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PROJECT SUMMARY

In contemporary societies, video gaming serves multiple functions, from enabling social interaction and meaningful leisure to supporting health, well-being, and creative self-expression. At the same time, esports and competitive online play expose young people to risks that include verbal aggression, harassment, racism, homophobic and transphobic slurs, and broader forms of hate speech. Within Europe—where tens of millions of people participate in online games—the social value and social risks of gaming remain unevenly mapped, particularly for younger cohorts who experience both the benefits and detriments of these spaces most acutely. The **ENHANCE** project addresses this gap by developing research-informed resources that reduce toxic behaviours and foster prosocial conduct through socially connected education and assessment for young players aged 16–26.

ENHANCE pursues three interlocking aims: (1) **Assessing** the social side of online competitive gaming by identifying prevalent toxic and prosocial behaviours among youth in Europe and by building a robust self-assessment tool; (2) **Raising awareness** among players, parents/educators, and stakeholders via open-access learning materials; and (3) **Achieving** long-term impact through an Esports Social Observatory that disseminates evidence, convenes dialogue, and supports safer, more inclusive communities. These aims translate into concrete outputs, including a psychometrically grounded Self-Assessment Tool, a multilingual MOOC for youth and caregivers, and an Esports Social Observatory that curates findings and good practice for the field.

Together, these components will support young players (16–26), decision makers, and industry actors (developers/publishers, clubs, federations) in recognising, preventing, and responding to toxic behaviours while cultivating prosocial norms and skills that contribute to sustainable value creation and healthier pathways in and beyond esports.

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1. Introduction

Esports and competitive online gaming have rapidly consolidated their position as mainstream cultural and economic practices, offering young people opportunities for social interaction, leisure, and well-being, while also exposing them to a persistent ecology of harmful behaviours. Within this ecology, “toxicity” is typically used as an umbrella term for a broad range of antisocial practices—such as flaming, harassment, racism, sexism, homophobia, trolling, griefing, and related forms of abuse—that are intensified by the affordances of high-stakes multiplayer play (e.g., anonymity, time pressure, and emotionally charged team coordination). (Schopke-Gonzalez et al., 2023; Huston et al., 2023; Gandolfi & Ferdig, 2021; Ruotsalainen et al., 2023; Freitas et al., 2021; Kordyaka et al., 2020; Maharani et al., 2024). These risks are consequential for player well-being and community integrity: toxic conduct can spread through social contagion dynamics, undermine communication and cohesion in team formats, and generate individual psychological harm; at ecosystem level, it can deter newcomers, erode trust, and create reputational and retention risks for organisers and platforms. (Freitas et al., 2021; Huston et al., 2023; Grandprey-Shores et al., 2014; Kordyaka et al., 2020). The policy relevance of these concerns is increasingly explicit, with European institutions recognising both the opportunities and risks associated with esports and video games, and emphasising education, awareness-raising, and safeguards—especially for youth. (European Parliament, 2022).

The ENHANCE project directly addresses this European need by developing an integrated model that combines assessment, awareness-raising, and sustained achievement mechanisms to reduce toxic behaviours and strengthen prosocial conduct in grassroots esports contexts. Across its architecture, ENHANCE pursues three interlocking aims: (i) assessing the social side of esports by identifying prevalent toxic and prosocial behaviours among young players and building a robust self-assessment instrument; (ii) raising awareness among players, parents/educators, and stakeholders through open-access learning materials; and (iii) achieving longer-term impact through an Esports Social Observatory that disseminates evidence and supports safer, more inclusive communities. These aims are operationalised via concrete outputs (e.g., a psychometrically grounded Self-Assessment Tool, a multilingual MOOC, and Observatory resources) that support young players and relevant decision-makers in recognising, preventing, and responding to toxic practices, while also cultivating the prosocial norms and skills that underpin sustainable value creation and healthier pathways in and beyond esports.

Within this programme, Deliverable D2.2 contributes empirical evidence on the prevalence and configuration of toxic and related psychosocial constructs among young players in the consortium countries, thereby strengthening the project’s assessment strand and informing downstream educational and stakeholder-facing interventions. Methodologically, D2.2 reports findings from a cross-sectional, multi-country online survey designed to capture young players’ experiences of toxic and prosocial dynamics in grassroots esports environments, using procedures aligned with the project’s target population and cross-national comparability needs. The survey design and construct operationalisation are consistent with the broader ENHANCE measurement architecture, which emphasises multidimensional coverage of toxicity (e.g., abusive communication, disruptive gameplay, unsportsmanlike conduct, discriminatory behaviour, real-world invasive harms, and general toxicity) and positions these experiences alongside theoretically relevant correlates such as gamer identity and relatedness. In doing so, D2.2 provides a baseline evidence layer that can be translated into targeted awareness materials

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and Observatory outputs, while also supporting iterative refinement and contextualisation of ENHANCE's assessment toolkit across partner countries.

2. Sampling strategy, recruitment, survey distribution channels and sample

2.1 Sampling strategy

A cross-sectional, multi-country online survey was implemented (Qualtrics) to capture young players' experiences of toxic and prosocial behaviours in grassroots esports contexts. The study used a **non-probability purposive sampling strategy**, targeting esports and competitive gaming participants who regularly play ranked modes and/or participate in online or offline tournaments. The target population included players across performance levels (recreational, amateur, and professional) and across the major participation platforms relevant to contemporary esports (PC, console, and mobile, depending on the game titles covered). Although the broader project addresses young people aged 16–26, this survey operationalised eligibility as 18–26 years old and excluded minors, to ensure consistent consent procedures and safeguards across countries.

The study was implemented only after approval from the Ethical Review Board of the Faculty of Human Kinetics, University of Lisbon (Protocol No. 18/2025), and procedures followed established human-subject research standards, including informed consent, voluntary participation, and the right to withdraw (World Medical Association, 2013; Regulation (EU) 2016/679). Participation was framed as anonymous, with explicit communication that personally identifying information was neither required nor collected for research purposes. Where an email field was used for prize-draw administration, appropriate encryption/anonymisation measures were applied.

To maximise inclusivity and comprehension, the questionnaire was offered in the language(s) spoken by participants (e.g., notably Greek and English in the Greek arm etc.), using equivalent translations to ensure conceptual consistency across versions. Data collection ran for approximately **two months (mid-November to mid-January)** and was supported by weekly reminder posts across recruitment channels to improve response rates and reduce temporal bias. As with other convenience-based online recruitment approaches, this strategy is appropriate for digitally embedded populations but requires transparent acknowledgement of potential coverage and self-selection biases when interpreting prevalence estimates (Bethlehem, 2010; Etikan et al., 2016).

2.2 Recruitment and survey distribution channels

Recruitment and survey dissemination were coordinated across the six partner countries using a multi-channel approach tailored to the communication ecosystems of competitive gaming communities in each context. In all cases, distribution prioritised channels where esports and competitive gamers naturally congregate (e.g., game- and title-specific communities, esports organisations and networks, and relevant social-media and messaging platforms). Below, country-specific recruitment and distribution procedures are reported by partner, to ensure transparency and comparability across national contexts.

Distribution channels for Greece

Recruitment in Greece was conducted primarily through online communities where competitive gamers naturally congregate, using a multi-channel dissemination approach to increase reach and sample diversity. Distribution included internet cafés and social-media communities affiliated with esports teams and gaming communities (e.g., title-specific Facebook and Instagram subgroups and general esports forums through Discord), as well as targeted Facebook groups (e.g., national and interest-based esports/gaming groups). For the internet cafés, a promotional flyer was distributed in physical venues in Athens and Patras. For the online communities, brief posts and invitation prompts with direct survey links were developed and posted in the aforementioned groups. These posts communicated the purpose of the study, provided brief guidance for survey completion, and mentioned small incentives to encourage participation.

To strengthen access to tournament-active and highly engaged competitive players, complementary promotion was conducted in collaboration with the Global eSport Federation and its Greek national federation branch. In addition, collaboration was established with the newly developed e-basket department of the Greek National Basketball Association. Both organisations were invited formally via invitation letters and agreed to support dissemination to their communities. Distribution was facilitated via newsletters and email lists where possible, and survey promotion materials and direct links were also shared during selected live online events.

Distribution channels for Portugal

In Portugal, data collection was conducted through a combination of online and in-person distribution channels to maximize reach within the esports and gaming community. The survey was disseminated online via the official social media networks of Sport Evolution Alliance (SEA), as well as through the channels of the associated partner, the Portuguese Esports Federation (FPDE), following formal authorization and support from the Federation's leadership to ensure legitimacy and trust in the recruitment process. In tandem, on-site data collection took place at Lisbon Games Week (i.e., the largest gaming events in the country), which three junior researchers approached the participants in person. During face-to-face recruitment, participants were fully informed about the purpose of the study, the voluntary nature of their participation, and the guarantees of anonymity and data protection, and informed consent was obtained prior to survey completion. This sequential mixed approach strengthened ethical compliance while enhancing the diversity and representativeness of the sample.

Distribution channels for Spain

To achieve comprehensive and multi-layered engagement, in Spain data collection was implemented through a diversified suite of outreach strategies. Formal recruitment was initiated via institutional email communications and telephone-based outreach, allowing for direct and structured engagement with identified stakeholders to ensure foundational participation. This was augmented by the dissemination of the survey through widely-used digital messaging platforms, specifically WhatsApp and Telegram channels, to facilitate efficient and rapid sharing within community networks. Concurrently, educational initiatives were implemented within school settings to engage younger demographics in a structured environment. Broader public reach was achieved through strategic dissemination on major social media platforms, namely Facebook and Instagram. Furthermore, to leverage organic trust and existing connections, the questionnaire was

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actively promoted through word-of-mouth within established professional and personal networks. This multi-channel approach was designed to permeate different community strata, thereby enhancing the study's accessibility and improving the diversity of the respondent pool.

Distribution channels for Belgium

In Belgium, a multi-channel and targeted recruitment strategy was implemented to reach esports players aged 16 to 26 for participation in the online self-assessment survey on exposure to toxic behaviours. Dissemination relied primarily on digital platforms commonly used by young gamers and students. The survey was promoted through social media channels, including Facebook, LinkedIn, and Discord, to ensure broad visibility across both professional and gaming-oriented networks. In addition, direct institutional outreach was conducted. The esports team of the Vrije Universiteit Brussel was contacted and invited to share the survey within their competitive player community. The Gemeenschapsonderwijs (GO) in Bruges was approached through a secondary school programme specifically designed for young esports players, enabling access to a structured cohort of adolescent participants engaged in regular training. Furthermore, the Faculty of Computer Science of a Belgian university was contacted to distribute the self-assessment tool among its students, a population with high relevance to competitive online gaming. To complement these efforts, the survey was published on dedicated participant-recruitment platforms such as SurveyCircle. Finally, the Belgian Esports Federation supported dissemination by sharing the survey through its official social media channels, increasing reach among organized and federated players. This combined strategy aimed to balance broad online outreach with targeted institutional recruitment to maximise both sample size and relevance to the target population.

Distribution channels for Cyprus

In Cyprus, a multi-faceted recruitment strategy was deployed to engage esports players aged 16 to 26, specifically tailored to an esports community characterized by low maturity. Dissemination was anchored within Frederick University, utilizing internal academic networks such as the Mobile Device Laboratory (MDL), the Department of Computer Science, and the Department of Sports Science. The survey was promoted through official university social media channels and targeted mailing lists to ensure direct communication with the student body. To bridge the gap between academia and active play, the project was introduced via 10-minute presentations during relevant courses and at a dedicated Frederick University eSports club event held in December 2025, where students were encouraged to complete the self-assessment tool.

Beyond the university, direct outreach was conducted with major national esports stakeholders to tap into organized player bases. This included email and social media coordination with the Cyprus Esports Organization (CESO), the Cyprus Electronic Football League (CyprusEFL), Kinx Esports Arena in Nicosia, and the Agency Esports Club, all of whom were invited to distribute the survey through their respective member networks. Looking forward to 2026, the strategy involves sustained promotion and the recruitment of prominent esports ambassadors, notable players within the Cypriot scene, to champion the survey across high-engagement platforms such as Discord, further boosting visibility within this emerging market.

In sum, the recruitment followed a coordinated multi-channel strategy designed to reach young esports and competitive gaming participants aged 16–26. Main channels used included social-media platforms (Facebook, Instagram, Discord, WhatsApp/Telegram), university networks, gaming communities, internet cafés, and esports-specific online

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groups. Institutional partners involved comprised national esports federations, university esports teams, secondary schools with esports programmes, gaming associations, and project-affiliated research units, each facilitating dissemination through official channels, mailing lists, and community forums. Events and in-person collection were carried out where feasible, such as Lisbon Games Week (Portugal) and through campus presentations or club meetings in Cyprus and Belgium, allowing researchers to engage directly with players and provide on-site participation opportunities. Incentives offered varied by country but generally included prize-draw entries, small rewards, or the intrinsic motivation of contributing to a European research project on esports. Estimated reach extended across several thousand potential respondents per country through combined digital and institutional networks, ensuring broad visibility within both grassroots and organised esports ecosystems despite differences in community maturity across national contexts.

Distribution channels for Italy

The recruitment of respondents in Italy was conducted primarily through in-person distribution channels to maximize reach within the esports and gaming communities. In particular, the survey was disseminated through a network of high schools which are actively engaged in esports programs. Access to the schools was facilitated following formal authorization to ensure legitimacy and trust in the recruitment process.

2.3 Sample

Following data collection, the full dataset (N = 941) was screened for eligibility and completeness to ensure that analyses were aligned with the intended population and suitable for cross-national interpretation. Screening indicated substantial non-response in key profiling variables (e.g., 59% missing for exact age and 44% missing for esports participation) and a non-trivial number of cases outside scope (including respondents under 18 and over 26), limiting the validity of inferences for the target population if the full dataset were retained. In addition, the aggregated "Other countries" category comprised a heterogeneous set of national contexts, reducing comparability and increasing the likelihood that apparent differences would reflect recruitment and contextual variability rather than meaningful cross-country patterns.

Accordingly, to support valid comparative analyses within the consortium scope, the analytic dataset was restricted a priori to respondents residing in the six EU partner countries and within the 18–26 age band; cases outside scope (e.g., under 18/over 26, non-partner countries) and responses with insufficient information for the planned analyses were excluded. This restriction is methodologically justified because it enhances internal comparability across focal national contexts while reducing inferential noise introduced by heterogeneous, non-equivalent groups (Shadish et al., 2002; von Elm et al., 2007).

Within the final analytic sample (N = 327), item-level missingness was negligible; the only missingness among the toxicity items occurred in the "overall frequency" item for real-world invasive behaviours (24 missing responses across partner countries). Composite construct scores were computed as mean scores using available items, so no composite-scale scores were missing; however, reliability estimates for the real-world invasive behaviours construct are based on reduced Ns in some countries due to this item-level missingness.

Challenges Related to Data Collection

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The ENHANCE researchers experienced hard time approaching large esport player samples for several reasons, across all six countries. Despite intensive efforts, professional eSports players are particularly reluctant to participate in lengthy research studies due to concerns related to personal and professional image management, as public visibility and brand reputation are central to their careers. Also, any data collection on negative experiences, such as toxic behaviours, may be perceived as potentially harmful to their public persona or contractual relationships.

In addition to the challenges associated with recruiting professional eSports players, participant retention throughout the research process also proved to be a significant limitation. Although a relatively large number of participants initially accessed and began the survey (over 941), a noticeable proportion did not complete it. This attrition can be attributed to several factors, including the length of the questionnaire, the cognitive and emotional demands of reflecting on toxic experiences, and competing time pressures related to training, competition schedules, and professional obligations. For professional players in particular, sustained engagement in research activities may be deprioritised given the long performance-related commitments. Moreover, concerns regarding data use, and potential reputational implications may have contributed to partial completion, with some participants choosing to withdraw before the end of the survey despite initial interest. These drop-off patterns highlight the structural constraints of conducting research within highly competitive digital environments and underscore the importance of designing concise, flexible, and participant-sensitive data collection tools in future studies.

3. Data analysis

Analyses were conducted in IBM SPSS (v29) following a predefined sequence consistent with good practice for survey-based scale reporting and cross-group comparison. First, data were screened for eligibility and completeness; where analytic restriction was applied (partner countries; age-range), analyses proceeded on the resulting restricted analytic dataset, noting that missing or out-of-scope data can otherwise bias estimates and undermine comparability (Graham, 2009; Enders, 2010). Second, item-level descriptive statistics (min–max, mean, SD) were produced to characterise response distributions and identify potential ceiling/floor effects. Third, internal consistency reliability was evaluated for each construct using Cronbach's alpha, interpreted as evidence of score consistency for group-level research use (Nunnally & Bernstein, 1994; Tavakol & Dennick, 2011). Fourth, bivariate associations among constructs were examined with Pearson correlations to assess convergent/discriminant patterns within the nomological network (Field, 2018). Fifth, cross-country differences in construct scores were tested using one-way ANOVA; homogeneity of variance was assessed with Levene's test, and where variance assumptions were violated, robust Welch tests and Games–Howell post-hoc comparisons were used to control Type I error under heteroscedasticity and unequal group sizes (Levene, 1960; Welch, 1951; Games & Howell, 1976). Finally, effects were complemented with effect-size indices (e.g., η^2/ω^2) and confidence intervals to support substantive interpretation beyond p-values, consistent with current reporting recommendations (Cohen, 1988; Lakens, 2013).

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4. Results

4.1 Descriptive results by preliminary data analysis

Table 1 presents the distribution of survey participants by country of residence. In total, 941 respondents completed the survey, with 372 participants (39.5%) originating from the project's partner countries and 569 (60.5%) from other countries (e.g., Poland, Turkey, Sweden, Bulgaria). Among partner-country respondents, Portugal contributed the largest share (n=103; 10.9%), followed by Greece and Spain (n=92 each; 9.8%), while smaller proportions were recorded for Belgium (n=37; 3.9%), Cyprus (n=25; 2.7%), and Italy (n=23; 2.4%). Overall, the sample composition indicates broad geographical reach, extending well beyond the consortium countries.

Table 1. Distribution of survey respondents by country

Countries	Frequency	Percent %
Belgium	37	3,9
Cyprus	25	2,7
Portugal	103	10,9
Greece	92	9,8
Italy	23	2,4
Spain	92	9,8
Total Partners	**372**	**39,5**
Others (Poland, Turkey, Sweden, Bulgaria etc.)	569	60,5
Total	**941**	**100,0**

Table 2 presents the distribution of respondents across age categories by country. Overall, the sample is concentrated in the 18–26 age group (n=565), followed by participants aged 16–17 (n=168), while smaller numbers are recorded for those under 16 (n=26) and over 26 (n=182). Partner-country participation is largely comprised of respondents aged 18–26 (e.g., Greece n=92; Portugal n=80; Cyprus n=24; Belgium n=17; Italy n=22), whereas the "Other" countries category shows greater heterogeneity, including all respondents under 16 (n=26) and over 26 (n=182).

Table 2. Age-group distribution of survey respondents by country (frequencies)

	Countries							
Age	Belgium	Cyprus	Portugal	Greece	Italy	Spain	Other	**Total**
I am between 16 and 17 years old	20	1	23	0	1	88	33	**168**
I am between 18 and 26 years old	17	24	80	92	22	4	329	**565**
I am under 16	0	0	0	0	0	0	26	**26**
I am over 26 years old	0	0	0	0	0	0	182	**182**
Total	**37**	**25**	**103**	**92**	**23**	**92**	**569**	**941**

Figure 1 presents the percentage distribution of respondents' ages across the 16–26 range, while also reporting missing data. A large share of cases is recorded as missing (59%), indicating substantial non-response to the age item. Among valid responses, the most

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frequently reported ages are 17 (8%) and 16 (7%), followed by 18 (5%), whereas the remaining ages (19–26) each account for relatively small proportions (generally 2–3% per age category), suggesting a dispersed distribution among older respondents within this range.

Figure 1. Respondents' age distribution (percent distribution, including missing values)

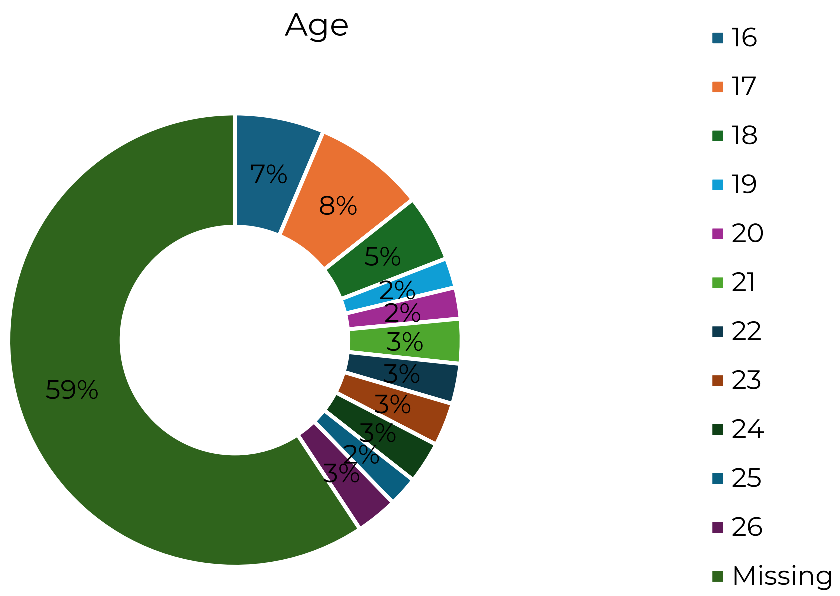

Figure 2 presents the frequency distribution of responses concerning informed consent provided by parents or legal guardians and the minor's verbal assent to participate. The majority of respondents indicated that they had read and understood the consent information and authorized the minor's participation, with consent granted in 147 cases, whereas authorization was withheld in 7 cases. With respect to assent procedures, verbal assent from the minor was reported as obtained in 102 cases and not obtained in 5 cases, suggesting high overall compliance with both guardian consent and minor assent requirements. Consent/assent items were shown only to respondents indicating age <18 and answering the age item; therefore totals do not equal the full under-18 count.

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Figure 2. Parental/guardian informed consent and minor verbal assent (frequencies)

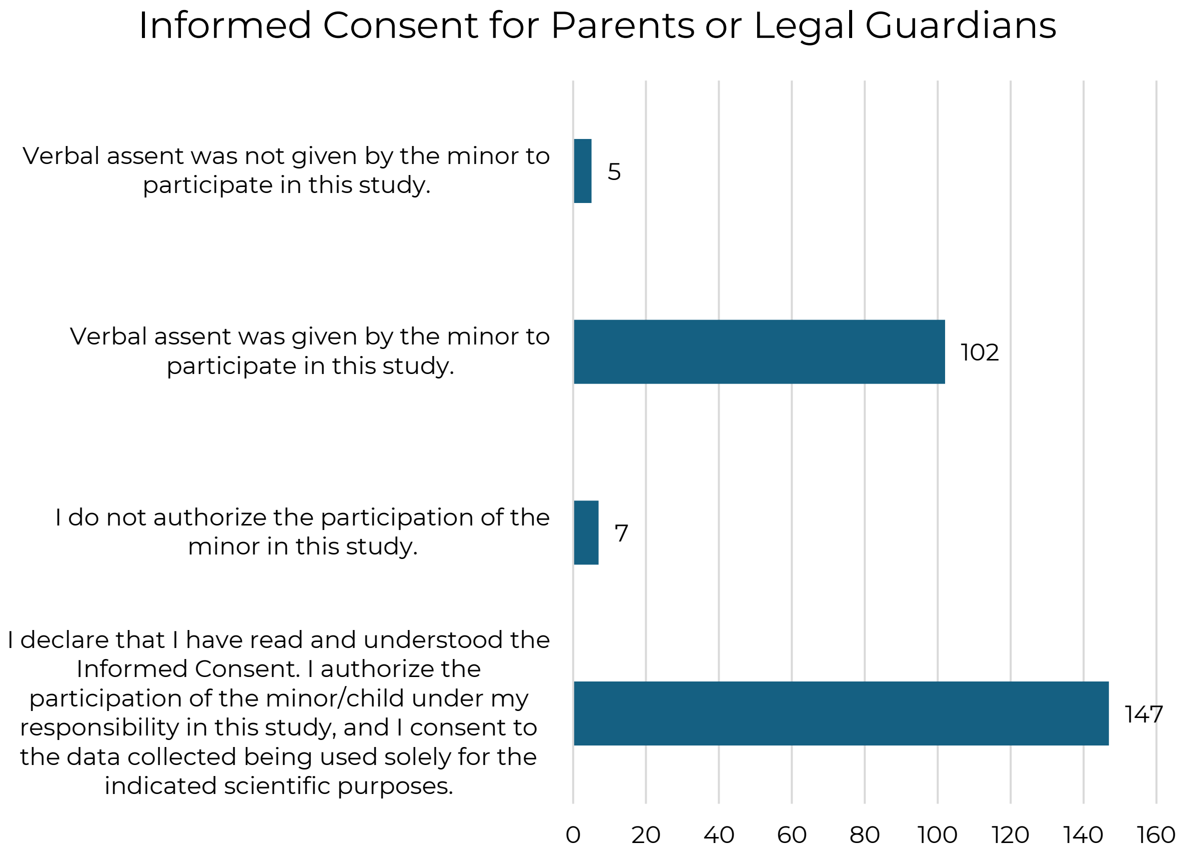

Figure 3 presents the percentage distribution of respondents' self-reported involvement in esports. Among those providing a response, 41% indicated that they are active in esports, whereas 15% reported that they are not. Notably, a substantial proportion of cases are missing (44%), suggesting considerable non-response for this item and indicating that interpretations of esports engagement should be made with caution given the extent of missing data.

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Figure 3. Self-reported participation in esports (percent distribution)

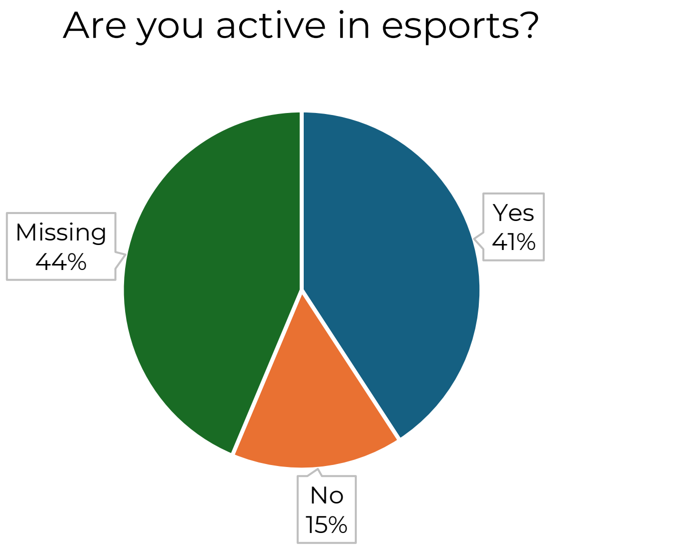

Table 3 presents the frequency distribution of respondents' ages (16–26 years) across the six partner countries. The table indicates marked cross-country differences in the age composition of the partner-country subsample (N=372). Spain contributes the largest number of younger respondents, particularly at ages 16 (n=39) and 17 (n=49), while Greece shows higher counts in the early twenties, notably at ages 23 (n=17) and 24 (n=13). Portugal displays a more even spread across ages 18–26, and Cyprus shows comparatively higher representation in the 21–22 range (n=5 and n=6, respectively). Italy's participation is concentrated almost exclusively at age 18 (n=18), with minimal counts at other ages.

Table 3. Age distribution of respondents in partner countries (16–26 years), by country

	Countries						
Age	**Belgium**	**Cyprus**	**Portugal**	**Greece**	**Italy**	**Spain**	**Total**
16	10	0	9	0	0	39	58
17	10	1	14	0	1	49	75
18	2	1	19	2	18	1	43
19	2	1	6	9	1	1	20
20	0	2	10	8	1	0	21
21	1	5	12	10	1	0	29
22	3	6	7	10	0	1	27
23	3	2	6	17	0	0	28
24	1	2	9	13	0	1	26
25	0	3	4	12	1	0	20
26	5	2	7	11	0	0	25
Total	**37**	**25**	**103**	**92**	**23**	**92**	**372**

4.2 Descriptive results by final data analysis

Table 4 and Figure 4 present the country-level composition of the final analytic sample (N=327), reporting both absolute frequencies and corresponding percentages. Spain constitutes the largest share of respondents (n=89; 27.2%), followed by Portugal (n=79; 24.2%) and Greece (n=76; 23.2%). Belgium accounts for 36 participants (11.1%), while Cyprus (n=24; 7.3%) and Italy (n=23; 7.0%) contribute smaller but comparable proportions. Overall, the distribution indicates that the analytic sample is primarily concentrated in Spain, Portugal, and Greece, which together comprise over two-thirds of all cases.

Table 4. Final analytic sample by country (frequencies and percentages)

Countries	Frequency	Percent (%)
Belgium	36	11.1
Cyprus	24	7.3
Greece	76	23.2
Italy	23	7
Portugal	79	24.2
Spain	89	27.2
Total	**327**	**100**

Figure 4. Final analytic sample distribution across countries (frequencies and percentages)

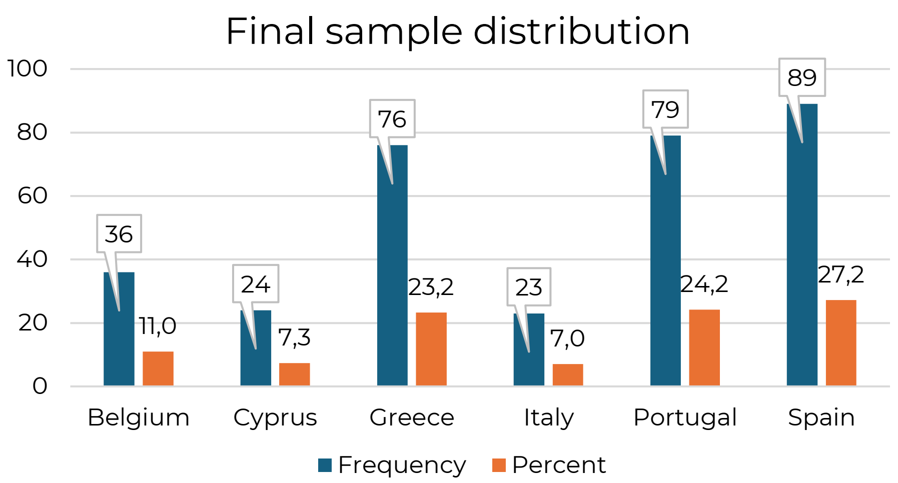

Table 5 presents the distribution of respondents in the final analytic sample (N=327) across two age ranges (16–17 and 18–26 years) by country. Overall, participants aged 18–26 constitute the larger share of the sample (n=202) compared with those aged 16–17 (n=125). Marked cross-country differences are evident: Spain contributes predominantly 16–17-year-olds (n=86), whereas Greece includes only respondents aged 18–26 (n=76). Portugal and Cyprus are largely represented by the 18–26 age group (n=62 and n=23, respectively), while Belgium shows a relatively balanced split between the two age ranges (n=20 vs. n=16).

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Table 5. Age-group distribution of the final analytic sample by country (frequencies)

	Countries						
Age range	**Belgium**	**Cyprus**	**Greece**	**Italy**	**Portugal**	**Spain**	**Total**
I am between 16 and 17 years old	20	1	0	1	17	86	125
I am between 18 and 26 years old	16	23	76	22	62	3	202
Total	**36**	**24**	**76**	**23**	**79**	**89**	**327**

Table 6 provides a finer-grained breakdown of respondent age (16–26 years) by country for the final analytic sample (N=327). The distribution highlights substantial variation in age composition across countries, including a strong concentration of 16- and 17-year-olds in Spain (n=37 and n=49, respectively) and a pronounced clustering of 18-year-olds in Italy (n=16). Greece's representation is concentrated in the early twenties (e.g., ages 21–25), while Belgium and Portugal display broader dispersion across ages. This table therefore contextualizes country contributions not only by volume but also by detailed age structure.

Table 6. Single-year age distribution of the final analytic sample by country (frequencies)

	Countries						
Age	**Belgium**	**Cyprus**	**Greece**	**Italy**	**Portugal**	**Spain**	**Total**
16	10	0	0	0	6	37	**53**
17	10	1	0	1	11	49	**72**
18	2	1	1	16	16	1	**37**
19	2	0	8	1	5	0	**16**
20	0	2	7	1	7	0	**17**
21	1	5	10	1	8	0	**25**
22	2	6	8	0	6	1	**23**
23	3	2	14	1	4	0	**24**
24	1	2	11	0	7	1	**22**
25	0	3	9	1	4	0	**17**
26	5	2	8	1	5	0	**21**
Total	**36**	**24**	**76**	**23**	**79**	**89**	**327**

Table 7 presents the distribution of reported game genres by country, with totals indicating multiple responses per respondent (overall responses N=723). Across countries, the most frequently selected genres are MOBA (n=153) and FPS (n=151), followed by RPG (n=88) and sports simulation games (n=87). Country-level patterns suggest genre preferences differ by context, with Spain contributing a particularly high number of MOBA selections (n=81), whereas FPS selections are especially prominent in Greece (n=45) and Portugal (n=48). The table thus captures both overall genre salience and cross-national variability in gaming preferences.

Table 7. Preferred game genres by country (multiple responses; frequencies)

	Countries						
Game genre	**Belgium**	**Cyprus**	**Greece**	**Italy**	**Portugal**	**Spain**	**Total**
RPG	21	7	21	5	17	17	**88**
FPS	23	18	45	10	48	7	**151**
Sports Simulation Games	15	8	20	5	36	3	**87**

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MOBA	4	5	43	5	15	81	**153**
MMO	7	6	8	0	10	0	**31**
Fighting Games	14	4	17	7	12	0	**54**
Strategy board games	5	7	8	5	9	2	**36**
TCG	4	0	4	0	1	1	**10**
Battle Royale	17	4	25	7	21	3	**77**
Other	11	4	3	4	12	2	**36**
Total	**121**	**63**	**194**	**48**	**181**	**116**	**723**

Table 8 displays the distribution of reported game genres by age range (16–17 vs. 18–26 years), reflecting multiple responses (total selections N=723). FPS and RPG selections are more concentrated among respondents aged 18–26 (n=121 and n=57, respectively), while MOBA is disproportionately reported by the younger group (16–17: n=83 vs. 18–26: n=70). Other genres show smaller but consistent differences between age ranges, indicating that genre engagement varies meaningfully with age, particularly for competitive multiplayer formats.

Table 8. Preferred game genres by age range (multiple responses; frequencies)

	Age range		
Game genre	**I am between 16 and 17 years old**	**I am between 18 and 26 years old**	**Total**
RPG	31	57	**88**
FPS	30	121	**151**
Sports Simulation Games	19	68	**87**
MOBA	83	70	**153**
MMO	8	23	**31**
Fighting Games	17	37	**54**
Strategy board games	11	25	**36**
TCG	3	7	**10**
Battle Royale	21	56	**77**
Other	15	21	**36**
Total	**238**	**485**	**723**

Table 9 presents the distribution of respondents' esports-related roles by age range. The table indicates that "Player" is the predominant role across both age groups (n=327), with additional roles such as coach (n=45), content creator (n=39), and staff (n=32) represented at lower frequencies. Older respondents (18–26) account for the majority of non-player roles (e.g., coaches n=37; moderators n=21), whereas the 16–17 group is more concentrated in the player role (n=125). This pattern suggests diversification of involvement with age, extending beyond playing to organizational and community functions.

Table 9. Roles in the esports environment (multiple responses allowed)

	Age range		
Role	**I am between 16 and 17 years old**	**I am between 18 and 26 years old**	**Total**
Coach	8	37	**45**
Player	125	202	**327**
Content creator	5	34	**39**

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	Age range		
Role	**I am between 16 and 17 years old**	**I am between 18 and 26 years old**	**Total**
Influencer	5	7	**12**
Staff	4	28	**32**
Caster	0	6	**6**
Moderator	1	21	**22**
Total	**148**	**335**	**483**

Table 10 presents the distribution of esports-related roles by country (total role entries N=483), showing both the dominance of the "Player" category (n=327) and cross-country differences in additional roles. Portugal and Greece show comparatively higher counts in non-player roles such as coach (n=14 and n=11) and staff (n=14 and n=11), while Spain's entries are largely concentrated in players (n=89) with minimal representation in staff and coaching roles. Overall, the table highlights how the composition of esports participation differs across national contexts, particularly with respect to supporting, managerial, and community-moderation roles.

Table 10. Roles in the esports environment by country (multiple responses allowed)

	Countries						
Role	**Belgium**	**Cyprus**	**Greece**	**Italy**	**Portugal**	**Spain**	**Total**
Coach	11	4	11	4	14	1	**45**
Player	36	24	76	23	79	89	**327**
Content creator	4	2	18	2	11	2	**39**
Influencer	2	0	2	1	5	2	**12**
Staff	2	2	11	3	14	0	**32**
Caster	1	1	2	1	1	0	**6**
Moderator	3	1	8	1	9	0	**22**
Total	**59**	**34**	**128**	**35**	**133**	**94**	**483**

Table 11 presents the distribution of player type (amateur, semi-professional, professional) across two age ranges (16–17 vs. 18–26 years) in the final analytic sample (N=327). Semi-professional participation is most prevalent overall (n=176), driven largely by respondents aged 16–17 (n=102), whereas amateur players are more concentrated in the 18–26 group (n=115 of 138). Professional status is rare (n=13) and appears exclusively among respondents aged 18–26, indicating that higher levels of competitive engagement are reported primarily by older participants.

Table 11. Player type by age range in the final analytic sample (frequencies)

	Age range		
Player type	**I am between 16 and 17 years old**	**I am between 18 and 26 years old**	**Total**
Amateur player	23	115	**138**
Semi professional	102	74	**176**
Professional	0	13	**13**
Total	**125**	**202**	**327**

Table 12 presents the distribution of player type by country (N=327). Amateur players represent the largest group in most countries (n=138 overall), particularly in Portugal (n=44) and Greece (n=38), whereas Spain is predominantly represented by semi-professional players (n=86 of 89). Professional players are infrequent across the sample (n=13), with the highest counts in Greece (n=7) and Portugal (n=5), and minimal representation elsewhere. Overall, the table highlights substantial cross-country variation in the competitive level at which respondents self-identify.

Table 12. Player type by country in the final analytic sample (frequencies)

	Countries						
Player type	**Belgium**	**Cyprus**	**Greece**	**Italy**	**Portugal**	**Spain**	**Total**
Amateur player	21	12	38	20	44	3	**138**
Semi professional	15	11	31	3	30	86	**176**
Professional	0	1	7	0	5	0	**13**
Total	**36**	**24**	**76**	**23**	**79**	**89**	**327**

Table 13 presents daily gaming time (1–5, 6–10, and 11+ hours per day) by age range for the final analytic sample (N=327). Most respondents report playing 1–5 hours per day (n=208), followed by 6–10 hours (n=109), while very intensive play (11+ hours) is uncommon (n=10). The distribution suggests broadly similar patterns across age groups, though 16–17-year-olds report 6–10 hours per day nearly as frequently as 1–5 hours (n=52 vs. n=67), whereas the 18–26 group is more clearly concentrated in the 1–5 hour category (n=141).

Table 13. Daily play-time intensity by age range (frequencies)

	Age range		
Play hours (per day)	**I am between 16 and 17 years old**	**I am between 18 and 26 years old**	**Total**
1-5 hours per day	67	141	**208**
6-10 hours per day	52	57	**109**
11+ hours per day	6	4	**10**
Total	**125**	**202**	**327**

Table 14 presents daily gaming time by country in the final analytic sample (N=327). Across countries, the modal category is 1–5 hours per day, particularly in Portugal (n=57), Greece (n=46), and Spain (n=38). Spain stands out for a comparatively high number of respondents reporting 6–10 hours per day (n=45), whereas very high daily play time (11+ hours) is rare overall (n=10) and appears only in Italy (n=1), Portugal (n=3), and Spain (n=6). These patterns suggest cross-national differences in gaming intensity, especially at higher daily engagement levels.

Table 14. Daily play-time intensity by country (frequencies)

	Countries						
Play hours (per day)	**Belgium**	**Cyprus**	**Greece**	**Italy**	**Portugal**	**Spain**	**Total**
1-5 hours per day	27	19	46	21	57	38	**208**
6-10 hours per day	9	5	30	1	19	45	**109**
11+ hours per day	0	0	0	1	3	6	**10**
Total	**36**	**24**	**76**	**23**	**79**	**89**	**327**

Table 15 presents respondents' weekly play frequency (1–2, 3–5, and 6–7 times per week) by age range in the final analytic sample (N=327). Most participants report playing frequently, with 3–5 times per week (n=150) and 6–7 times per week (n=140) accounting for the vast majority of responses, while 1–2 times per week is less common (n=37). The two age groups show comparable engagement profiles, although the 18–26 group reports slightly higher counts in both moderate (3–5) and very frequent (6–7) play categories.

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Table 15. Weekly play frequency by age range (frequencies)

	Age range		
Play frequency (per week)	**I am between 16 and 17 years old**	**I am between 18 and 26 years old**	**Total**
1-2 times per week	8	29	**37**
3-5 times per week	66	84	**150**
6-7 times per week	51	89	**140**
Total	**125**	**202**	**327**

Table 16 presents the distribution of weekly play frequency by country (N=327). In most countries, respondents cluster in the higher-frequency categories (3–5 and 6–7 times per week), indicating generally regular engagement. Spain contributes the largest number of respondents playing 3–5 times per week (n=53), while Greece shows high representation among those playing 6–7 times per week (n=41). Italy displays a comparatively higher count in the lowest frequency category (1–2 times per week; n=11) relative to its sample size, suggesting potentially lower weekly engagement among Italian respondents compared with other partner countries.

Table 16. Weekly play frequency by country (frequencies)

	Countries						
Play frequency (per week)	**Belgium**	**Cyprus**	**Greece**	**Italy**	**Portugal**	**Spain**	**Total**
1-2 times per week	8	1	2	11	14	1	**37**
3-5 times per week	14	11	33	7	32	53	**150**
6-7 times per week	14	12	41	5	33	35	**140**
Total	**36**	**24**	**76**	**23**	**79**	**89**	**327**

4.3 Descriptive statistics for toxic behaviours

A. Abusive communication

Table 17 reports descriptive statistics for the abusive communication dimension, including each item's minimum and maximum observed values, the mean (average endorsement on the 1–5 scale), and the standard deviation (variability in responses). All items span the full response range (1–5), indicating that respondents used all available categories. Mean scores are relatively elevated for the five statement items (M≈3.49–3.86), suggesting frequent agreement that abusive communication is present in their esports environments, whereas the overall frequency item is lower (M=2.92), indicating that self-reported direct experience occurs less often than perceived prevalence in the environment; standard deviations around ~1.1–1.3 suggest moderate between-participant variability.

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Table 17. Descriptive statistics for abusive communication items (Min–Max, Mean, SD)

Items	Min	Max	Mean	Std. deviation
The players that I play with harassed others with insults online.	1	5	3.49	1.287
I have witnessed threats in esports environments.	1	5	3.63	1.330
Bullying is present in esports.	1	5	3.86	1.117
The players that I play with mock the others.	1	5	3.58	1.294
Hurtful comments are posted regularly.	1	5	3.61	1.277
Overall, how often have you experienced abusive communication.	1	5	2.92	1.150

Abusive communication is widespread across environments, with bullying and threats reported at the highest levels. Notably, experienced abuse (M=2.92) is lower than witnessed abuse (M≈3.6–3.8), indicating that participants encounter toxicity more often as observers than direct targets.

B. Disruptive gameplay

Table 18 summarizes item-level descriptives for disruptive gameplay. Minimum and maximum values again cover the full 1–5 scale, showing broad dispersion of responses. Item means indicate comparatively high endorsement of trolling-related experiences, particularly witnessing other players being trolled (M=4.05), while the “overall frequency” item is lower (M=2.87), implying that disruptive actions are widely observed but less consistently experienced at high frequency by respondents. Standard deviations (≈1.0–1.4) point to moderate heterogeneity in reported exposure across the sample.

Table 18. Descriptive statistics for disruptive gameplay items (Min–Max, Mean, SD)

Items	Min	Max	Mean	Std. deviation
Players' gameplay has been maliciously sabotaged.	1	5	3.34	1.148
I have witnessed intentional team play sabotaging.	1	5	3.54	1.288
I have seen other players being trolled.	1	5	4.05	1.026
Other players have been tricked by making them angry.	1	5	3.88	1.049
Trolling actions have made me question my gametime.	1	5	3.34	1.381
Overall, how often have you experienced disruptive gameplay.	1	5	2.87	1.021

C. Unsportsmanlike behaviour

Table 19 presents descriptive statistics for unsportsmanlike behaviour, capturing observed range, central tendency (mean), and response dispersion (standard deviation). The means for items concerning hacks, third-party programmes, and bug exploitation are high (M≈3.88–3.96), suggesting substantial perceived prevalence of cheating-related practices, whereas the item regarding duplication of virtual assets is notably lower (M=2.95), indicating less common exposure to that specific behaviour. The overall frequency item (M=3.04) reflects moderate self-reported experience, and standard deviations near 1.0–1.4 indicate meaningful individual differences in perceived and experienced unsportsmanlike conduct.

Table 19. Descriptive statistics for unsportsmanlike behaviour items (Min–Max, Mean, SD)

Items	Min	Max	Mean	Std. deviation
I have seen other players using hacks.	1	5	3.96	1.165
Players have used third-party programmes to gain unlawful advantages.	1	5	3.88	1.190
There have been cheaters abusing game procedure (through in-game quitting when you are about to lose) to gain advantages.	1	5	3.68	1.207
I have seen players exploiting in-game bugs.	1	5	3.95	1.139
The players that I play with use tricks to obtain or duplicate virtual assets (virtual gear and in-game money).	1	5	2.95	1.428
Overall, how often have you experienced unsportsmanlike behaviour.	1	5	3.04	0.984

D. Discriminatory behaviour

Table 20 reports item-level descriptive statistics for discriminatory behaviour, showing that responses cover the full 1–5 range across items. Mean scores suggest that racist comments are particularly salient (M=3.91), while other discriminatory manifestations (e.g., LGBTQ+ phobic remarks, sexual remarks) fall in the mid-range (M≈3.25–3.33). The overall frequency item is lower (M=2.81), indicating that although discriminatory behaviours are perceived within esports contexts, respondents report experiencing them less frequently at the personal level. Standard deviations around ~1.1–1.3 reflect moderate variability in these experiences across participants.

Table 20. Descriptive statistics for discriminatory behaviour items (Min–Max, Mean, SD)

Items	Min	Max	Mean	Std. deviation
Encouraging the participation of teams based on gender promotes sexism.	1	5	3.14	1.213
I have seen other players making racist comments.	1	5	3.91	1.076
The players that I play with make LGBTQ+ phobic remarks.	1	5	3.33	1.344
The players I play with make sexual remarks towards someone's gender.	1	5	3.25	1.331
Stronger players often refuse to play with weaker players, creating an elitist environment.	1	5	3.59	1.188
Overall, how often have you experienced discriminatory behaviour.	1	5	2.81	1.114

E. Real-world invasive behaviours (doxing/DDoS)

Table 21 presents the descriptive statistics for the real-world invasive toxic behaviours (doxing/DDoS) items, all measured on a 1–5 scale. Mean scores ranged from 2.66 to 3.07, indicating moderate levels of perceived exposure overall. The highest mean was reported for instances of doxing in the esports environment (M = 3.07, SD = 1.186), followed closely by seeing players use personal information to harass others (M = 3.02, SD = 1.256). The lowest mean concerned players interfering with other players' internet usage (M = 2.66, SD = 1.318). The remaining items clustered around similar moderate values (e.g., use of sensitive information against others: M = 2.84, SD = 1.293; sharing personal details without consent: M = 2.82, SD = 1.324). The overall frequency item also reflected a moderate level of experience (M = 2.69, SD = 1.181), with variability across responses (SDs approximately 1.19–1.32).

Table 21. Descriptive statistics for real-world invasive toxic behaviours (doxing/DDOS) items (Min–Max, Mean, SD)

Items	Min	Max	Mean	Std. deviation
I have seen players using personal information to harass others.	1	5	3.02	1.256
The players that I play with have interfered with other players' internet usage.	1	5	2.66	1.318
Players have used sensitive information against other players.	1	5	2.84	1.293
Other players have shared personal details without consent.	1	5	2.82	1.324
There are instances of doxing in esports environment.	1	5	3.07	1.186
Overall, how often have you experienced Real-life toxic behaviours.	1	5	2.69	1.181

F. General toxic behaviour

Table 22 presents descriptives for general toxic behaviour perceptions in esports environments. All items span the full response range (1–5), and mean scores cluster around the mid-to-upper range (M≈3.20–3.47), indicating that respondents, on average, tend to agree that toxicity characterises their gaming contexts and that toxic identities and behaviours are observable. Standard deviations (~1.12–1.20) suggest moderate variation in perceived general toxicity across the sample.

Table 22. Descriptive statistics for general toxic behaviour items (Min–Max, Mean, SD)

Items	Min	Max	Mean	Std. deviation
In my esports environments, players' behaviours are toxic.	1	5	3.20	1.196
Some of the players identify themselves with toxic players.	1	5	3.38	1.123
I define other players as toxic gamers.	1	5	3.33	1.168
I see other players' game behaviours as toxic.	1	5	3.47	1.128

Gamer Identity and Need satisfaction of Relatedness

Table 23 reports item-level descriptives for gamer identity, showing full use of the 1–5 response scale. Mean scores are consistently above the scale midpoint (M≈3.61–3.94), indicating relatively strong identification with esports participation and affiliation with other esports players. Standard deviations (~1.06–1.18) reflect moderate individual differences, suggesting that identification is common but not uniform across respondents.

Table 23. Descriptive statistics for gamer identity items (Min–Max, Mean, SD)

Items	Min	Max	Mean	Std. deviation
I see myself as an esports player.	1	5	3.61	1.182
I am pleased to be an esports player.	1	5	3.94	1.063
I identify with other esports players.	1	5	3.72	1.143
I feel strong ties with other esports players.	1	5	3.69	1.180

Table 24 presents descriptive statistics for need satisfaction of relatedness within esports communities. All items range from 1 to 5, and means are high (M≈3.61–3.89), implying that respondents generally report feeling socially connected and cared for in their esports contexts. Standard deviations close to 1.0 indicate moderate dispersion, consistent with meaningful between-participant differences in perceived social connectedness.

Table 24. Descriptive statistics for relatedness need satisfaction items (Min–Max, Mean, SD)

Items	Min	Max	Mean	Std. deviation
I feel that the players I care about in my esports communities also care about me.	1	5	3.61	1.076
I feel connected with the players in my esports communities who care for me, and for whom I care.	1	5	3.89	0.987
I feel close and connected with other players in my esports communities who are important to me.	1	5	3.86	0.982
I experience a warm feeling with the players I connect with through esports.	1	5	3.83	1.024

Table 25 summarizes the descriptive statistics for the composite (scale) scores of each construct, reporting observed range, mean level, and standard deviation. Overall, toxic-behaviour domain scores are mostly above the midpoint (M≈3.34–3.58), indicating moderate-to-high perceived prevalence/experience across abusive communication, disruptive gameplay, unsportsmanlike behaviour, discriminatory behaviour, and general toxicity, while real-world invasive behaviours are lower on average (M=2.85), suggesting comparatively less frequent occurrence. Gamer identity (M=3.74) and relatedness satisfaction (M=3.80) are also relatively high, indicating that respondents simultaneously report strong esports identification and social connection, with standard deviations around ~0.86–1.01 reflecting moderate variability across constructs.

Table 25. Descriptive statistics for composite construct scores (Min–Max, Mean, SD)

Study constructs (toxicity dimensions and psychosocial correlates)	Min	Max	Mean	Std. Deviation
Abusive communication	1	5	3.5163	0.93759
Disruptive gameplay	1	5	3.5032	0.86020
Unsportsmanlike behaviour	1	5	3.5761	0.88369
Discriminatory behaviour	1	5	3.3400	0.90248
Real-world invasive behaviours (doxing/DDoS)	1	5	2.8500	1.01491
General toxic behaviour	1	5	3.3472	0.96939
Gamer Identity	1	5	3.7417	0.99169
Need satisfaction of Relatedness	1	5	3.7983	0.91288

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Figure 5 depicts the mean levels (blue bars) and standard deviations (orange bars) for abusive communication, disruptive gameplay, unsportsmanlike behaviour, discriminatory behaviour, real-world invasive behaviours (doxing/DDoS), general toxic behaviour, gamer identity, and need satisfaction of relatedness. Overall, mean scores indicate moderate-to-high levels of toxicity, with unsportsmanlike behaviour (M≈3.58), abusive communication (M≈3.52), and disruptive gameplay (M≈3.50) ranking highest. Real-world invasive behaviours show the lowest mean (M≈2.85) but the greatest variability (SD≈1.01), suggesting less frequent yet unevenly distributed experiences. Gamer identity (M≈3.74) and relatedness (M≈3.80) are comparatively high, indicating strong engagement and social connectedness in parallel with exposure to toxic dynamics.

Figure 5. Mean and standard deviation of toxicity dimensions, gamer identity, and relatedness

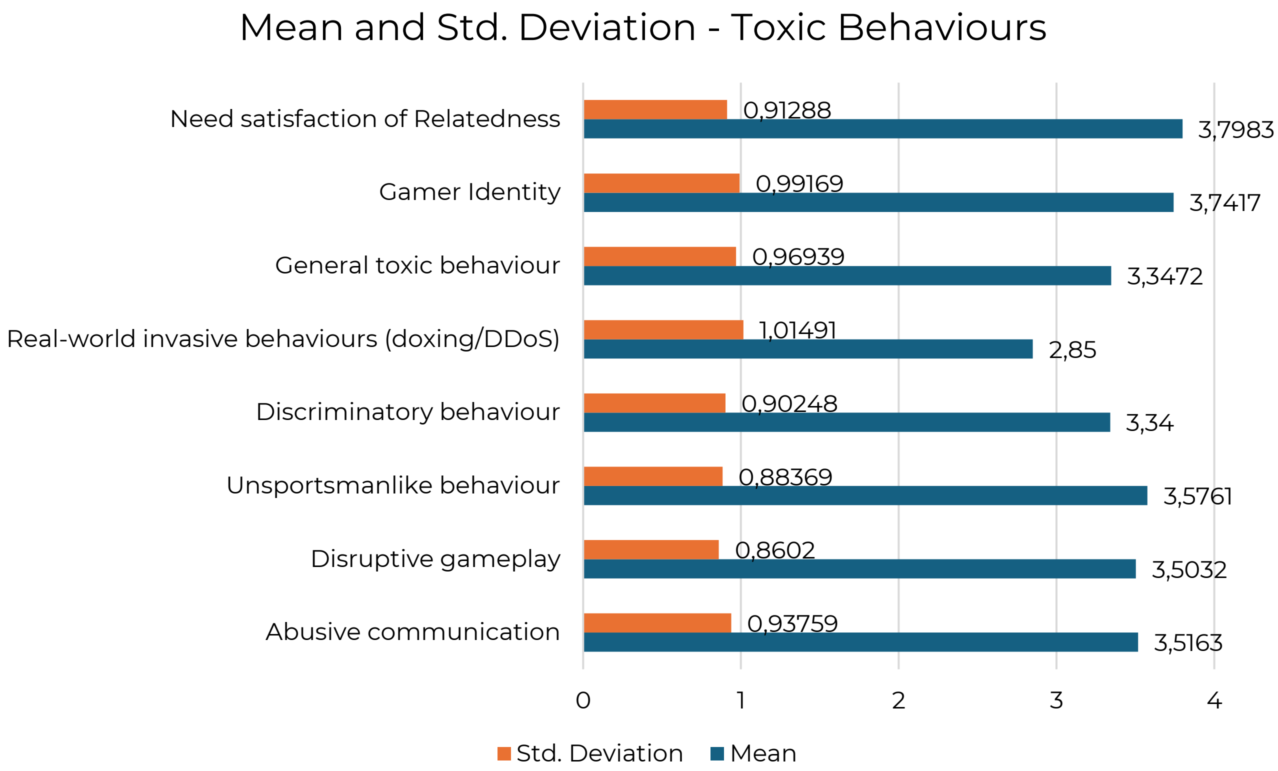

Figure 6 depicts a radar-chart profile of mean scores across the same constructs, allowing direct visual comparison of their relative magnitude. The plot shows that gamer identity and relatedness are the highest-scoring dimensions, while most toxicity domains cluster in a moderate-to-high range (approximately M≈3.3–3.6). Unsportsmanlike behaviour emerges as the most elevated toxic behaviour, closely followed by abusive communication and disruptive gameplay, whereas real-world invasive behaviours (doxing/DDoS) form the most pronounced "dip" in the profile. Overall, the figure visually reinforces that participants report strong belonging and identification with gaming communities alongside notable levels of perceived toxic conduct, particularly in competitive etiquette and communication.

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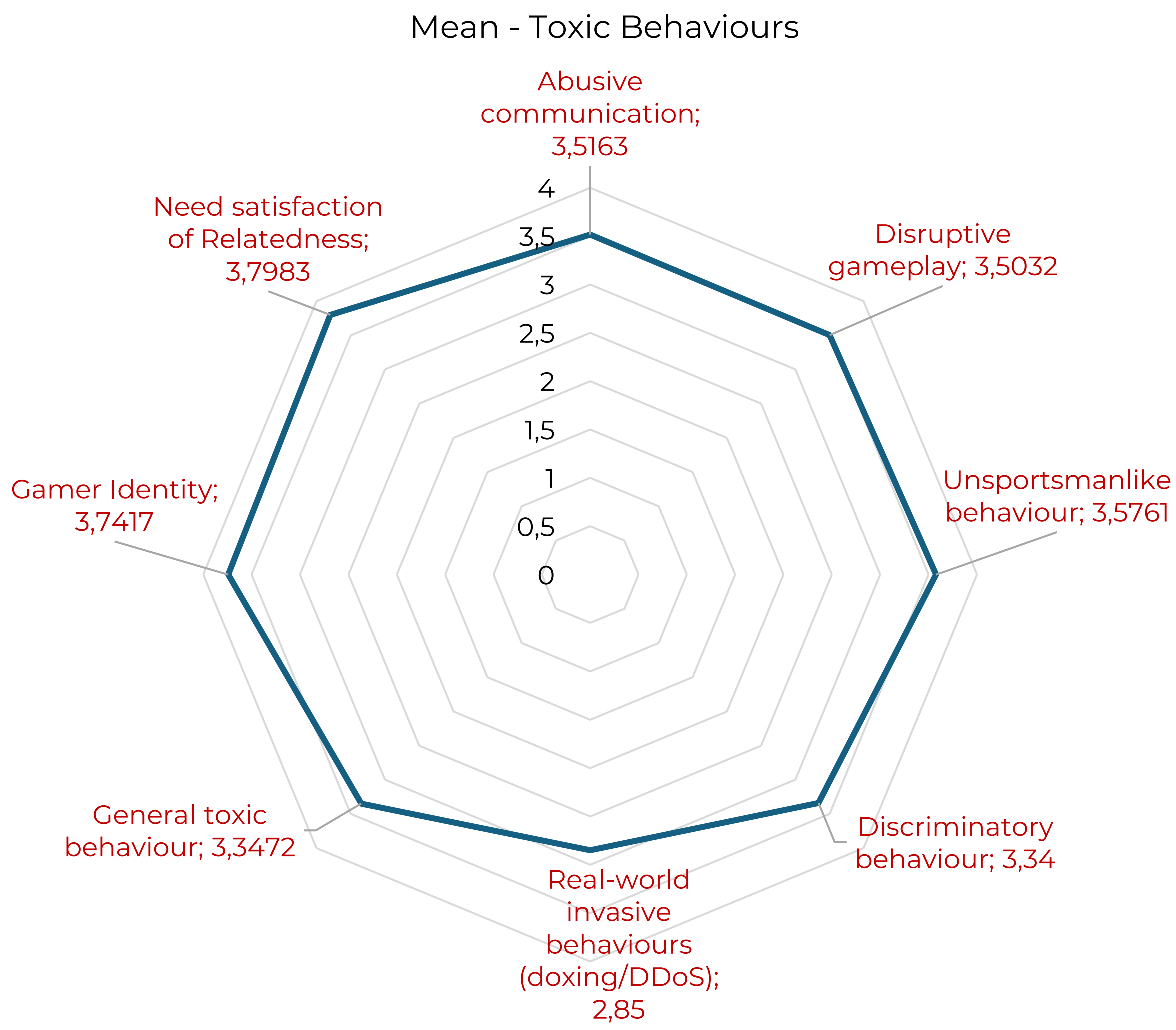
Figure 6. Radar plot of mean levels across toxicity dimensions, gamer identity, and relatedness



4.4 Statistical analysis for toxic behaviours

Table 26 reports Cronbach's alpha coefficients for each multi-item construct, providing an index of internal consistency (i.e., the extent to which items within each scale measure the same underlying concept). All constructs demonstrate good to excellent reliability (α = .836–.919), indicating that the item sets show coherent measurement properties in this sample. The highest internal consistency is observed for Need satisfaction of Relatedness (α = .919) and Real-world invasive behaviours (α = .895), supporting the use of composite (mean) scores for subsequent analyses.

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Table 26. Internal consistency reliability of study constructs (Cronbach's α)

Constructs	Cronbach's α
Abusive communication	0.847
Disruptive gameplay	0.836
Unsportsmanlike behaviour	0.836
Discriminatory behaviour	0.837
Real-world invasive behaviours (doxing/DDoS)	0.895
General toxic behaviour	0.861
Gamer Identity	0.891
Need satisfaction of Relatedness	0.919

Table 27 summarises the internal consistency of each construct across countries and shows that most scales demonstrated acceptable to excellent reliability overall. Abusive communication was consistently reliable across all partner countries (α = .796–.855), while Disruptive gameplay was generally acceptable-to-excellent (α = .717–.924) but lower in Cyprus (α = .672). Unsportsmanlike behaviour was strong in most countries (α = .746–.895) yet showed very low reliability in Cyprus (α = .403), indicating poor item coherence for that subgroup on this construct. Discriminatory behaviour was mostly acceptable-to-excellent (α = .754–.893), with Cyprus again lower (α = .615). Real-world invasive behaviours (doxing/DDoS) showed uniformly strong reliability (α = .831–.896). The broader psychosocial constructs also performed very well: General toxic behaviour (α = .779–.963), Gamer identity (α = .822–.939), and Need satisfaction of relatedness (α = .854–.956), supporting strong internal consistency of these measures across countries.

Table 27. Internal consistency reliability (Cronbach's α) by country

Constructs	Country	N	Items	Cronbach's α
	Belgium	36	6	.796
	Cyprus	24	6	.829
	Greece	76	6	.836
	Italy	23	6	.831
	Portugal	79	6	.827
Abusive communication	Spain	89	6	.855
	Belgium	36	6	.756
	Cyprus	24	6	.672
	Greece	76	6	.879
	Italy	23	6	.924
	Portugal	79	6	.813
Disruptive gameplay	Spain	89	6	.717
	Belgium	36	6	.869
	Cyprus	24	6	.403
	Greece	76	6	.850
	Italy	23	6	.895
	Portugal	79	6	.832
Unsportsmanlike behaviour	Spain	89	6	.746
	Belgium	36	6	.811
	Cyprus	24	6	.615
	Greece	76	6	.849
	Italy	23	6	.879
	Portugal	79	6	.754
Discriminatory behaviour	Spain	89	6	.893

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	Belgium	35	6	.875
	Cyprus	23	6	.831
	Greece	70	6	.856
	Italy	19	6	.896
	Portugal	67	6	.848
Real-world invasive behaviours (doxing/DDoS)	Spain	89	6	.893
	Belgium	36	4	.791
	Cyprus	24	4	.904
	Greece	76	4	.897
	Italy	23	4	.963
	Portugal	79	4	.779
General toxic behaviour	Spain	89	4	.817
	Belgium	36	4	.891
	Cyprus	24	4	.896
	Greece	76	4	.833
	Italy	23	4	.939
	Portugal	79	4	.867
Gamer Identity	Spain	89	4	.822
	Belgium	36	4	.927
	Cyprus	24	4	.956
	Greece	76	4	.895
	Italy	23	4	.953
	Portugal	79	4	.902
Need satisfaction of Relatedness	Spain	89	4	.854

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Table 28 presents Pearson correlations among the toxic-behaviour dimensions, general toxicity, gamer identity, and relatedness, indicating the direction and strength of linear associations between constructs. Toxic-behaviour domains are moderately to strongly intercorrelated (approximately $r = .45–.65$, $p < .001$), suggesting related but non-identical facets of toxicity. Gamer identity shows small-to-moderate positive correlations with toxicity domains ($r \approx .24–.31$, $p < .001$), while relatedness exhibits small positive associations with toxicity ($r \approx .12–.23$), and is strongly correlated with gamer identity ($r = .643$, $p < .001$), indicating that identity and social connectedness co-occur robustly in this sample.

Table 28. Pearson correlation matrix among toxic-behaviour dimensions, gamer identity, and relatedness (N = 327)

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Pearson Correlation	1	.645**	.499**	.644**	.567**	.594**	.288**	.228**
	Sig. (2-tailed)		<.001	<.001	<.001	<.001	<.001	<.001	<.001
(1) Abusive communication	**N**	327	327	327	327	327	327	327	327
	Pearson Correlation	.645**	1	.638**	.598**	.570**	.557**	.279**	.152**
	Sig. (2-tailed)	<.001		<.001	<.001	<.001	<.001	<.001	.006
(2) Disruptive gameplay	**N**	327	327	327	327	327	327	327	327
	Pearson Correlation	.499**	.638**	1	.510**	.517**	.445**	.244**	.119*
	Sig. (2-tailed)	<.001	<.001		<.001	<.001	<.001	<.001	.032
(3) Unsportsmanlike behaviour	**N**	327	327	327	327	327	327	327	327
	Pearson Correlation	.644**	.598**	.510**	1	.629**	.649**	.284**	.204**
	Sig. (2-tailed)	<.001	<.001	<.001		<.001	<.001	<.001	<.001
(4) Discriminatory behaviour	**N**	327	327	327	327	327	327	327	327
	Pearson Correlation	.567**	.570**	.517**	.629**	1	.601**	.281**	.185**
	Sig. (2-tailed)	<.001	<.001	<.001	<.001		<.001	<.001	<.001
(5) Real-world invasive behaviours (doxing/DDoS)	**N**	327	327	327	327	327	327	327	327
	Pearson Correlation	.594**	.557**	.445**	.649**	.601**	1	.314**	.167**
	Sig. (2-tailed)	<.001	<.001	<.001	<.001	<.001		<.001	.002
(6) General toxic behaviour	**N**	327	327	327	327	327	327	327	327
	Pearson Correlation	.288**	.279**	.244**	.284**	.281**	.314**	1	.643**
	Sig. (2-tailed)	<.001	<.001	<.001	<.001	<.001	<.001		<.001
(7) Gamer Identity	**N**	327	327	327	327	327	327	327	327
	Pearson Correlation	.228**	.152**	.119*	.204**	.185**	.167**	.643**	1
	Sig. (2-tailed)	<.001	.006	.032	<.001	<.001	.002	<.001	
(8) Need satisfaction of Relatedness	**N**	327	327	327	327	327	327	327	327

****. Correlation is significant at the 0.01 level (2-tailed).**

***. Correlation is significant at the 0.05 level (2-tailed).**

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Table 29 reports, for each country and construct, the sample size, mean, standard deviation, standard error, 95% confidence interval for the mean, and observed range (min–max), thereby summarizing both central tendency and uncertainty in country estimates. Across most toxic-behaviour domains and general toxicity, Spain shows comparatively higher mean levels, whereas Italy tends to show lower mean levels; similar country patterning is also visible for gamer identity and relatedness, with Italy displaying notably lower averages. The confidence intervals provide an indication of precision, showing where country estimates are more stable (narrower intervals) versus more uncertain (wider intervals).

Table 29. Country-specific descriptives for construct scores (means, dispersion, and 95% CIs)

						95% Confidence Interval for Mean			
		N	**Mean**	**Std. Deviation**	**Std. Error**	**Lower Bound**	**Upper Bound**	**Min**	**Max**
	Belgium	36	3.4352	.90174	.15029	3.1301	3.7403	1.67	5.00
	Cyprus	24	3.2917	.89314	.18231	2.9145	3.6688	1.33	4.50
	Greece	76	3.4167	.88297	.10128	3.2149	3.6184	1.00	4.83
	Italy	23	2.7464	.92232	.19232	2.3475	3.1452	1.00	4.83
	Portugal	79	3.4684	.96339	.10839	3.2526	3.6841	1.17	5.00
	Spain	89	3.9363	.81514	.08641	3.7646	4.1080	1.33	5.00
Abusive communication	**Total**	327	3.5163	.93759	.05185	3.4143	3.6183	1.00	5.00
	Belgium	36	3.3566	.79699	.13283	3.0869	3.6262	1.50	5.00
	Cyprus	24	3.4654	.66118	.13496	3.1862	3.7446	2.00	4.83
	Greece	76	3.4475	.89824	.10304	3.2422	3.6528	1.00	4.83
	Italy	23	2.5874	1.04952	.21884	2.1335	3.0412	1.00	4.67
	Portugal	79	3.4223	.85772	.09650	3.2301	3.6144	1.17	5.00
	Spain	89	3.9288	.58219	.06171	3.8062	4.0515	1.67	5.00
Disruptive gameplay	**Total**	327	3.5032	.86020	.04757	3.4096	3.5968	1.00	5.00
	Belgium	36	3.4651	1.06108	.17685	3.1061	3.8241	1.17	5.00
	Cyprus	24	3.4893	.52946	.10807	3.2657	3.7129	2.67	4.50
	Greece	76	3.2869	.92328	.10591	3.0759	3.4979	1.00	4.83
	Italy	23	3.0495	1.01923	.21252	2.6087	3.4902	1.00	4.67
	Portugal	79	3.6533	.89113	.10026	3.4537	3.8529	1.17	5.00
Unsportsmanlike behaviour	**Spain**	89	3.9588	.61355	.06504	3.8296	4.0880	2.17	5.00

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		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	Upper Bound	Min	Max
	Total	327	3.5761	.88369	.04887	3.4799	3.6722	1.00	5.00
Discriminatory behaviour	**Belgium**	36	3.3560	.89516	.14919	3.0531	3.6588	1.00	4.69
	Cyprus	24	3.3207	.74247	.15156	3.0072	3.6342	1.67	4.33
	Greece	76	3.2307	.88740	.10179	3.0279	3.4335	1.00	4.83
	Italy	23	2.7403	.93932	.19586	2.3341	3.1465	1.00	4.00
	Portugal	79	3.1827	.81226	.09139	3.0007	3.3646	1.00	5.00
	Spain	89	3.7266	.89444	.09481	3.5382	3.9150	1.00	5.00
	Total	327	3.3400	.90248	.04991	3.2418	3.4381	1.00	5.00
Real-world invasive behaviours (doxing/DDoS)	**Belgium**	36	2.6356	1.11426	.18571	2.2585	3.0126	1.00	5.00
	Cyprus	24	2.3978	.83055	.16954	2.0471	2.7485	1.00	3.83
	Greece	76	2.5958	.82867	.09505	2.4064	2.7851	1.00	4.83
	Italy	23	2.0298	.78314	.16330	1.6912	2.3685	1.00	3.00
	Portugal	79	2.7581	.90225	.10151	2.5560	2.9602	1.00	5.00
	Spain	89	3.5693	.91901	.09741	3.3757	3.7629	1.50	5.00
	Total	327	2.8500	1.01491	.05612	2.7396	2.9604	1.00	5.00
General toxic behaviour	**Belgium**	36	3.0999	.92696	.15449	2.7863	3.4136	1.00	5.00
	Cyprus	24	3.0040	.99581	.20327	2.5836	3.4245	1.00	4.75
	Greece	76	3.4115	1.00145	.11487	3.1827	3.6404	1.00	5.00
	Italy	23	2.6256	1.13083	.23579	2.1366	3.1146	1.00	4.50
	Portugal	79	3.2964	.84689	.09528	3.1067	3.4861	1.00	5.00
	Spain	89	3.7163	.85629	.09077	3.5359	3.8967	1.00	5.00
	Total	327	3.3472	.96939	.05361	3.2417	3.4526	1.00	5.00
Gamer Identity	**Belgium**	36	3.4789	1.13285	.18881	3.0956	3.8622	1.00	5.00
	Cyprus	24	3.5934	.99398	.20290	3.1737	4.0131	2.00	5.00
	Greece	76	4.0352	.75061	.08610	3.8637	4.2067	1.75	5.00
	Italy	23	2.5094	1.15998	.24187	2.0078	3.0110	1.00	4.75
	Portugal	79	3.5905	1.02917	.11579	3.3600	3.8210	1.00	5.00
	Spain	89	4.0899	.68595	.07271	3.9454	4.2344	1.75	5.00
	Total	327	3.7417	.99169	.05484	3.6338	3.8496	1.00	5.00
Need satisfaction of Relatedness	**Belgium**	36	3.8069	.95260	.15877	3.4846	4.1292	2.00	5.00

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	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	Upper Bound	Min	Max
Cyprus	24	3.5541	.93002	.18984	3.1614	3.9468	2.00	5.00
Greece	76	3.9959	.75268	.08634	3.8239	4.1679	1.00	5.00
Italy	23	2.7149	1.18212	.24649	2.2037	3.2261	1.00	5.00
Portugal	79	3.6782	.94009	.10577	3.4677	3.8888	1.00	5.00
Spain	89	4.0787	.65993	.06995	3.9396	4.2177	1.00	5.00
Total	327	3.7983	.91288	.05048	3.6990	3.8976	1.00	5.00

Table 30 presents Levene's tests assessing whether score variances are equal across the six countries—an assumption underlying standard one-way ANOVA. Non-significant results (e.g., abusive communication, discriminatory behaviour, real-world invasive behaviours, and general toxic behaviour) suggest that variance homogeneity is tenable for those constructs. In contrast, significant Levene tests for disruptive gameplay, unsportsmanlike behaviour, gamer identity, and relatedness indicate unequal variances across countries, supporting the use of variance-robust omnibus tests (e.g., Welch's ANOVA) and robust post-hoc procedures.

Table 30. Homogeneity of variance tests across countries (Levene's test)

		Levene Statistic	df1	df2	Sig.
	Based on Mean	.700	5	321	.624
	Based on Median	.812	5	321	.541
	Based on Median and with adjusted df	.812	5	318.459	.541
Abusive communication	**Based on trimmed mean**	.849	5	321	.516
	Based on Mean	4.196	5	321	.001
	Based on Median	3.871	5	321	.002
	Based on Median and with adjusted df	3.871	5	296.053	.002
Disruptive gameplay	**Based on trimmed mean**	4.098	5	321	.001
	Based on Mean	3.896	5	321	.002
	Based on Median	3.044	5	321	.011
	Based on Median and with adjusted df	3.044	5	274.830	.011
Unsportsmanlike behaviour	**Based on trimmed mean**	3.641	5	321	.003
Discriminatory behaviour	**Based on Mean**	.436	5	321	.824

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		Levene Statistic	df1	df2	Sig.
	Based on Median	.403	5	321	.847
	Based on Median and with adjusted df	.403	5	317.775	.847
	Based on trimmed mean	.401	5	321	.848
Real-world invasive behaviours (doxing/DDoS)	**Based on Mean**	.780	5	321	.564
	Based on Median	.745	5	321	.590
	Based on Median and with adjusted df	.745	5	299.321	.590
	Based on trimmed mean	.755	5	321	.583
General toxic behaviour	**Based on Mean**	1.802	5	321	.112
	Based on Median	1.602	5	321	.159
	Based on Median and with adjusted df	1.602	5	317.143	.159
	Based on trimmed mean	1.820	5	321	.108
Gamer Identity	**Based on Mean**	6.035	5	321	<.001
	Based on Median	5.287	5	321	<.001
	Based on Median and with adjusted df	5.287	5	282.721	<.001
	Based on trimmed mean	5.893	5	321	<.001
Need satisfaction of Relatedness	**Based on Mean**	5.661	5	321	<.001
	Based on Median	4.571	5	321	<.001
	Based on Median and with adjusted df	4.571	5	288.320	<.001
	Based on trimmed mean	5.382	5	321	<.001

Table 31 reports one-way ANOVA results testing whether mean construct scores differ significantly across countries. For all constructs, the between-country effect is statistically significant (all $p < .001$), indicating that average levels of the measured toxic-behaviour dimensions, gamer identity, and relatedness vary by national context within the partner-country sample. These omnibus tests establish that at least one country mean differs from the others for each construct, warranting follow-up effect size reporting and pairwise comparisons to identify where differences lie.

Table 31. One-way ANOVA of country differences in construct scores

		Sum of Squares	df	Mean Square	F	Sig.
Abusive communication	**Between Groups**	31.720	5	6.344	7.990	<.001

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		Sum of Squares	df	Mean Square	F	Sig.
	Within Groups	254.860	321	.794		
	Total	286.580	326			
Disruptive gameplay	**Between Groups**	36.976	5	7.395	11.623	<.001
	Within Groups	204.243	321	.636		
	Total	241.219	326			
Unsportsmanlike behaviour	**Between Groups**	26.866	5	5.373	7.575	<.001
	Within Groups	227.708	321	.709		
	Total	254.574	326			
Discriminatory behaviour	**Between Groups**	24.455	5	4.891	6.513	<.001
	Within Groups	241.061	321	.751		
	Total	265.517	326			
Real-world invasive behaviours (doxing/DDoS)	**Between Groups**	73.660	5	14.732	18.040	<.001
	Within Groups	262.134	321	.817		
	Total	335.794	326			
General toxic behaviour	**Between Groups**	29.647	5	5.929	6.879	<.001
	Within Groups	276.699	321	.862		
	Total	306.345	326			
Gamer Identity	**Between Groups**	57.082	5	11.416	13.906	<.001
	Within Groups	263.522	321	.821		
	Total	320.604	326			
Need satisfaction of Relatedness	**Between Groups**	39.529	5	7.906	10.932	<.001
	Within Groups	232.145	321	.723		
	Total	271.674	326			

Table 32 quantifies the magnitude of country effects using multiple effect-size indices derived from the ANOVA framework, accompanied by confidence intervals. The estimates indicate small-to-moderate country effects across constructs, with relatively larger effects for real-world invasive behaviours (η^2 = .219) and gamer identity (η^2 = .178), and smaller—but still meaningful—effects for discriminatory behaviour (η^2 = .092) and general toxic behaviour (η^2 = .097). Reporting these effect sizes clarifies practical significance beyond p-values, indicating how much variance in each construct is attributable to country membership.

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Table 32. Effect sizes for country differences (η², ε², and ω² with 95% CIs)

			95% Confidence Interval	
		Point Estimate	**Lower**	**Upper**
	Eta-squared	.111	.044	.166
	Epsilon-squared	.097	.029	.153
	Omega-squared Fixed-effect	.097	.029	.152
Abusive communication	**Omega-squared Random-effect**	.021	.006	.035
	Eta-squared	.153	.078	.214
	Epsilon-squared	.140	.063	.202
	Omega-squared Fixed-effect	.140	.063	.201
Disruptive gameplay	**Omega-squared Random-effect**	.031	.013	.048
	Eta-squared	.106	.040	.160
	Epsilon-squared	.092	.025	.147
	Omega-squared Fixed-effect	.091	.025	.146
Unsportsmanlike behaviour	**Omega-squared Random-effect**	.020	.005	.033
	Eta-squared	.092	.031	.144
	Epsilon-squared	.078	.016	.130
	Omega-squared Fixed-effect	.078	.016	.130
Discriminatory behaviour	**Omega-squared Random-effect**	.017	.003	.029
	Eta-squared	.219	.135	.284
	Epsilon-squared	.207	.122	.273
	Omega-squared Fixed-effect	.207	.121	.272
Real-world invasive behaviours (doxing/DDoS)	**Omega-squared Random-effect**	.050	.027	.070
	Eta-squared	.097	.034	.149
	Epsilon-squared	.083	.019	.136
	Omega-squared Fixed-effect	.082	.019	.136
General toxic behaviour	**Omega-squared Random-effect**	.018	.004	.030
	Eta-squared	.178	.099	.241
	Epsilon-squared	.165	.085	.229
	Omega-squared Fixed-effect	.165	.084	.228
Gamer Identity	**Omega-squared Random-effect**	.038	.018	.056
Need satisfaction of Relatedness	**Eta-squared**	.146	.071	.205

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	Point Estimate	95% Confidence Interval Lower	Upper
Epsilon-squared	.132	.057	.193
Omega-squared Fixed-effect	.132	.057	.192
Omega-squared Random-effect	.029	.012	.045
Note: Eta-squared and Epsilon-squared are estimated based on the fixed-effect model.			

Table 33 presents Welch's tests of equality of means, a robust alternative to standard ANOVA that remains appropriate when variances are unequal across groups. The Welch statistics are significant for every construct (all $p < .001$), confirming that country-level differences persist even under variance heterogeneity. These results provide stronger evidence for cross-country variation by reducing the risk of inflated Type I error that can occur when ANOVA assumptions are violated.

Table 33. Robust omnibus tests of country mean differences (Welch's ANOVA)

	Statistic [a]	df1	df2	Sig.
Abusive communication	8.237	5	96.210	<.001
Disruptive gameplay	11.585	5	94.687	<.001
Unsportsmanlike behaviour	8.851	5	96.671	<.001
Discriminatory behaviour	5.866	5	97.245	<.001
Real-world invasive behaviours (doxing/DDoS)	18.629	5	97.387	<.001
General toxic behaviour	6.131	5	94.758	<.001
Gamer Identity	10.970	5	92.316	<.001
Need satisfaction of Relatedness	7.564	5	92.684	<.001
a. Asymptotically F distributed.				

Table 34 reports Games–Howell post-hoc comparisons, identifying which specific country pairs differ while accounting for unequal variances and unequal sample sizes. The pattern of significant contrasts indicates that Spain frequently shows higher mean scores than several other countries across multiple toxicity domains (notably disruptive gameplay and real-world invasive behaviours), whereas Italy repeatedly appears lower than other countries on several constructs (including multiple toxicity domains as well as gamer identity and relatedness).

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These pairwise results translate the omnibus country effects into concrete comparative differences, specifying where national "peculiarities" are most pronounced.

Table 34. Pairwise country comparisons using Games–Howell post-hoc tests

Dependent Variable	(I) Country	(J) Country	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
		Cyprus	.14352	.23627	.990	-.5567	.8437
		Greece	.01852	.18123	1.000	-.5131	.5501
		Italy	.68881	.24408	.072	-.0367	1.4143
		Portugal	-.03317	.18530	1.000	-.5757	.5093
	Belgium	**Spain**	-.50114	.17336	.057	-1.0116	.0094
		Belgium	-.14352	.23627	.990	-.8437	.5567
		Greece	-.12500	.20856	.990	-.7504	.5004
		Italy	.54529	.26500	.328	-.2435	1.3341
		Portugal	-.17669	.21210	.960	-.8108	.4575
	Cyprus	**Spain**	-.64466*	.20175	.033	-1.2536	-.0358
		Belgium	-.01852	.18123	1.000	-.5501	.5131
		Cyprus	.12500	.20856	.990	-.5004	.7504
		Italy	.67029*	.21736	.042	.0154	1.3251
		Portugal	-.05169	.14835	.999	-.4799	.3765
	Greece	**Spain**	-.51966*	.13313	.002	-.9039	-.1355
		Belgium	-.68881	.24408	.072	-1.4143	.0367
		Cyprus	-.54529	.26500	.328	-1.3341	.2435
		Greece	-.67029*	.21736	.042	-1.3251	-.0154
		Portugal	-.72198*	.22076	.026	-1.3850	-.0589
	Italy	**Spain**	-1.18995*	.21084	<.001	-1.8293	-.5506
		Belgium	.03317	.18530	1.000	-.5093	.5757
		Cyprus	.17669	.21210	.960	-.4575	.8108
		Greece	.05169	.14835	.999	-.3765	.4799
Abusive communication	**Portugal**	**Italy**	.72198*	.22076	.026	.0589	1.3850

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Dependent Variable	(I) Country	(J) Country	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
		Spain	-.46798*	.13862	.012	-.8680	-.0679
		Belgium	.50114	.17336	.057	-.0094	1.0116
		Cyprus	.64466*	.20175	.033	.0358	1.2536
		Greece	.51966*	.13313	.002	.1355	.9039
		Italy	1.18995*	.21084	<.001	.5506	1.8293
	Spain	**Portugal**	.46798*	.13862	.012	.0679	.8680
		Cyprus	-.10884	.18936	.992	-.6679	.4502
		Greece	-.09092	.16811	.994	-.5823	.4004
		Italy	.76919*	.25600	.049	.0012	1.5372
		Portugal	-.06570	.16418	.999	-.5463	.4149
	Belgium	**Spain**	-.57227*	.14647	.004	-1.0060	-.1385
		Belgium	.10884	.18936	.992	-.4502	.6679
		Greece	.01792	.16980	1.000	-.4844	.5202
		Italy	.87804*	.25711	.018	.1054	1.6506
		Portugal	.04315	.16591	1.000	-.4490	.5352
	Cyprus	**Spain**	-.46343*	.14840	.039	-.9119	-.0149
		Belgium	.09092	.16811	.994	-.4004	.5823
		Cyprus	-.01792	.16980	1.000	-.5202	.4844
		Italy	.86012*	.24188	.014	.1279	1.5923
		Portugal	.02523	.14117	1.000	-.3822	.4327
	Greece	**Spain**	-.48134*	.12010	.001	-.8290	-.1337
		Belgium	-.76919*	.25600	.049	-1.5372	-.0012
		Cyprus	-.87804*	.25711	.018	-1.6506	-.1054
		Greece	-.86012*	.24188	.014	-1.5923	-.1279
		Portugal	-.83489*	.23917	.017	-1.5607	-.1090
	Italy	**Spain**	-1.34146*	.22737	<.001	-2.0409	-.6420
		Belgium	.06570	.16418	.999	-.4149	.5463
		Cyprus	-.04315	.16591	1.000	-.5352	.4490
		Greece	-.02523	.14117	1.000	-.4327	.3822
Disruptive gameplay	**Portugal**	**Italy**	.83489*	.23917	.017	.1090	1.5607

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Dependent Variable	(I) Country	(J) Country	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
		Spain	-.50657*	.11455	<.001	-.8377	-.1754
	Spain	Belgium	.57227*	.14647	.004	.1385	1.0060
		Cyprus	.46343*	.14840	.039	.0149	.9119
		Greece	.48134*	.12010	.001	.1337	.8290
		Italy	1.34146*	.22737	<.001	.6420	2.0409
		Portugal	.50657*	.11455	<.001	.1754	.8377
	Belgium	Cyprus	-.02420	.20726	1.000	-.6363	.5879
		Greece	.17818	.20613	.953	-.4283	.7847
		Italy	.41562	.27648	.664	-.4047	1.2359
		Portugal	-.18820	.20329	.938	-.7872	.4108
		Spain	-.49373	.18843	.113	-1.0546	.0671
	Cyprus	Belgium	.02420	.20726	1.000	-.5879	.6363
		Greece	.20238	.15132	.763	-.2412	.6460
		Italy	.43982	.23843	.453	-.2814	1.1610
		Portugal	-.16399	.14742	.875	-.5968	.2688
		Spain	-.46952*	.12613	.007	-.8464	-.0927
	Greece	Belgium	-.17818	.20613	.953	-.7847	.4283
		Cyprus	-.20238	.15132	.763	-.6460	.2412
		Italy	.23744	.23745	.915	-.4796	.9545
		Portugal	-.36637	.14584	.127	-.7873	.0546
		Spain	-.67190*	.12428	<.001	-1.0315	-.3123
	Italy	Belgium	-.41562	.27648	.664	-1.2359	.4047
		Cyprus	-.43982	.23843	.453	-1.1610	.2814
		Greece	-.23744	.23745	.915	-.9545	.4796
		Portugal	-.60381	.23499	.134	-1.3150	.1074
		Spain	-.90934*	.22225	.004	-1.5917	-.2270
Unsportsmanlike behaviour	Portugal	Belgium	.18820	.20329	.938	-.4108	.7872
		Cyprus	.16399	.14742	.875	-.2688	.5968
		Greece	.36637	.14584	.127	-.0546	.7873
		Italy	.60381	.23499	.134	-.1074	1.3150

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Dependent Variable	(I) Country	(J) Country	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
		Spain	-.30553	.11951	.115	-.6510	.0399
		Belgium	.49373	.18843	.113	-.0671	1.0546
		Cyprus	.46952*	.12613	.007	.0927	.8464
		Greece	.67190*	.12428	<.001	.3123	1.0315
		Italy	.90934*	.22225	.004	.2270	1.5917
	Spain	Portugal	.30553	.11951	.115	-.0399	.6510
		Cyprus	.03526	.21267	1.000	-.5926	.6631
		Greece	.12526	.18061	.982	-.4043	.6549
		Italy	.61568	.24621	.145	-.1168	1.3482
		Portugal	.17331	.17496	.919	-.3411	.6877
	Belgium	Spain	-.37063	.17677	.302	-.8898	.1485
		Belgium	-.03526	.21267	1.000	-.6631	.5926
		Greece	.09000	.18257	.996	-.4530	.6330
		Italy	.58042	.24765	.200	-.1590	1.3198
		Portugal	.13805	.17698	.969	-.3908	.6669
	Cyprus	Spain	-.40589	.17877	.228	-.9391	.1273
		Belgium	-.12526	.18061	.982	-.6549	.4043
		Cyprus	-.09000	.18257	.996	-.6330	.4530
		Italy	.49042	.22073	.254	-.1750	1.1558
		Portugal	.04804	.13680	.999	-.3469	.4429
	Greece	Spain	-.49589*	.13911	.006	-.8972	-.0946
		Belgium	-.61568	.24621	.145	-1.3482	.1168
		Cyprus	-.58042	.24765	.200	-1.3198	.1590
		Greece	-.49042	.22073	.254	-1.1558	.1750
		Portugal	-.44237	.21613	.340	-1.0968	.2121
	Italy	Spain	-.98631*	.21760	<.001	-1.6442	-.3285
		Belgium	-.17331	.17496	.919	-.6877	.3411
		Cyprus	-.13805	.17698	.969	-.6669	.3908
		Greece	-.04804	.13680	.999	-.4429	.3469
Discriminatory behaviour	Portugal	Italy	.44237	.21613	.340	-.2121	1.0968

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Dependent Variable	(I) Country	(J) Country	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
		Spain	-.54394*	.13168	<.001	-.9236	-.1643
	Spain	Belgium	.37063	.17677	.302	-.1485	.8898
		Cyprus	.40589	.17877	.228	-.1273	.9391
		Greece	.49589*	.13911	.006	.0946	.8972
		Italy	.98631*	.21760	<.001	.3285	1.6442
		Portugal	.54394*	.13168	<.001	.1643	.9236
	Belgium	Cyprus	.23778	.25146	.933	-.5036	.9792
		Greece	.03977	.20862	1.000	-.5766	.6561
		Italy	.60572	.24729	.157	-.1238	1.3352
		Portugal	-.12257	.21164	.992	-.7468	.5016
		Spain	-.93374*	.20971	<.001	-1.5528	-.3147
	Cyprus	Belgium	-.23778	.25146	.933	-.9792	.5036
		Greece	-.19801	.19436	.909	-.7807	.3846
		Italy	.36794	.23539	.626	-.3326	1.0685
		Portugal	-.36035	.19760	.463	-.9510	.2303
		Spain	-1.17152*	.19553	<.001	-1.7569	-.5861
	Greece	Belgium	-.03977	.20862	1.000	-.6561	.5766
		Cyprus	.19801	.19436	.909	-.3846	.7807
		Italy	.56595	.18895	.050	-.0008	1.1327
		Portugal	-.16234	.13907	.852	-.5637	.2390
		Spain	-.97351*	.13611	<.001	-1.3660	-.5810
	Italy	Belgium	-.60572	.24729	.157	-1.3352	.1238
		Cyprus	-.36794	.23539	.626	-1.0685	.3326
		Greece	-.56595	.18895	.050	-1.1327	.0008
		Portugal	-.72829*	.19228	.006	-1.3032	-.1534
		Spain	-1.53946*	.19015	<.001	-2.1090	-.9699
Real-world invasive behaviours (doxing/DDoS)	Portugal	Belgium	.12257	.21164	.992	-.5016	.7468
		Cyprus	.36035	.19760	.463	-.2303	.9510
		Greece	.16234	.13907	.852	-.2390	.5637
		Italy	.72829*	.19228	.006	.1534	1.3032

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Dependent Variable	(I) Country	(J) Country	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
		Spain	-.81116*	.14069	<.001	-1.2169	-.4055
	Spain	Belgium	.93374*	.20971	<.001	.3147	1.5528
		Cyprus	1.17152*	.19553	<.001	.5861	1.7569
		Greece	.97351*	.13611	<.001	.5810	1.3660
		Italy	1.53946*	.19015	<.001	.9699	2.1090
		Portugal	.81116*	.14069	<.001	.4055	1.2169
General toxic behaviour	Belgium	Cyprus	.09587	.25532	.999	-.6626	.8543
		Greece	-.31162	.19252	.589	-.8749	.2517
		Italy	.47433	.28190	.551	-.3689	1.3175
		Portugal	-.19648	.18151	.887	-.7301	.3371
		Spain	-.61637*	.17918	.013	-1.1437	-.0890
	Cyprus	Belgium	-.09587	.25532	.999	-.8543	.6626
		Greece	-.40750	.23348	.512	-1.1072	.2922
		Italy	.37845	.31132	.827	-.5492	1.3061
		Portugal	-.29236	.22449	.782	-.9702	.3855
		Spain	-.71224*	.22261	.033	-1.3856	-.0389
	Greece	Belgium	.31162	.19252	.589	-.2517	.8749
		Cyprus	.40750	.23348	.512	-.2922	1.1072
		Italy	.78595	.26229	.053	-.0069	1.5788
		Portugal	.11514	.14925	.972	-.3158	.5461
		Spain	-.30475	.14641	.303	-.7275	.1180
	Italy	Belgium	-.47433	.28190	.551	-1.3175	.3689
		Cyprus	-.37845	.31132	.827	-1.3061	.5492
		Greece	-.78595	.26229	.053	-1.5788	.0069
		Portugal	-.67081	.25432	.120	-1.4451	.1035
		Spain	-1.09070*	.25266	.002	-1.8612	-.3202
	Portugal	Belgium	.19648	.18151	.887	-.3371	.7301
		Cyprus	.29236	.22449	.782	-.3855	.9702
		Greece	-.11514	.14925	.972	-.5461	.3158
		Italy	.67081	.25432	.120	-.1035	1.4451

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Dependent Variable	(I) Country	(J) Country	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
		Spain	-.41989*	.13159	.021	-.7994	-.0404
	Spain	Belgium	.61637*	.17918	.013	.0890	1.1437
		Cyprus	.71224*	.22261	.033	.0389	1.3856
		Greece	.30475	.14641	.303	-.1180	.7275
		Italy	1.09070*	.25266	.002	.3202	1.8612
		Portugal	.41989*	.13159	.021	.0404	.7994
	Belgium	Cyprus	-.11447	.27716	.998	-.9335	.7046
		Greece	-.55626	.20751	.097	-1.1711	.0586
		Italy	.96951*	.30684	.031	.0574	1.8816
		Portugal	-.11157	.22149	.996	-.7628	.5396
		Spain	-.61095*	.20233	.045	-1.2126	-.0093
	Cyprus	Belgium	.11447	.27716	.998	-.7046	.9335
		Greece	-.44179	.22041	.362	-1.1098	.2262
		Italy	1.08398*	.31570	.016	.1429	2.0251
		Portugal	.00290	.23361	1.000	-.6968	.7026
		Spain	-.49648	.21553	.225	-1.1533	.1603
	Greece	Belgium	.55626	.20751	.097	-.0586	1.1711
		Cyprus	.44179	.22041	.362	-.2262	1.1098
		Italy	1.52578*	.25674	<.001	.7408	2.3107
		Portugal	.44469*	.14429	.029	.0279	.8615
		Spain	-.05469	.11270	.997	-.3799	.2706
	Italy	Belgium	-.96951*	.30684	.031	-1.8816	-.0574
		Cyprus	-1.08398*	.31570	.016	-2.0251	-.1429
		Greece	-1.52578*	.25674	<.001	-2.3107	-.7408
		Portugal	-1.08109*	.26816	.004	-1.8922	-.2699
		Spain	-1.58047*	.25257	<.001	-2.3562	-.8047
Gamer Identity	Portugal	Belgium	.11157	.22149	.996	-.5396	.7628
		Cyprus	-.00290	.23361	1.000	-.7026	.6968
		Greece	-.44469*	.14429	.029	-.8615	-.0279
		Italy	1.08109*	.26816	.004	.2699	1.8922

Dependent Variable	(I) Country	(J) Country	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
		Spain	-.49938*	.13673	.005	-.8947	-.1040
		Belgium	.61095*	.20233	.045	.0093	1.2126
		Cyprus	.49648	.21553	.225	-.1603	1.1533
		Greece	.05469	.11270	.997	-.2706	.3799
		Italy	1.58047*	.25257	<.001	.8047	2.3562
	Spain	Portugal	.49938*	.13673	.005	.1040	.8947
		Cyprus	.25280	.24748	.909	-.4803	.9859
		Greece	-.18896	.18072	.900	-.7221	.3441
		Italy	1.09197*	.29320	.007	.2144	1.9696
		Portugal	.12867	.19077	.984	-.4310	.6883
	Belgium	Spain	-.27175	.17349	.624	-.7862	.2427
		Belgium	-.25280	.24748	.909	-.9859	.4803
		Greece	-.44176	.20855	.303	-1.0722	.1887
		Italy	.83917	.31112	.097	-.0898	1.7682
		Portugal	-.12413	.21732	.992	-.7757	.5275
	Cyprus	Spain	-.52455	.20232	.131	-1.1406	.0915
		Belgium	.18896	.18072	.900	-.3441	.7221
		Cyprus	.44176	.20855	.303	-.1887	1.0722
		Italy	1.28093*	.26117	<.001	.4820	2.0798
		Portugal	.31763	.13653	.190	-.0766	.7118
	Greece	Spain	-.08280	.11112	.976	-.4036	.2380
		Belgium	-1.09197*	.29320	.007	-1.9696	-.2144
		Cyprus	-.83917	.31112	.097	-1.7682	.0898
		Greece	-1.28093*	.26117	<.001	-2.0798	-.4820
		Portugal	-.96330*	.26822	.013	-1.7782	-.1484
	Italy	Spain	-1.36372*	.25622	<.001	-2.1518	-.5757
		Belgium	-.12867	.19077	.984	-.6883	.4310
		Cyprus	.12413	.21732	.992	-.5275	.7757
		Greece	-.31763	.13653	.190	-.7118	.0766
Need satisfaction of Relatedness	Portugal	Italy	.96330*	.26822	.013	.1484	1.7782

Dependent Variable	(I) Country	(J) Country	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
		Spain	-.40042*	.12681	.023	-.7669	-.0339
		Belgium	.27175	.17349	.624	-.2427	.7862
		Cyprus	.52455	.20232	.131	-.0915	1.1406
		Greece	.08280	.11112	.976	-.2380	.4036
		Italy	1.36372*	.25622	<.001	.5757	2.1518
	Spain	Portugal	.40042*	.12681	.023	.0339	.7669

***. The mean difference is significant at the 0.05 level.**

As a non-parametric robustness check suitable for Likert-type scale composites, Kruskal–Wallis tests (with Bonferroni-adjusted pairwise comparisons) were also conducted. Results converged with the parametric and variance-robust analyses, indicating significant cross-country differences across all constructs.

Table 35 shows that all eight constructs differ significantly across countries (all Kruskal–Wallis $p < .001$), confirming the presence of robust cross-national variation without relying on normality or equal-variance assumptions. The largest effect is observed for real-world invasive behaviours ($\varepsilon^2 \approx .215$), indicating the strongest country differentiation on that dimension, while the remaining constructs show small-to-moderate effects ($\varepsilon^2 \approx .086–.152$). The pairwise (Bonferroni) results indicate that Spain is involved in the majority of significant contrasts across toxicity domains, suggesting that cross-national differences are largely driven by Spain's position relative to other countries, with additional significant contrasts involving Italy and Portugal in several domains.

Table 35. Kruskal–Wallis tests for cross-national differences across key constructs

Construct (DV)	N	H (χ^2)	df	p	ε^2 (effect size)	Significant pairwise differences (Bonferroni-adjusted p < .05)
Abusive communication	327	39.533	5	<.001	0.108	Italy–Portugal; Italy–Spain; Cyprus–Spain; Greece–Spain; Belgium–Spain; Portugal–Spain

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Construct (DV)	N	H (χ^2)	df	p	ε^2 (effect size)	Significant pairwise differences (Bonferroni-adjusted p < .05)
Disruptive gameplay	327	53.665	5	<.001	0.152	Italy–Portugal; Italy–Greece; Italy–Spain; Belgium–Spain; Cyprus–Spain; Portugal–Spain; Greece–Spain
Unsportsmanlike behaviour	327	40.997	5	<.001	0.112	Italy–Portugal; Italy–Spain; Greece–Spain; Cyprus–Spain
Discriminatory behaviour	327	38.187	5	<.001	0.103	Italy–Spain; Portugal–Spain; Greece–Spain
Real-world invasive behaviours (doxing/DDoS)	327	73.915	5	<.001	0.215	Italy–Portugal; Italy–Spain; Cyprus–Spain; Belgium–Spain; Greece–Spain; Portugal–Spain
General toxic behaviour	327	32.596	5	<.001	0.086	Italy–Greece; Italy–Spain; Cyprus–Spain; Belgium–Spain; Portugal–Spain
Gamer Identity	327	47.333	5	<.001	0.132	Italy–Belgium; Italy–Cyprus; Italy–Portugal; Italy–Greece; Italy–Spain; Belgium–Spain; Portugal–Spain
Need satisfaction of Relatedness	327	35.435	5	<.001	0.095	Italy–Portugal; Italy–Belgium; Italy–Greece; Italy–Spain; Portugal–Spain

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5. Executive summary of the findings

This deliverable presents the first cross-national assessment of toxic and prosocial behaviours in grassroots esports environments across the ENHANCE partner countries of Belgium, Cyprus, Greece, Italy, Portugal, and Spain. Based on a multi-country online survey with a final analytic sample of 941 and 327 fully completed by young players aged 16–26, the findings reveal consistent exposure to a wide range of toxic behaviours alongside strong identification with esports communities and meaningful experiences of social relatedness. The sample was primarily composed of respondents from Spain, Portugal, and Greece, with some cross-country imbalances in age distribution that reflect differences in recruitment contexts and community maturity. Participants reported high levels of engagement with competitive gaming, typically playing between one and five hours per day and three to seven days per week, with a clear preference for socially intense and competitive genres such as MOBAs and FPS titles. While most respondents identified primarily as players, older participants were more likely to occupy additional roles such as coach, moderator, or staff member.

Across all countries, toxic behaviours were reported at moderate-to-high levels. In tandem, respondents witnessed toxic behaviours more frequently than they personally experienced them, indicating that harmful conduct is visible and pervasive even when not directly targeted at individual players. Abusive communication (insults, threats, and mockery) was widespread, while disruptive gameplay behaviours including trolling and intentional sabotage were among the most frequently observed toxic practices, especially in team-based environments. Unsportsmanlike conduct, including the use of hacks, exploiting bugs, and quitting to avoid losses, was also common. Discriminatory behaviours, particularly racist comments and elitist exclusion of weaker players, were reported at moderate-to-high levels across countries. Although real-world invasive harms such as doxing or misuse of personal information occurred less frequently, their presence remains a point of concern given their severity. Spain consistently showed the highest toxicity levels across multiple domains, whereas Italy showed the lowest, although these differences partly reflect the age structure, size, and characteristics of the country-specific subsamples.

Alongside these patterns of toxicity, respondents reported strong gamer identity and high satisfaction of relatedness within esports communities. Identity and relatedness were strongly associated, and both showed small-to-moderate positive correlations with toxicity, indicating that close-knit communities and strong identification with gaming culture can coexist with, and occasionally reinforce, norms that tolerate or normalise harmful behaviour. Reliability analyses demonstrated good-to-excellent internal consistency for nearly all constructs, supporting the robustness of the measurement framework. Some scales showed weaker reliability (e.g., Cyprus) due to small sample size and restricted variation in responses. Statistical tests identified significant cross-country differences for most constructs, underscoring the importance of using robust or non-parametric analytical methods to account for variance heterogeneity and uneven sample sizes.

In sum, the findings show that toxic behaviours are a common, visible, and structurally embedded feature of grassroots esports environments. The coexistence of strong social bonds and widespread toxicity highlights the need for targeted educational resources, norm-shifting interventions, and more effective moderation practices.

6. Discussion

The pattern of results reported here reinforces the view that "toxicity" in competitive online gaming is not a single behaviour but a clustered ecology of communicative, gameplay, discriminatory, and occasionally real-world invasive practices. Across the sample, mean levels are moderate to high for abusive communication, disruptive gameplay, unsportsmanlike behaviour, discriminatory behaviour, and general toxicity, while real-world invasive behaviours (doxing/DDoS-type harms) are lower on average but still non-trivial. These patterns align with literature situating toxic conduct in the affordances and pressures of multiplayer competition: anonymity, rapid escalation under performance stress, and team coordination with strangers create conditions in which blame, flaming, and norm violations become recurrent interactional tactics (Freitas et al., 2021; Huston et al., 2023; Kordyaka et al., 2020). At the same time, the salience of discriminatory content—particularly racism—echoes qualitative accounts showing that slurs and exclusionary talk operate as both interpersonal attacks and boundary-policing mechanisms that reproduce broader social prejudices inside game spaces (Ruotsalainen & Meriläinen, 2023; Kowert, 2020). In this sense, the present findings converge with large-scale empirical work characterising toxicity as prevalent in team competition environments and intertwined with cyberbullying-like dynamics rather than being an episodic "bad apple" phenomenon (Kwak et al., 2015). This convergence is also consistent with the project's policy and educational rationale: European stakeholders have explicitly framed esports as requiring safeguards, awareness raising, and youth-focused learning resources to protect well-being and digital citizenship (European Parliament, 2022).

A second prominent feature is the gap between "ambient" visibility of toxicity and direct personal experience. Item-level patterns indicate that witnessing and perceived prevalence are often endorsed at higher levels than "overall frequency" self-reports, suggesting that harmful conduct is highly visible even when individuals are not always directly targeted. This asymmetry is theoretically meaningful because toxic climates can function through social contagion and norm signalling: players learn what is tolerated, imitate what seems strategically effective, and adjust emotional responses to match the competitive tone (Freitas et al., 2021; Beres et al., 2021). Even when an individual is not directly targeted in a given match, repeated observation can erode team communication and cohesion, normalise hostile speech, and increase the likelihood that frustration is externalised as blame or harassment in subsequent encounters (Grandprey-Shores et al., 2014; Huston et al., 2023). The prominence of unsportsmanlike behaviour (e.g., cheating and exploits) is also consistent with scholarship treating rule-breaking as both a performance tactic and a community-level trust problem: cheating undermines perceived fairness, increases suspicion, and can trigger verbal escalation and retaliatory sabotage (Wu & Chen, 2013; Kordyaka et al., 2020). Importantly, prior work shows that these dynamics are not only social harms but ecosystem risks—newcomers are deterred, retention drops, and reputational damage can extend to sponsors and organisers when disreputable conduct becomes the visible "front stage" of a title or scene (Freitas et al., 2021; Grandprey-Shores et al., 2014).

The results concerning gamer identity and relatedness are especially instructive for theory building because they suggest that strong social attachment to gaming communities can co-exist with (and sometimes accompany) heightened exposure to toxic settings. In this sample, gamer identity and relatedness are both relatively high and strongly associated, while toxicity dimensions show small-to-moderate positive correlations with identity and smaller positive correlations with relatedness. This complicates a simple "toxicity reduces belonging" narrative and instead points to at least two mechanisms emphasised in prior research. First, high identification can intensify norm sensitivity and competitive stakes,

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increasing the likelihood of aggressive norm enforcement and retaliatory incivility when performance expectations are violated (Kordyaka et al., 2020; Kowert, 2020). Second, players who are more embedded in community spaces may spend more time in matches and channels where toxicity occurs, thereby encountering more negative behaviour even while maintaining (or compartmentalising) social connection—an interpretation consistent with work showing nuanced links between perceived toxicity, social capital, relatedness satisfaction, and loneliness rather than a uniform linear relationship (Frommel et al., 2023). This tension underlines why the project's educational framing—supporting youth to recognise risks while preserving the social benefits of play—matters: interventions need to engage the identity/belonging layer, not only punish incidents, if the goal is durable norm change (European Parliament, 2022).

Country-level means also reveal clear cross-national differences across all constructs. In the partner-country sample, Spain consistently shows the highest mean levels across multiple toxicity domains (e.g., abusive communication, disruptive gameplay, unsportsmanlike behaviour, and real-world invasive behaviours), whereas Italy tends to show the lowest; the same ordering is also visible for gamer identity and relatedness, with Spain highest and Italy notably lower. For example, Spain's means are approximately 3.94 (abusive communication), 3.93 (disruptive gameplay), 3.96 (unsportsmanlike behaviour), and 3.57 (real-world invasive behaviours), alongside high gamer identity (~4.09) and relatedness (~4.08). Italy's corresponding means are substantially lower for abusive communication (~2.75), disruptive gameplay (~2.59), discriminatory behaviour (~2.74), and real-world invasive behaviours (~2.03), and it also shows markedly lower gamer identity (~2.51) and relatedness (~2.71). Other countries (Portugal, Greece, Belgium, Cyprus) generally fall between these endpoints, though with domain-specific variation. Importantly, omnibus tests (including variance-robust Welch tests where relevant) indicate that these country differences remain statistically detectable even under variance heterogeneity.

These cross-country differences should be interpreted through the dual lens of contextual variation and methodological caution. The literature notes definitional and operational heterogeneity in toxicity research, which can amplify apparent differences when measurement blends perceived climate, witnessed behaviour, and direct victimisation under a single label (Ruotsalainen & Meriläinen, 2023; Kowert, 2020). Offline cultural environments and local community norms can also shape both behavioural tendencies and what players interpret as "normal" competitive talk (Kordyaka et al., 2023; Huston et al., 2023). At the same time, because the study relies on digitally mediated, convenience-based recruitment, observed country gaps may partly track differences in recruitment channels, platform access, and the genre/ecosystem composition of national subsamples (Freitas et al., 2021; Kwak et al., 2015). This is precisely why a modular, multidimensional measurement strategy is advocated: no single existing scale captures the full toxicity spectrum, and robust validity evidence requires integrating content coverage with a theoretically specified nomological network (DeVellis & Thorpe, 2021; Kordyaka et al., 2020). In practical terms, these findings strengthen the case for tailoring education and prevention resources to local contexts while maintaining a shared conceptual framework that supports cross-national learning and policy transfer (European Parliament, 2022).

7. Limitations and directions for future research

Several limitations should be considered when interpreting the present results, especially regarding representativeness and cross-national generalisability. First, the survey relied on online recruitment via partner networks and organic dissemination, which is appropriate for reaching digitally embedded esports populations but implies self-selection and coverage constraints that can bias prevalence estimates. Second, to support valid comparisons within the consortium scope, analyses were restricted to respondents residing in the six EU partner countries and within the intended age band, excluding out-of-scope and incomplete cases; while this improves internal comparability, it also narrows external validity and limits inference to the broader European esports population. Third, substantial non-response on profiling variables (e.g., age, esports participation) required careful screening and analytic restriction, underscoring that the reported distributions should be read as evidence of patterns within an eligible analytic sample rather than definitive population benchmarks. Future research would benefit from expanded sampling strategies that complement network-based recruitment with designs better suited to population inference (e.g., stratified outreach across platforms and communities), while preserving the project's focus on grassroots accessibility and cross-country coverage.

A second set of limitations concerns measurement and interpretation in a domain where constructs are known to be heterogeneous and context-dependent. The broader literature notes definitional variability and inconsistent operationalisation of "toxicity," which complicates synthesis across studies and can amplify apparent differences when measures blend perceived prevalence, witnessed behaviour, and direct victimisation under a single label. (Ruotsalainen et al., 2023; Kowert, 2020). Because D2.2 draws on self-report indicators (including perceptions of ambient climate and personal frequency), findings may also reflect reporting thresholds and local norms—i.e., what respondents interpret as "normal" competitive talk versus harmful behaviour—rather than behavioural incidence alone. In cross-national work, these challenges make it especially important to pursue systematic checks of cultural–linguistic clarity, comparability, and (where applicable) measurement invariance, consistent with ENHANCE's emphasis on best-practice scale development and the integration of ecological validity with methodological rigour. (DeVellis & Thorpe, 2021). Future research should therefore triangulate survey findings with complementary sources—such as structured qualitative evidence from digital habitats, platform-level behavioural signals, and repeated measures—to improve interpretability and strengthen causal claims about how toxicity emerges and changes over time.

Taking into account the high drop off rates of the esports players in this study, future researchers examining esports communities and sensitive topics such as toxic behaviours are encouraged to adopt research designs that balance methodological rigor with participant burden and contextual constraints. Shorter, modular survey instruments or mixed-methods approaches that combine brief questionnaires with optional follow-up interviews may help improve completion rates and data quality. Establishing early partnerships with teams, leagues, and player associations can facilitate access and trust, while clear communication regarding the non-evaluative nature of the research may alleviate image-management concerns. Additionally, allowing flexible participation windows and timing data collection around competition cycles could enhance engagement. Finally, incorporating pilot testing with representative participants can help identify potential points of fatigue or dropout, enabling researchers to refine instruments before large-scale deployment.

Building on these limitations, three future research directions appear particularly aligned with the ENHANCE programme. First, longitudinal and intervention-linked designs are needed to distinguish stable "climate" features from short-term fluctuations and to evaluate whether educational and community supports produce sustained change; this aligns with the project's intention to monitor learning experiences and assess change over time through pre- and post-feedback mechanisms. Second, future studies should more explicitly model contextual moderators—such as genre, communication channel, and local

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scene characteristics—given that competitive affordances and community norms can condition both exposure and behavioural thresholds; ENHANCE's approach of grounding evidence in real player habitats and grassroots realities provides a clear pathway for such contextualisation. Third, the project's modular assessment architecture should be progressively strengthened through cumulative psychometric work (e.g., reliability estimation, construct validation within a theoretically specified nomological network, and cross-country equivalence checks), ensuring that future Observatory and MOOC outputs can be targeted with confidence to the most salient risk profiles and protective factors across countries.

8. Conclusions

Overall, D2.2 provides a cross-national empirical snapshot of young players' experiences of toxicity-related phenomena within grassroots esports contexts across the ENHANCE partner countries, contributing directly to the project's assessment objectives. Descriptive results indicate moderate-to-high mean levels across several toxicity domains (abusive communication, disruptive gameplay, unsportsmanlike behaviour, discriminatory behaviour, and general toxicity), with real-world invasive harms (e.g., doxing/DDoS-related items) lower on average but still non-trivial. Item-level patterns further suggest that witnessed/ambient toxicity indicators are often endorsed at higher levels than direct "overall frequency" items, consistent with the idea that toxic climates can be highly visible even when individual direct experiences are less frequent. Reliability evidence supports the coherence of the measured constructs in this sample, enabling meaningful composite scoring for cross-construct and cross-country analysis.

A central contribution of the deliverable is its demonstration of statistically significant country-level variation across all constructs, indicating that toxicity-related experiences—and related identity and connectedness indicators—are not uniform across national contexts even within a shared project framework. Effect-size estimates point to small-to-moderate practical differences, with comparatively larger country effects observed for real-world invasive behaviours and gamer identity, reinforcing the need to interpret "toxicity" as multi-layered rather than reducible to a single index. These patterns directly support the project rationale that prevention and education should be tailored to local contexts while maintaining a shared conceptual framework that enables cross-national learning, policy transfer, and stakeholder alignment with European values of inclusion and non-discrimination.

In the broader ENHANCE logic, the evidence consolidated in D2.2 strengthens the project's ability to move from diagnosis to action. By mapping toxicity domains alongside gamer identity and relatedness within the partner-country sample, D2.2 provides actionable input for the project's research-informed Self-Assessment Tool and for the design of awareness resources that help young players and caregivers recognise risks while preserving the social benefits of play. Finally, by documenting cross-country variation and multidimensional risk signals in grassroots contexts, the deliverable offers a robust empirical base for the Esports Social Observatory to disseminate evidence, convene dialogue among stakeholders, and support safer, more inclusive esports communities across Europe.

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