender-diverse/ undisclosed (n=70)	Total (n=9,989)
Type of sport				
Individual	1646 (33.2)*	3116 (62.7)	46 (65.7)	4808 (48.1)
Team	3307 (66.8)*	1850 (37.3)	24 (34.3)	5181 (51.9)
Competitive sports attire				
Non-revealing	4209 (85.0)*	2635 (53.1)	40 (57.1)	6884 (68.9)
Revealing	774 (15.0)*	2331 (46.9)	30 (52.9)	3105 (31.1)
Weight-sensitivity				
Less weight-sensitive sports	3959 (79.9)*	2790 (56.2)	32 (45.7)	6781 (67.9)
Weight-sensitive sports	994 (20.1)*	2176 (43.8)	38 (54.3)	3208 (32.1)

294 * Significantly different from women and gender-diverse/undisclosed gender participants ($p < .001$)

295

296 Figure 1 shows the relationship between the three sport categories. A total of 46.7% ($n=4,669$)
 297 of participants represented sports categorised as less-weight-sensitive team sports that used
 298 non-revealing sports attire. Weight-sensitive individual sports that used revealing sports
 299 attire were represented by 25.8% of the participants ($n=2574$). Separated by gender, 65.2%
 300 of the men represented sports categorised as less weight-sensitive team sports that used non-
 301 revealing sports attire. Among women, 38.1% represented sports categorised as weight-
 302 sensitive individual sports that used revealing sports attire.

303 [Please insert figure 1 here]

304 *Figure 1. Relationship map for type of sports, sports attire, and weight-sensitivity for the total*
 305 *sample, and for men and women separately.*

306

307 **Main effects of sport categories on experiences of interpersonal violence**

308 *Type of sport*

309 Binary logistic regression showed that team sport participants had greater odds of reporting
 310 at least one incident within all separate types of interpersonal violence, compared to
 311 individual sport participants (OR 1.30-1.60, Table 2).

312 *Sports attire*

313 Regarding sports attire, participants in sports with non-revealing attire had greater odds of
 314 reporting experiences of all types of interpersonal violence compared to participants in sports
 315 with revealing attire (OR 1.22-1.68, Table 3).

316 *Weight-sensitivity*

317 Participants in sports categorised as less weight-sensitive had higher odds of reporting
 318 experiences of all types of violence compared to participants in weight-sensitive sports (OR
 319 1.27-1.68, Table 4).

320 *Table 2. Binary logistic regressions of reported experiences of interpersonal violence in sport by type*
 321 *of sport, sports attire, and weight-sensitivity (n=9,989).*

			Parameter estimate (B)	Wald (df = 1)	p	OR	95 % CI for OR
Type of Sport	Individual (0) n (%)	Team (1) n (%)					
Neglect	1527 (31.8)	2157 (41.6)	.427	103.9	p<.001	1.53	1.41-1.66
Psychological	2957 (61.5)	3543 (68.4)	.303	51.9	p<.001	1.35	1.25-1.47
Physical	1825 (38.0)	2561 (49.4)	.469	132.6	p<.001	1.60	1.48-1.73
Non-contact sexual	1521 (31.6)	1944 (37.5)	.261	38.1	p<.001	1.30	1.20-1.41
Contact sexual	783 (16.3)	1204 (23.2)	.442	75.0	p<.001	1.56	1.41-1.72
IVAC	3435 (71.4)	4082 (78.8)	.395	71.8	p<.001	1.49	1.36-1.62

Sports attire	Revealing (0) n (%)	Not revealing (1) n (%)					
Neglect	940 (30.3)	2744 (39.9)	.423	83.9	p<.001	1.53	1.39-1.67
Psychological	1917 (61.7)	4583 (66.6)	.211	22.0	p<.001	1.23	1.13-1.35
Physical	1184 (38.1)	3202 (46.5)	.344	60.8	p<.001	1.41	1.29-1.54
Non-contact sexual	982 (31.6)	2483 (36.1)	.199	18.6	p<.001	1.22	1.11-1.34
Contact sexual	452 (14.6)	1535 (22.3)	.521	79.3	p<.001	1.68	1.50-1.89
IVAC	2220 (71.5)	5297 (76.9)	.286	34.0	p<.001	1.33	1.21-1.47

Weight- sensitivity	Weight- sensitive (0) n (%)	Less weight- sensitive (1) n (%)					
Neglect	992 (30.9)	2692 (39.7)	.386	71.7	p<.001	1.47	1.35-1.61
Psychological	1970 (61.4)	4530 (66.8)	.235	27.8	p<.001	1.27	1.16-1.38
Physical	1255 (39.1)	3131 (46.2)	.289	43.9	p<.001	1.34	1.23-1.45
Non-contact sexual	991 (30.9)	2474 (36.5)	.251	30.0	p<.001	1.29	1.18-1.41
Contact sexual	470 (14.7)	1517 (22.4)	.518	80.3	p<.001	1.68	1.50-1.88
IVAC	2305 (71.9)	5212 (76.9)	.263	29.3	p<.001	1.30	1.18-1.43

322 OR: odds ratio, CI: confidence interval, IVAC: any interpersonal violence against children in sports

323

324 Interactions between interpersonal violence, gender, and sport categories

325 *Neglect*

326 In total, 36.9% of participants reported experiencing at least one incident of neglect in sport.

327 Gender was most strongly associated with experiencing neglect, whereby men were more

328 likely to report experiencing neglect than women (difference=13.2%; $\chi^2=186.8$, $df=1$, $p<.001$;

329 see Figure 2). Within both separate groups of men and women, type of sport was the second

330 strongest factor associated with reporting neglect in sport, with participating in a team sport
331 associated with higher risk of neglect. Additionally, women in team sports with non-revealing
332 attire were somewhat more likely to report experiences of neglect than women in team
333 sports with revealing sports attire (difference=5.6%; $\chi^2=4.6$, $df=1$, $p<.032$; see Figure 2).

334 [Please insert figure 2 here]

Figure 2. CHAID regression tree for neglect in sport

335

336 *Psychological violence*

337 Experiencing at least one incident of psychological violence in sport was reported by 65.0%
338 (see Figure 3). Type of sport was the strongest factor associated with experiencing
339 psychological violence. Participants in team sports were more likely to report psychological
340 violence experiences than participants in individual sports (difference=7.0%, $\chi^2=54.4$, $df=1$,
341 $p<.001$; see Figure 3). For both separate groups of team sport and individual sport, gender
342 was the second most strongly associated factor for reporting psychological violence
343 experience in sport, with men more likely to report psychological violence than women (see
344 Figure 3). In other words, men in team sports reported the highest (70.4%), and women in
345 individual sports reported the lowest (60.0%) levels of experiences of psychological violence.

346

347 [Please insert figure 3 here]

Figure 3. CHAID regression tree for psychological violence in sport

348

349 *Physical violence in sport*

350 Experiencing at least one incident of physical violence in sport was reported by 43.9% of the
351 participants (see Figure 4). Being a man was the strongest associated factor; Men were more

352 likely to report experiences of physical violence than women (difference=15.1%, $\chi^2=229.5$,
353 $df=1$, $p<.001$; see Figure 4). For both genders, team sport participants were more likely to
354 report physical violence than participants in individual sports. More men in individual sports
355 who participated in a sport categorised as weight-sensitive reported physical violence than
356 men in individual sports categorised as less weight-sensitive (difference=6.7%, $\chi^2=7.0$, $df=1$,
357 $p=.008$; see Figure 4). Men in team sports reported the highest and women in individual sports
358 reported the lowest levels of physical violence.

359

360

[Please insert figure 4 here]

Figure 4 CHAID regression tree for physical violence in sport

361

362 *Non-contact sexual violence*

363 At least one incident of non-contact sexual violence in sport was reported by 34.7%. Type of
364 sport was the strongest associated factor, where participants in team sports were more likely
365 to report experiences of non-contact sexual violence than participants in individual sports
366 (difference=5.9 %; $\chi^2=38.0$, $df=1$, $p<.001$; see Figure 5). Among those in individual sports,
367 gender was the second strongest associated factor, with men more likely to report non-
368 contact sexual violence than women (difference=5.5%; $\chi^2=14.7$, $df=1$, $p<.001$; see Figure 5).
369 Women in individual sports with non-revealing attire reported slightly more non-contact
370 sexual violence than women in individual sports with revealing attire (difference=3.76%;
371 $\chi^2=4.8$, $df=1$, $p<.029$; see Figure 5). Men and women participating in team sport reported
372 most experiences with non-contact sexual violence (37.5%). Men in individual sports had
373 higher risk (35.2%) than women in individual sports (29.7%), while in the latter group risk
374 increased somewhat in the group with non-revealing attire.

375 [Please insert figure 5 here]

Figure 5. CHAID regression tree for non-contact sexual violence in sport

376

377 *Contact-sexual violence*

378 In total, 19.9% of participants reported experiencing at least one incident of contact-sexual
379 violence in sport. Gender was most strongly associated with experience of contact-sexual
380 violence, with men more likely to report experiencing contact-sexual violence than women
381 (difference=12.3 %; $\chi^2=237.7$, $df=1$, $p<.001$; see Figure 6). Within each of the separate groups
382 of men and women, weight-sensitivity was the second strongest factor associated with
383 reporting experience of contact-sexual violence in sport. Participants in less weight-sensitive
384 sports were more likely to report contact-sexual violence than participants in weight-sensitive
385 sports. Men had significantly higher risk for contact sexual violence (26.0%) than women
386 (13.7%). For both genders, risk was higher when participating in less weight-sensitive sports
387 compared with weight-sensitive sports. The lowest levels of reported experience with contact
388 sexual violence were reported by women who participated in weight-sensitive sports. Attire
389 appeared to play no role.

390 [Please insert figure 6 here]

Figure 6. CHAID regression tree for contact sexual violence in sport

391 *Any interpersonal violence in sport*

392 In total, 75.2% of participants reported experiencing at least one form of interpersonal
393 violence in sport. Gender was most strongly associated with experience of interpersonal
394 violence, with men more likely to report experiencing it than women (difference=8.0 %;

395 $\chi^2=83.8$, $df=1$, $p<.001$; see Figure 7). Within each of the separate groups of men and
396 women, type of sport was the second strongest associated factor, where participating in a
397 team sport was associated with higher risk of interpersonal violence than participating in an
398 individual sport. The highest risk was recorded for men in team sports (no less than 80.8%
399 reported having experienced at least one form of interpersonal violence), and the lowest for
400 women in individual sports (where risk was still considerable at 69%).

401 [Please insert figure 7 here]

Figure 7. CHAID regression tree for any interpersonal violence in sport (IVAC)

402 Lastly, a cross-check with participants' second sport was performed. Results based on the
403 smaller sample of respondents who indicated a second sport ($n=6289$) barely differed from
404 those based on participants' first reported sport. One relevant change was noted for non-
405 contact sexual violence where weight-sensitivity was a significant factor.

406

407 **Discussion**

408 The aim of this study was to investigate whether experience of interpersonal violence varies
409 according to sport type and gender. Participants in sports categorised as team sports, sports
410 with non-revealing sports attire, and less weight-sensitive sports were more likely to report
411 experiences of all types of interpersonal violence compared to those in the counterpart
412 categories. The odds ratio ranged from 1.22 (non-contact sexual violence) to 1.68 (contact
413 sexual violence). Gender (men) and type of sport (team) were most strongly associated with
414 reporting all forms of interpersonal violence in sport, except for non-contact sexual violence

415 where gender (men) and weight-sensitivity (less weight-sensitive sports) were the strongest
416 factors.

417

418 **Type of sport**

419 Interpersonal violence occurs in all sports and among all genders (Mountjoy et al., 2016). In
420 the current study, being male was strongly associated with reported experience of
421 interpersonal violence, as also reported in [REDACTED]. Furthermore, team sport
422 participants reported experiencing more interpersonal violence than participants in
423 individual sports. This supports previous research on sexual violence – one form of
424 interpersonal violence – that suggests team sports may be a risk factor for this particular
425 form of victimisation , although other research has reported no difference in experiences of
426 various forms of interpersonal violence between athletes competing in team sports and
427 individual sports (Daignault et al., 2023; Fasting et al., 2004). In this study, we did not
428 consider perpetrator profile. However, a report originating from the same data material
429 notes that peers were most often the reported perpetrators of interpersonal violence in
430 sport [REDACTED]. Additionally, male perpetrators are far more common than
431 female perpetrators (e.g., Rintaugu et al., 2014; Vertommen et al., 2017), and thus
432 elementary epidemiological law predicts that the risk of victimisation increases with
433 frequency of exposure to (potential) perpetrators, which is highest in male-dominated team
434 sport settings. Considering the social aspect of team sports, where groups train and
435 compete together, higher exposure to peer athletes may be related to increased reported
436 experience of interpersonal violence in team sports. The dynamic of team sports may create
437 a locker-room culture and competition between teammates that could contribute to a
438 higher occurrence of unacceptable behaviours. For example, adherence to team values and

439 the 'sport ethic' (Hughes and Coakley, 1991) may rationalise behaviours that constitute
440 forms of interpersonal violence as 'functional'– necessary for performance and team
441 cohesion (Lang, 2010). Mirroring behaviours and talk of team members can also be a
442 strategy used by team athletes to bond and build cultural capital as well as to prevent
443 themselves becoming a target for abuse (Curry, 1991). As Demers et al. (2023) note,
444 increased conformity to striving for distinction, one aspect of the 'sport ethic', is related to
445 increased chance of experiencing sexual violence among young team sport athletes. Hard-
446 working and/or successful athletes may be perceived as competitors by teammates, which
447 may increase tension in the group or rivalry between peers (e.g., to get a place on the
448 team), with the potential for this to be expressed as violent/unacceptable behaviours
449 (Passos et al., 2016; Vveinhardt and Fominiene, 2020).

450 In addition, the rules of team sports often sanction more physical contact than individual
451 sports, which may create more opportunities for and tolerance of unsanctioned forms of
452 interpersonal violence as 'all part of the game' (e.g., kicking, shoving), blurring the
453 boundaries between acceptable and unacceptable behaviours (Kreager, 2007; Moesch et
454 al., 2010). Physical contact in sports settings can be used for positive (e.g. to demonstrate,
455 ensure safety) and negative purposes (e.g. physical violence, sexual grooming) (Gleaves and
456 Lang, 2017; Lang, 2015). Sports where such contact is inherent to the rules, as with between
457 teammates and opponents in many team sports, afford more opportunities for legitimate
458 physical contact. As well as offering more opportunity for (sanctioned as well as
459 unsanctioned) violence against a teammate or opponent, this also potentially allows
460 unsanctioned forms of interpersonal violence to be concealed as the perpetrator may

461 attribute the act to 'part of the game'. It may also de-sensitise athletes to negative forms of
462 physical contact, including sexual grooming (Lang, 2015).

463 Additionally, normative conformity to team values and hierarchical team structures alongside
464 the valorisation of risk-taking in pursuit of success above all else – further norms of the sport
465 ethic (Hughes and Coakley, 1991) – may mean that violent behaviours that in other social
466 contexts would be unacceptable (i.e.: eye gouging, 'sledging') are rationalised as acceptable
467 or even necessary to succeed in a competitive team context (Atkinson and Young, 2008;
468 Danioni and Barni, 2017; Donnelly, 2004; Waldron, 2015). The historical foundation of many
469 team sports as socialising institutions for boys to learn hegemonic forms of masculinity, in
470 which violence and aggression are celebrated (Anderson, 2009; Connell, 2005), may also
471 explain why athletes in team sports are at higher risk of experiencing all forms of
472 interpersonal violence.

473

474 **Sports attire**

475 The notion that wearing sports attire that is tight fitting or revealing increases the risk of
476 experiencing interpersonal violence, particularly sexual violence, was not supported in this
477 study. To our knowledge, only one previous study has investigated levels of one form of
478 interpersonal violence and sports attire (Fasting et al., 2004). This reported no difference
479 between levels of sexual harassment experienced among athletes in sports requiring a little,
480 moderate, or a lot of body coverage from the attire. In the current study, we categorised
481 each sport based on the attire worn in competition. However, athletes wearing revealing
482 clothing in competition may wear less revealing clothing in training, meaning that the total

483 exposure time in non-revealing attire may be higher than in revealing attire (Dantas et al.,
484 2018).

485 It may also be the case that those working with or training alongside athletes who wear
486 revealing attire are more sensitive to their behaviours, especially their touch practices, and
487 so restrict their physical contact, reducing opportunities for certain forms of interpersonal
488 violence. Lang (2015) and Gleaves and Lang (2017) found that swimming coaches
489 internalised child safety discourses to restrict how frequently they touched swimmers'
490 bodies during coaching practice out of concern their behaviour could be (mis)interpreted as
491 abuse. Those working with athletes whose body is more visible because of their sports attire
492 may be extra careful to avoid physical interactions with athletes that could result in an
493 allegation against them, resulting in fewer athletes in sports with revealing attire reporting
494 experience of interpersonal violence in sport.

495

496 **Weight-sensitivity**

497 Many of the less weight-sensitive sports in this study were also categorised as team and
498 non-revealing attire sports, highlighting the overlap between categories. This overlap may
499 partly explain why participants in less weight-sensitive sports reported more experiences of
500 interpersonal violence compared to those in weight-sensitive sports.

501 While few studies have explored the intersection of weight-sensitivity and violence in sport,
502 our findings contrast with those of Boudreault et al. (2022), who found that young athletes
503 in weight-class sports (i.e., weight-sensitive sports) were more likely to report weight-
504 related maltreatment compared with other types of sports (i.e., technical, endurance,
505 aesthetic, ball games). Similarly, research with athletes in aesthetic sports (also weight-

506 sensitive) notes that emotional abuse in the form of body shaming is often normalised in
507 these environments and can become deeply ingrained in athletes' belief systems (Willson
508 and Kerr, 2022). Additionally, one study identified that disordered eating and unhealthy
509 weight management practices are often normalised in sport, resulting in higher prevalence
510 of such issues in weight-sensitive sports (Mancine et al., 2020). These concerns are also
511 frequently under-reported (Coker-Cranney and Reel, 2015; Martinsen and Sundgot-Borgen,
512 2013). Given these points, it is possible that experiences of interpersonal violence, especially
513 in the form of weight-related maltreatment, have been normalised and thus underreported
514 among athletes in weight-sensitive sports in our study [REDACTED]. Another
515 hypothesis could be related to emphasis on increasing weight/muscle mass in men's team
516 sports - a form of weight-related maltreatment that is often overlooked (Edwards et al.,
517 2017; Knight et al., 2024). The 'drive for muscularity' tied to pressure to embody hegemonic
518 masculinity may be behind discrepancies between this study's results and previously
519 reported findings.

520

521 **Conclusion**

522 This study was the first major, multi-national study to investigate whether reported
523 experiences of interpersonal violence vary according to gender and different sport
524 categories. While gender was the strongest factor for elevated exposure to interpersonal
525 violence, participants in team sports, sports with non-revealing sports attire, and
526 participants in less weight-sensitive sports were more likely to report experiencing
527 interpersonal violence. The idea that wearing revealing sports attire elevates the risk of
528 interpersonal violence exposure in sport does not hold. Specific sports and sport types

529 should receive more attention in future research, and prevention efforts should be tailored
530 based on characteristics of participants, perpetrators, and sport disciplines.

531

532 **Limitations**

533 We categorised sports into type of sport, type of sports attire worn, and weight-sensitivity
534 based on the first sport each participant listed in their response to the questionnaire.

535 However, many participants reported more than one sport. Consequently, participants
536 categorised into individual sports, for example, may also have played team sports as
537 children, and the specific sport in which they were reporting their experience of
538 interpersonal violence may have been different from the first sport they identified.

539 Similar to the previous paper published from this study [REDACTED] while this
540 sample is extensive, consisting of people of all genders, disciplines, and levels of sport, it is
541 not representative for youth sport participation in the European countries involved.

542 However, the most popular sports reported by male and female participants in this study
543 align with the most popular sports and leisure-time physical activities reported for children
544 and adolescents in Europe (Hulteen et al., 2017).

545 Lastly, while 'false positive' reports of interpersonal violence experiences in sport are
546 possible, research on the validity of retrospective reports shows 'false negatives' are more
547 common (Hardt and Rutter, 2004).

548

549 **Implications and directions for future research, policy, and practice**

550 Future quantitative studies should cover elements of perpetrator profile when examining
551 sport participants' experiences of interpersonal violence in different sports, such as the

552 gender of the perpetrator, number of perpetrators, and the perpetrator's role/relationship
553 to the athlete. Other classifications of sports, including a more detailed examination of type
554 of sports (endurance, aesthetic, weight-class, ball-sports etc.) and of the gender culture
555 within these, is also warranted. Furthermore, a breakdown of the specific behaviours within
556 each type of interpersonal violence that men vs. women report will give deeper insight into
557 which specific manifestations of interpersonal violence are experienced most commonly by
558 boys/ men and women/girls in sport.

559 This multi-national dataset enables examination of country differences in future studies.

560 Research examining both child and adult experiences of the prevalence of interpersonal
561 violence in the same study, using the same methodology, is needed to compare rates and
562 types of interpersonal violence between children and adults in sport.

563 In addition, while the current literature provides valuable insights into the prevalence and
564 determinants of interpersonal violence in sport, further research, including meta-analyses,
565 is needed to deepen our understanding of these phenomena and inform interventions
566 aimed at promoting athlete safety and well-being. More qualitative research that explores
567 how sports cultures contribute to and/or mitigate risk of experiencing interpersonal
568 violence in sport is also needed, as is work that advances theoretical insights into the causes
569 of and mitigating factors for interpersonal violence in sport so as to propose new solutions.

570 Education on the existence of and risk factors for interpersonal violence in sport remains
571 key. It is essential to expand education on interpersonal violence risk factors to include
572 everyone involved in sports, not just athletes and coaches. This should focus on early
573 recognition and response to warning signs of interpersonal violence. Education should be
574 tailored to address the unique cultures within (team) sports. Training bystanders to detect

575 and respond early to signs of abuse is also crucial (Adriaens et al., 2024; Verhelle et al.,
576 2022).

577 Ultimately, there is a need to transform the culture of sport into one that prioritises safety
578 and well-being for all participants. Listening to and incorporating athletes' opinions into
579 sport is a key tenet of human rights principles and a recognised way of breaking down the
580 power imbalances within sport that can facilitate interpersonal violence and silence those
581 affected (Lang, 2022; Purdy and Lang, 2024). Training is therefore also needed to develop
582 'listening cultures' within sport (Lang, 2022). Athletes of all ages should be educated on their
583 rights, and especially their right to participate, and empowered to regularly contribute to
584 decision-making in sport. Those involved in running sport should be trained to facilitate
585 athlete 'voice' and incorporate athletes' views into sports practice regularly rather than as
586 part of tokenistic short-term or one-off initiatives.

587 Furthermore, policies must be updated to reflect that the body itself – its shape, weight,
588 and the attire worn – is not a risk factor for interpersonal violence. Instead, bodily
589 autonomy, whereby athletes consent to and have ultimate control over when and how
590 physical contact takes place, what they wear, and their body shape and weight, should be
591 promoted across all sports.

592 Finally, despite the differences in interpersonal violence exposure found across various
593 types of sports, prevalence remains high across all sports, genders, and levels of
594 competition. Rather than any sport or athlete group, childhood experiences of interpersonal
595 violence outside sport remain the strongest predictor of interpersonal violence experiences
596 in sport [REDACTED]. An all-compassing societal approach to address this endemic
597 public health issue is required.

598

599 **Acknowledgements**

600 We would like to thank all participants in the study and the [REDACTED]

601 [REDACTED]

602 **Statements and declarations**603 *Ethical considerations*

604 The study was approved by university research ethics committees in each of the partner
605 countries.

606 *Consent to participate*

607 Information on the study, its aims, content, withdrawal procedures, and how the data
608 would be used was provided at the start of the survey, with participants asked to consent to
609 continue to access the questionnaire.

610 *Consent for publication*

611 Not applicable

612 *Declaration of Conflicted Interest*

613 The authors declared no potential conflicts of interest with respect to the research,
614 authorship, and/or publication of this article.

615 *Funding statement*

616 The authors disclosed receipt of the following financial support for the research, authorship,
617 and/or publication of this article: [REDACTED]
618 [REDACTED] The
619 funder had no involvement in study design, writing of the report, or decision to submit for
620 publication.

621 *Data availability*

622 Data will be available on request.

623

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