Playing with Prejudice: Do Colour Scheme and Hypersexualization of Women In Games Influence Player Decisions, Perceptions, and Avatar Appeal?

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ABSTRACT

Hypersexualization of women video game characters through unrealistic body proportions and revealing clothes is common. Previous work suggested that overexposure to sexualized women characters can harm players, through increased self-objectification and higher rape myth acceptance; however, there have been inconsistencies across studies that we suggest may stem from variations in the study design and other visual characteristics of the characters, such as relying heavily on stereotypes reinforced by colour schemes (e.g., blonde princess). To address this, we designed a text-based game prototype and four identical women characters who varied only in their colour scheme (gold/red or purple/black) and amount of sexualization (through bikini armour and exaggerating body proportions). We measure attributes assigned to the avatar, avatar appeal, rape myth acceptance and self-objectification. 82 participants participated in our online-study in 2021. Most participants found the non-sexualized character versions more appealing than the sexualized characters and were more likely to assign 'manipulativeness' to the sexualized character. When presented with the sexualized characters, participants demonstrated higher rape myth acceptance, and more self-objectification.

CCS CONCEPTS

• **Human-centered computing** → **Empirical studies in HCI**; • **Applied computing** → **Computer games**.

KEYWORDS

avatars, character design, digital games, sexualization, colour

1 INTRODUCTION

It has been forty years since the first playable and anthropomorphic video game characters were introduced; however, since then, women characters[1] have been less prevalent than men characters in games. Women have typically been secondary, rather than main, characters [21], and often follow specific gendered media tropes (e.g., damsel in distress; woman in the refrigerator) [66]. Furthermore, it became normal to portray women characters in games as overly sexualized through unrealistic body proportions with prominent breasts, tiny waists, emphasized buttocks, and wearing revealing clothes that are inappropriate for performing their intended task [21]. Such depictions of women in games are often the result of assumptions that the gaming audience is mostly young, male, and heterosexual [86]—it has also been shown that traditionally male-oriented genres (e.g., fighting) have more sexualized characters than role-playing games [60]. However, in 2022, 48% of gamers in the United States were women [83], and this has been relatively stable over the last decade. Research has suggested that hypersexualized characters are not very popular with women, who tend to not like them as much [76] and are less likely to want to play them [46].

Beyond potentially alienating a large group of players, stereotypical depictions of women can lead to harmful beliefs and assumptions about individuals in the physical world. For example, Benedict [7] describes how news media tend to characterize victims of sex crimes as either 'vamps' or 'virgins', depending on (among other factors) their appearance. Victims being characterized as 'virgins' (innocent victims) is not only reductive, but also rare; whereas, a characterization as a 'vamp' can lead to victim-blaming. Women video game characters often follow either virgin or vamp tropes. The 'virgin' has been represented, for example, in damsel in distress characters, often kind and 'worthy' of rescue [17]; whereas 'vamps' might often be found as background characters used to please the eye (e.g., [27]). This dichotomy of feminine virtual game characters has been shown to have harmful effects: in a study, presenting both 'vamps' (suggestively dressed characters with their head oriented towards the participants) and 'virgins' (conservatively dressed characters that did not 'gaze' at the participants) led to higher rape myth

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acceptance (i.e., agreement with harmful beliefs about sexual aggression towards women) in participants than non-stereotypical representations [29]. Later work, showed that the greater rape myth acceptance from overexposure to hypersexualized characters could be explained by increased self-objectification (i.e., valuing physical appearance over physical competence) [31]. Other possible consequences of exposure to hypersexualized characters can be a diminished self-efficacy in women [6], the promotion of hostile sexism [29], or tolerance to sexual harassment [19]. With the rise of the incel community [39], studying depictions that reduce women to sexual objects is increasingly important and relevant. Representing women in uni-dimensional ways aligns with the worldview of incel culture in which women are reduced to their value as potential sexual partners for heterosexual men [69]. However, not all previous studies that have analyzed effects of character sexualization show consistent findings (see section 2.2 for details).

Beyond the explicit sexualization and trope-ification, women have also been subject to visual character designs that are grounded in media stereotypes of how physical attributes imply a character's personality or skillset. For example, blonde is rare as a natural hair colour, yet blonde women have been over-represented in the media, especially in magazines such as the Playboy since the 1970s [77]. Aside from hair colour, in western tradition there are numerous associations of colour with personality, emotions, or even morals. For example, black is often associated with negative terms, such as fear or sadness, whereas white is often associated with positive terms such as trust or joy [64]. In character design, heroes are often shown in yellow, blue, green, or red, whereas antagonists are often presented in black, purple, or dark red [33, 62]. By relying on stereotypes, game designers might assume that players will intuitively understand a character. For example, Curtis [17] notes that: *"Peach's and Zelda's long blonde hair and feminine dress signify them as kind, vulnerable princesses"*, worthy of rescue without the need for further explanation, even though hair colour or clothing choices do not determine an individual's personality and can be easily changed. Game designers continue to utilize tired tropes; additionally, character design principles aim to use visual attributes to imbue personality (e.g., 'white' signifies innocence) , morals (e.g., dark colours are 'bad' and bright colours are 'good'), and skillset (e.g., purple is for characters that use poison) [33].

We suggest that the lack of consistency in the research findings around effects of hypersexualization of women characters may stem from differences in the various experimental designs: for example, results might depend on the sub-groups of participants that are surveyed in different studies, findings might vary with the game genre, or there may be are additional variables that influence the effects of exposure to hypersexualized characters in digital games. Such variables might include the colour schemes used in character design (as a method of conveying personality or morals), the setting of the presented game, whether the sexualized characters are acting agents or presented as secondary characters, or whether participants identify with the characters. To address this gap in prior work, we consider both colour scheme (hair colour and clothing) and degree of sexualization (clothing and exaggerated proportions), along with participant gender identity, to explore whether these factors differentially affect player responses to hypersexualized women characters. Finally, we use this experiment

design to assess how sexualization and colour scheme influence character attribute point distribution, character appeal, character identification, self-objectification, and rape myth acceptance. We consider gender identity as an additional factor as women might respond differently to representations of their own identity.

This study both replicates findings from prior work, and further adds the consideration of colour scheme as a new factor to consider when studying effects of character appearance. We question the insistence of many game studios to add a disproportionate amount of overly sexualized and idealized characters to their games. This study once again casts doubt on the supposed benefits of portraying women characters in superficial, stereotypical, and sexualized ways, and again highlights the potential risks of this approach to character design that have been shown to cause real harm.

2 BACKGROUND

2.1 Gender Representation in Videogames

Previous work has consistently shown that male characters are more common than female characters in digital games and that the portrayal of women characters is often gendered [27]. In 2009, Mou and Peng [66] noted that out of 19 randomly-selected popular games, 32% had no female characters and most of these were sports, adventure, and action games. In all 19 games considered, the leading characters were male. Multiple studies have presented similar results (e.g., [40, 41, 66, 92]) and have added that female characters often exposed more skin than male characters [4] and were more likely to be presented as sexualized [20]. Female characters in games are often designed for the male gaze and likely to represent either 'virgins' or 'vamps' [29]. Hypersexualization of women in games has increased over time until the mid-2000s, but has since then started to decrease slightly [60]. This can take many forms: beyond scantily clad characters with exaggerated proportions in suggestive poses, women characters are often animated with oddly sexualized movements or jiggling breasts, often referred to as 'boob physics' [78].

One reason given for hypersexualization is related to marketing, due to the notion that 'sex sells'; however, Ivory [50] found that players who review games online are more likely to comment on male than on female characters when evaluating a game (however, we also have to acknowledge that male characters are more common): only 12% of reviewers mentioned attractiveness or sexual appeal of female characters in their reviews, potentially indicating that the enthusiasm for sexualized female characters is not that high. That some players openly disapprove of such sexualization could mean that the benefits of marketing in this way might be cancelled out. Consistent with this, Lynch et al. [60] report that the critical success of games is not related to sexualization, meaning that sexualization is not needed to improve sales.

2.1.1 Common Tropes. Women are often presented as accessories in digital games: this means they are likely to be portrayed as needing to be saved or as just being pretty [27]. Curtis describes the damsel in distress narrative in more detail, using the example of Princess Peach and Princess Zelda [17]. Both iconic characters are white women with long blonde hair and (at least initially) pink

dresses. Curtis concludes that the symbolism of this exact appearance is to "signify them as kind, vulnerable princesses" [17]. This reveals a potential significance of colour choices in game design and appearance bias. Other common female archetypes and representations in Western tradition include presenting women with physical characteristics of animals, showing them in connection with nature, engaging in promiscuous behaviour, or as having powers to bewitch and control men [42]. Some game studios have made statements to justify such design choices. For example, former Halo franchise director Frank O'Connor explained the implied nudity of the character Cortana in the following way [72]: "*So one of the reasons is to attract and demand attention. And she does it to put people off so that they're on their guard when talking to her and she has the upper hand in those conversations.*" Such an explanation is in line with the trope of a woman who holds control over men and suggests that the sexualization of women is supposed to represent female empowerment.

2.1.2 How do Women who Play Games Feel about Sexualization? Previous work shows that women are often uninterested in sexualized protagonists and are (on average) more likely to state that they prefer playing non-sexualized characters [46]. Women are more likely to prefer characters who represent women [34], but often find hypersexualized characters less appealing [76]. Taken together, prior work has suggested that one reason for why women are less interested in games on average may be that they perceive that games are not designed for them or that the way women are often portrayed marginalizes them [60, 63].

2.2 Effects of Sexualization in Video Games

Beyond the effects on sales and the appeal of games, researchers have been interested in how exposure to hypersexualized characters can affect players.

In general, prior research has either found no effects of character sexualization or harmful effects [26]. Portraying women characters as sex objects has an effect on how women players are treated within the gaming community [15]. When presented with characters in a swimsuit, study participants decided to send more sexist jokes to the other player if they thought they were playing with a woman but not if they thought they had played with a man[15].

Behm-Morawitz & Mastro [6] found that sexualization negatively influenced female participants' self-efficacy and their beliefs about women. A meta-analysis concluded that being exposed to a high amount of subordinate, hypersexualized female characters with disproportionate body parts can result in women being perceived as less competent [38]. The same work suggests that men who are frequently exposed to such female representations are more likely to hold sexist attitudes towards women [38]. Presenting women in gender-stereotypical ways (both as 'virgins' and 'vamps') can lead to more sexism and higher acceptance of rape myths, as compared to less stereotypical characters [29]. Even a study that did not find stereotypical character representations to influence rape myth acceptance noted that exposure to sexualized characters increased men's tolerance of sexual harassment [19]. Other research found that playing sexually explicit games that include the objectification of women can prime men to regard women as sex objects or lead to self-reported tendencies to behave inappropriately towards women

[93]. In contrast, other researchers did not find effects of playing the Sims with a sexualized character on female body dissatisfaction or self-objectification [80] .

Many of these studies look at short-term exposure, for example, during a lab study. Cultivation theory (e.g., [63]) is more concerned with long-term effects of repeated exposure to media content (activation frequency). For example, if participants were already exposed to sexualized characters on a regular basis, the short-term exposure to a character during a study might be less likely to influence participants' beliefs further. Breuer [13] describes the relationship between character sexualization and harmful beliefs as complex and less relevant than interactions between people in the physical world. However, even if that is the case, portrayals in the digital world may matter to those who have few social interactions in the physical world, for example as a result of social isolation during the Covid-19 pandemic [24] or due to high levels of loneliness in young men [3].

A study with adolescents noted that character sexualization influenced self-objectification, regardless of participant gender [90]. However, in this study, gaming frequency did not moderate the relationship between playing with a sexualized character and self-objectification, contrary to the activation frequency hypothesis. Karsay et al. [51], however, provide a meta-review of media exposure (not limited to games) and show a moderate effect of sexualization in the media on self-objectification. According to their findings, the effect of exposure to sexualized characters in games tended to be stronger than that of exposure to such characters on television.

In summary, previous studies have shown mixed findings: in addition to cross-sectional versus longitudinal approaches, other aspects of study design (e.g., extent of character sexualization, colour choices, or game context) and demographic characteristics of the participant sample might be a reason for inconsistent results. Some authors have attempted to add additional variables that might help explain discrepancies. For example, Read et al. [74] did not find self-objectification, hostile sexism, or rape myth acceptance to be influenced by playing with a sexualized character and added that cognitive load could be a potential moderating variable. Other authors have looked at specific samples (e.g., only women participants) or specific types of hostility (e.g., hostility exhibited by women towards other women): Lindner et al. [57] did not find a sexualized avatar in a Tomb Raider game to influence self-objectification or woman-to-woman hostility towards a confederate. Other researchers sought to explain the mechanisms in which attitudes are influenced by exposure to sexualized characters: Fox et al. [31] observed a main effect of college women being more likely to self-objectify after being exposed to a sexualized character. However, in their study, the effect of sexualization on acceptance of rape myths was not a direct effect, but rather mediated by the level of reported self-objectification.

The inconclusive results of these various studies suggest that more research is needed to better understand the influence of character sexualization and the underlying variables that can help us understand who is more likely to be influenced, and under which

circumstances. Therefore, this study is an invitation to other researchers to not just compare sexualized and non-sexualized characters but to highlight and compare the extent and types of sexualization. With inconsistent findings in mind, rather than looking only at the study methods as a source of discrepancy, we should carefully look at aspects of the character design to understand why different studies draw different conclusions. This work should be understood as a call to explore other variables of character design in addition to sexualization and to carefully compare and describe our choices in experimental design to allow for more comparable replication. For example, there are different questionnaires for measuring the effects of sexualization, such as self-reported self-objectification, and it is possible that different measures have different levels of sensitivity when it comes to capturing short-term changes. Ultimately, our goal is not to condemn sex appeal of virtual representations altogether, nor is it to condemn femininity. However, it also does not seem wise to ignore the numerous studies that do find harmful effects of being overexposed to one-dimensional women characters.

2.3 Colour Associations and Character Design

While character sexualization is a topic that has been looked at in several studies and that has been addressed in at least three meta-reviews [26, 38, 51], there has been little emphasis on comparing the different ways in which characters for these studies could be described aside from the amount of clothing or sex appeal and how that could influence findings. When we look at a character, we might not purely be influenced by how sexualized it is but also by the several other design choices. For example, colour schemes influence our perception, and simple attributes such as hair colours are frequently associated with personality judgments that may intersect with the effects of sexualization.

2.3.1 Colour Associations in Western Culture. Different colours have different associations within western cultures. For example, desaturated and dark colours are more likely to be perceived as serious and professional, whereas saturated colours are often interpreted as exciting and dynamic [55]. White is often associated with purity, whereas black is associated with death and power; yellow is often associated with weakness, kindness, or happiness, and red is associated with love, anger, or danger; both purple and blue are associated with royalty and green is associated with country life [43]. In 2014, Elliot and Maier provided an extensive review of literature around the psychology of colour, describing theory and prior work in detail [23].

2.3.2 Colours in Character Design. Colour choices in character design are usually made intentionally to communicate or suggest certain traits of a character. Red, blue, and yellow can be described as the most iconic superhero colours [33], which can be explained through the interpretation of such colours as exciting and dynamic [55]. A list of colours that are often used for antagonists names black as the most common bad guy colour, blood red as usually being used for 'crazy' villains and purple being associated with poison [33, 65]. Ngo [68] notes that colour affects the perception of personality, stating that, for example, characters styled in red are often brave, angry, or hot-headed, whereas characters styled with black clothing and accessories are often seen as evil. They cite

the exploration by McGuire [61], who inspected 40 Disney heroes and villains and determined that the most dominant colours in Disney hero characters are blue, yellow, green, and red (in this order), whereas the most dominant colours in Disney villains are red, purple, and black (respectively). Red can be noted as an in-between colour, frequently associated with both protagonists and antagonists [55]. In games, antagonists are often presented with darker colour palettes, whereas protagonists are frequently presented with bright colours [71].

2.3.3 Hair Colour Associations. Even outside of fictional characters, associations of colour with abilities or personality are common. One example are stereotypes based on hair colour, such as the 'dumb blonde' or 'temperamental redhead' stereotype [91]. In a qualitative study, blonde women found the assumptions that are made based on their hair colour to be a 'mixed blessing' [47]: blonde women are often idealized in Western tradition and associations that they have encountered were those of innocence, fun, sex appeal, but also being 'easy' or 'stupid'. These hair colour associations are predominately studied in samples of white people; without consideration of the influence of race (and corresponding skin and hair colour representations); however, full intersectional studies are needed to unpack the complexities of privilege.

2.4 Scope of the Present Study

Considering the many perception biases around both sexualization and colour, it seems likely that interactions between these factors might produce different effects on players. For example, pairing sexualization with a blonde character might be perceived differently to a dark-haired character, given stereotypes that blondes are often rated as more sexy or attractive but also more innocent. Previous work has reported how players can relate to the game characters they play in various ways such as seeing them as a Protégé that needs protection, as 'cool and capable' or even as a crush [10]. Thus, in this exploratory study, we explore influences of colour schemes and sexualization in a woman character design on player preferences and decisions that are made for the character in a text-based story adventure. We situate our study among previous work by assessing influences of colour scheme and sexualization on self-reported self-objectification and rape myth acceptance. The goal of this study is to provide a starting point for a nuanced conversation about how different types of stereotypical representations interact. We argue the need for careful descriptions of and explanations for experimental design choices in research, as well as the importance of describing and comparing participant samples. Prompted by inconclusive results of previous work, we emphasize the need to limit conclusions to the contexts and sub-groups of people that we have access to when studying effects of character design. Several aspects of study design might be of importance: for example, if the presented character has no agency, this alone might influence self-objectification and rape myth acceptance negatively and between-group comparisons might not be the biggest factor in such a case. We therefore argue that descriptive statistics (e.g., how high or low self-objectification is in the sample regardless of experimental condition) should be taken into account as well when interpreting main effects of sexualization.

First, the present study explores *how character appearance (sexualization through clothing, and predominant colour scheme) of women game characters influences player decisions.* Second, we explore *whether the character design influences attitudes towards the character.* Finally, we *situate our work in existing research* by assessing whether self-objectification and rape myth acceptance differed as a result of sexualization and colour scheme. We manipulate two factors in a 2x2 design (*clothing condition:* bikini armor vs. long-sleeves and armour and *colour condition:* golden/red (hero) vs. black/purple (villian)). For all analyses, we include the participants' self-reported gender identity as an additional factor to assess player differences.

3 METHODS

3.1 Participants

We recruited 82 participants for an online study at the University of Trier in 2021 and compensated with course credit: 53 participants self-identified as women, 27 self-identified as men, 1 identified as 'gender-fluid/woman/non-binary' and 1 as non-binary. We considered removing non-binary participants because they were too few to form a representative group but since we did not want to render them invisible, participants were instead grouped into two groups: those who identified (sometimes) as women (N=54) and those who did not (N=28). 41 participants self-reported that they were sexually attracted to women. Two of the non-women participants were not attracted to women. Excluding these two participants did not affect the results. Participants were 24.9 years on average (SD=8.18) and took around 15-25 minutes to complete the survey. We asked participants to self-describe their ethnicity. Participants in the sample predominantly identified using one of 'German', 'European', 'Caucasian', or 'White' (n=54). A few identified by their country: 'German-Turkish' (n=1), 'Russian-German' (n=1), 'Slovakian' (n=1), 'Greek' (n=1), 'Chinese-Luxembourgian' (n=1). A few identified by ethnicity: 'Latino' (n=1), 'Asian' (n=1), and 'Mixed-race Black' (n=1). The remaining people identified themselves by their religion—'Catholic' (n=2), 'Protestant' (n=1), as a 'human being' (n=1), or as 'none' (n=1). There were 15 participants who did not disclose. There were no clear observable differences in ethnicity across the groups.

3.2 Materials and Procedure

The study was created as a text adventure to avoid influences of gaming experience with controls, to create more consistent experiences across participants, and to support replication. Bowey et al. [11] showed that text prototypes were able to as effectively demonstrate differences in player perceptions and experiences (in a similar context) as a fully-interactive game.

3.2.1 Experimental Conditions. Participants were randomly assigned to one of four conditions. The condition determined the character appearance of the game protagonist ('Leandra'), who varied in her colour scheme and amount of sexualization. Leandra was either presented as blonde in a golden armor with red fabric, or with purple hair, dark silver/black armor and purple/black fabric. Both versions had the same hairstyle, facial features and skin colour but differently coloured makeup (lips). The golden/red version had more typical colours of a protagonist or hero character. Further, she

was blonde, which could heighten the effects of sexualization in our central European sample (because 'blondes' were stereotyped as 'sexy' in previous work, [47]). The colours we chose for the purple/black version were darker, less warm, and both purple and black are colours often used for antagonist's colour designs; the dark clothing was a stronger contrast with the character's pale skin in the black and purple character versions. For readability, we hereafter refer to the golden/red/blonde version as the *'hero' colour scheme* and the silver/black/purple version as the *'villain' colour scheme.*

Both colour schemes were presented as either sexualized (scantily clad in bikini armor) or non-sexualized (breastplate and long sleeves/pants). In the sexualized condition, the proportions of breasts, waist, and hips were further exaggerated. This resulted in four conditions in a 2x2 study design: 1: hero colour scheme and sexualized; 2: hero colour scheme and non-sexualized; 3: villain colour scheme and sexualized; and 4: villain colour scheme and non-sexualized (see Figure. 1). For brevity we may refer to the sexualized versus non-sexualized condition as 'clothing condition' and colour scheme variation as 'colour condition'. The 3D characters were designed and dressed with the software Character Creator 3 (Reallusion) [75].

Figure 1: The avatar as presented to participants in the four conditions from left to right: hero colour scheme and sexualized; hero colour scheme and non-sexualized; villain colour scheme and sexualized; and villain colour scheme and non-sexualized.

3.2.2 Text-Adventure. Depending on experimental condition, one out of the four character images (Figure 1) was presented along with the description: *"Imagine that you are playing the character Leandra in the magical kingdom of Doreandrios".* Participants were then asked to assign primary abilities and secondary attributes to the character. The text adventure (translated from German) started with the following words: *"An unknown darkness has befouled the kingdom and thus you are travelling from your home village to the castle of the king and queen to support the battle against the dark power with your abilities."* Participants were asked to make 6 decisions as the 'Leandra' when navigating through the text adventure. They were presented with the consequence of their decision and progressed to the next decision (see supplementary materials for the entire story). Each step of the story was presented alongside the

image of the character (styled depending on condition) in the scene. This was both to illustrate the text adventure and to repeatedly confront participants with the appearance of the character. These images were created by placing the 3D model of the character in a scene created with Unity 3D [88] in the same position and using the same character pose for all conditions. Rather than being placed as an accessory to the story, 'Leandra' (no matter the appearance condition) was always presented as an independent and capable protagonist who had agency over her decisions. This was a deliberate study design decision and might be in contrast to other studies, potentially influencing the results.

3.2.3 Follow-Up Questionnaire. After navigating through the story, participants were asked to fill out questionnaires: first, whether they made the decisions as themselves or as the character (Leandra); second, whether they would want to play Leandra in a game; third, a questionnaire to measure self-objectification; and fourth, a questionnaire to measure rape myths acceptance. Finally, demographic information was collected, asking participants their age, gender identity, and whether or not they were attracted to women.

3.3 Measures

3.3.1 Assignment of Character Attributes.

Primary Abilities: Participants were asked to distribute points between their character's attributes after they were first confronted with her appearance. Participants had 30 points to distribute, and each attribute needed to have at least one point assigned to it. Therefore, the maximum possible number of points that could be assigned to one attribute was 26. As primary attributes, we presented *intelligence, strength, dexterity, endurance,* and *manipulativeness.* Intelligence, strength, and dexterity are common attributes in role-playing games. Endurance represented an alternative to strength as a marker for physical fitness, and manipulativeness was used as a less positive attribute, to explore whether the character was equipped differently based on their colour scheme (e.g., hero or villain) and sexualization (e.g., 'virgin' or 'vamp').

Secondary Attributes: Participants were asked to distribute another 30 points in the same way across five different traits: *impulsive, deceitful, charismatic, clever, eager to help.* Again, these traits were chosen to explore how participants might describe or equip their character with different traits depending on what appearance they were presented with.

3.3.2 Character-player Relationship.
Participants were then asked whether they made the story decisions as themselves or from the perspective of the character (Leandra) on a 5-pt. bipolar semantically anchored scale ('as myself' to 'as the character'). Further, they were asked if they would choose to play as Leandra in a video game or not (1- 'yes', 2- 'probably yes', 3- 'probably no', 4- 'no').

3.3.3 Self-Objectification.
After playing the game, participants were given a list of 10 attributes and asked to rank them from the one that has the greatest impact on their self-concept to the least impactful. Five attributes were competence-based (e.g., *'physical coordination'*) and five were appearance-based (e.g., *'sex appeal'*). Scores were calculated as described by Fredrickson et al. [32]. A lower score meant low self-objectification (higher importance

placed on competence-based attributes) and a higher score meant high self-objectification (higher importance placed on appearance-based attributes).

3.3.4 Rape Myth Acceptance.
Participants completed the 'acceptance of modern myths about sexual aggression scale' (AMMSA) [37]. They were asked to what degree they disagree or agree with sixteen statements (e.g., *'Interpreting harmless gestures as "sexual harassment" is a popular weapon in the battle of the sexes.'*) on a 7-pt. Likert scale from 1- 'completely disagree' to 7- 'completely agree'.

3.4 Data Analyses

First, we removed outliers from all dependent variables (values that were 2 standard deviations below or above the mean). Then, we conducted two MANOVAs with *(a)* colour condition, *(b)* clothing condition, and *(c)* participant gender identity (woman/non-woman) as *independent variables* and *(1)* primary abilities and *(2)* secondary attributes as *dependent variables*. Using two 2x2x2-ANOVAs, with the same independent variables *(a-c)* as in the MANOVAs above, we explored whether participants *(3)* reported that they made the decisions as themselves or as Leandra and, *(4)* how likely they would be to decide playing Leandra in a game. Finally, we conducted two more ANOVAs with the same three independent variables *(a-c)* and *(5)* self objectification and *(6)* rape myth acceptance as the dependent variables. This data analysis approach resulted in 6 analyses, for which each dependent variable was only used in one analysis. For each dependent variable, we test the main effects (colour condition, clothing condition, gender identity) and interaction effects (between these three independent variables) in the same analysis to avoid alpha error inflation. This automatically results in the output of three-way-interaction results, however, we do not interpret the three-way-interactions because they would require a larger sample size. We set $\alpha = 0.05$ and report significant effects only. All analyses and values can be viewed in our supplementary materials along with graphs that display three significant three-way interactions.

4 RESULTS

4.1 Assignment of Primary Abilities

A two (colour) by two (clothing) by two (gender identity) MANOVA with the five primary abilities as dependent variables (i.e., intelligence, strength, dexterity, manipulation, endurance) showed a significant effect of clothing condition (sexualized/non-sexualized) on assigning points for manipulativeness. More manipulativeness was assigned to the character in the sexualized condition ($F_{1,56} = 5.22, p = .03, \eta^2 = .09$). There was further a significant effect of participant identity on manipulativeness: participants who did not identify as women assigned more manipulativeness points to the character overall ($F_{1,56} = 5.16, p = .03, \eta^2 = .08$). Another significant main effect of gender identity indicated that women assigned more endurance to the character than non-women did ($F_{1,56} = 6.93, p = .01, \eta^2 = .11$). No other significant main effects or interactions of clothing condition, colour condition, or participant gender identity on primary attribute distribution were observed. See Table 1 for overall means and standard deviations of attribute distribution and Figure 2 for a visualization of the main effects.
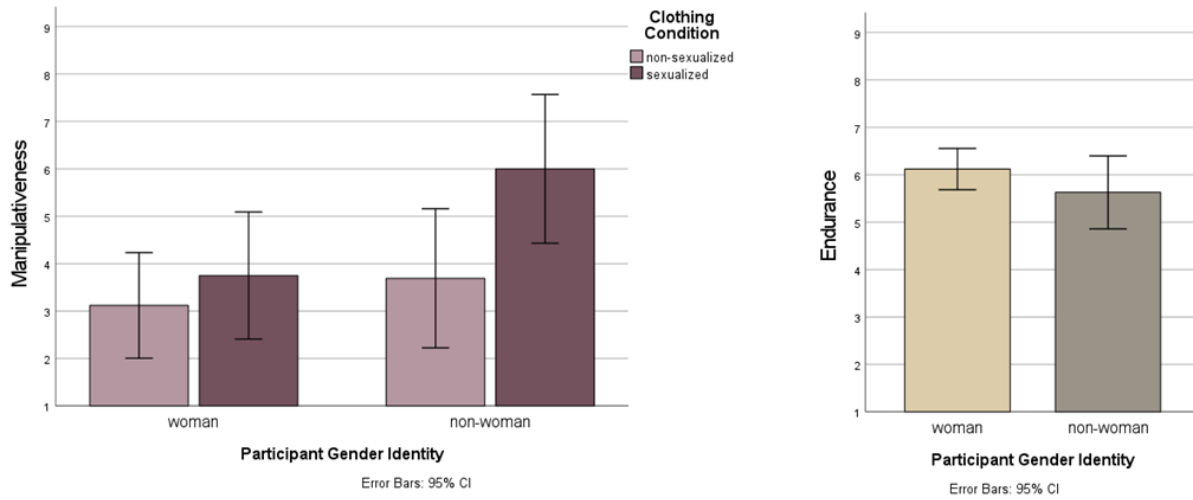
Figure 2: Significant main effects for primary attribute distribution. Error bars represent 95% confidence intervals.

Table 1: Means and standard deviations of primary and secondary attribute distribution in this sample.

	Mean	SD		Mean	SD
intelligence	8.3	2.2	impulsive	3.6	2.1
strength	5.6	2.0	deceitful	3.3	2.6
dexterity	5.9	2.0	charismatic	6.5	1.9
manipulativeness	4.0	2.8	clever	9.6	2.8
endurance	5.9	1.7	eager to help	6.7	2.9

4.2 Assignment of Secondary Attributes

A second MANOVA with the five secondary attributes (i.e., impulsive, deceitful, charismatic, clever, eager to help) as dependent variables revealed a significant main effect, indicating that, on average, women assigned the character more eagerness to help ($F_{1,54} = 10.54, p = .002, \eta^2 = .16$). A significant interaction between colour condition and participant gender identity further revealed that women and non-women were about equally likely to assign eagerness to help to the hero colour scheme character (women mean= 6.8; non-women mean=6.3); whereas, for the villain colour scheme, women were more likely to assign eagerness to help than non-women (women mean= 8.6; non-women mean= 5.0; $F_{1,54} = 5.94, p = .02, \eta^2 = .1$). Another significant interaction effect was observed between colour condition and participant gender identity on impulsiveness ($F_{1,54} = 4.77, p = .03, \eta^2 = .08$). Women were slightly more likely to assign impulsiveness to the hero colour scheme (women mean= 3.7; non-women mean= 3.2), whereas non-women were more likely to assign impulsiveness to the villain colour scheme (women mean= 3.2; non-women mean= 4.8). More specifically, this result shows that non-women were more likely to assign impulsiveness to the villain colour scheme characters than women were.

See Table 1 for overall means and standard deviations of attribute distribution and supplementary materials for a visualization of the main and interaction effects.

4.3 Character-Self Differentiation

In a three-way-ANOVA, we observe a significant effect for gender identity on whether participants reported that they made their story decisions as themselves or as the character. Women were more likely to report making decisions as themselves, whereas non-women were more likely to report making the decision from the perspective of the character ($F_{1,74} = 4.6, p = .04, \eta^2 = .06$). On a 5-pt. scale from 1=‘as myself’ to 5=‘as the character’, the mean in this sample was 2.8 (SD= 1.2). See Table 2 and supplementary materials.

4.4 Character Appeal

We asked participants whether they would choose to play Leandra in a game. A main effect in another three-way-ANOVA showed that regardless of participant gender or colour condition, participants in the non-sexualized conditions were more likely to report they would want to play the character ($F_{1,74} = 8.18, p = .005, \eta^2 = .1$). On a 4-pt. scale from 1-‘yes’to 4-‘no’, the mean in this sample was 2.2 (SD=.8). See Table 2 and supplementary materials.

4.5 Self-Objectification

Descriptive statistics show that most participants were likely to self-objectify, regardless of experimental condition (See Table 3). We observe a significant main effect, indicating that levels of self-objectification where higher after being confronted with a hypersexualized character ($F_{1,70} = 4.13, p = .046, \eta^2 = .06$). For a visualization see supplementary materials.

4.6 Rape Myth Acceptance

In the final three-way-ANOVA, using rape myth acceptance (AMMSA questionnaire) as the dependent variable, we observe two significant main effects. First, that of gender identity on rape myth acceptance ($F_{1,73} = 7.75, p = .007, \eta^2 = .1$), with non-women being more likely than women to agree with the rape myth statements. Second, a significant effect of the character clothing condition, with participants

Table 2: Means of perspective from which participants made their decision (lower indicating a player perspective and higher a character perspective; scale range 1 to 5) and how likely they would be to play the character (lower number indicating a higher likelihood; scale range 1 to 4) by condition and participant gender identity.

	player-character perspective		character appeal	
	woman	not a woman	woman	not a woman
hero colours/sexualized	3.0	3.0	2.4	2.3
hero colours/non-sexualized	2.6	2.8	2.0	2.0
villain colours/sexualized	2.2	3.5	2.6	2.4
villain colours/non-sexualized	2.6	3.4	1.8	1.8

in the sexualized conditions being more accepting of rape myths ($F_{1,73} = 5.2, p = .03, \eta^2 = .07$). However, all participant groups in our sample had low agreement with the rape myths on average (Mean=2.2, SD=.9 on a scale ranging from 1 to 7), with non-women in the hero-coloured sexualized condition having the highest agreement descriptively (Mean=3.1). See Table 3 and supplementary materials.

5 DISCUSSION

We first summarize the significant results and contributions from our study, then explain and interpret our findings, before discussing implications for design, and presenting the limitations of our research.

5.1 Summary of Results

Main Effects of Sexualization:

- Sexualized Characters were assigned more manipulativeness than non-sexualized characters were.
- Participants found the non-sexualized characters more appealing than the sexualized characters.
- Participants with sexualized characters were more likely to self-objectify.
- Participants with sexualized characters indicated higher agreement with rape myth statements.

Main Effects of Participant Gender Identity:

- Non-women assigned more manipulativeness to the character than women did.
- Women assigned more endurance to the character than non-women did.
- Women assigned more eagerness to help to the character than non-women did.
- Women were more likely to state that they made their decisions from their own perspective, rather than as the character, non-women were more likely to state that they made their decisions from the perspective of the character, rather than their own point of view.
- Non-women indicated higher agreement with rape myth statements that women did.

Interactions of Colour and Participant Gender Identity:

- Women assigned more eagerness to help to the villain colour characters than non-women did. Women and non-women both assigned a similar amount of eagerness to help to the hero colour scheme characters.

- Non-Women were more likely to assign impulsiveness to the villain colour scheme characters than women.

5.1.1 Contributions. The effects of character sexualization on rape myth acceptance and self-objectification that we see in our study are replications from previous work. However, prior work has produced mixed results, with some studies finding such effects while others did not. This is why *we explore additional character design factors beyond hypersexualization.* We theorized that other appearance traits may heighten or buffer effects of sexualization, and that one reason for mixed findings in previous work could be discrepancies in design of the character or game context. By deconstructing one additional aspect of character design (i.e., colour scheme) and considering participant gender, we hope to inform the conversation and create a template by which other aspects could be deconstructed as well, along with providing direction for future work that disentangles the effects of hypersexualization due to differences in character design and characteristics of the sample in which an effect is or is not observed.

Another replication of previous results in our work is the appeal of characters depending on their design: namely whether sexualization sells. Fewer studies have investigated this and such results might also depend on the characteristics of the participant sample. We asked participants if they would want to play the presented character in a game to see whether the sexualized or non-sexualized characters were more popular with our sample of young college students (of whom a majority were women).

A novel aspect of our work is the *exploration of whether sexualization and colour schemes lead to stereotypical attribute distribution in games.* Previous work has shown that players can relate to their avatars in different ways (e.g., [10]) and that some players make character choices based on what they feel fits the context and setting of a game (e.g., [56]). Bright, saturated colours are often used for protagonists, while dark, muted colours, specifically black and purple (or dark red) are often used for villains [33]. Thus, we assumed that the design of the main character influences how players describe it, and this factor was, indeed, relevant in our study. Colour seems to influence participants differently based on their gender identity, with non-women being more likely to be influenced by the hero-villain colour dichotomy for a feminine character than women. Understanding more complex three-way-interactions between colour schemes, degree of sexualization and player gender identity, however, requires future work.

Table 3: Means of self-objectification and rape myth acceptance (higher values indicating higher self-objectification (scale range -25 to +25) and higher agreement with rape myth acceptance statements (scale range 1 to 7)) by condition and participant gender identity.

	self-objectification		rape myth acceptance	
	woman	**not a woman**	**woman**	**not a woman**
hero colours/sexualized	11.4	19.0	2.0	3.1
hero colours/non-sexualized	16.9	10.7	2.0	2.0
villain colours/sexualized	17.0	8.3	2.3	2.6
villain colours/non-sexualized	5.5	7.8	1.8	2.4

5.2 Result Explanations and Interpretations

5.2.1 Character Attributes. Participants, on average, distributed more skill points into the manipulativeness attribute for sexualized characters. This pattern was especially pronounced for those participants who did not identify as women themselves (see Figure 2). This suggests that the lack of clothing and exaggerated proportions might have reminded participants of tropes that describe women as having powers to bewitch or control men [42]. It is further consistent with suggesting that feminine characters in games 'decide' not to wear clothes in order to gain an advantage by throwing others (people who are attracted to women) off guard [72]. Manipulativeness was likely interpreted as the most villain-like primary ability and our results show that sexualization suggested this trait to participants, while the villain colour scheme did not. Prior work has shown that even elementary school children rated sexualized middle school girls as less intelligent, less nice, and less athletic than non-sexualized girls [84]. This effect has also been shown in adult participants (e.g., [8]), and we show that negative characteristics are also more likely to be ascribed to sexualized characters even when participants can equip and control the character in any way they want. However, in this study we did not find a direct influence of how much intelligence was attributed to the character. That non-women were more likely to create their character in line with stereotypes could have multiple reasons. One possibility is that this is because women were more likely to state that they made decisions for the character from their own perspective. Because they were more likely to identify with the character in this way, they might have assigned Leandra more positive attributes, regardless of the appearance condition. Another option is that in general, non-women had less positive attitudes about the feminine character than women did. Women were further more likely to assign the character endurance as a character trait. It is not clear why this is the case but a possibility is that endurance is valued higher by women and is potentially a less gendered aspect of physical fitness. Further, participants might have found it to be a desirable attribute for their character because it could refer to emotional resilience as well.

As a secondary attribute, women were more likely to assign 'eagerness to help' to the character. However, this main effect is mostly caused by women assigning eagerness to help to both colour schemes, while men only assigned it to the characters in the hero colour scheme (as expressed in the two-way-interaction between colour and participant gender). Gender stereotypes often describe women as caring and nurturing (e.g., [2, 44]): a high identification of the women in the sample with gender stereotypes could explain the main effect. However, non-women (comprised of men and one non-binary participant in our sample) who hold such stereotypes might also have assigned eagerness to help to the hero-coloured character because the character was a woman. One possibility for the gender difference in eagerness to help assigned in the villain colour scheme character could be that, on average, women reported that they were more likely to make decisions as themselves rather than as the character. As such, assigning eagerness to help to the character in the 'villain colour scheme' could be a compensatory response, emphasizing a kind nature of their dark protagonist. It is possible that non-women were more likely to make choices based on stereotypical hero and villain colour schemes. In line with this interpretation, non-women were also slightly more likely to assign impulsiveness as a character trait in the villain colour scheme condition. Perhaps, the darker colours suggested less predictability to the non-women participants, or women were more likely to associate the black clothing with melancholy or sadness [64], and less with being villainous. In summary, participants were influenced by both character clothing and colour scheme when assigning character traits and we observed that these effects seem to influence participants differently depending on gender identity when they equipped a feminine character. This raises the question whether these effects would be different if the character had been masculine, which should be explored in future work.

5.2.2 Character Identification and Appeal. Our results show that women were more likely than non-women to report making story-decisions as themselves, whereas non-women were more likely to report that they made their decision from the perspective of the character. This is not surprising, given that the character was feminine. Previous work has determined that women are more likely to prefer playing female characters in video games (e.g., [34]), which could be because it allows them to identify more. As previous work has indicated, a lack of character representation for different identities in games can lead to lower levels of player flow and enjoyment [59, 82]. However, we did not find that non-women were less likely to report wanting to play this character. When asked whether they would want to play Leandra in a game, participants in this sample preferred the non-sexualized characters regardless of their own gender identity or the character colour scheme. Descriptively, the non-sexualized villain colour scheme character had the highest appeal out of all character versions for both women and non-women participants, showing that hypersexualized or characters catering to white (blonde) beauty standards are not needed to appeal to an audience and might even have the opposite effect in

some cases. In prior work, sexualized women were rated by participants as less nice, less intelligent, and less popular, especially when they were white [8]. An explanation for the preference of the non-sexualized character could be that the bikini armor outfit is viewed as immersion-breaking and unrealistic in the context of the presented story, or it might make players uncomfortable. Prior work found that fixation-durations on objects increase when they are seen as improbable in the context, showing that the context in which an object is presented influences ease of object processing [18]. However, this does not mean that sexy characters need to be excluded from the market. Rather, that they were less appealing and exciting to the majority of our participants of young, European university students. Out of 40 participants in the sexualized conditions, 5 said that they would want to play the sexualized character in a game and only two said that they definitely would not (14 said 'probably yes' and 19 said 'probably no'). Our results, thus, show that on average, players might be tired of seeing hypersexualized female characters, but that there were still those who appreciated or did not mind them. Stermer & Burkley hypothesized that repeated exposure to sexualized content might lead to desensitization [70]. The key to resolving stereotypical representation is to add less exaggerated and more realistic characters, that players can identify with, to the mix—not necessarily to remove options or condemn sexuality altogether. Our results should encourage game designers to create a wide representation of female characters (or any group of characters, no matter their gender, race, body type, hair or clothing colour, abilities etc.). Ultimately, the goal should be to allow all players to feel represented and any demographic to be recognized as unique individuals with different preferences and personalities rather than feeling stereotyped, objectified, or narrowly defined.

5.2.3 Self-objectification. We note that the overall prevalence of self-objectification was high. Most participants clearly already valued their appearance higher than their physical competence prior to the study. This could be a characteristic of the sample we are working with. We theorized that whether or not sexualization influences self-objectification in a study might depend on the type of sample that the study is conducted with. Again, our sample was a convenience sample of young university students, of which the majority were women. Prior work suggests multiple reasons for self-objectification beyond hypersexualized video game characters. A recent study reports exposure to idealized images through social media platforms like Instagram to be a source of self-objectification for many [35]. Skowronski et al. [81] report long-term effects of both Instagram use and sexualized video game content on self-objectification. For example, Tiggeman and Barbato presented either appearance-related or place-related comments along with Instagram pictures to female undergraduate students: while they did not find a direct effect of condition on self-objectification, they found that participants higher in self-objectification showed increased levels of body dissatisfaction after being confronted with the appearance comments [85]. This might highlight that participants who already self-objectify are more susceptible to being confronted with sexualized depictions of women. Even if objectification in media does not universally harm everyone, it can still be detrimental to sub-groups. The literature is not conclusive when it comes to main effects of sexualization and idealization on self-objectification;

however, most studies find either no significant effect or negative effects, meaning that it is unlikely that constant hypersexualization has a positive effect. This further suggests that there are groups that are more affected and groups that are less affected (because findings seem to depend on the design and sample of each specific study) and identifying and protecting vulnerable groups is still an important task. Even a meta analysis that did not find significant overall effects still presents marginally significant results for effects of sexualization on both body dissatisfaction and sexism/misogyny [26]. Prior results do indicate that it might be unlikely that being exposed to only a few scantily clad or exaggerated characters has a lasting effect on self-objectification; however, a constant exposure to unrealistically idealized images throughout social media, video games and film, could still have additive effects for many consumers. If there are no clear indications for their positive impact, then why hold on to this amount of exaggerated representations? In summary, beauty standards and unrealistic depictions of human beings might lead to the overall notion that appearance matters more than bodily health and fitness, which seemed to be generally the case in our sample (as indicated by the high prevalence of self-objectification in all experimental conditions).

In this study, we did not find women to be self-objectifying more than non-women. For men and non-binary people, these results suggest that a sexualized or idealized character may prompt similar thoughts around beauty standards as for women, but possibly interpreted through the lens of a potential partner rather than a comparator (as all but 2 of 28 people in our non-woman sample were attracted to women). Such a character may prompt agreement with stereotypes around beauty standards for women, and perhaps also raise awareness of beauty standards for men, which might relate to different beauty standards, such as a need for musculature.

5.2.4 Rape Myth Acceptance. In this sample, rape myth acceptance was overall low, but nonetheless we observed two significant main effects. Participants in the sexualized character conditions were significantly more likely to agree with the statements in the questionnaire, indicating that being exposed to exaggerated and hypersexualized characters is likely to contribute to harmful stereotypes. This is a replication of previous findings (e.g.,[22, 31]). Fox et al. [31] explained such effects in women, through exposure to sexualized media heightening self-objectification and this self-objectification leading to dehumanizing women, which results in more negative attitudes. In our sample, however, self-objectification means were high and rape myth acceptance was low. In general, non-women were more likely to indicate higher agreement with rape myth acceptance statements than women. A reason could be that harmful narratives might be more easily rejected when identifying with them personally: women might find it easier to imagine themselves in situations as described in the questionnaire and might be more likely to have experienced threatening circumstances prior to the study. We want to emphasize that this does not mean that non-women cannot be subject to such harmful beliefs about themselves as well. Other factors, such as race, may further contribute to such effects [8, 67]. Most video game characters are white, which makes comparisons difficult and rare, however, prior work has found that black female characters are less likely to be depicted as 'attractive'

(compared to Asian and white characters) and white female characters are unlikely to be depicted as muscular [5]. The same study noted that white female characters are more likely to be depicted as sexualized than black or Asian female characters [5]. It is possible that such findings are due to the rarity of non-white women characters in games, meaning that games that feature only white characters might also be the most likely to depict characters in stereotypical ways. This study can not inform about intersectional aspects because only white feminine characters were presented and most participants were white.

5.3 Implications for Game Designers and Game Publishers

Our study replicates previous findings [30, 31, 93], showing that exposure to overly sexualized characters can reinforce harmful beliefs about sexual aggression, and the intentions of women. These assumptions range from believing that woman prioritize their appearance over their intelligence, to assuming that women are seeking sex when they initiate meeting for a cup of coffee. Given the prevalence of incel culture within gaming spaces [14, 53, 58], reinforcing potentially harmful beliefs about women through gaming characters is a dangerous practice. The term *incel* stands for 'involuntary celibate' and is a self-description of men who find it difficult to attain sexual relationships and often express misogynistic views, including that women want to be sexualized and men want to sexualize [69]. Gaming companies need to take responsibility for their role in perpetuating these problems. If exaggerated or exposed characters are the only options for feminine representation or if they are overly prevalent, then we can anticipate negative ramifications for all players, and for women in particular, such as increasing self-objectification, which is characterized as placing beauty above health. While the first incels were women [73], the current course of the incel movement can be described as a group of men who do not only objectify women, but also themselves. They are mostly heterosexual men who define themselves through the extent to which they perceive themselves as rejected by women (which they frequently refer to as 'femoids') [73]. Incels usually see themselves as 'beta males' [39] who are less attractive, powerful, and sexually successful than desirable 'alpha men' [89].

Given the current prevalence of toxicity and sexism in gaming cultures (e.g., [12, 16]), and the harm that women gamers experience as a result, even the potential or a higher likelihood of reinforcing harmful stereotypes is problematic, especially when there are no clear benefits of hypersexualization. In many games, and particularly ones with a collection of heroes or champions (such as DoTA, League of Legends, Overwatch, or Valorant), the appearance of the characters is less important to the gameplay than their attributes; however, our findings show that players are making some of their game-play decisions based on the character's appearance. Further, assumptions based on character appearance may extend to the player behind the character [79].

An argument that could be made is that overly sexualized characters persist because fantasies are appealing; however, our results suggest that this may not always be the case and that there are other (less harmful) ways than extreme sex appeal to creating a fantasy appearance. For example, in the case of Overwatch, Activision

Blizzard decided to remove a sexualized victory pose of the female character 'Tracer' from the game as a result of player feedback [45]. Our participants were less enthusiastic about the overly sexualized character versions. In our study, the non-sexualized characters were still conventionally attractive and idealized, so we cannot extend beyond what we presented to participants. Even if the appeal of the unrealistically 'idealized' fantasy was that strong, however, we are conditioned by what we see, and many popular games have limited designs for their female characters. That can make it difficult to understand whether people report what they want or what they think they are supposed to want, based on current options and what they are used to.

Newer games are more likely to have the option to design characters that don't conform to these tropes, but it might be more difficult to change existing characters in older, yet still popular games. However, even in new releases we still see little diversity in facial features and body types of female characters. While this is frequently pointed out by the community (e.g., [28, 48, 49, 94]), the lack of facial feature diversity receives little to no attention in games research. In one study it was noted that female game characters do not demonstrate human diversity and are characterized by a lack of emotional expressiveness [36]. While, for example, character designs in Overwatch [9] are more diverse than in many previous games, they still leave much room for improvement. A blogger describes this in detail: *"While the men seem to have varied body types, all of the women seem to be rather cookie-cutter. As one commenter puts it, "These women are all palette swaps of each other." They all still have the same proportions: large chest, small waist, generally younger, with a fit-figure and slender legs. Very, very few of these women have radically different body types, ages, physical features, or really anything that directly relates to their playstyle"* [1]. Furthermore, we still see examples of newer games where even female martial artists only wear high heels and have exaggerated walking animations (e.g., Lost Ark [87], released in the west in 2022; see [25]). Further, mobile game apps advertising aggressively with scenes of hypersexualized characters are hard to avoid, even though prior work found overly sexualized content to be one of the reasons that participants gave for disliking online advertisements [95].

If there is no clear evidence that hypersexualization improves sales or player experience, then what other reasons cause this? Tompkins & Martins interviewed 19 game designers to better understand common design practices [86]. They portray a world where creating content for an 18 to 35-year-old male audience is normalized, with sexualized women being seen as attractive to this demographic. However, the authors further describe that many in the industry are open to a change in typical representations when team members who are conscious of diversity are allowed to advocate for it—portraying a situation in which the majority of white, heterosexual and male game designers is simply less likely to question the status quo. This highlights that even today there is still a lack of awareness when it comes to issues with character representations.

According to our findings, game designers should also be mindful of unintentionally influencing game-play decisions through stereotypical character designs. Players can make assumptions based on the appearance of a protagonist and assign it different character

traits. Game designers could, however, use such effects to their advantage by encouraging players to explore different traits by presenting less stereotypical character designs. More work is needed on understanding how design choices influence player decision-making. Even the effects of common character design practices such as 'shape language' or 'colour associations' are hardly empirically understood. In the meantime, it is worth to at least question potential implications of any (stereotypical) design choice before implementation. Prior work has suggested to adjust colour palettes of films in order to localize them for different cultures, because people in different cultures respond differently to colours [54]. This suggests that colour associations are learned rather than innate and reinforced by culture.

5.4 Limitations and Future Work

Our study has several limitations. First, it was in part a replication and in part an exploratory study (because effects of colour schemes in character designs are understudied, while sexualization of women characters has been researched before). While we can observe which colours are often used, we had little empirical evidence for how this might affect character perception and in-game decision-making to inform our study design. Therefore, our study marks a starting point in this area. Further, we are aware that there are intersectional elements when it comes to the perception of sexualization [8]. In our study, most participants were white, with a sample that was not diverse enough to check for meaningful statistical differences between ethnic groups. The presented character was also white and feminine. In future studies, it should be explored if these effects can be replicated and also whether they apply for different types of avatars with varying representations of gender. We distinguished participants who self-identified as women from participants who do not, rather than comparing women to men, in order to be inclusive of non-binary participants. Removing these participants would have rendered the group invisible and unimportant as was often the case in the past. However, we acknowledge that including two non-binary participants and grouping them in with the next-best fitting group does not mean that non-binary participants were sufficiently represented in our study. We further asked about sexual preferences and queer identities but ultimately our convenience sample was not diverse enough to draw conclusions when it comes to complicated interactions between gender identity and sexual orientation variables, which highlights the need for more future work. While presenting a text adventure illustrated with images allowed us to remove nuisance variables and is a valid approach to researching the game context [11], it does not allow to include all aspects of sexualization that can be present in games, such as sexualized movements, voice acting, or animations such as physics of the breasts (e.g., exaggerated jiggling) [78]. These aspects might add additional layers to character sexualization and our understanding of how it is perceived. In addition, varying the overall clothing style, tightness of clothes, facial expression, or body type of the character might play a role. These variables might interact with the amount of clothing that is presented. Further, the experiment design did not account for the influence of stereotype threat (see [52]). We measured demographic variables in the end of the study to avoid inducing stereotype threat but with a bigger

sample size it would be possible to have an additional experimental condition, where stereotype threat is induced in the beginning of the experiment. In a real-world setting, stereotype threat is likely to be present and experiencing it might change the way in which players react to digital characters. Finally, social desirability and conformity bias pose a challenge to any experiment design that involves self-report measures. There is a need for future work that can account for and overcome these biases.

5.5 Conclusions

This work replicates and expands on previous findings regarding the effects of character appearance on player perceptions, preferences and decision-making. In particular, we introduce colour scheme as a factor that we expected to interact with character sexualization. However, we conclude that in this study, effects of colour scheme and sexualization were mostly independent from each other. Participants who were confronted with the hypersexualized character assigned more manipulativeness, found the character less appealing, and were more likely to agree with self-objectifying and rape myth acceptance statements than participants who were assigned the non-sexualized character. Colour schemes influenced participants differently depending on gender identity, with women leaning less heavily into stereotypes founded in common narrative tropes. Our study further addresses a gap in previous research by considering the role of visual character design in conveying personality and morals, which can influence player perceptions of women. We argue that additional underlying variables may be able to explain the inconsistencies observed in prior studies when it comes to effects of exposure to hypersexualized game characters. Finally, our findings challenge the prevailing trend among game studios to rely heavily on sexualized and stereotypical depictions of women. This study provides further evidence that such depictions do not offer any tangible benefits, and in fact, may cause harm to players. As such, we urge game studios to reconsider their reliance on superficial and idealized character designs, and instead strive for more diverse and realistic depictions of women.

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