The Avatar Affordances Framework: Mapping Affordances and Design Trends in Character Creation Interfaces

Victoria McArthur
University of Toronto
victoria.mcarthur@utoronto.ca

Robert J. Teather
McMaster University
teather@mcmaster.ca

Jennifer Jenson
York University
jjenson@edu.yorku.ca

ABSTRACT
Avatar customization is available in many games, but as yet there is no analytical framework capable of enabling systematic comparison between games. To investigate this issue, we present our novel analytical framework, referred to as the Avatar Affordances Framework. To model the framework, we analyze the character creation interfaces of 20 games. We focus in particular on the different ways gender and ethnicity are presented to players. Preliminary analysis reveals that many popular games have socially exclusive values, and that high fidelity character creation interfaces are no exception. The framework itself offers a more comprehensive tool than previous (e.g., count-based) approaches to investigating self-representation issues in character creation interfaces.

Author Keywords
Avatar Affordances Framework; Character Creation Interfaces; Gender: Ethnicity; Self-Representation; Interface Analysis

ACM Classification Keywords
H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous; K.8.0 [Personal Computing]: Games.

INTRODUCTION
A growing number of digital games and virtual worlds allow users to create a virtual self, commonly referred to as an "avatar". The avatar is a digital entity which is controlled by the user to attain agency within the virtual world. Avatars are visually customized by users via interfaces, referred to within the body of this work as Character Creation Interfaces (CCIs). Figure 1 depicts a typical CCI from CCP Games *Eve Online*.

Avatar customization in video games has been widely studied. Work in this area is largely anthropocentric, offering theories on avatar customization in the context of user choice [1, 9, 10, 19, 20, 25, 38]. In this sense, avatars are theorized as designed artifacts – the result of intentional design by intentional users. While these approaches tell us a great deal about users, they tell us very little about the interfaces used to create these avatars.

When creating an avatar, users are presented with hundreds if not thousands of options to customize their avatar's appearance. This typically includes, for example, selecting their avatar's hairstyle, skin colour, body features (height, weight), facial features (eyes, nose, eyebrows), and so on. Many CCIs are thus capable of producing millions of unique combinations. Each combination represents a unique avatar. Customizing one's avatar is a key component of creating an identity in online environments [30]. The pragmatics of avatar customization induces a meaningful relationship between user and avatar from the start.

Figure 1. Character Creation Interface for EVE Online.

CCIs are a relatively understudied aspect of identity in games. Analytical methods for the systematic study of game interfaces have been proposed within the field of game studies [6]. The most common method applied to date is a counting method, where all available customization options are counted and documented in order to quantify differences between avatars [6, 28] or games [18, 29]. While the counting method has contributed valuable critiques about these interfaces, the methods tend to break when applied to different games. For example, differences in quantities provide little insight into the range of customization options presented to users of certain games. To this end, we have developed an analytical framework which we refer to as the *Avatar Affordances Framework*, to

CHI PLAY 2015, October 03 - 07, 2015, London, United Kingdom

ACM 978-1-4503-3466-2/15/10…$15.00
DOI: http://dx.doi.org/10.1145/2793107.2793121

address these limitations. To model this framework, we present an analysis of the CCIs of 20 different recent games. We focus exclusively on how customization options are presented to players for two features: gender and ethnicity.

The primary motivation of this research is to explore the affordances or *action possibilities* of avatar creation interfaces. While these systems have previously been studied in terms of content (e.g., ethnic diversity or lack thereof) [19, 23] or complexity (e.g., high/low fidelity) [9], few scholars have systematically studied these interfaces in terms of affordances [30]. The main purpose of the Avatar Affordances Framework is to present researchers with a robust tool for systematically studying the affordances of CCIs. While our analysis of 20 games is presented as an example to validate the framework, the resultant analysis also provides valuable discussion on current trends in CCIs.

RELATED WORK

Character creation interfaces are the fundamental tool by which players create their avatars, yet these interfaces are largely underrepresented in the literature. Critical analysis of these interfaces is largely discursive in nature. They provide narrative accounts of limits on self-representation that are strongly grounded in relevant theories [17, 23], but fall short of yielding productive discourses that contextualize these results in a meaningful way.

A few studies have provided quantitative interface analysis data. For example, research conducted by Consalvo [5] and Pace et al. [28, 29] indicates that there are quantifiable differences between different race and sex choices within games. The researchers counted all distinct customization options available to players. They found significant differences between the number of options available within the same game, in particular, how customization favours Caucasian or light-skinned avatars. This illustrates how socially exclusive values (e.g., marginalization of minorities by making it impossible to create representative avatars) were coded within the games [29].

Data derived from the counting method employed by Consalvo [5] or Pace et al. [28, 29] is useful in demonstrating quantifiable differences. However, it provides little insight into the quality or range of customization choices available in a given CCI. Additionally, while this data is highly useful in discussing differences (e.g., between races) within a single game, quantitative data yielded from the counting method does not enable meaningful comparison between games. To further complicate matters, many modern character creation interfaces introduce the use of novel widgets, such as triangular sliders, such as those found in *Saints Row IV* and *Rift* (see Figure 2). In many cases, these novel widgets provide no straightforward means to count the number of options they afford. An alternative means of analyzing such widgets is thus required.

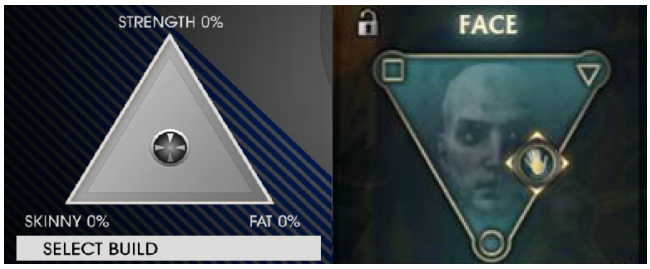

Figure 2. Triangular sliders in Saints Row IV and Rift.

The study of game interfaces is important, not just in terms of usability, but also in terms of understanding how game interfaces remediate culture and communicate ideologies. Consalvo and Dutton explain, "[e]xamining the interface (and going beyond elegance of design or ease of use) lets researchers determine how free players are to experiment with options within a game. Alternately, it can help us see what information is privileged...and what information is absent or difficult to find" [6]. Consequently, we argue that critical study of CCIs should include analysis of what choices are present or absent, default configurations, and how users are invited to modify these configurations. We thus look to the widgets (interaction elements within the graphical-user interface) used in the interface. This allows us to isolate each widget (e.g., widgets associated with ethnicity) for direct comparison between each game.

Nakamura [24] describes how interface widgets constrain a user's ability to express their identity online. She referred to this phenomenon as "menu-driven identities"; the ways in which design "...reveals assumptions about a user's race and ethnicity" [24, p. 101]. The type of widget chosen by the designer, and the limitations it imposes on a players' online identity, presents a hegemonic view of identity and limits the user in their ability to represent themselves online. As Nakamura suggests, "[c]yberspace's interfaces are perfectly hegemonic, in the sense that they are enforced and informed by dominant ideologies, however unconscious, as well as, to a much lesser extent, infrastructure and design limitations" [24, p. 135].

Massively-Multiplayer Online Games (MMOGs) and virtual worlds are, in essence, modern graphical variants of text-driven Multi-User Dungeons (MUDs). Early work on self-representation in MUDs reveals that multiple genders were available to players; players could choose to be gendered, gender-neutral, or gender-plural [2, 32]. Modern CCIs, however, often limit players to the gender binary of male/female. In this sense, modern CCIs are much more constraining than the expressive freedom offered by the text-based UI of MUDs. Modern CCIs effectively conflate biological sex with gender, the distinction between which is made in feminist theory [2, 3]. Nevertheless, even contemporary academic papers [16] still mistakenly use the word *gender* as a formal sounding word for *biological sex*. With this in mind, it is not surprising that the same issue would commonly occur in CCIs as well.

While not surprising, the problematic representation of race in games is a recurring topic in game studies literature [4, 7, 17, 19, 23]. This topic ranges from issues of lack of ethnic diversity in games and virtual worlds [17, 19], problematic (often racist) representations of race in games [23], and the seemingly benign design decision to have character creation interfaces "default" to a particular ethnicity [4, 5]. Based on these and other critiques, we look to existing character creation interfaces to study the action possibilities they afford their users. Our work is motivated by the expectation that the affordances of these interfaces have a greater impact on self-representation than currently theorized.

AFFORDANCES

The term affordance originated with the work of Gibson [14, 15] and was later adopted by the HCI community through the work of Don Norman [26, 27]. Within the HCI community, interpretations of the concept of affordances have become increasingly diverse since Gibson's work [22]. Despite nuanced conceptual shifts, the term has generally held to refer to *action possibilities* offered by a tool, environment, or user interface, to give clues to its usage. Norman [26], for example, discusses the affordances of door handles at length, and how the design of the handle should indicate if the door requires pushing or pulling. Similarly, in UI design, software buttons are often designed with a bevelled look, to help convey the ability to push them. We argue that interfaces are more than tools – through their affordances, interfaces *co-construct* an online identity with the user.

As discussed, existing theories on avatar customization focus on avatars as something that is designed by the user for the purpose of taking on a desired identity in a virtual setting. Player avatars are discussed in terms of identity fidelity or the kinds of avatars users like to create. This assumes they approach CCIs already knowing what kind of avatar they will create. Suchman [34] examines the tension between interaction and intention, challenging "traditional assumptions regarding purposeful action and shared understanding" [34, p. 69].

Using the term "situated action", Suchman proposes that the actions we take when interacting with interfaces depends on "material and social circumstances" [34, p. 70]. In the context of avatar creation, even if users approach CCIs with customization strategies in mind, the avatar they create is a result of situational circumstances that contributed to the creative process. We developed the Avatar Affordances Framework to break down individual parts of CCIs in order to study their affordances and how these influence avatar customization. We present this framework in the following section.

THE AVATAR AFFORDANCES FRAMEWORK

We propose a framework within which to study how CCI affordances influence avatar creation. Starting with the Function-Behaviour-Structure framework [11-13, 21, 33], we propose a framework to address the aforementioned limitations of previous work. Our intent is to provide an analytical tool that facilitates the study of CCI affordances, allows for comparable analysis between different games, and is capable of analyzing novel UI widgets which were previously inaccessible by counting methods.

Gero et al. have published extensively on their Function-Behaviour-Structure (FBS) framework [11-13, 21, 33]. The FBS framework is a design ontology that provides a foundation for analyzing the design process as well as designed objects. The FBS framework has been refined and modified over more than two decades, and provides a good starting point for systematically analyzing CCIs.

The FBS consists of the following components:

Function – the purpose(s) for the interface widget (e.g., select hairstyle, etc.)

Behaviour – attributes derivable from the widget (e.g., choose 1 of n options, etc.).

Structure – a technical description of the interface widget (e.g., slider, button, etc.). Additional specifications pertaining to the widget are appended with a colon (e.g., slider: discrete). Where the quantity of choices is derivable from the widget, this number is indicated in round brackets immediately following the structure's name.

Ultimately, this breaks down each customization option into its function, behaviour, and structure. This allows us to code CCIs in a way that is not only meaningful in terms of affordances. Moreover, because it can be applied consistently to different CCIs, it also enables direct comparison between games. Using FBS as a foundation for our framework, new components can be added as necessary to accommodate new and emerging research questions. Our Avatar Affordances Framework adds three components to Gero's framework: Identifier, Hierarchy, and Default.

Identifier – what text and/or icons are used to convey the widget's purpose? (e.g., text: select a gender). This is relevant since the identifier gives hints as to how to use a particular widget. This, in turn, may influence the player directly or indirectly.

Hierarchy – a numerical value indicating a widget's position in relation to the customization section of a hierarchical interface. For example, a hierarchy value of "2" indicates that the widget is part of a sub-section, while a hierarchy value of "0" indicates that it exists outside the customization section**.** Hierarchy is important because hierarchical interfaces not only privilege some customization options over others, but may also unintentionally hide options from novice users. An example of hierarchy is depicted in Figure 3.

Presently, the framework only includes customization that occurs prior to entering the game world. This includes some options that occur prior to entering the CCI (i.e., at

hierarchy "0"). While some games offer customization in-world, we chose to focus only on customization options as they are presented to users outside of the game world. We included hierarchy "0" options to allow us to distinguish between interfaces with default permutations, those that are randomized on loading, and those that invite users to make choices prior to entering the CCI that subsequently make up the avatar that is shown when the CCI loads.

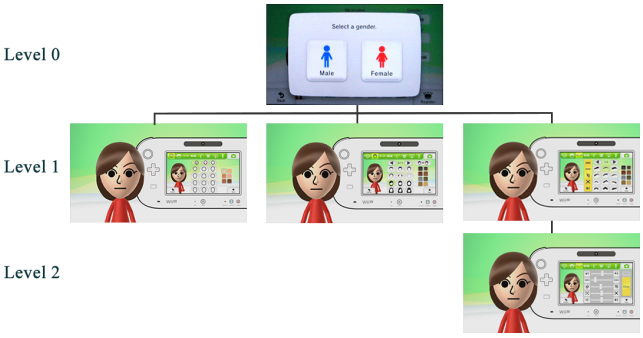

Figure 3. Hierarchy in the WiiU Mii Maker interface. Level 0 occurs before entering the CCI. Level 1 is the "top-level" options presented. Level 2 is a sub-menu.

Default – indicates whether the widget consistently defaults to a particular selection, i.e., they always present a particular configuration upon starting to create a new avatar. Where possible, additional qualifiers are added to indicate what the default value is (e.g., skin colour: white). Some CCIs do not employ default values, and instead present players with a randomized avatar at the onset of character creation. In such cases, we indicate that these widgets have a default value of *none.* This means that the players can modify this value, but it does not have a default configuration. In addition, some games prompt players to make selections *prior* to entering the character creation interface (see Figure 3). We have coded these widgets as having a default value that is *player selected,* indicating that players must actively make this choice before they are presented with a starting avatar.

Hierarchies in interfaces are particularly important [6] since the hierarchical presentation of customization options can be problematic. For example, some options may be hidden or "buried" in deeper levels of the hierarchy, while others are prominent. It is not a question as to whether or not artifacts have political properties; researchers need only study them to uncover political relationships or ideologies with which they are aligned [37]. Similarly, we are interested in default configurations of avatar bodies, especially with regard to gender and ethnicity [4]. While users are usually able to move away from defaults, defaults reveal assumptions about players that, even if not intentional, are significant and should not go unstudied.

ANALYSIS

In this section we present an example of using the Avatar Affordances Framework to model gender and ethnicity in 20 different game CCIs. Game titles are seen in Tables 1 and 2. The games were selected to represent a broad range of release dates (2004 – 2015), and genres (e.g., MMORPG, urban crime simulator, sports, social virtual world, etc.). This variety helps validate the robustness of the framework. The data presented here was coded by the lead author.

All but one of the analyzed games present players with the option of playing as either a male or female avatar. Some CCIs contains additional widgets that allow players to further modify how their bodies are gendered, such as being able to edit secondary sex characteristics. In these cases, any additional widgets that allow players to modify aspects of their avatar's body pertaining to the avatar's sex are included in this analysis. Table 1 summarizes the gender analysis results.

We also used the framework to code interface widgets associated with ethnicity (Table 2). Where possible, the default ethnicity was identified in the coding (e.g., Caucasian). This helps draw out a more meaningful analysis beyond whether or not each game does default to one ethnicity over another. In nearly all cases, a human female (or closest equivalent) was created using each interface. Some games analyzed contain playable races that are based on humans, or humanoid, but are not officially classified as human. These include races such as the Caldari in *EVE Online* (shown in Figure 1) or the Mathosians in *Rift.* However, these races are close enough to human for the purposes of comparable analysis.

Affordances Analysis for Gender and Ethnicity

The Avatar Affordances Framework enables collection of countable data, such as that presented by discrete sliders or colour pickers. As stated previously, while this data is not very meaningful between different games, it can be meaningful to compare the number of options available to different avatars within the same game, similar to the racial discrepancies Consalvo noted in The Sims [5].

As seen in Table 2, when creating a *Mii*, players can choose from six skin colours, while *Rift* players can choose from 90. However, we note that a greater number of customization options is not necessarily indicative of a socially inclusive interface. Nor does simple counting enable meaningful comparison of the affordances of these two CCIs for ethnicity. Both widgets are seen in Figure 4.

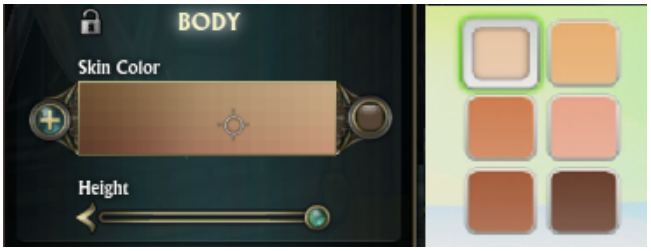

Figure 4. Widgets associated with skin colour for *Rift* (left) and the *Mii Creator* (right).

Game	Avatar	Identifier	Function	Behaviour	Structure	Hier.	Default
Dark Souls	Female	Sex	Select sex	Choose 1 of 2	List(2)	1	Male
		Hormones	Adjust gender	Adjusts incrementally	Slider: continuous	1	Yes
Demon's Souls	Female	Gender	Select sex	Choose 1 of 2	List(2)	1	Male
		Gender	Adjust gender	Adjusts incrementally	Slider: continuous	1	Yes
Destiny	Human female	Race/gender	Select race and sex	Choose 1 of 6	Button(6)	1	None
Dragon Age Origins	Human female	Gender	Select Sex	Choose 1 of 2	Button: Preview(2)	1	Male
EA Sports Active	Female	Gender	Select sex	Choose 1 of 2	List(2)	0	Player selected
EVE Online	Caldari female	♂ and ♀	Select sex	Choose 1 of 2	Button: avatar(2)	0	None
		♂ and ♀	Select sex	Choose 1 of 2	Button(2)	1	Player selected
Guild Wars 2	Human female	Select gender	Select sex	Choose 1 of 2	Button: avatar(2)	0	Male
Guitar Hero 5	Female	Select a gender	Select sex	Choose 1 of 2	List(2)	1	None
Jam City Rollergirls	Female	N/A	N/A	N/A	N/A	N/A	Female
Maple Story	Explorer female	Character gender	Select sex	Choose 1 of 2	Button: avatar(2)	1	None
Mass Effect 3	Female	New game	Select sex	Choose 1 of 3	List(3)	0	Player selected
Mii Creator	Female	Select a gender	Select sex	Choose 1 of 2	Button(2)	0	Player selected
Playstation Home	Female	[tooltip]	Select sex and skin colour	Choose 1 of 18	Button: preview(18)	0	Female
		Gender	Select sex	Choose 1 of 2	Button(2)	1	Player selected
Rift	Mathosian female	Choose your race...	Select race and sex	Choose 1 of 6	Button: portrait(6)	0	None
RuneScape 3	Female	Choose a gender	Select sex	Choose 1 of 2	Button: avatar(2)	1	None
Saints Row 2	Female	Sex	Select sex	Choose 1 of 2	List(2)	1	Male
		Body Shape	Adjust gender	Adjusts incrementally	Slider: discrete(101)	1	25
Saints Row IV	Female	Customize Character	Select sex and skin colour	Choose 1 of 9	Button: portrait(9)	0	Yes
		Sex	Select sex	Choose 1 of 2	List	2	Player selected
SIMS 3	Female	Gender	Select sex	Choose 1 of 2	Button(2)	1	None
Skyrim	Nord female	Sex	Select sex	Choose 1 of 2	Slider: discrete(2)	1	Male
World of Warcraft	Human female	Gender	Select sex	Choose 1 of 2	Button(2)	1	None

Table 1. Avatar Affordances data for gender. The avatar type listed is the avatar the researcher was attempting to create.

Initially, the *Rift* CCI appears to offer greater diversity in terms of ethnicity. However, examining these two widgets side-by-side, it is apparent that players would be hard pressed to notice the difference in skin tones offered by *Rift*. The 6 shades offered by the *Mii Creator* may offer equally or at least more noticeable diversity in skin colour. We therefore argue that researchers should focus on *how* these choices are presented and mediated by the CCI itself, rather than focusing exclusively on *how many* options are provided. The Avatar Affordances Framework offers this capability, unlike past counting methods.

It is interesting to note which games use identifiers to help communicate widget purpose. The most frequently occurring word in the "Identifier" column of Table 1 is gender; 60% of the games analyzed use the term. Sex is the next most common term, used by only 20% of the games. Looking to the rest of the data reveals a commonality: In all cases the player is presented with a binary choice between male and female, regardless of the widget's label.

There are a handful of outliers in the gender data that will be addressed here. While the terms sex and gender are the most frequently occurring identifiers in the table, games like *Destiny* and *Rift* present the choice of race and sex as a combined one, where players can choose one of *n* choices, where *n* is greater than two, but incorporates the choice of 1 out of 2 possible avatar sex settings.

In some cases, the choice of avatar sex was presented to players prior to entering the CCI, such as the magazine presets in *Saints Row IV*. This occurs in eight of the interfaces included analyzed. What is most interesting about

Game	Avatar	Identifier	Function	Behaviour	Structure	Hier.	Default
Dark Souls	Female	Skin color	Select skin colour	Adjusts incrementally	Slider: continuous	1	Caucasian
		Pigment		Adjusts incrementally	Slider: continuous	1	Caucasian
Demon's Souls	Female	Skin color	Select skin colour	Adjusts incrementally	Slider: continuous	1	Caucasian
		Pigment		Adjusts incrementally	Slider: continuous	1	Caucasian
Destiny	Human female	Skin color	Select skin colour	Choose 1 of 9	Button: swatch(9)	1	None
Dragon Age Origins	Human female	Skin Complexion	Select Skin Complexion	Choose 1 of 6	Slider: discrete(6)	1	Caucasian
		Skin Tone	Select Skin Tone	Choose 1 of 7	Slider: discrete(7)	1	Caucasian
EA Sports Active	Female	Skin color	Select skin colour	Choose 1 of 6	Button: swatch(6)	1	Caucasian
EVE Online	Caldari female	Complexion	Select skin colour	Choose 1 of 12	Colour wheel(12)	1	Yes
Guild Wars 2	Human female	Skin color	Select skin colour	Choose 1 of 24	Button: swatch(24)	1	Yes
Guitar Hero 5	Female	Change color	Select skin colour	Choose 1 of 65	Colour wheel(65)	2	None
Jam City Rollergirls	Female	Body	Select skin colour	Choose 1 of 5	List(5)	1	Caucasian
		Arms	Select skin colour	Choose 1 of 6	List(6)	1	Caucasian
		Legs	Select skin colour	Choose 1 of 7	List(7)	1	Caucasian
Maple Story	Explorer female	Skin color	Select skin colour	Choose 1 of 4	List(4)	1	None
Mass Effect 3	Female	Skin tone	Select skin colour	Adjusts incrementally	Slider: continuous	1	Yes
Mii Creator	Female	None	Select skin colour	Choose 1 of 6	Button: swatch(6)	1	Caucasian
Playstation Home	Female	[tooltip]	Select sex and skin colour	Choose 1 of 18	Button: preview(18)	0	Caucasian
		Color	Select skin colour	Choose 1 of 12	Button: swatch(12)	1	Player selected
Rift	Mathosian female	Skin color	Select skin colour	Choose precise value	Colour picker(90)	1	None
RuneScape 3	Female	Tooltip["Choose a skin colour"]	Select skin colour	Choose 1 of 12	Button: swatch(12)	1	None
Saints Row 2	Female	Skin	Select skin colour	Choose 1 of 18	Button: swatch(18)	1	African American
		Race	Select ethnicity	Choose 1 of 4	List	2	African American
Saints Row IV	Female	Customize Character	Select sex and skin colour	Choose 1 of 9	Button: portrait(9)	0	Yes
		Race	Select ethnicity	Choose 1 of 4	List	2	Yes
		Skin	Select skin colour	Choose 1 of 55	Button: swatch(55)	2	Yes
SIMS 3	Female	[tooltip: skin color]	Select skin colour	Adjust incrementally	Slider: continuous	1	None
		[tooltip: skin tone]	Select skin colour	Choose 1 of 13	Button: swatch(13)	1	Yes
Skyrim	Nord female	Skin tone	Select skin tone	Choose 1 of 10	Slider: discrete(10)	1	Caucasian
World of Warcraft	Human female	Skin color	Select skin colour	Choose 1 of 10	Button: preview(10)	1	None

Table 2. Avatar Affordances data for ethnicity. The avatar type listed is the avatar the researcher was attempting to create.

this is not necessarily the hierarchy level (seen in the "Hier." column), but whether or not a default is presented to players this early in the customization process. For example, the *Mii Creator* presents players with the identifier "select a gender" and two buttons, one for a male avatar and one for a female avatar. Neither button is pre-selected; the user must make a choice before they can proceed. Other games, like *Guild Wars 2*, use avatar style buttons to represent the choice of avatar sex within the player-selected race. The male avatar is always pre-selected for the player (see Figure 6). Players who wish to create a male avatar simply have to click "next" to proceed to the CCI. Players wishing to choose a female avatar must actively make this choice before proceeding. The presentation of avatar race and sex is very similar in *EVE Online*, where pairs of avatar bodies are used to represent the choice of race and sex. However, unlike in *Guild Wars 2*, the pre-selected avatar in *EVE Online* is randomly selected each time the player chooses to create a character.

We included two rows for sex selection in *EVE Online*. This choice was made largely to reflect the fact that, unlike

Figure 6. Default human avatar in Guild Wars 2.

Guild Wars 2, the pre-selected avatar sex is randomly generated. Players may opt to keep with this randomized choice, *or*, they may opt to actively select the opposite sex for their avatar. We believe the duality of this widget is significant, and thus chose to represent it in this way.

Some games had additional widgets to modify secondary sex characteristics. Some games used more benign identifiers such as "body shape" while others used more questionable terms like "hormones" - a highly problematic choice that arguably invokes the social stigma of gender dysphoria. These games include *Dark Souls, Demon's Souls, Saints Row 2*, and *Saints Row 4.* The secondary sex characteristic widget in *Saints Row 2* is the "Body Shape" slider. See Figure 5.

This slider allows incremental adjustments to the degree to which secondary sex characteristics are presented. The slider values range from -50 to +50, with positive values resulting in more obvious male traits (such as broad shoulders, a broad jaw line, etc.). Negative values result in more obvious female traits (such as a narrow waist, a narrow jaw line, hips, and breasts). Negative values on this scale are always associated with female traits, regardless of the avatar's sex. Figure 5 illustrates how these changes manifest on a male avatar with the Body Shape values of +50, 0, and -50.

The decision on the developer's part to distribute the numbers this way is significant. Players building female characters still interact with the same distribution, with negative values on the Body Shape scale adjusting female secondary sex characteristics. The CCI is really mediating the manipulation of secondary sex characteristics for both males and female avatars, with a neutral position in the middle available to both. There is no mechanical reason for the developers to use numeric values to represent the degree of maleness or femaleness of an avatar's body. Yet, the developers not only chose to numerically quantify this aspect of self-representation, but also to distribute the numbers such that feminine traits are always represented by negative values.

Figure 5. The Body Shape slider in Saints Row 2. From top to bottom the values 50, 0, and -50 are applied to the avatar.

The "Body Shape" widget from *Saints Row 2* was replaced with the "Sex Appeal" slider in *Saints Row IV* (see Figure 7). This widget retained the numeric scale but eliminated the ability to cross dress avatars. Once an avatar's sex is selected, the slider associated with gender works only to modify the size of the avatar's bulge or breasts. It does not adjust any other secondary sex characteristics or dimorphic morphology.

Of the games analyzed, six present the player with a male avatar by default and two present the player with a female avatar by default. The remaining games either require the user to make this selection prior to entering the CCI (noted as "Player Selected" in the *Default* column of Table 1), or

Figure 7. The Sex Appeal slider in Saints Row IV.

generate a random choice. Of the two that default to a female avatar, one is *Jam City Rollergirls,* which is a game featuring a female-only sport and thus has no option to play as a male avatar. Among these same games, 12 default to a light-skinned avatar, 8 of which are definitely Caucasian.

Unfortunately, the only game analyzed that presents a default avatar of African American ethnicity is *Saints Row 2*. This early entry in the series presents the narrative of the Third Street Saints gang at the time when the franchise was still very much a clone of the *Grand Theft Auto* series. Default configurations may (unintentionally) make statements about the ideal player or protagonist within the context of the game [4]. *Saints Row 2* defaults to an African American male in an urban crime simulation. Conversely, a later game in this series, *Saints Row IV,* situates the player as the president of the United States, and instead attempts to centralize on a Caucasian male protagonist. In the case of *Saints Row 2*, a designed system that defaults to a dark skinned male in the context of an urban crime simulation perpetuates negative racial stereotypes [23].

Identifiers for avatar ethnicity vary slightly from game to game, but common identifiers include "skin color", "skin tone", "pigment", "complexion", and "race" (see Table 2). Default values aside, the most unusual example of ethnicity comes from *Jam City Rollergirls*. The game allows players to modify their avatar's skin colour, but forces them to actively seek out a matching face, arms, and legs during the customization process (see Figure 8). Unfortunately, this effectively treats ethnicity as an "outfit". Players who wish to move away from the default Caucasian skater must actively match all of the components of their ethnic costume.

The problematic mediation of gender and ethnicity via CCIs act as "regulatory regimes" [3], uncritically participating in the cycle of socially exclusive values. The Avatar Affordances Framework has thus far allowed us to isolate the different properties of each widget to compare different widgets/games to discuss how gender and ethnicity are presented to players. It is clear from related work that these issues have not gone unnoticed [4, 5, 7, 17, 19, 23, 28, 29].

Figure 8. Players of Jam City Rollergirls choose components of ethnicity as though they are selecting pieces of an outfit.

DISCUSSION

The Avatar Affordances Framework functions as an analytical tool facilitating the study of the affordances of CCIs, and allowing for comparable analysis between different games. It is also capable of analyzing novel interface widgets which have previously been inaccessible by counting methods. In addition to addressing the limitations noted in the related work, components of the framework may be used individually, or in smaller groups to provide analysis on a variety of design trends. For instance, researchers could code interfaces and focus only on defaults, or structures, or any combination offered by the framework. We have opted to focus on only two traits (avatar sex and ethnicity), but the framework could also be applied to study other customization traits, such as height, weight, hairstyle, hair colour, and so on.

In addition to modeling the framework, our analysis is also valuable in terms of discussing design trends and issues present in CCIs. While some analysis of problematic practices may seem heavy-handed, it is important to note that we are not suggesting that game developers are, by nature, prejudiced against people of colour. Video games are not created in a vacuum; they are cultural artefacts. Video game worlds are created in consonance or dissonance with our own world, but are always positioned in relation to it. A longstanding, problematic culture of negative racial stereotyping - particularly in relation to perceptions of criminal tendencies - exists in our culture [35]. This is illustrated by the overrepresentation of African Americans and Latinos in televised reports of criminal activity [8], fallacious perceptions of crime rate in Black neighbourhoods [31], and the link between racial profiling and harsh criminal justice policies directed towards persons of colour [36]. Thus, we argue that problematic defaults, such as the aforementioned association of race with criminal behaviour, was not designed to engage with social

commentary on racial profiling. Rather, it was likely an unintentional symptom of a much more powerful cultural force, one which still shapes media perceptions [8] and law enforcement practices [35].

Still, despite the fact that we do not believe these choices to be intentionally exclusive or problematic, they are still design *choices*. Thus, it is our intent that this analysis not only assists games scholars with the study of CCIs, but that present and future analyses may assist developers in making design choices that are more socially inclusive.

We also acknowledge that players do not always desire a realistic avatar in games, and that they seldom arrive at CCIs with concrete plans for their avatar's appearance. Returning briefly to Suchman's work [34], we understand avatars to be the result of a dialogue between user and interface. We have chosen to study affordances at the interface level in order to understand how CCIs present their part of the dialogue to users. We believe the Avatar Affordances Framework to be a useful tool to this end.

CONCLUSIONS

The Avatar Affordances Framework was designed to address analytical limitations present in related work. Our preliminary analysis of 20 game CCIs found that the framework was useful in generating data that enables meaningful comparison between different games with extremely different interface configurations. The framework also identifies properties of affordances that mediate and potentially constrain self-representation. The framework identifies designs present in CCIs that reveal assumptions about ideal players, particularly through the study of default configurations.

The next logical step in this research is to speak more generally across multiple games, and to demonstrate the differences between interfaces as *designed* artifacts. This would involve extending our analysis to even more CCIs in order to further test the robustness of the framework and to generate even more data about design trends and affordances in character creation interfaces.

Video games have a great deal of potential as imagined virtual playgrounds in which we may try on new identities and have agency in fantastic new worlds. Some games provide users with the ability to create their own avatar - an opportunity for players to try on new identities, or to visually place themselves at the center of a digital interactive adventure.

The issue of social exclusion arises when players who want to recreate themselves via their avatars are limited by interface affordances. When this happens, games go from being places where we can be who we want to be, to becoming places where we can only be who the developers *allowed* us to be.

The study of affordances is important, as it not only makes visible the ways in which these interfaces may be socially exclusive, but also provides an opportunity to systematically study industry practice and to propose guidelines to help developers design CCIs with social inclusion in mind. We believe that our analytical framework and resultant analysis make strong contributions to the theoretical work on self-representational practices, both within the game studies and HCI communities.

Future Work

The framework has proven to be an effective tool for isolating and coding CCI widgets in order to generate meaningful data between games. One current limitation is that our framework does not present meaningful data with regard to diversity in skin colours. We plan to revisit this topic by examining ways in which we might code this data (e.g., collecting RGB values, or using a method similar to Dietrich [7]) in future iterations of the framework.

The data presented here was coded by the lead author, with the objective of proposing the framework to the community, with sample data, such that others might use it. We are currently planning a user study to further test replicability. In this proposed study, participants would use the framework to code the same CCIs and we will then compare their results for consistency.

ACKNOWLEDGMENTS

This work was supported by the Social Sciences and Humanities Research Council of Canada.

REFERENCES

1. Bessière, K., Seay, A. F., and Kiesler, S., The ideal elf: Identity exploration in World of Warcraft, *CyberPsychology and Behaviour*, *10*, 2007, 530-535.
2. Bruckman, A. S., Gender swapping on the Internet, in *High noon on the electronic frontier: Conceptual issues in cyberspace*, (P. Ludlow, Ed.). MIT Press, 1996.
3. Butler, J., *Gender trouble: Feminism and the subversion of identity*. Routledge, 1990.
4. Consalvo, M., Hot dates and fairy-tale romances: Studying sexuality in video games, in *The Video Game Theory Reader*, (M. J. P. Wolf and B. Perron, Eds.). Routledge, 2003, 171-194.
5. Consalvo, M., It's a queer world after all: Studying The Sims and sexuality, *Glaad*, 2003.
6. Consalvo, M. and Dutton, N., Game analysis: Developing a methodological toolkit for the qualitative study of games, *Game Studies: International Journal of Computer Games Research*, *6*, 2006.
7. Dietrich, D. R., Avatars of whiteness: Racial expression in video game characters, *Sociological Inquiry*, *83*, 2013, 82 - 105.
8. Dixon, T. and Linz, D., Overrepresentation and underrepresentation of African Americans and Latinos

as lawbreakers on television news, *Journal of Communication*, *50*, 2006, 131 - 154.

9. Ducheneaut, N., Wen, M.-H., Yee, N., and Wadley, G., Body and mind: a study of avatar personalization in three virtual worlds, in *Proceedings of the ACM Conference on Human Factors in Computing Systems - CHI 2009*. (New York: ACM, 2009), 1151-1160.
10. Gee, J. P., *What video games have to teach us about learning and literacy*. Palgrave MacMillan, 2003.
11. Gero, J. S., Design prototypes: A knowledge representation schema for design, in *AI Magazine*, vol. 11, 1990, 26-36.
12. Gero, J. S., Categorising technological knowledge From a design methodological perspective, in *Technological Knowledge: Philosophical Reflections*. Boxmeer, The Netherlands, 2002.
13. Gero, J. S. and Kannengiesser, U., The situated function-behaviour structure framework, *Design Studies*, *25*, 2004, 373-391.
14. Gibson, J. J., The theory of affordances, in *Perceiving, acting and knowing*, (R. Shaw and J. Bransford, Eds.). Erlbaum, 1977.
15. Gibson, J. J., *The ecological approach to visual perception*. Houghton Mifflin, 1979.
16. Haig, D., The inexorable rise of gender and the decline of sex: Social change in academic titles, 1945-2001, *Archives of Sexual Behaviour*, *33*, 2004, 87-96.
17. Higgin, T., Blackless fantasy: The disappearance of race in massively multiplayer online role-playing games, *Games and Culture*, *4*, 2009, 3-26.
18. Isaksson, S., Character creation processes in MMORPGs: A qualitative study of determining important factors., in *Faculty of Science and Engineering, School of Computer Science, Physics and Mathematics*, Master's thesis: Linnaeus University, 2012.
19. Kafai, Y. B., Fields, D. A., and Cook, M. S., 'Blacks deserve bodies too!: Design and discussion about diversity and race in a tween virtual world, *Games and Culture*, *5*, 2010, 43-63.
20. Kafai, Y. B., Fields, D. A., and Cook, M. S., Your second selves: Player-designed avatars, *Games and Culture*, *5*, 2010, 23-42.
21. Kannengiesser, U. and Gero, J. S., A process framework of affordances in design, *Design Issues*, *28*, 2012, 50-62.
22. Kaptelinin, V. and Nardi, B., Affordances in HCI: toward a mediated action perspective, in *Proceedings of the ACM Conference on Human Factors in Computing Systems - CHI 2012*. (New York: ACM, 2012), 967-976.
23. Leonard, D. J., Not a hater, just keepin' it real: The importance of race- and gender-based game studies, *Games and Culture*, *1*, 2006, 83-88.
24. Nakamura, L., *Cybertypes: race, ethnicity, and identity on the Internet*. Routledge, 2002.
25. Neustaedter, C. and Fedorovskaya, E., Presenting identity in a virtual world through avatar appearances, in *Proceedings of Graphics Interface 2009*. (Toronto: Canadian Information Processing Society, 2009), 183-190.
26. Norman, D. A., *The psychology of everyday things*. Basic Books, 1988.
27. Norman, D. A., Affordance, conventions and design, *interactions*, *6*, 1999, 38-43.
28. Pace, T., Can an orc catch a cab in stormwind?: cybertype preference in the world of warcraft character creation interface, in *Extended Abstracts of the ACM Conference on Human Factors in Computing Systems - CHI EA 2008.* (New York: ACM, 2008), 2493-2502
29. Pace, T., Houssian, A., and McArthur, V., Are socially exclusive values embedded in avatar creation interfaces of MMORPGs?, *Journal of Information, Communication, and Ethics in Society*, *7*, 2009, 192-210.
30. Pearce, C. and Artemesia, *Communities of play: Emergent cultures in multiplayer games and virtual worlds*. MIT Press, 2009.
31. Quillian, L. and Pager, D., Black neighbors, higher crime? The role of racial stereotypes in evaluations of neighborhood crime, *American Journal of Sociology*, *107*, 2001, 717 - 767.
32. Reid, E. M., Text-based virtual realities: Identity and the cyborg body, in *High noon on the electronic frontier: conceptual issues in cyberspace*, (P. Ludlow, Ed.). MIT Press, 1996.
33. Rosenman, M. A. and Gero, J. S., Purpose and function in design: From the socio-cultural to the techno-physical, *Design Studies*, *19*, 1998, 161-186.
34. Suchman, L., *Human-machine reconfigurations: Plans and situated actions*. Cambridge University Press, 2006.
35. Walker, S., Spohn, C., and DeLone, M., *The color of justice: Race, ethnicity, and crime in America*. Cengage Learning, 2011.
36. Welch, K., Payne, A. A., Chiricos, T., and Gertz, M., The typification of Hispanics as criminals and support for punitive crime control policies, *Social Science Research*, *40*, 2011, 822 - 840.
37. Winner, L., Do artifacts have politics? in *The whale and the reactor: a search for limits in an age of high technology*). University of Chicago Press, 1986, 19-39.
38. Yee, N., Ducheneaut, N., Yao, M., and Nelson, L., Do men heal more when in drag? Conflicting identity cues between user and avatar, in *Proceedings of the ACM Conference on Human Factors in Computing Systems - CHI 2011*. (New York: ACM, 2011), 773-776.