Article

new media & society
1–27


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DOI: 10.1177/14614448251336427
journals.sagepub.com/home/nms


The virtual census 2.0: A continued investigation on the representations of gender, race, and age in videogames

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Abstract

This study revisits the original four research questions of Williams et al.'s "The Virtual Census: Representations of Gender, Race and Age in Video Games" to investigate if mainstream videogame representations have changed over time. In addition, this study expands on the original by including a fifth question examining the intersection of

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representations within videogames. Using a sample of the top 100 best-selling boxed videogames of 2017 from four console platforms, this study compares its findings to the 2017 US Census demographic estimates as well as to findings of the original study. The results of the study are similar to those of the original, but the intersectional analysis shows an over-representation of white adult male characters, specifically, and an under-representation of Black female characters of any age group. This study discusses potential reasons for the slow progress made in videogame representations and the need for more intersectional analyses on videogames.

Keywords
Age, comparison, consoles, content analysis, gender, intersectionality, population, race, ratings, videogames

Introduction

A recent Entertainment Software Association (2022) study estimated that "[t]wo thirds of Americans—people of all ages, races, genders and backgrounds—play video games" (p. 2). The majority of videogame players are adults, with women just as likely to play as men.[1] Nevertheless, women and characters of color are under-represented in videogames, often depicted stereotypically or as background characters (e.g. Behm-Morawitz, 2017; Near, 2013); gender-nonbinary and transgender characters are even less visible (e.g. Shaw et al., 2019). Relatedly, around two-thirds of developers identify as white, two-thirds as men, and their average age is 34 years (Kumar et al., 2022). Gray (2014) argues this demographic makeup may reinforce white patriarchal norms in videogame development.

Recognizing the discrepancy between consumers and representations, Williams et al. (2009) published "The Virtual Census: Representations of Gender, Race and Age in Video Games" in 2009. This study aimed to establish baseline measures of representations in mainstream videogames to facilitate effective applications of social theories concerning media influences (e.g. Harwood and Anderson, 2002; Tajfel, 1978; Williams, 2006). This baseline was then compared to US population demographics in order to draw generalizable conclusions about human representations in videogames, finding male, white, and adult characters comparatively over-represented.

Since the original study, social discourse on representations has significantly increased. Movements like #OscarsSoWhite (Shoard, 2019) in film, the recasting of familiar comic book characters (e.g. Miles Morales as Spider-Man), and discussions on diversity at game industry events, such as the annual Game Developers Conference (GDC), reflect a growing consensus on the importance of media representation for under-represented communities.

However, these successes have faced social pushback, with Gamergate in 2014 and the increasing visibility of far-right groups being striking examples.[2] Gamergate, in particular, highlighted the toxic masculinity pervading mainstream gaming culture. Videogames with more queer and feminist characters have been targeted with negative reviews (Koscieszа, 2023b). Gray et al. (2017) argue this culture pressures female players to play

characters that align with their gender—characters that are often more sexualized and have fewer in-game abilities than male characters. Those who critique these stereotypes, according to Gray et al., frequently face harassment in games and online.

Considering these social developments, the present study revisits Williams et al.'s (2009) research questions (RQs) with data from 2017—an important year for gaming marked by influential titles like *Destiny 2* and *PlayerUnknown's Battlegrounds*, which have had a lasting effect on today's market.[3] This study replicates the original, comparing videogame representations to the US population and additionally analyzing changes between 2005 and 2017. Moreover, we examine the intersectional representations of gender, race, and age in relation to character playability and Entertainment Software Rating Board (ESRB) ratings. This approach nuances the estimates of videogame representations and enriches the application of theories of media influences.

Literature review

Studies since Williams et al. (2009) show that problems in representations of gender, race, and age persist. Despite the increase in female characters in primary roles,[4] Lynch et al. (2016) found that their overall proportion remains unchanged; these characters continue to be sexualized in fighting games as well as in Mature and Teen-rated games, though this trend is declining. The researchers argue that the industry has responded to criticisms regarding the sexualization of women in videogames, but there is little incentive to further increase their representation. Regarding marketing, Near (2013) found that non-sexualized protagonist female characters on videogame box art did not correspond to high sales. In addition, Shaw et al. (2019) observed that nonbinary and transgender characters are rarely represented, and when included, they are often secondary characters.

Similarly, people of color remain under-represented in videogames (e.g. Waddell et al., 2014; Wohn, 2011). As Shaw (2014) notes, studies of race in videogames have separated such representations from other identity categories. However, more recent studies have begun examining racial representations as it intersects with gender. Haines (2019) observed that white women and men of color had fewer speaking roles and less screen time compared to white male characters, further noting an "extreme under-representation of non-white women" (p. ii) in videogames. In Shaw et al. (2019), nonbinary and transgender characters of color accounted for only a few characters across 20 years of games sampled, highlighting how under-representation is compounded when considering intersecting marginalized identities.

Finally, studies on age in videogames typically analyze specific groups, such as children or the elderly, rather than a spectrum of age categories. Reay (2021) analyzed children's representations in 506 videogames (2009–2019), finding nearly one-fifth ($N=97$) featured child characters in substantive roles, with only 45 of those 97 games featuring primary child characters. Furthermore, games rated "16+" and "18+" more often included child characters than those games considered suitable for children. Reay concluded that child characters are often used as narrative objects (i.e. lacking an active role). Similarly, elderly characters are often portrayed as passive. Rughiniş et al. (2015) found that elderly characters seldom display qualities of gained experience or wisdom; rather they "do little else than reminisce and wait to die" (p. 10). Despite an

increase in older players, videogame content primarily targets young adults, with games aimed at older populations often emphasizing health benefits or cognitive training (e.g. Toma, 2015).

The history of white male videogame protagonists persists, leaving groups such as women, nonbinary, transgender, people of color, children and older adults in marginal roles or under-represented. This lack of representation may further alienate or disempower groups that already experience discrimination.

Theoretical framework

Like Williams et al. (2009), we draw on the theoretical frameworks of ethnolinguistic vitality theory, cultivation theory and social identity theory. These frameworks theorize how social groups perceive themselves and others through the consumption of media representations. Therefore, by measuring videogame representations and comparing them to US demographics, we are able to characterize identities as over-represented, under-represented, or adequately represented. This informs the articulation of potential impacts of videogame consumption on different demographic populations concerning feelings of power and importance.

Ethnolinguistic vitality theory posits that a social group's prevalence in media reflects their presumed "vitalness" to social life (Harwood and Anderson, 2002). According to Harwood and Anderson, media representations simultaneously reflect and perpetuate discourses and ideas about social groups. Measuring a group's media prevalence thus estimates their socially perceived "vitality."

Cultivation theory suggests media shapes viewers' perception of social groups based on representations (e.g. Gerbner et al., 1994; Williams, 2006). This cultivation may be stronger in videogames that more closely resemble the social world, such as those featuring human characters. Martins et al. (2011) argue that videogame photorealism might contribute to specific cultivation effects, while Behm-Morawitz and Ta (2014) suggest that the frequency of gameplay may reinforce cultivated beliefs. We therefore focus on representations of human characters.

Social identity theory asserts that individuals seek self-representations in media and compare their portrayals to those of other groups (Tajfel, 1978). Trepte (2013) suggests that this may influence media preferences, as individuals may favor media that better represents their social group. It may also shape knowledge of other groups, as elaborated by ethnolinguistic vitality theory and cultivation theory. Videogame players' understandings of other social groups may be reinforced through identification with their avatar and the avatar's relationships with other game characters. As Teng (2017) observed, online players tend to view avatars as extensions of themselves. Paul (2018) expands on this, arguing that game design and narratives facilitate the bond between players and avatars by providing meritocratic character story arcs in which players level up their avatars, potentially fulfilling players' empowerment fantasies (p. 105). Hence, games allow players to actively participate in the growth and emancipation of their avatars. However, Shaw (2014) cautions against hasty oversimplifications, explaining that player identification is more complex than markers like gender, sexuality, and race. Connections, life experiences, and stories can play an even more significant role in the attachment to an avatar (pp. 71–72).

Finally, recognizing the need for intersectional approaches to social identities, we are informed by Kimberlé Crenshaw's (1989) intersectionality. This framework explains how the intersection of multiple marginalized identities can lead to unique forms of discrimination, challenging the conventional approach of addressing inequalities in isolation. By examining intersections of gender, race, and age, this study follows other media content analyses examining intersectional representations to consider the routine portrayal of specific social groups (e.g. Isard and Melton, 2022; Ward, 2017).

Within game studies, research on intersectional representations has predominantly focused on intersections of gender and race (e.g. Behm-Morawitz, 2017; Waddell et al., 2014) or gender, race, and LGBTQ2S+ identities (e.g. Shaw et al., 2019), but rarely age (for exceptions, see Reay, 2021; Rughiniş et al., 2015). Importantly, Shaw (2018) advocates for more intersectional research in game studies but cautions that intersectionality should not constitute a "stand-in for diversity" (p. 77). Citing Bernice Johnson Reagon, Shaw argues that intersectional analyses should inquire into "who gets to make, play, and be represented in games" (p. 77) alongside discussions of social inequalities. Shaw et al. (2019) identified the original virtual census study as lacking an intersectional approach in its analysis of representations. Therefore, we created an additional RQ to address this shortcoming.

Given the principles of intersectionality, we raise a point of critical consideration in our replication of Williams et al. (2009): comparing to US Census data.[5] While necessary to determine over- or under-representations, this comparison is only directly applicable to the US context. Furthermore, it is not self-evident that population demographic proportions should constitute the ideal for videogame representations. For one, it may perpetuate the assumed discreteness of particular social groups. As categories, "biracial" encompasses an array of actual identities and experiences, as well as assumed ones; "Hispanic" refers to language and not race; and gender refers to identity, experience, and expression (e.g. women, men, nonbinary, Two-Spirit, and transgender) rather than to biological sex (e.g. female, male, and intersex). These considerations have implications for our coding schema and data analysis. While our use of census data and the collapsing of certain categories for analytical purposes may not fully capture the complexities emphasized by intersectionality, they provide a practical framework for examining videogame representations.

Moreover, the assertion that media representation matters presumes a causal effect leading to positive or negative outcomes in different groups of media consumers. However, previous research and theory have not clarified such causal mechanisms nor which outcomes should be maximized. For example, a justice-oriented approach to videogames (e.g. Phillips, 2018) might advocate over-representing historically marginalized groups to rectify past injustices. Specifying such value-laden goals and associated causal mechanisms is beyond the scope of this study. Instead, we wish to highlight these issues to caution readers against assuming that having representations match population demographics is necessarily the end goal.

Research questions

This study revisits the following RQs by Williams et al. (2009) to examine the representations of gender, race, and age in contemporary videogames:

RQ1: How frequently are different gender, race, and age groups represented in games?

RQ2: Is there a difference between groups' appearance in primary and secondary roles?

RQ3: Is there a difference in character representation between the typical game made and the most popular games?

RQ4: Is there a difference in characters' social group representation between games with different ESRB ratings? (pp. 821–822)

RQ1 considers the frequency of gender, race, and age in isolation and forms the foundation upon which the others build. This question entails the comparison of observed frequencies to US Census data to determine over-represented, under-represented, or proportionately represented social categories. RQ2 concerns representations of gender, race, and age among primary and secondary characters. Research suggests videogame players may perceive primary and secondary characters differently, with playability and narrative role influencing the quality of identification and emotional attachment (e.g. Bopp et al., 2019). Primary characters display a range of player agency, from open-world narrative games to racing or fighting games, which may impact the degree of attachment to characters. For RQ3, we compare the frequency of representations before and after weighting by videogame units sold, providing insight into consumer preferences. Finally, RQ4 addresses the representations in relation to ESRB ratings.

This study additionally examines representation frequencies over time to assess the impact of continued discourses on media representation and to identify the need for further critique. Each of the aforementioned RQs is given a corresponding sub-question:

RQ1a: How do the frequencies of different gender, race, and age group representations in games compare over time?

RQ2a: Is there a difference in groups' appearance in primary and secondary roles over time?

RQ3a: Is there a difference in character representation between the typical game made and the most popular games over time?

RQ4a: Is there a difference in characters' social group representation between games with different ESRB ratings over time?

Finally, this study also examines the intersection of gender, race, and age with character playability and ESRB ratings—variables from RQ2 and RQ4, respectively. This approach enriches our understanding of videogame representations, as ignoring intersecting social identities can conceal the discrimination experienced by specific communities (Bauer and Scheim, 2019). Furthermore, discussing social inequalities in unspecific terms creates further obstacles to finding effective solutions (Mcmaster and Cook, 2018).

Intercategorical intersectionality, a branch of intersectional quantitative studies, provides a more nuanced overview of reality, demonstrating how changes in one demographic

category may not be equally distributed across other intersecting demographic variables. For example, an overall increase in female characters does not necessarily mean that female characters increased within each racial category. Looking at inter categorical intersectionality makes visible the gaps in representations defined by multiple identities.

Therefore, this study includes a fifth RQ:

RQ5: How does character playability relate to the intersection of demographic characteristics and game rating?

Methods

We conducted a content analysis of the representations of videogame characters following the methods of Williams et al. (2009).

Sample and data collection

We analyzed the top 100 US best-selling boxed videogames based on a list shared by Wargaming Competitive Intelligence, titled *Premium Physical Full Game Sales 2017*.[6] The study's scale warranted focusing on a year notable for emerging trends and hit successes, rather than selecting the latest available year. This list primarily includes console games but also features cross-platform titles like *Destiny* and *Overwatch*, popular on PC. Mobile games were excluded.[7] In addition, handheld consoles were seemingly omitted; the PS Vita was discontinued in 2017, and the Nintendo Switch succeeded both the DS series and Wii U in 2017, making it a hybrid console. We therefore consider the Nintendo Switch both a handheld and traditional console.

One of three researchers played each videogame, recording the opening cutscenes and first fifteen minutes of gameplay for subsequent coding. As the study aimed to capture a baseline measure of representations, our choice in sampling duration was informed by the assumption that game commencement does not equate to game completion (see Bailey and Miyata, 2019). To expedite progression and ensure consistent sampling, games were played on the easiest setting, focusing on the main quest. For games featuring both solo and multiplayer modes, only the solo campaign was recorded.

Nine of the 100 games allowed for character customization. On customizable characters, Waddell et al. (2014) found that "users of MMOs [. . .] seem to be—for the most part—replicating patterns of gender and race representation common to computer-controlled characters in MMOs" (p. 11), with most characters being white and male. For these nine games, the default appearance was selected. When multiple avatars were available, one was selected at random. Finally, in sports games, the first team displayed was selected. Recordings were captured through share functionality (PS4 and Xbox One) or a capture card (Nintendo Switch and PC) and uploaded to cloud storage for review and analysis.

Data analysis

Three researchers used a standardized protocol to code all 13,144 characters, excluding those too small or too blurry to classify. While coding identities based on appearance is

not best-practice in human-subjects research (see Rasmussen et al., 2023), an approach of "self-identification" is not possible in the case of fictional characters. Therefore, similar to Shaw et al. (2019), we did our best "to make subjective, but culturally informed, judgment calls for coding purposes" (p. 1551). This included using both explicit and implicit information: visual representations, dialogue and identity attributions (e.g. pronoun use and cultural association), narrative, and in extreme cases of uncertainty, paratextual information. As Consalvo (2017) argues, videogames and their paratexts are mutually constitutive in terms of story, context, and character development.

Characters were coded for their presentation of gender, race, and age, as well as playability and character type. Characters whose identities or roles could not be determined were coded as such. Primary characters were those controllable by the player in any capacity, with some games having multiple primary characters. Characters were categorized according to the following types: human, non-human, or anthropomorphized creatures. Only human characters ($N = 8{,}178$) were retained for analyses, following Williams et al. (2009).[8]

Intercoder reliability was evaluated by double-coding a random subset of games ($N = 20$). Cohen's kappa was .95 for gender, .73 for race, and .73 for age, with percent agreement at .99 for gender, .93 for race, and .97 for age. The comparatively lower kappa values for race and age are likely due to the overwhelming number of adult and white characters, leading to high chance agreement.[9] Experts generally agree that kappa values above .81 indicate almost perfect agreement, while .60–.80 is considered substantial (e.g. Landis and Koch, 1977; Viera and Garrett, 2005). Given that all kappa values indicate substantial agreement or better, the remaining 80 recordings were randomly assigned and single-coded, following prior studies (e.g. Kuznekoff and Rose, 2013; Seering et al., 2019).

After coding, a data analysis was conducted in R (version 3.6.2). The weighted average, based on units sold, was used for all RQs to generalize the results to the consumer experience. We used demographic estimates of the 2017 US population (US Census Bureau, Population Division, 2020)—extrapolated from the 2010 census—as the basis for population comparisons. The RQs were analyzed in two stages: examining the 2017 sample as a replication study, followed by comparing the 2005 and 2017 samples using chi-square tests. Significant differences were identified based on studentized residuals.

Finally, RQ5 was investigated using only the 2017 sample by logistic regression, chi-square tests, and Fisher's exact test. Scott and Siltanen (2017) argue that regression approaches are most appropriate in quantitative intersectional research because regression allows for the simultaneous examination of relationships between multiple predictor variables (gender, race, age, and ESRB in this study) and a single outcome variable (playability).

Results

The overall results are similar to the findings of Williams et al. (2009): the 2017 sample shows a predominance of white, adult, and male characters. Each RQ's analyses use weighted demographics unless stated otherwise. Comparisons to US population

estimates are observational, whereas comparisons between sample years (2005 and 2017) involved statistical significance testing. The following results are presented within a gender binary due to the lack of nonbinary and transgender characters in our sample—of which there were five and zero observations, respectively. In the case of the five nonbinary characters coded, four were non-human and therefore excluded from the study, while one, The New Kid from *South Park: The Fractured But Whole*, was a customizable character.

RQ1: Overall representations

Figure 1 compares the gender representation of characters from 2017 to the US population and to the 2005 sample. Female representation increased significantly from 14.77% to 18.98%, although still more than 30 percentage points lower than in the US population.

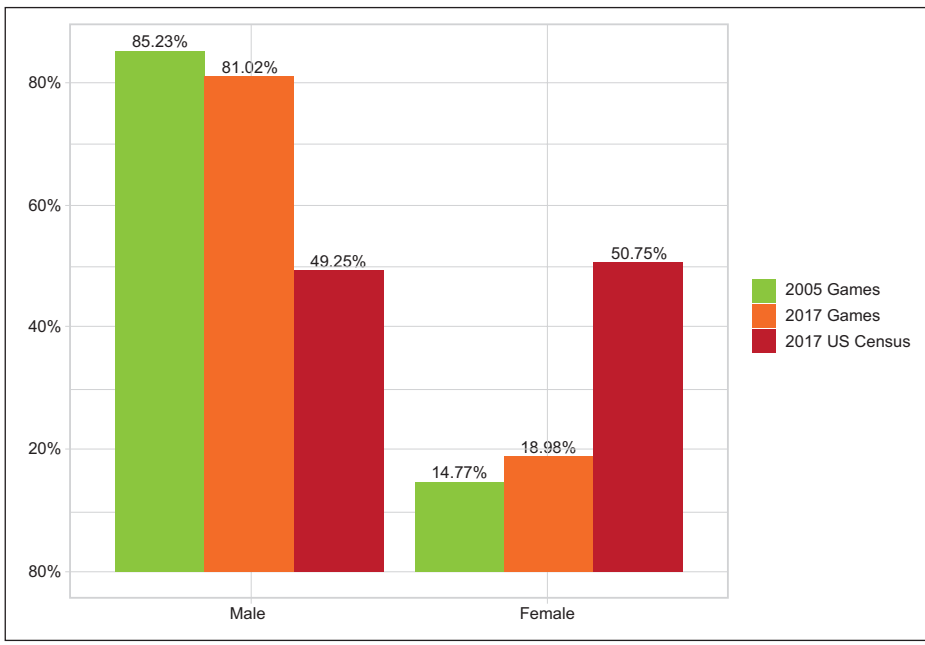

Figure 1. Comparison of gender in videogames (weighted by sales data) over time ($\chi^2[1] = 4.8413$, $p < .05$) and against estimated US population in 2017.

Figure 2 presents the racial demographics. Notably, biracial and Black characters significantly increased, rising from 1.39% to 3.15% and from 10.74% to 15.49%, respectively. Conversely, white, Asian/Pacific Islander, and Hispanic characters significantly decreased, by 2.89, 2.63, and 0.95 percentage points, respectively.

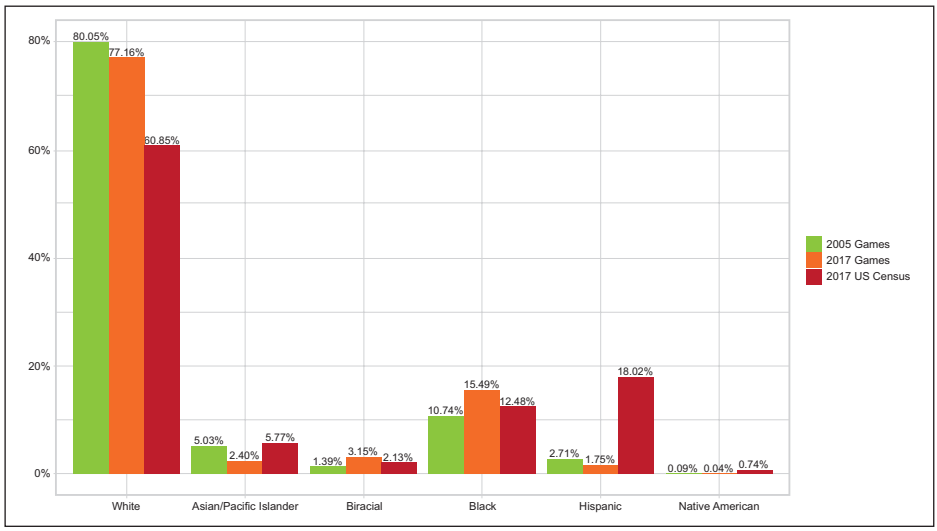

Figure 2. Comparison of race in videogames (weighted by sales data) over time ($\chi^2[5] = 109.7$, $p < .001$) and against estimated US population in 2017.

Finally, Figure 3 shows the age demographics. Elderly characters significantly increased (1.75%–3.86%), while teens decreased (7.81%–6.21%). Changes in child and adult characters were not statistically significant.

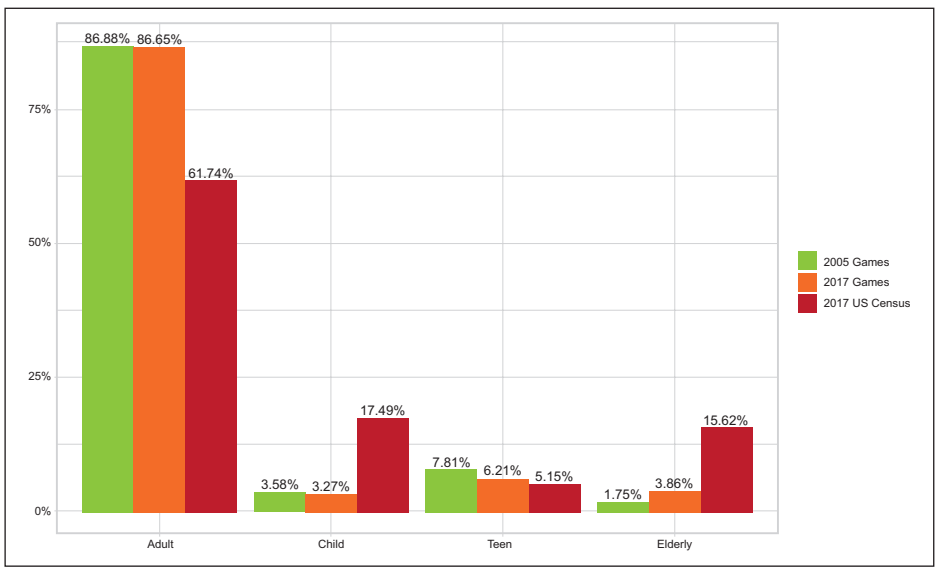

Figure 3. Comparison of age in videogames (weighted by sales data) over time and ($\chi^2[3] = 46.837$, $p < .001$) against estimated US population in 2017.

RQ2: Representations and playability

Figure 4 presents character playability by gender, with primary and secondary male characters constituting a higher percentage than in the US population, and conversely, female characters a lower percentage. Between 2005 and 2017, the percentage of female characters increased significantly—by 11.12 percentage points for primary characters and 5.99 for secondary—yet they still accounted for only about 20% of characters in each role.

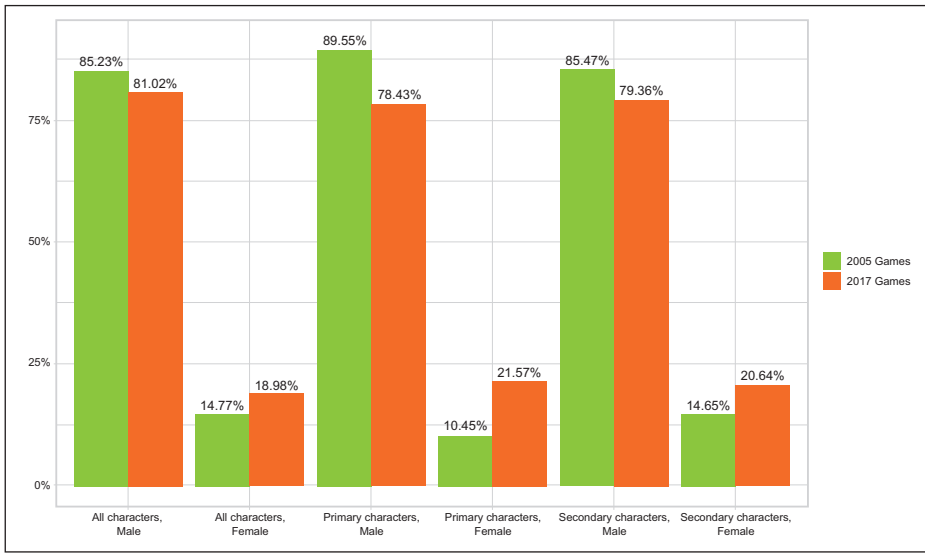

Figure 4. Comparison of gender and character playability in videogames (weighted by sales data) over time: for primary characters, $\chi^2(1) = 4.8413$, $p < .05$; for secondary characters, $\chi^2(1) = 56.328$, $p < .001$.

Regarding race, the proportions of white, biracial, and Black characters in both primary and secondary roles are higher than those in the US population, consistent with RQ1 results. However, no significant difference in the race of primary characters was observed between the 2005 and 2017 samples. As Williams et al. (2009) did not report on secondary roles concerning race and age, no comparison can be made. For age, adults and teens constituted a higher percentage of primary characters than the US population, while only adult secondary characters are over-represented. Primary adult characters significantly increased over time (76.50%–87.68%), while child characters decreased (8.9%–2.63%).

RQ3: Representations and game sales

Sales figures were used as weights to account for how often a character's representation was likely viewed by consumers. Following Williams et al. (2009), gender demographics are the sole focus. In the 2017 data, the unweighted gender percentages are 77.59% male and 22.41% female. When weighted, male representation increases to 81.02%, while

female decreases to 18.98%. Therefore, male characters were not only more prevalent in the videogames developed, but even more so in those that sold more units, mirroring Williams et al.'s findings.

When examining the unweighted and weighted data of male characters within each ESRB category, the results are as follows: E-rated videogames featured 90.61% male characters in the videogames created and 92.76% as sold; E10+ with 74.75% created and 76.13% sold; T with 71.92% created and 71.23% sold; and M with 79.58% created and 84.58% sold.[10] Unlike Williams et al. (2009), which found E-rated games to have the most equitable gender representation (albeit still overwhelmingly male at 79.03% created and 86.19% sold), we found E-rated games to have more male representation than other ratings categories.

RQ4: Representations and ESRB ratings

Table 1 compares the 2005 and 2017 sample representations by ESRB ratings. Female characters significantly increased in T-rated games and decreased for E, with no statistical significance in E10+ and M-rated videogames. For race, E-rated games showed a significant increase in white characters and decreases in biracial and Hispanic characters; E10+ an increase in white and biracial characters and decrease in Asian/Pacific Islander and Black characters; T an increase in Black characters and decrease in white; and M an increase in white and biracial characters and a decrease in Asian/Pacific Islander, Hispanic and Native American characters. Finally, E-rated games saw a significant increase in adult characters and decrease in teen; E10+ an increase in teen and elderly and decrease in adult and child; T an increase in adult while a decrease in teen; and M an increase in child but decrease in adult.

Table 1. Weighted demographic variables by ESRB rating across years.

	Everyone		E10+		Teen		Mature	
	2005	2017	2005	2017	2005	2017	2005	2017
Gender as a percentage of all characters:								
Male	86.09	92.76	79.10	76.13	85.03	71.23	86.55	84.58
Female	13.91	7.24	20.90	23.87	14.97	28.77	13.45	15.42
Race as a percentage of all characters:								
White	59.53	65.66	75.07	81.27	79.60	69.98	72.39	82.74
Asian/Pacific Islander	0.89	0.68	4.00	0.78	6.36	8.28	7.47	1.21
Biracial	5.30	0.11	0.53	7.92	3.14	2.95	0.15	1.28
Black	32.64	33.53	18.78	9.00	9.09	17.69	11.68	11.38
Hispanic	1.63	0.02	1.61	0.99	1.70	1.10	7.59	3.32
Native American	0.00	0.00	0.00	0.04	0.11	0.00	0.71	0.07
Age as a percentage of all characters:								
Adult	81.74	86.01	83.06	74.37	93.27	89.80	96.15	93.82
Child	5.14	7.05	16.61	0.91	2.14	4.10	0.41	2.91
Teen	10.76	5.48	0.00	17.05	3.66	1.61	1.62	1.38
Elderly	2.37	1.46	0.33	7.67	0.93	4.49	1.82	1.89

RQ5: Intersectional representations

RQ5 examines the relationship between the demographic variables, ESRB ratings, and character playability within the 2017 sample. We used logistic regression to predict character playability (outcome variable) based on the predictor variables of gender, race, age, game rating, and the interaction of gender and race. Table 2 presents the results of the logistic regression analysis, with some significant individual effects of gender, race, age, and game rating. Notably, there is a significant interaction between gender and the racial category of Black, specifically.

Table 2. Logistic regression analysis of 8,178 human characters' playability.

Predictor	β	*SE* β	Wald's χ^2	*df*	*p*	Odds ratio
Constant	1.851	0.129	207.016	1	<.001	NA
Gender (ref: Male)						
Female	0.300	0.180	2.796	1	<.001	1.350
Race (ref: White)						
Asian/Pacific Islander	−0.434	0.317	1.877	1	.095	0.648
Biracial	−1.065	0.475	5.040	1	.171	0.345
Black	0.113	0.148	0.589	1	.443	1.120
Other	−0.460	0.348	1.752	1	.186	0.631
Age (ref: Adult)						
Child	−0.637	0.344	3.420	1	.064	0.529
Teen	−0.594	0.262	5.123	1	.024	0.552
Elderly	−0.657	0.372	3.120	1	.077	0.519
ESRB Rating (ref: E)						
E10	0.294	0.158	3.458	1	.063	1.342
T	0.844	0.171	24.438	1	<.001	2.326
M	1.626	0.182	79.892	1	<.001	5.086
Gender x Race Interaction						
Female + Asian/Pacific Islander	0.002	0.581	0.000	1	.997	1.002
Female + Biracial	−0.259	0.812	0.101	1	.750	0.772
Female + Black	1.297	0.619	4.387	1	.036	3.658
Female + Other	−0.126	0.830	0.023	1	.879	0.881

Due to a lack of Hispanic and Native American characters, the questions that can be answered through logistic regression are limited. Table 3 shows the model-predicted probabilities of a character being playable based on demographic intersections within M-rated videogames; M-rated videogames were selected for their high number of units sold compared to other ESRB-rated games. The model predicts, for example, that an Asian/Pacific Islander female teen character has a 6% probability of being primary in an M-rated game. The probability of a Black female character being primary was lowest across all ESRB ratings compared to other demographic combinations.

Table 3. Intersection of gender race and age in terms of probability character is playable in M-rated videogames.

		Child	Teen	Adult	Elderly
Male	White	6%	5%	3%	6%
	Asian/Pacific Islander	8%	8%	5%	8%
	Biracial	14%	14%	8%	15%
	Black	5%	5%	3%	5%
	Other	8%	8%	5%	8%
Female	White	4%	4%	2%	4%
	Asian/Pacific Islander	6%	6%	3%	6%
	Biracial	14%	13%	8%	14%
	Black	1%	1%	1%	1%
	Other	7%	7%	4%	7%

Although the probability for white male characters being playable appears low, this is due to the prevalence of secondary white male characters. Table 4 shows the counts of primary and secondary characters by demographic intersections within M-rated videogames. As shown, the abundance of secondary, white male adult characters ($N = 1{,}011$) lowers the odds of a white male character being playable ($N = 25$).

This result highlights an important limitation of the logistic regression approach: the focus is on the proportions of playable characters *within* each demographic group rather than comparing across categories. Consequently, white male characters have among the lowest predicted probabilities despite constituting the largest single race-gender group of both primary and secondary characters. In addition, the model predicts some probability of a teen or elderly character being primary in M-rated games (Table 3)—despite no such characters observed in the dataset (Table 4)—as it uses all data across ESRB ratings to predict probabilities for characters outside of the analyzed sample. Finally, the limited combinations of age and ESRB ratings preclude meaningful examination of intersections involving three or more demographic categories.

To investigate intersections with age, we performed tests of association using a chi-square test, which was further verified by Fisher's exact test as needed. The aim was to determine if the association between gender and race varied by age and playability. These tests were conducted on frequency tables of gender and race within four subsets of the data: adult primary, adult secondary, non-adult primary, and non-adult secondary. Age was dichotomized into adult and non-adult (child, teen, elderly) due to limited data within individual non-adult categories and their overall juxtaposition to the adult category, which constituted a majority of characters observed.

The chi-square tests show a significant association between race and gender among adult primary characters ($\chi^2(3) = 22.085$, $p < .001$). Studentized residuals indicate white female characters (2.57) and Asian/Pacific Islander female characters (2.22) significantly exceed the overall proportion of female characters, while Black male characters (4.23) significantly exceed the proportion of male characters, highlighting the absence of Black female characters given the dichotomous nature of the gender variable. A similar pattern

Table 4. Frequency count of gender, race, and age in terms of character playability in M-rated videogames.

		Child		Teen		Adult		Elderly	
		Primary	Secondary	Primary	Secondary	Primary	Secondary	Primary	Secondary
Male	White	6	70	0	7	25	1,011	0	20
	Asian/Pacific Islander	0	0	0	0	6	4	0	0
	Biracial	0	0	0	0	1	8	0	1
	Black	0	6	0	13	6	127	0	2
	Other	0	3	0	2	1	71	0	0
Female	White	1	2	0	4	7	308	0	4
	Asian/Pacific Islander	0	0	0	0	1	5	0	0
	Biracial	0	0	0	0	2	6	0	0
	Black	0	1	0	1	1	40	0	1
	Other	0	1	0	1	0	34	0	1

of significance was observed among adult secondary characters. For non-adult primary characters, no significant association was found, likely due to lower sample sizes of non-adult characters and insufficient statistical power to detect a relationship.

Discussion

This study revisited the questions of Williams et al. (2009) to investigate systemic patterns in videogame character representations and changes over time. Our findings indicate real yet slow progress toward more diverse representations. Comparing the 2005 and 2017 datasets, we noted significant increases in female, biracial, Black, and adult representation. However, Asian/Pacific Islander, Hispanic and teen characters significantly decreased. Concerning playability, there was a significant increase in percentages of female and adult characters, while child characters decreased in primary roles; only female characters saw an increase in secondary roles. When comparing unweighted percentages to those weighted by sales, our findings were consistent with Williams et al. (2009): weighting by sales increased male representation. However, we found E-rated videogames had the highest proportion of male characters, challenging the previous finding that E-rated videogames display greater gender equity. While 2017 provided many games with strong female characters like in *Horizon Zero Dawn* or *Uncharted: The Lost Legacy*, hypersexualization of female characters still persists with franchises like *Mortal Kombat*. Moreover, these results on gender do not take into account the array of gender identities, experiences or expressions (e.g. nonbinary, Two-Spirit, transgender). Despite these overall changes, our results show that white, adult, and male characters are still over-represented relative to the US population.

Regarding the over-representation of white characters, specifically, there are three important points to consider: the "contribution" of Japanese studios, the social influence of over-representation, and the impact of secondary characters. First, Japanese-produced videogames often feature characters with clear Caucasian origins, such as Mario or Link, or characters presumed white due to ambiguous racial markers. According to Iwabuchi (2002), Japanese cultural producers (e.g. anime and videogames creators) often soften racial characteristics to achieve "universal appeal" (28, 30), thus contributing to the over-representation of white characters. Second, Kukshinov and Shaw (2022) found that white male players are less influenced by their social identities when selecting characters, whereas players with marginalized identities tend to select characters that better represent them. The researchers suggest white male players benefit from the privilege of being the "default" in videogames. This over-representation also impacts white female players, who are more likely to "bend" their race but not their gender. This "bending"—or "identity tourism" (Nakamura, 1995)—allows dominant group members to temporarily adopt marginalized identities, usually rooted in stereotypes. Gray et al. (2017) note that female players often face social pressure to choose gender-aligned characters. Given this, and considering intersectionality, it is reasonable to infer that players of color, who lack the privilege to casually select characters without considering their social identities, may feel more pressure to seek out and adhere to characters that align with their own identities. Third, videogames featuring multiple or customizable characters may not fully meet self-representation needs. Although customization allows avatars to align more

closely with one's social identities, Waddell et al. (2014) point out that these avatars still navigate worlds populated by predominantly white secondary characters. Identification and interaction with these characters are not only dependent on the player's social identity but may also influence the player's perceived sense of social importance.

Moreover, it is important to consider the study's findings in the context of demographic shifts. For instance, comparing the 2005 and 2017 datasets reveals a decrease in white representation, implying movement toward greater diversity in videogame characters. However, from 2000 to 2017, the proportion of white, non-Hispanic residents in the US decreased from 69.10% (Grieco and Cassidy, 2001) to 60.85% (US Census Bureau, Population Division, 2020). White characters were thus over-represented in videogames by 10.95% (weighted) compared to the 2000 US population, and by 16.31% in 2017, suggesting that white representation in videogames has actually decreased more slowly than the white proportion of the US population.[11] This reduction might not indicate actual improvement in videogame representativeness but possibly a perceived one, with players interpreting these changes differently. For example, gamers of color might view the increased representation of characters of color positively, despite it not reflecting demographic proportions, while white gamers might perceive the decline in their representation as a diminishment of their social vitality.

Altogether, the findings from RQ1–4 examine the variables in isolation. Consequently, the over-representation of white characters includes those of any age and gender; adult characters any race and gender; and male characters all races and ages. Recognizing this, we examined how specific demographic intersections may be under- or over-represented beyond what individual identities might suggest. Our goal is to emphasize that social theories should consider both individual and intersecting identities, as those with multiple marginalized identities may seek representations reflecting multiple aspects of themselves. Considering the complexity of identities will allow researchers to better assess representational influences.

Our findings revealed that indeed white adult male characters constitute the largest single gender-race-age group both overall (46% of all characters) and among primary characters (42% of all primary characters). Conversely, Black female characters, regardless of age, were least likely to be primary, being playable in only two videogames from the sample—*WWE 2K17* and *Borderlands: The Handsome Collection*—totaling just three characters. Superficially, this study appears to be examining two separate issues: the overall frequency of representations and the distribution of characters in primary and secondary roles. But similar to what intersectionality posits, these issues are interconnected. White adult male characters, due to their high frequency of representation, appear to have a low probability of being playable, whereas Black female characters have a low probability of being playable because they are actually infrequently featured.

The low probability of a Black female character being playable is also related to their narrative role in videogames, often relegated to secondary roles, and cast as narrative objects. Russworm (2017) observes in *The Last of Us* how "throughout the game blackness labors to shore up white character agency" (p. 112). This reflects broader media tropes of Black women in supporting roles, such as the "Black lady therapist" or "Black best friend" (Harris, 2018), to advance white characters' stories. Simply increasing

representations is therefore insufficient; the quality of representation is crucial, including ensuring that under-represented social groups are drivers of their own narratives.

Williams et al. (2009) suggest that the rate at which videogame representations diversify is impacted by a number of factors, most notably by consumer demand (as evident from the results of RQ3) and developer demographics. Yet, another important factor to consider is the role of franchises and serials. Videogame producers are motivated by sales and therefore are risk-averse, favoring franchises and serials (Dyer-Witheford and de Peuter, 2009). Legacy franchises, such as *The Legend of Zelda* and *Mario*, often revisit established worlds with specific characters and tropes—for example, male protagonists rescuing "damsels in distress." This can cement fan expectations of character appearance and behavior, leading to strong attachments that hinder attempts at diversification. Similarly, older games like *Grand Theft Auto* and *Assassin's Creed* maintain their relevance by periodically releasing downloadable content, likely perpetuating old patterns of representation. For instance, *Grand Theft Auto 5* was initially released in 2013 yet still made the 2017 best-selling list due to new downloadable content.

In cross-media franchises such as *Star Wars* and *Marvel*, games occasionally tie in with film releases. Abrupt changes to these established series may trigger consumer backlash, thereby threatening financial returns on investments. This risk-averse approach likely slows representational progress. For example, Miles Morales, a biracial Black and Puerto Rican Spider-Man, received mixed reviews upon his introduction in a 2011 comic. Morales gradually gained acceptance, featuring in more prominent comic and animation roles before appearing as the lead in the 2020 videogame *Marvel's Spider-Man: Miles Morales*. Ultimately, including diverse characters in established media franchises is one avenue for better representation of marginalized groups in videogames.

Limitations

This study has some important limitations, particularly the exclusion of mobile and PC games. Between 2005 and 2017, the market share of mobile games grew from 20% to 46%, while console games dropped from 22% to 20% and PC games from 32% to 26%.[12] Excluding mobile games likely influenced certain results, such as the diminution of teens and children as primary characters and the decline of female characters in E-rated games, possibly due to a portion of the children's game market shifting to mobile platforms. Wohn (2011), for example, found that mobile games featured more female primary characters than console games. Similarly, franchises like *Final Fantasy* entering the mobile market likely influenced the distribution of gender and race in mobile games. Although PC games were not explicitly included, several of the top selling games were available on both console and PC. Of the top 12 games of 2017 on Steam, eight were included in our survey (Steam, 2018). This excluded notable best-selling multiplayer online games like *Dota 2* or *H1Z1*, as well as successful indie games like *Shovel Knight* or *Doki Doki Literature Club*. Platforms like Steam allow for smaller developers to coexist with larger companies, potentially increasing content diversity and, likely, representations. Thus, this study reflects a specific gaming market rather than a comprehensive view. Nevertheless, given the influence of console games on gaming culture and their ability to establish enduring franchises due to

large-scale investment and promotion, this study highlights core problems in the industry, such as tokenism and the influence of the market on representations.

A second limitation is the sampling duration. While this study captured the opening cutscene as well as the first 15 minutes of gameplay, such a sample does not capture all characters within a given videogame nor does it offer a complete picture of a character's identity, which may change or be clarified over the course of the game. This shorter sampling duration increases the likelihood of excluding certain social groups, such as nonbinary and transgender characters. For example, the trans women of color characters Hainly Abrams (*Mass Effect: Andromeda*) and Miranda Comay (*Watch Dogs 2*) fall outside our timeframe and are thus absent from our analysis. This omission unintentionally perpetuates the erasure of particular social identities, yet underscores an important point: characters who are not white, adult and/or male are not only under-represented or relegated to secondary roles, but in some cases, substantially so. Furthermore, this study treated all character appearances equally, without considering screen time. Haines (2019) found that screen and speaking time, in addition to visual appearance, influence representations. While there is an assumption that, due to greater screen time, primary characters impact consumers more, secondary characters also vary in screen time and narrative impact. Hence, future studies should investigate representativeness of gameplay samples relative to the whole game, as well as account for on-screen presence and narrative role of characters. This can be understood as an issue of quantity *and* of quality.

Significant work remains to better our understanding of representation in games. First, videogame representations, like human population demographics, are continuously changing, thus requiring examination at regular intervals. Updated data are needed to complete the portrayal made in our study. Second, our study includes a number of videogames allowing character customization. Future research should explore how players perceive the representation of their customized character. This is especially needed as customization does not equate to limitless possibilities, as in the case of nonbinary and gender-queer individuals who are routinely forced to operate within a gender binary system (Kosciesza, 2023a). Third, our intersectional analysis was limited by smaller raw counts in particular categories, complicating statistical analysis and necessitating specific category combinations. Future studies should consider specific intersections in their analyses for more robust conclusions. Fourth, this study examined a limited number of representations. Other representations, such as queerness and disability, should be investigated. Finally, this study speculates on player interpretations of representation using social identity frameworks. Future research should examine how players interact with and interpret both discrete and intersectional representations in videogames, which would further nuance our understanding of the social impact of representations.

Conclusion

The findings of this study show that while the representation of women as primary characters in console games has slightly increased since 2005, the representation of people of color lags behind US demographic changes. Moreover, while specific individual racial categories had a low probability of being primary, an intersectional approach highlighted the severe under-representation of Black female primary characters and the complete

absence of Native American, Hispanic, nonbinary, and transgender primary characters. These absences in primary roles are concerning as they may perpetuate the notion of these groups as being less vital (Harwood and Anderson, 2002).

This study focused on the frequency of representation of particular social identities (quantity) but acknowledges the importance of quality as well. Developers should both increase the number of roles and expand the narratives of non-white, non-male and non-adult characters—as discrete categories and in their intersections. If, as Williams et al. (2009) states, the lack of representations "is a potential source of identity-based problems" (p. 831), then players should be able to see themselves in diverse roles that go beyond stereotypical tropes.

Given the widespread influence of videogames, it is essential to critically examine the discourses and representations they present. The lack of diverse characters, especially compared to societal diversity, can further marginalize certain groups and limit their aspirations. This study emphasizes that continued examinations of videogame representations—both in terms of quantity and quality—are necessary, and that despite some progress, significant change remains imperative.

Acknowledgements

The authors would like to thank Dr. Ramsey Cardwell for his generous feedback and valuable input on the quantitative aspects of the study. We also thank the anonymous reviewers for their insightful and constructive comments, questions, and suggestions, all of which greatly enhanced the clarity and rigor of this paper.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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Notes

1. We acknowledge that as nouns, "women" and "men" refer to gender, while "female" and "male" refer to sex. In this study, we use "female" and "male" only as adjectives to refer to gender rather than to sex (e.g. "female characters"). Moreover, our choice in the adjectival forms of "female" and "male" is to encompass all age groups, as "women" and "men" typically only refer to adults. We recognize these terms are imperfect and rooted within a binary framework, which do not fully capture the diversity of gender identities.
2. Many op-ed pieces have argued Gamergate an early sign of the increasing visibility of far-right groups in North America (see Lees, 2016; Sinclair, 2022).

3. This study uses videogame sales data from 2017. Research progress was delayed by the COVID-19 pandemic. Nevertheless, this study provides valuable insight as one of the few large-scale censuses of console games and the only replication of Williams et al. (2009), thus allowing for evaluating changes over time.
4. Following the terminology of Williams et al. (2009), we use "primary characters" to denote player-controlled characters and "secondary characters" for computer-controlled.
5. We used mutually exclusive ethnoracial categories for coding and analysis, such that an individual character could be Hispanic or another race, but not both. Consequently, we use the US census figures for race which distinguishes Hispanic from other ethnoracial categories (e.g. white, non-Hispanic and Black, non-Hispanic).
6. For a list of games sampled in this study, see Appendix 1.
7. This study focuses on console boxed games for several reasons. First, console games remain emblematic of stereotypical videogame culture, being highly recognizable and inspiring players to pursue a career in the gaming industry, potentially impacting future representation practices. Second, boxed videogames are generally more story-driven than mobile games, emphasizing character development. Third, the free-to-play and micro-transactions sales model of mobile games complicates direct comparisons with boxed games. Finally, this study follows Williams et al.'s (2009) sampling scheme in order to make direct comparisons. See Limitations for implications.
8. This study deviated from the original in two respects: number of videogames sampled and duration of recording. Whereas Williams et al. (2009) sampled the first 30 minutes from each of the top 150 best-selling boxed videogames of 2005, we sampled the first 15 minutes of the top 100 from 2017. Technological advancements now allow videogames to display more detailed and numerous characters, enabling us to gather a larger dataset from less recorded gameplay. Williams et al. recorded 4,966 human characters while we recorded 8,178.
9. Viera and Garrett (2005) describe this as an issue of accuracy and precision; the large number of adult and white characters accounts for rater accuracy in coding a character as such, but the precision of this coding is affected by chance results, ultimately lowering the kappa value.
10. The ESRB rating categories are E (for everyone), E10+ (for everyone 10 and up), T (for teen, 13 and up), and M (for a mature audience, 17 and up).
11. Although Williams et al. (2009) used videogame sales data from 2005, they compared this to the 2000 US Census figures.
12. These numbers were calculated based on data by Rao (2023).

References

Bailey E and Miyata K (2019) Improving video game project scope decisions with data: an analysis of achievements and game completion rates. *Entertainment Computing* 31: 1–13.

Bauer GR and Scheim AI (2019) Advancing quantitative intersectionality research methods: intracategorical and intercategorical approaches to shared and differential constructs. *Social Science & Medicine* 226: 260–262.

Behm-Morawitz E (2017) Examining the intersection of race and gender in video game advertising. *Journal of Marketing Communications* 23(3): 220–239.

Behm-Morawitz E and Ta D (2014) Cultivating virtual stereotypes?: The impact of video game play on racial/ethnic stereotypes. *Howard Journal of Communications* 25(1): 1–15.

Bopp JA, Müller LJ, Aeschbach LF, et al. (2019) Exploring emotional attachment to game characters. In: *Proceedings of the Annual symposium on computer-human interaction in play*, Barcelona, 22–25 October, pp. 313–324. New York: ACM.

Consalvo M (2017) When paratexts become texts: de-centering the game-as-text. *Critical Studies in Media Communication* 34(2): 177–183.

Crenshaw K (1989) Demarginalizing the intersection of race and sex: a Black feminist critique of antidiscrimination doctrine, feminist theory and antiracist politics. *University of Chicago Legal Forum* 1989(1): 139–168.

Dyer- Witheford N and de Peuter G (2009) *Games of Empire: Global Capitalism and Video Games*. Minneapolis, MN: University of Minnesota Press.

Entertainment Software Association (2022) 2022 essential facts about the video game industry. Available at: https://www.theesa.com/wp-content/uploads/2024/02/2022-Essential-Facts-About-the-Video-Game-Industry.pdf (accessed 24 April 2023).

Gerbner G, Gross L, Morgan M, et al. (1994) Growing up with television: the cultivation perspective. In: Bryant J and Zillman D (eds) *Media Effects: Advances in Theory and Research*. 1st ed. Hillsdale, NJ: Lawrence Erlbaum Associates, pp. 17–41.

Gray KL (2014) *Race, Gender, and Deviance in Xbox Live: Theoretical Perspectives from the Virtual Margins*. Waltham, MA: Anderson Publishing.

Gray KL, Buyukozturk B and Hill ZG (2017) Blurring the boundaries: using Gamergate to examine "real" and symbolic violence against women in contemporary gaming culture. *Sociological Compass* 11(3): 1–8.

Grieco EM and Cassidy RC (2001) Overview of race and Hispanic origin: census 2000 brief. Available at: https://www2.census.gov/library/publications/decennial/2000/briefs/c2kbr01-01.pdf (accessed 14 April 2023).

Haines C (2019) *Race, Gender, and Sexuality Representation in Contemporary Triple-A Video Game Narratives*. MA thesis, Virginia Tech. Available at: https://vtechworks.lib.vt.edu/server/api/core/bitstreams/26ef8e0d-12e5-4a09-b6c1-89f598b2d854/content

Harris A (2018) New pop culture trend alert: the Black lady therapist. *Slate*, 22 March. Available at: https://slate.com/culture/2018/03/black-woman-character-actors-are-popping-up-on-your-favorite-shows-as-therapists-to-white-characters-video.html (accessed 4 February 2023).

Harwood J and Anderson K (2002) The presence and portrayal of social groups on prime-time television. *Communication Reports* 15(2): 81–97.

Isard RF and Melton EN (2022) Does sport media raise her name? Examining intersectional representation in media narratives. *Sport, Business and Management: An International Journal* 12(3): 305–322.

Iwabuchi K (2002) *Recentering Globalization: Popular Culture and Japanese Transnationalism*. Durham, NC; London: Duke University Press.

Kosciesza AJ (2023a) Doing gender in game spaces: transgender and non-binary players' gender signaling strategies in online games. *new media & society* 27: 5–23.

Kosciesza AJ (2023b) The moral service of trans NPCs: examining the roles of transgender non-player characters in role-playing video games. *Games and Culture* 18(2): 189–208.

Kukshinov E and Shaw A (2022) Playing with privilege: examining demographics in choosing player-characters in video games. *Psychology of Popular Media* 11(1): 90–101.

Kumar S, Kwan E, Weststar J, et al. (2022) *Developer satisfaction survey 2021: Diversity in the game industry report*. Report. International Game Developers Association, September. Available at: https://igda-website.s3.us-east-2.amazonaws.com/wp-content/uploads/2022/11/15161607/IGDA-DSS-2021-Diversity-Report_Final.pdf (accessed 31 January 2023).

Kuznekoff JH and Rose LM (2013) Communication in multiplayer gaming: examining player responses to gender cues. *new media & society* 15(4): 541–556.

Landis JR and Koch GG (1977) The measurement of observer agreement for categorical data. *Biometrics* 33: 159–174.

Lees M (2016) What Gamergate should have taught us about the "alt-right." *The Guardian*, 1 December. Available at: https://www.theguardian.com/technology/2016/dec/01/gamergate-alt-right-hate-trump (accessed 10 January 2022).

Lynch T, Tompkins JE, Van Driel II, et al. (2016) Sexy, strong, and secondary: a content analysis of female characters in video games across 31 years. *Journal of Communication* 66(4): 564–584.

Mcmaster NC and Cook R (2018) The contribution of intersectionality to quantitative research into educational inequalities. *Review of Education* 7(2): 271–292.

Martins N, Williams D, Ratan A, et al. (2011) Virtual muscularity: a content analysis of male video game characters. *Body Image* 8: 43–51.

Nakamura L (1995) Race in/for cyberspace: identity tourism and racial passing on the Internet. *Works and Days* 13(1-2): 181–193.

Near CE (2013) Selling gender: associations of box art representation of female characters with sales for Teen- and Mature-rated videogames. *Sex Roles* 68(3–4): 252–269.

Paul CA (2018) *The Toxic Meritocracy of Video Games: Why Gaming Culture is the Worst*. Minneapolis, MN: University of Minnesota Press.

Phillips A (2018) Game studies for great justice. In: Sayers J (ed.) *The Routledge Companion to Media Studies and Digital Humanities*. London: Taylor and Francis, pp. 117–127.

Rao P (2023) 50 years of video game industry revenues, by platform. *Visual Capitalist*, 31 December. Available at: https://www.visualcapitalist.com/video-game-industry-revenues-by-platform (accessed 1 August 2024).

Rasmussen K, Chen J, Colquhoun RL, et al. (2023) Gender inclusive methods in studies of STEM practitioners. Available at: https://arxiv.org/abs/2307.15802

Reay E (2021) The child in games: representations of children in contemporary videogames (2009–2019). *Game Studies* 21(1): 162.

Rughiniş C, Toma E and Rughiniş R (2015) Time to reminisce and die: representing old age in art games. In: *DiGRA '15 – Proceedings of the 2015 DiGRA international conference*, May, pp. 1–12. Available at: http://www.digra.org/digital-library/publications/time-to-reminisce-and-die-representing-old-age-in-art-games/

Russworm TAM (2017) Dystopian Blackness and the limits of racial empathy in The Walking Dead and The Last of Us. In: Malkowski J and Russworm TM (eds) *Gaming Representation: Race, Gender, and Sexuality in Video Games*, pp. 109–128. Bloomington, IN: Indiana University Press.

Scott NA and Siltanen J (2017) Intersectionality and quantitative methods: assessing regression from a feminist perspective. *International Journal of Social Research Methodology: Theory & Practice* 20(4): 373–385.

Seering J, Wang T, Yoon J, et al. (2019) Moderator engagement and community development in the age of algorithms. *new media & society* 21(7): 1417–1443.

Shaw A (2014) *Gaming at the Edge: Sexuality and Gender and the Margins of Gamer Culture*. Minneapolis, MN: University of Minnesota Press.

Shaw A (2018) Are we there yet? The politics and practice of intersectional game studies. *The Velvet Light Trap* 81: 76–80.

Shaw A, Lauteria EW, Yang H, et al. (2019) Counting queerness in games: trends in LGBTQ digital game representation, 1985–2005. *International Journal of Communication* 13: 1544–1569.

Shoard C (2019) Gender and racial diversity on the up in blockbuster films, study finds. *The Guardian*, 4 September. Available at: https://www.theguardian.com/film/2019/sep/04/diversity-films-gender-race (accessed 24 May 2020).

Sinclair B (2022) Gamergate was a test and the industry failed. *Gamesindustry.biz*, 1 November. Available at: https://www.gamesindustry.biz/gamergate-was-a-test-and-the-industry-failed-opinion (accessed 10 January 2022).

Steam (2018) Top sellers: The top 100 games as measured by gross revenue this year, 2 February. Available at: https://web.archive.org/web/20180202062554/http://store.steampowered.com:80/sale/2017_best_sellers (accessed 6 August 2024).

Tajfel H (1978) *Differentiation between Social Groups: Studies in the Social Psychology of Intergroup Relations*. London: Academic Press.

Teng C-I (2017) Impact of avatar identification on online gamer loyalty: perspectives of social identity and social capital theories. *International Journal of Information Management* 37(6): 601–610.

Toma E (2015) Powerful elderly characters in video games: Flemeth of Dragon Age. *Journal of Comparative Research in Anthropology and Sociology* 6: 51–65.

Trepte S (2013) Social identity theory. In: Bryant J and Vorderer P (eds) *Psychology of Entertainment*. New York: Routledge, pp. 255–271.

US Census Bureau, Population Division (2020) Annual estimates of the resident population by sex, age, race, and Hispanic origin for the United States: April 1, 2010 to July 1, 2019 (NC-EST2019-ASR6H). Available at: https://www.census.gov/newsroom/press-kits/2020/population-estimates-detailed.html

Viera AJ and Garrett JM (2005) Understanding interobserver agreement: the kappa statistic. *Family Medicine* 37(5): 360–363.

Waddell TF, Ivory JD, Conde R, et al. (2014) White man's virtual world: a systematic content analysis of gender and race in massively multiplayer online games. *Journal of Virtual Worlds Research* 7(2): 1–14.

Ward O (2017) Intersectionality and press coverage of political campaigns: representations of Black, Asian, and minority ethnic female candidates at the U.K. 2010 general election. *The International Journal of Press/politics* 22(1): 43–66.

Williams D (2006) Virtual cultivation: online worlds, offline perceptions. *Journal of Communication* 56: 69–86.

Williams D, Martin N, Consalvo M, et al. (2009) The virtual census: representations of gender, race and age in video games. *new media & society* 11(5): 815–834.

Wohn DV (2011) Gender and race representation in casual games. *Sex Roles* 65: 198–207.

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Mia Consalvo is a Professor and Canada Research Chair in Game Studies and Design at Concordia University in Montreal. She is the co-author of *Real Games: What's Legitimate and What's Not in Contemporary Videogames* (2019) and *Players and their Pets: Gaming Communities from Beta to Sunset* (2015). She is also a co-editor of *Sports Videogames* (2013) and *The Handbook of Internet Studies* (2011) and is the author of *Cheating: Gaining Advantage in Videogames* (2007) as well as *Atari to Zelda: Japan's Videogames in Global Context* (2016).

Appendix 1

Premium Physical Full Game Sales 2017 (Limited to PS4, Xbox One, NSW, USA Territory)
List is sorted alphabetically.

Title	Publisher
1-2-SWITCH	Nintendo
ARK: SURVIVAL EVOLVED	Studio Wildcard
ARMS	Nintendo
ASSASSIN'S CREED: ORIGINS	Ubisoft
BATMAN: ARKHAM KNIGHT	Warner Bros. Interactive
BATTLEFIELD 1	Electronic Arts
BIOSHOCK: THE COLLECTION	Take 2 Interactive (Corp)
BORDERLANDS: THE HANDSOME COLLECTION	Take 2 Interactive (Corp)
CALL OF DUTY 4: MODERN WARFARE	Activision Blizzard (Corp)
CALL OF DUTY: BLACK OPS III	Activision Blizzard (Corp)
CALL OF DUTY: INFINITE WARFARE	Activision Blizzard (Corp)
CALL OF DUTY: WWII	Activision Blizzard (Corp)
CARS 3: DRIVEN TO WIN	Warner Bros. Interactive
CRASH BANDICOOT: N. SANE TRILOGY	Activision Blizzard (Corp)
DARK SOULS III	Bandai Namco Games (Corp)
DESTINY	Activision Blizzard (Corp)
DESTINY 2	Activision Blizzard (Corp)
DOOM 2016	Bethesda Softworks Nintendo
DRAGON BALL: XENOVERSE 2	Bandai Namco Games (Corp)
FALLOUT 4	Bethesda Softworks
FIFA 17	Electronic Arts
FIFA 18	Electronic Arts
FINAL FANTASY XII: THE ZODIAC AGE	Square Enix Inc (Corp)

(Continued)

Appendix 1. (Continued)

Title	Publisher
FINAL FANTASY XV	Square Enix Inc (Corp)
FOR HONOR	Ubisoft
FORZA HORIZON 3	Microsoft (Corp)
FORZA MOTORSPORT 7	Microsoft (Corp)
FRIDAY THE 13TH: THE GAME	Gun Media
GRAN TURISMO: SPORT	Sony (Corp)
GRAND THEFT AUTO V	Take 2 Interactive (Corp)
HALO WARS 2	Microsoft (Corp)
HORIZON ZERO DAWN	Sony (Corp)
INJUSTICE 2	Warner Bros. Interactive
JUST DANCE 2017	Ubisoft
JUST DANCE 2018	Ubisoft
KINGDOM HEARTS HD 2.8 FINAL CHAPTER PROLOGUE	Square Enix Inc (Corp)
KINGDOM HEARTS 1.5 + 11.5 REMIX	Square Enix Inc (Corp)
LEGO CITY UNDERCOVER	Warner Bros. Interactive
LEGO MARVEL SUPER HEROES 2	Warner Bros. Interactive
LEGO MARVEL'S AVENGERS	Warner Bros. Interactive
LEGO STAR WARS: THE FORCE AWAKENS	Warner Bros. Interactive
LEGO WORLDS	Warner Bros. Interactive
LEGO: THE NINJAGO MOVIE VIDEOGAME	Warner Bros. Interactive
MADDEN NFL 17	Electronic Arts
MADDEN NFL 18	Electronic Arts
MAFIA III	Take 2 Interactive (Corp)
MARIO + RABBIDS: KINGDOM BATTLE	Ubisoft
MARIO KART 8	Nintendo
MARVEL VS. CAPCOM: INFINITE	Capcom USA
MASS EFFECT: ANDROMEDA	Electronic Arts
MIDDLE EARTH: SHADOW OF WAR	Warner Bros. Interactive
MINECRAFT	Microsoft (Corp)Sony (Corp)
MINECRAFT: STORY MODE A TELLTALE GAMES SERIES	Telltale Games
MLB THE SHOW 17	Sony (Corp)
MORTAL KOMBAT X	Warner Bros. Interactive
MORTAL KOMBAT XL	Warner Bros. Interactive
NBA 2K17	Take 2 Interactive (Corp)
NBA 2K18	Take 2 Interactive (Corp)
NBA LIVE 18	Electronic Arts
NEED FOR SPEED 2015	Electronic Arts
NEED FOR SPEED: PAYBACK	Electronic Arts
NEED FOR SPEED: RIVALS	Electronic Arts
NHL 18	Electronic Arts
NIER: AUTOMATA	Square Enix Inc (Corp)
NIOH	Sony (Corp)
OVERWATCH	Activision Blizzard (Corp)

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Appendix 1. (Continued)

Title	Publisher
PAC-MAN CHAMPIONSHIP ED 2 + ARCADE GAME SERIES	Bandai Namco Games (Corp)
PERSONA 5	Atlus
PLANTS VS. ZOMBIES: GARDEN WARFARE 2	Electronic Arts
PLAYERUNKNOWN'S BATTLEGROUNDS	Microsoft (Corp)
POKKEN TOURNAMENT DX	Nintendo
PREY 2017	Bethesda Softworks
RESIDENT EVIL 7: BIOHAZARD	Capcom USA
ROCKET LEAGUE	505 Games
SNIPER ELITE 4	Rebellion Developments
SONIC FORCES	Sega
SOUTH PARK: THE FRACTURED BUT WHOLE	Ubisoft
SPLATOON 2	Nintendo
STAR WARS: BATTLEFRONT 2015	Electronic Arts
STAR WARS: BATTLEFRONT II 2017	Electronic Arts
SUPER BOMBERMAN R	Konami Digital Ent.
SUPER MARIO ODYSSEY	Nintendo
TEKKEN 7	Bandai Namco Games (Corp)
THE ELDER SCROLLS V: SKYRIM	Bethesda Softworks
THE EVIL WITHIN 2	Bethesda Softworks
THE LAST OF US	Sony (Corp)
THE LEGEND OF ZELDA: BREATH OF THE WILD	Nintendo
THE SIMS 4	Electronic Arts
THE WITCHER 3: WILD HUNT	Warner Bros. Interactive
TITANFALL 2	Electronic Arts
TOM CLANCY'S GHOST RECON: WILDLANDS	Ubisoft
TOM CLANCY'S RAINBOW SIX: SIEGE	Ubisoft
UFC 2	Electronic Arts
UNCHARTED: THE LOST LEGACY	Sony (Corp)
UNCHARTED: THE NATHAN DRAKE COLLECTION	Sony (Corp)
WATCH DOGS 2	Ubisoft
WOLFENSTEIN II: THE NEW COLOSSUS	Bethesda Softworks
WWE 2K17	Take 2 Interactive (Corp)
WWE 2K18	Take 2 Interactive (Corp)
XENOBLADE CHRONICLES 2	Nintendo