How the Visual Design of Video Game Antagonists Affects Perception of Morality

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The visual design of antagonists—typically thought of as "bad guys"—is crucial for game design. Antagonists are key to providing the backdrop to a game's setting and motivating a player's actions. The visual representation of antagonists is important because it affects player expectations about the character's personality and potential actions. Particularly important is how players perceive an antagonist's morality. For example, an antagonist appearing disloyal might foreshadow betrayal; a character who looks cruel suggests that tough fights are ahead; or, a player might be surprised when a friendly looking character attacks them. Today, the art of designing character morality is informed by archetypal elements, existing characters, and the artist's own background. However, little work has provided insight into how an antagonist's appearance can lead players to make moral judgments. Using Mechanical Turk, we collected participant ratings on a stimulus image set of 105 antagonists from popular video games. The results of our work provide insights into how the visual attributes of antagonists can influence judgments of character morality. Our findings provide a valuable new lens for understanding and deepening an important aspect of game design. Our results can be used to help ensure that a particular character design has the best chance to be universally seen as "evil," or to help create more complex and conflicted emotional experiences through carefully designed characters that do not appear to be bad. Our research extends current research practices that seek to build an understanding of game design and provides exciting new directions for exploring how design and aesthetic practices can be better studied and supported.

Keywords: video games, morality, visual design, empirical methods, antagonists, bad guys, character design, visual attributes

INTRODUCTION

Antagonists—who are often thought of as "bad guys"—are a critical part of game design. Antagonists often drive the story of a game, by acting as a catalyst for conflict, thereby influencing player choices and providing important challenges (e.g., a "boss fight"; Vorderer et al., 2003; Schell, 2008; Przybylski et al., 2010). Villains that inspire and challenge the player will keep them from losing interest in the goal (Manninen and Kujanpää, 2007). While character design often involves creating a backstory and defining behaviors and abilities, one key way that characters are initially experienced by players is through their visual attributes—what they look like (Bar et al., 2006).

We draw from visual stereotypes to predict character attributes and behaviors. Our presumptions are based on common references and traits. First impressions of a new character have

been shown to be persistent even if impressions are contradicted or more nuanced information are revealed (Haake and Gulz, 2008). Visual attributes help game designers to communicate elements of a game's theme, story, and challenge, and steer player behavior (Baranowski et al., 2008; Schell, 2008; Przybylski et al., 2010; Bakkes et al., 2012; Mohd Tuah et al., 2017). For example, the slanting eyebrows of the Goombas in *Super Mario Bros.* Nintendo 1983 help convey to the player that they are not happy, and that the player should get out of the way. Important to understand how people perceive the intent and actions of characters is *morality*, which is the "… differentiation of intentions, decisions and actions between those that are distinguished as proper and those that are improper" (Long et al., 1987). People use characters' appearances to help make judgments about their morality, and morality perception greatly affect people's enjoyment of games and other media (Eden et al., 2015). Thus, game designers and artists try to match designs with how they want a player to interpret their characters, whether it is in a congruent way (e.g., a bad guy who looks evil) or an incongruent way (e.g., a bad guy who looks innocent, non-threatening and friendly). Providing information about the perception of higher level personality traits with the visual attributes of antagonists could be extremely useful for game designers (McLaughlin, 2012).

Because the visual design of characters is a critical part of game design, we provide a first study examining how different visual attributes lead to different moral interpretations of antagonists. To do this, we first created a stimulus set of 105 images of antagonists that span a wide range of successful games from the last 5 years. Next, we conducted a survey on Mechanical Turk ($N = 283$), in two parts. Part 1 solicited rating of antagonist images using the CMFQ-S (Character Moral Foundations Questionnaire–Short, a short, validated scale previously used in the interpretation of character morality). In part 2, we gathered people's judgments on the saliency of visual attributes that featured "prominently" in the design of antagonists. By assembling our two data sets, we are able to provide evidence-based insights into many of the important visual attributes used in the design of video game antagonists and relate them directly to judgments of morality.

The findings of our work provide valuable new insights and deepen our understanding of how character design—an important aspect of game design—is interpreted. In practice, our results can be used to help ensure that a particular character design has the best chance to be universally seen as "evil," or to help create more complex and conflicted emotional experiences through carefully designed characters that do not appear to be bad. More broadly, we believe the methodology that we have identified can be leveraged, extended and strengthened to improve game design research, to better characterize current practices and cultural experience, and to build more precise and engaging entertainment experiences.

LITERATURE REVIEW

Antagonists in Video Games

The tension between the main character (i.e., protagonist) of a story and their opponent (i.e., antagonist) is ubiquitous to fiction and fuel many dramatic situations; e.g., when Darth Vader reveals himself to be Luke Skywalker's father. Looking at the common template of the monomyth or the hero's journey (Lane, 2017), the antagonist is the cause of going on a journey, and provides the reason that challenges need to be faced, while providing temptations on the way (e.g., Vader to Luke: "Join me and together we can rule the galaxy as father and son." *The Empire Strikes Back,* Lucas Films 1982). In video games, antagonists fulfill a similar role—in the *Super Mario Bros.* series (Nintendo 1985) Bowser keeps Princess Peach hostage so that Mario can set out to rescue her; in the *Sonic the Hedgehog* series (Sega 1989) Dr. Robotnik/Eggman aims to achieve world domination which Sonic tries to prevent.

Villains are central to every culture, because they provide a moral compass (Eden et al., 2015)—they show behaviors that are threatening to society, because they cause others physical harm, deny the rights and freedom of others, create chaos, would betray others, or perform actions that are disgusting. As such, villains are on the opposite line of moral behavior, which helps us relate to the hero's efforts and understand their drive.

Visual Attributes of Villains and Archetypes

It has been well-established that there are clear differences between how heroes and villains are visually represented and that this affects people's judgments about these characters (Hoffner and Cantor, 1991; Eden et al., 2015; Grizzard et al., 2018). Narratives often use tropes or clichés that the audiences are familiar with—such as the damsel in distress trope used in Mario—to set expectations and to make clear what actions will need to be taken. Similar to narrative tropes, character designers use visual archetypes (Haake and Gulz, 2008; e.g., the muscle packed action hero; or the magician in long robes) to provide visual affordances for players (e.g., recognizing a character that will likely use brute force vs. magic) to motivate player actions. For example, when facing a life or death decision we would act differently toward an immoral character (e.g., someone who puts themselves at risk to help an injured child in a dire situation vs. someone who always acts in their own best interests); or, someone who betrays their team or family, compared to someone who has displayed moral behavior (e.g., acting with loyalty even while being tempted toward disloyalty).

Classic villains such as the gangster wearing a fedora, a striped suit, and two-tone shoes, or the long-nosed witch with a tall hat, and crooked teeth, are well-known and easily identified. Literature and drama are the source of villain archetypes (Fahraeus and Yakali Çamoglu, 2011), but archetypes are present in games as well, e.g., the mentally unstable villain Joker in *Batman: Arkham Asylum* (Rocksteady 2009), or the superior species like the Sectoids in *XCOM 2: Enemy Unknown* (Fireaxis Games 2016). While the presented archetypes could be applied across genders, age groups, and race, the majority of villains are male (Ivory, 2006), with an observable uptake in female villains (Lindner et al., 2019). In the design of villain character designers show several preferences, such as Classic Villain—TV Tropes (n.d.):

- **Display a common vice:** antagonists often represent a sin or a vice; e.g., wrath, gluttony, pride; e.g., *God of War*'s Baldur

represents wrath through his visual display of anger and rage (Sony Interactive Entertainment 2018);

- **Display a common moral flaw:** many villains have at least one moral flaw; e.g., they are deeply disloyal or careless toward the wellbeing of others; e.g., the ruthless Handsome Jack in *Borderlands 2* (2K Games, 2012);
- **Distinct Color:** antagonists are visually distinct through the use of color (Lundwall, 2017); e.g., antagonists are often represented with dark color palettes, while protagonists are bright; e.g., Link's primary color is green, the color of hope, wielding the bright Master Sword, while the evil Ganon is black and red (*The Legend of Zelda: Breath of the Wild*, Nintendo, 2017); and,
- **Distinct Form:** antagonists are visually distinct through the use of shape (Ekström, 2013); e.g., the spiky Sauron (*Middle-earth: Shadow of War*, Warner Bros. Interactive Entertainment 2017); or, size, e.g., the oversized Onyxia in *World of Warcraft* (Blizzard Entertainment, 2004).

While designers often draw from their experience, mood boards, and previous characters with similar traits, media psychology and communication studies provide theoretical frameworks to characterize the effects and implications of designing for moral judgments. So how exactly are moral judgments formed?

Appearance and Moral Foundations

As a member of any society, we learn what is right and what is wrong, and we learn to associate certain forms of appearance with morally questionable behavior (Klapp, 1954). Motorcycle gangs like the Hell's Angles, for example, wear vests with patches—identifying them as gang members—and are associated with violence. Or, the slick look of a wall street banker that suggests a dedication to personal gain, the willingness to put personal gain before others, and to cause chaos and disorder through immoral actions like morally questionable stock trades. Media commonly draws from imagery that is reminiscent of morally corrupt parts of a historical or current society to make it easy for the audience to identify the moral stance of a character (Klapper, 1960).

Several theories from different fields [e.g., psychology (Kohlberg, 1971; Diessner et al., 2008; Doris et al., 2020), philosophy (Haidt and Joseph, 2008), sociology (Boltanski and Thévenot, 2000), law (Raz, 1995), and communication studies (Fiske et al., 2007; Eden et al., 2015)], provide a nuanced perspectives on how morality might be communicated through a person's appearance (Haidt and Joseph, 2008), for example, present the moral foundation theory (MFT). Moral foundation theory offers a pluralistic perspective on moral, suggesting that morality is judged on in five domains: harm/care, fairness/reciprocity, ingroup/loyalty, authority/respect, purity/sanctity.

Building on Haidt and Joseph's theory, Grizzard et al. (2019) evaluated and extended the character morality questionnaire. Their questionnaire asks participants to indicate their agreement to questions such as "This character would physically hurt another person."

Linking appearance with emotional responses, people are capable of making split-second judgments of others (Willis and Todorov, 2006). It is suggested that both men and women are influenced by physiognomy in day-to-day life. In this study, participants rated faces based on attractiveness, likeability, competence, trustworthiness, and aggressiveness with insignificantly no difference between being with or without time constraints. This spontaneous detection skill is suggested to be essential for survival. These papers have also studied how and why people perceive stereotypes of good guys and bad guys (Secord et al., 1953; Bull and Green, 1980; Goldstein et al., 1984; Yarmey, 1993; Flowe, 2012; Croley et al., 2017), and discuss moral perceptions based on physiognomy and other visual attributes. To measure morality, the Character Moral Foundations Questionnaire (CMFQ) (Eden et al., 2015; Grizzard et al., 2019) was often used. In all cases, visual attributes are capable of affecting the peoples' moral judgments of characters.

Studies have shown that the perceived morality among heroes and villains (Eden et al., 2015) in media have strong connections with viewer's enjoyment (Sanders and Tsay-Vogel, 2016; Eden et al., 2017). A well-known theory in understanding the ties between media enjoyment and morality is affective disposition theory (ADT) (Raney, 2006). Affective disposition theory suggests that viewers interpret characters as liked or disliked based on how they judge the character's morality. The outcome of any event affects the viewer's enjoyment, depending on the congruence of the viewer's expectations: highly liked characters who experience positive outcomes and less liked characters who experience negative outcomes increase viewer enjoyment (Raney, 2004). Consequently, enjoyment decreases when unexpected events occur, such as when a liked character experiences a negative outcome or a disliked character experiences a positive outcome.

Moral Judgments

The interaction between media and entertainment use, media experience, and moral judgment, has is at the center of ADT (Zillmann, 1996). Affective disposition theory engages with how viewers perceive and assess a character based on their actions and determine if a character is good or bad. From the viewer perspective defining a character as good or bad creates tension and suspense, because depending on the characters moral leaning the audience tries to predict future action and observes if a character acts according to the ascribed moral category. The perceived disposition affects the audience's enjoyment of a narrative. The game the Last of Us 2, plays with character expectations. The player starts out playing the character Abby Anderson. Playing from Abby's view the player first likes Abby. Deeper into the narrative Abby commits violent actions against characters that were established as "good," which leads to Abby being depicted as "bad" due to her actions. Abby being depicted as a "bad" character creates expectations regarding Abby's future actions and conflicts for the player when they need to take on Abby's role playing now a "bad" character themselves. Applied to games ADT would suggest that the expectations regarding the disposition of the character is foundational for the player's affective response; e.g., the feeling of disgust or despair when a "bad" character falls in carnage or kills a good character or the positive feeling when the hero prevails and experience

success (Raney, 2004) offers two complementing amendments to ADT: (1) the formation of an affective disposition sometimes precedes the moral evaluation of a character (for evidence see Grizzard et al., 2018), and (2) the ascribed disposition "good" or "bad" leads to an interpretation of a character's actions in line with expectations. Both concepts are interesting our research, because (1) suggests that the simple interpretation of a character's appearance affects moral decision and (2) that the interpretation potentially influences how further actions of such a character are perceived.

The theory has practical value for our research, because it argues that the dispositions we ascribe to a character may be relevant for our entertainment experience and might lead to emotional experiences. Hence, judging a character as "bad" and differentiate potential future actions based on the character's appearance, e.g., a character judged as impure who commits violent actions, might be exactly the form of tension a game-designer aims for. The tyrant Pagan Min in *Far Cry 4* (Ubisoft), who is introduced to the player by killing one of his commanders using a pen, might create an expectation of unpredictable violence and could facilitate emotional experiences for the player; e.g., fear of Min's unpredictable actions.

To advance media theories and ADT—which focused on short-term affective engagement with media—and provide a more wholistic perspective on morality and media effects on society, Tamborini (2011) suggested the Model of Intuitive Morality and Exemplars (MIME). Model of intuitive morality and exemplars suggests that strong moral beliefs are uphold by media selection, i.e., we like content that fits within our overall moral belief system and is therefore more likely to be selected, and reinforces our moral belief system. Build on Moral Foundation Theory (Haidt and Joseph, 2008), MIME follows a dual-processing logic and suggests that we evaluate events intuitively (process 1) unless they are not within expectations or too complex, then we are deliberately rational to comprehend the given events (process 2). Model of intuitive morality and exemplars also draws from exemplification theory (Zillmann, 1999), which suggests that recent or frequent events or concrete and highly emotional exemplars increase moral judgment. From a game-designers perspective MIME might explain preferences and playstyle of a player by considering previous media preference and moral examples within these games. Game designers can make use of character expectations and effects of creating unexpected scenarios, e.g., a morally corrupt character helping a vulnerable protagonist.

Model of intuitive morality and exemplars has been applied in studies to analyze or discuss the effect of videogames (Tamborini et al., 2011, 2017; Eden et al., 2014) and game characters (Joeckel et al., 2012; Tamborini et al., 2013; Boyan et al., 2015) and provides guidance to understand morality processes during game play and a framework to understand how videogames shape audience's moral intuitions, and subsequently media interpretation and response. Looking at the morality of the characters we present, MIME supports that our interpretation and moral judgment is a result of the media context and its effect on our moral intuition. The gangster world of Martin Scorsese, contributed to our interpretation of Italian man in needle striped suits with a fedora as gangsters, and informed our moral intuition to interpret video game character in games such as *Grant Theft Auto* (Rockstar Games 1997) or *Mafia* (Illusion Softworks 2002) that dress the same way as similarly morally corrupt.

Morality in Video Games

In comparison to other media forms, video games put the player into the driver's seat, resulting in a context where moral actions are not just observed, but actively executed (DeVane and Squire, 2008). Video games enable players to explore their moral values through the protagonist, by making moral decisions of any kind themselves and act in environments where moral values are deviate from the values of modern society.

In video games, morality and its different dimensions set players expectations—for example, the criminal setting of *Grand Theft Auto* (Rockstar Games 1997) puts the player in the role of a criminal in a fictional city. The mechanics and rules of the game reinforce morally questionable behavior such as beating up people, stealing cars, or destroying property. However, even in a criminal world not all moral dimensions are abolished: e.g., loyalty toward gang comrades remains relevant. Morality in such games such has been intensively studied and has triggered heated public and academic debates about transfer effects of violence (Ferguson, 2008).

In games where the player has a choice about the moral compass of their character, we usually find indicators of their standing in society represented by the people they can talk to (*Mass Effect*; BioWare 2007), the availability of dialog (*Detroit Become Human*; Quantic Dream 2018), or visual indicators—the classic game *Ultima Online* (Origin Systems 1997), for example, assigned a special name tag to individuals who attacked other players.

The antagonist and the moral beliefs they project have implication for the presumptions of the player, and subsequently their intuition about in-game situations (Joeckel et al., 2012). For example, when interacting with an antagonist that has not acted fairly, the player would mistrust their offers. The narrative-driven zombie game series, *The Walking Dead* (Telltale Games 2012–2019), frequently presents players with situations where they need to judge the moral compass of the players around them; e.g., when offered food from a group that might or might not have engaged in cannibalism.

From a designer's perspective, the visual attributes (e.g., an eye patch or a scar), that inform players about the morality of a character are important to effectively communicate a character's moral standing. This is particularly difficult, considering that a character's moral is not just judged on a single axis from good to bad, but on visual elements that speak to their fairness, willingness to physically hurt others, their loyalty, how willing they are to follow rules, and their ability to engage in disgusting behavior. But how do we approach the complex effects that small details like the nose on how a character is interpreted?

Quantifying Visual Experiences

Jacobsen (2006) outlines how aesthetics can be captured by applying scientific method: by manipulating size and shape of body parts, e.g., waist-to-hip ratios, or evaluating the effect of

abstract patterns in comparison to known stimuli. A model to understand aesthetic experiences has been presented by Leder et al. (2004). The authors suggest that aesthetic experiences are context dependent and show that aesthetic experiences are a complex interaction between cognition, affect, and perceptual processes—e.g., judging visual complexity, or relating an experience to prior memories are different cognitive processes.

Researchers and designers have applied several techniques to understand the interpretation of design. Hassenzahl (2004), for example, has investigated the consistency of beauty judgments, and operationalizes beauty. Reinecke et al. (2013) investigated the appeal of websites, in terms of visual complexity, colorfulness, and appeal. The created model of visual appeal combined with basic demographics explained about 50% of resulting appeal ratings. These are similar to Tuch et al.'s (2012) findings, which show that prototypes and visual complexity affect the aesthetic perception of a website, but that the amount of time that a website is viewed matters.

Research has also demonstrated that the visual presentation of interactive products affects our judgment and experience of them (Hassenzahl, 2004). Games, however, more often combine the interactivity of digital products such as apps and websites, with the narrative depth of fiction and drama, creating unique demands on the visual design of video game characters.

Studies Visual Attributes of Characters in Video Games

In the context of our work, we focus primarily on the visual attributes of characters. Providing a deeper understanding of how people interpret game characters is relevant important because identifying with a representation increases the amount of time a game is played (Passmore et al., 2018), how deeply players comprehend information (Kao and Harrell, 2015), and overall engagement (Reinecke, 2009).

Previous work has established that we interpret characters values using a number of visual attributes, for example, character shape (Veronica, 2015), age (Schwind and Henze, 2018), gender (Schwind and Henze, 2018), and fashion (Klastrup and Tosca, 2009). Importantly, based on visual attributes we draw conclusions about characters' moral beliefs (Happ et al., 2013). Further, how we see a character affects in-game behavior. We tend to act in a way that we believe confirms a character's beliefs. For example, beating up prostitutes in *Grand Theft Auto* is not necessary, but people still do so, because it is in-line with the moral value system presented in the game (Happ et al., 2013).

There has been some work that has tried to tease apart visual properties of characters and how they are perceived. Schwind and Henze (2018) investigated gender and age differences in virtual faces, finding that in a character designing task that participants create villain faces as more masculine, unattractive, and with lower likeability. Villain faces have also been shown to be more related to features such as looking dead or zombie-like (Schwind et al., 2015).

To move toward a comprehensive understanding of the relationship visual attributes and experience, we need to investigate specific visual elements of character design systematically and empirically.

STUDY DESIGN

To provide an initial understanding about how the visual attributes of game antagonists can influence how people experience them, we carried out two studies. Our studies asked people to separately rate a stimulus set of 105 antagonist images, identifying their most salient visual attributes and to judge the characters' morality. Our two studies were conducted using the crowdsourcing platform Amazon Mechanical Turk (MTurk), using the same set of antagonists' images, but differing in the requested assessment of the images. In Study 1, participants rated the morality of each character based on their appearance using the five morality dimensions (Haidt and Joseph, 2008): "harm/care," "fairness/reciprocity," "ingroup/loyalty," "authority/respect," and "purity/sanctity." In Study 2, participants rated the prominence of character visual features (e.g., eyebrows, age, dermatological problems), defined as characteristics that "… relative to other characteristics, stand out and grab attention." Previous work has investigated the salience of eyes on fixation times (Birmingham et al., 2009), the role of eyebrows in face recognition (Sadr et al., 2003), and shown that we form opinions about a face within 100 ms (Willis and Todorov, 2006)—while prompting individuals to rate relative salience is conceptually fuzzy, it enabled us to guide attention and gauge participants subjective perception of a character. Our analysis connects these two different rating sets, using regression analysis and correlational analysis with the goal to build an understanding of correlations between visual attributes and how they might affect players' experiences of characters.

General Procedure

Both studies followed the same general procedure. Participants were recruited using the crowdsourcing platform Amazon Mechanical Turk. MTurk is a digital platform that acts as a broker between requesters (e.g., researchers looking for participants to rate character images) and workers (e.g., people willing to engage in a rating task for payment).

Our study procedure was reviewed by the Research Ethics Board of the University of New Brunswick and is on file as REB 2019-118. Before being asked to indicate their consent, participants were informed about the procedure, their payment, and the approximate time the task will take. To assure quality data, MTurk participants needed to be US-based and have successfully completed at least 500 tasks with an approval rating of at least 90%. Restricting eligibility combined with attentiveness measures (Study 1) and the screening of completion time reduced the likelihood of bot produced data in our data set, which is an increasing issue in crowdsourced research (Ahler et al., 2019).

Upon qualifying and accepting the MTurk task, participants accessed a website that guided them through the study. Participants were first presented an informed consent form, followed by a demographic questionnaire, and then given instructions on how to complete the rating task. Compensation was calculated at the rate of $7.50 USD/h, to be just above the

national minimum wage in the US. We determined 35 min for Study 1 ($5 USD) and 70 min for Study 2 ($8 USD). Since rating 105 characters was a relatively long task, participants only needed to rate five characters to qualify for payment but could opt-in to rate more.

We conducted two separate studies that solicited moral judgments (Study 1) and visual attributes (Study 2) separately, because we anticipated sequence effects from asking moral judgments and visual attributes together. Further, creating two tasks greatly simplified each task and reduced the length of time to perform ratings on any individual character for MTurk participants.

Selecting and Presenting Antagonists

We selected a total of 105 antagonists using publicly available game ranking data using a pre-determined procedure. We determined four main criteria to select our character image repository. The repository should include images of characters that (1) are humanoid; (2) represent recent trends in game and character design; (3) are well-designed; and (4) represent the main antagonists of the games in which they appear. Our intent was to focus on carefully considered, well-designed characters that also represent many of the common visual attributes in their design. Further, we decided to focus on humanoid characters to ensure that the visual attributes that we asked about were present in the character, which assured that our insights are derived from a source that has found mainstream acceptance, covering a wide range of antagonists that have a presence in current games.

To identify antagonist characters, we first had to identify individual games that fit the criteria. To ensure that character designs were both of high quality and represented recent practices, we filtered the database of Gamerankings.com—a website that collects ratings from numerous sources to provide an average score. We selected games released from 2014 to 2019, with a rating above 80% from at least 20 reviews. These criteria allowed us to identify a set of games that met the criteria above, since it captured games, and, therefore, were most likely to contain characters, that were widely seen as "well-designed." Importantly, however, since changes to our criteria or the game database used could result in a different stimulus set, our stimulus set is likely not representative of all games. The resulting initial candidate game list featured 105 games that we filtered further based on the character specific criteria.

For each qualifying game, we identified the main antagonist or final boss using Fandom pages as our main source (https://www.fandom.com). Fandom provides background information and character images for many recent popular games, and all of the characters in our image set. After investigating each game individually, we removed games with non-humanoid antagonists and games without a clear antagonist (e.g., sports games usually do not feature an antagonist created by a game designer) from our initial pool. Our final list of suitable characters featured the main antagonists from 105 games.

Presenting Antagonists

To standardize our stimuli, we created composite images that include a body shot of the character and a close-up of their face.

We know from previous work (Schwind et al., 2015; Schwind and Henze, 2018) that the face plays an important role in judging characters and needs to be fully visible for accurate judgments to be made. We removed any background from the images and placed the character on a plain gray background measuring 800 × 570 pixels. See **Figure 1**.

Our stimuli were then presented using a custom-built web application[1].

Figure 1 shows the presentation screen for Study 1 and Study 2, respectively, which were composed of the following five main elements. (1) Each screen displayed breadcrumbs to provide information to participants about their progression through the study. (2) The number of the current character rated over the total number of characters (n/105)—the system gave participants the option to stop the procedure after five images to avoid an extensive time commitment. (3) Additional instructions—participants could read instructions about the procedure at any time. (4) The character image drawn from a pool of 105 antagonists. We pseudo-randomized the presentation of images. Our image selection was automated to ensure that all images were presented with similar frequencies. To do this we grouped images by how often they had been previously rated by participants. Within the group of images that were rated the fewest times, we randomly selected five images and presented them in random order. The same procedure was performed for the next block of five images, omitting previously presented images out of the image pool. (5) A 7-point Likert-scale rating system for the morality scales used in Study 1, and a binary rating system for the salience of visual attributes in Study 2.

While still images are less rich in information than animated in-game characters, using still images and rating salient features in accordance with moral features strikes a balance between stimuli control, participant burden, and stimuli variance; i.e., displaying a large range of stimuli in a short amount of time. While limited when compared to experience of characters displayed in videogames, images sufficiently allow participants to identify visual character features that are perceived as salient.

Participants and Study-Specific Procedure

In Study 1 we assessed perceived character morality, and in Study 2 we collected binary ratings of the salience of visual attributes.

Study 1: Character Morality Ratings

For study 1, we recruited 99 participants. Four participants were removed from the data set, because they provided more than 25 ratings with a maximum variance ≤1, indicating a response pattern that was inattentive. Participants rated up to 21 sets of five images each. The first five images included additional demographic questions and were compensated by $1. The remaining 20 sets were compensated with 20 cents each, for a maximum of $5. In total, we obtained 5,963 ratings from 95 participants. Images received a minimum of 54 and a maximum of 60 ratings, mode = 57. For demographics, see **Table 1**.

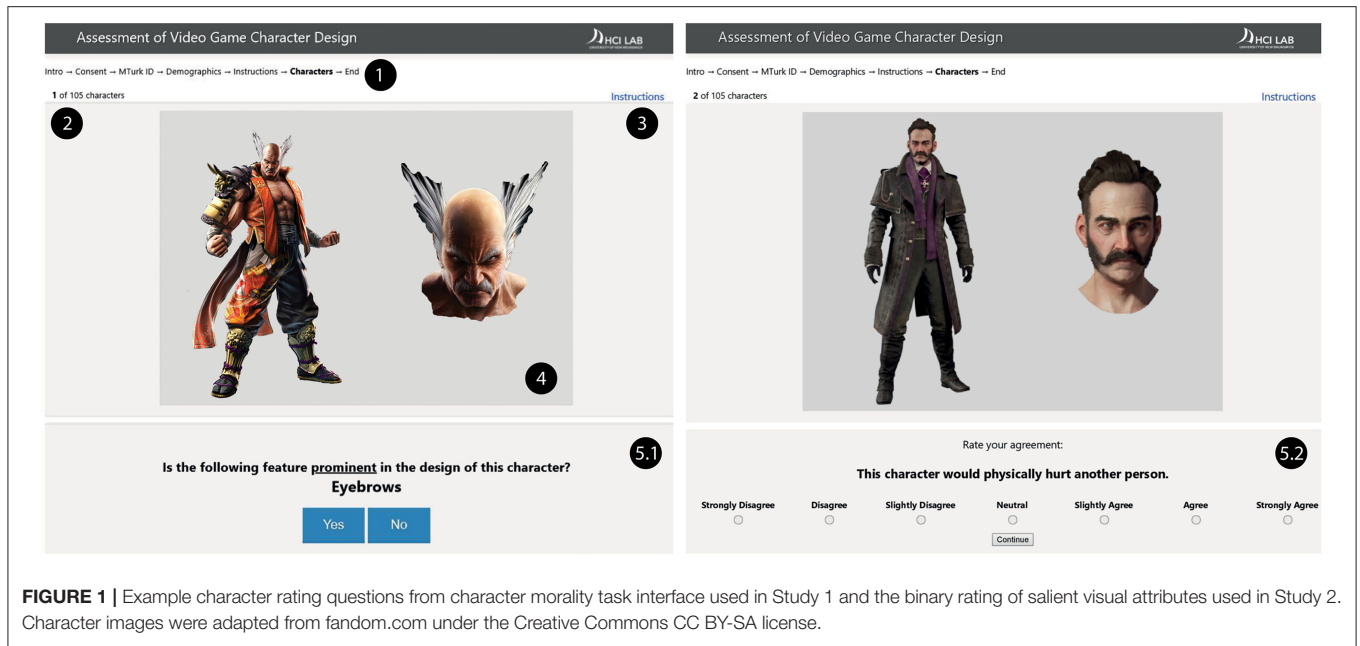[1]Our system was built in Python using the BOFS system (Johanson, 2019).

FIGURE 1 | Example character rating questions from character morality task interface used in Study 1 and the binary rating of salient visual attributes used in Study 2. Character images were adapted from fandom.com under the Creative Commons CC BY-SA license.

TABLE 1 | Demographics for Study 1 and Study 2.

Variables	Study 1				Study 2			
	N	% (n/N)	M	SD	N	% (n/N)	M	SD
Age	95		36.08	12.00	188	–	38.82	11.95
Gender	95				188	–		
Men		60% (57/95)				56.9% (107/188)		
Women		39% (37/95)				42% (79/188)		
Non-binary		0% (0/95)				0.5% (1/188)		
Prefer not to answer		1% (1/95)				0.5% (1/188)		
Playtime	95				188	–		
Everyday		40% (38/95)				36.7% (69/188)		
A few times per week		40% (38/95)				39.9% (75/188)		
A few times per month		18.9% (18/95)				6.4% (12/188)		
A few times per year		1.1% (1/95)				13.3% (25/188)		
Not at all		0% (0/95)				3.7% (7/188)		
Ethnicity	95				188	–		
Asian		9.5% (9/95)				7.4% (14/188)		
Black/African American		7.4% (7/95)				7.4% (14/188)		
Hispanic/Latino		6.3% (6/95)				6.4% (12/188)		
White		72% (69/95)				73.9% (139/188)		
Two or more categories		0% (0/95)				3.7 (7/188)		
Platforms	95				188	–		
Desktop		86.3% (82/95)				80.3% (151/188)		
Console		60% (57/95)				7.6% (127/188)		
Mobile		54% (56.8/95)				73.4% (138/188)		

Specific Procedure for Study 1: Ratings of Character Morality
To collect data on player's interpretation of characters, we used the short form of the Character Moral Foundations Questionnaire (CMFQ-S) (Grizzard et al., 2019), which is a validated short-form questionnaire based on Haidt and

Joseph's (2008) five moral domains. Images in our stimuli set were rated on a 7-point Likert-scale, one time for each dimension of the five-dimensional CMFQ-S. The statements and morality domains were as follows, from the CFMQ-S (Grizzard et al., 2019):

- "Harm/care": This character would physically hurt another person.
- "Fairness/reciprocity": This character would deny others their rights.
- "Ingroup/loyalty": This character would betray their group.
- "Authority/respect": This character would cause chaos and disorder.
- "Purity/sanctity": This character would do something disgusting.

Seven-Point agreement ratings were converted to numbers prior to analysis where 1 means "Strongly Disagree" with one of the statements above; 4 is neutral; and, 7 "Strongly Agree." Following this a character who scores, say, a 1 for *harm/care* would be perceived to behave morally for the particular domain. Whereas, a character who scores 7 for *harm/care* would be perceived to behave strongly in an immoral way for the domain.

To control effects of familiarity, participants were instructed that their "[…] ratings should be made based on the appearance of the character only (in other words you should not use knowledge of the character to make your judgment)." Further, we asked participants to indicate whether they were familiar with a particular character, and to rate their overall familiarity with the character using a 100-point scale, by positioning a visual slider between "Not familiar at all" and "Very Familiar." In total, we collected 5,963 morality ratings from 95 participants. Images received a minimum of 54 and a maximum of 60 ratings, mode = 57.

Specific Procedure for Study 2: Identification of Prominent Visual Characteristics

In Study 2, we asked participants to indicate whether an attribute of an antagonist is salient or not. We decided to ask participants to rate individual character features instead of listing the most salient character features, because we were interested in a comprehensive analysis that allows for the evaluation of non-obvious visual character features that contribute to the overall perception of a character such as body alterations or age.

Attributes were derived from previous work on character attributes (McLaughlin, 2012) and extended by our own interpretation of relevant visual attributes of antagonists, resulting in a list of 24 visual attributes (see the full list in **Table 3**). A "salient" physical attribute was defined for participants as an attribute that "… relative to other characteristics stands out or grabs attention." Participants were prompted to make a binary decision to the statement "Is the following feature prominent in the design of this character?" followed by the name of the attribute (e.g., "eyes"). To stay away from overly scientific jargon, we used "prominence" instead of "salience" in our instructions to participants. For the most part these presented visual attributes simply stated the name of the attribute (e.g., "eyes," "hair," "nose," "mouth," etc.); however, some features required further explanation (i.e., "dermatological problems," "body weight," "build," "height," "head size," "skin exposure," "age," "stance," "clothing," "jewelry," "face cover," "body alterations"). In these cases, we provided a short description to provide clarification [e.g., "Dermatological problems (such as dark circles around

the eyes, wrinkles, facial scars, warts, bulbous nose)"]; a full list of the visual features and descriptions has been provided in **Supplementary Material**.

For each character, participants initially responded to whether they were familiar with the character, and if so, how familiar (as in Study 1). Participants responded to all 24 attributes for each character, attributes were presented in serial, and participants were required to respond "yes" or "no" for each feature, before proceeding. To discourage participants from simply responding without considering each attribute, we imposed a brief 2 s delay before input would be accepted using the buttons.

For Study 2, we recruited 188 participants, who rated up to 21 sets of five images each (as previously described). Note the rating task in Study 2 took longer than in Study 1, hence more participants were recruited and each conducted fewer ratings on average. We received a total of 5,560 ratings from 176 participants. Images received a minimum of 48 ratings and a maximum of 59 ratings, mode = 54. See **Table 1** for demographics, and **Table 3** for a list of all 24 visual attributes. A limitation of Study 2 a lack of control for moral foundations, this is something we believe should be included in future work (we discuss further in limitations).

Analysis

All analysis was conducted using SPSS 25 (IBM, 2017).

Morality Score

Character Moral Foundations Questionnaire–Short (CMFQ-S) ratings (from Study 1) were transferred to score data (as described above), means were calculated by scale and data is presented in aggregate. The relationship between morality scores is evaluated using correlations and the average of all five scales is presented as a single "badness" score (see section Descriptive Statistics for Morality Ratings). Theoretically the morality dimensions are distinct, but the underlying assumption to either acting in line with a moral standard or not, is consistent across scales, and allows the scales to be combined if statistically internally consistent, as defined by Cronbach's alpha.

Salience Ratings

Salience ratings of visual attributes (from Study 2) were aggregated by calculating the percentage of participant responses that indicated a feature as being salient over the total number of responses by image. Ratings were normalized by the total number of responses to account for differences in the number of ratings received.

Broadly, we distinguish salience ratings in four blocks: (1) facial features and skin including features such as nose, mouth, or dermal problems; (2) body shape such as height or weight; (3) abstract features that depends on the viewer's judgment such as age or attractiveness; (4) accessories such as clothing or jewelery that could be removed.

Relationship Between Character Morality and Salient Features

To investigate the relationship between moral judgment and character features, we used correlations, and hierarchical

TABLE 2 | Pearson correlations for the five morality domains.

Domain	This character would…	1.	2.	3.	4.	5.
1. Care/harm	… physically hurt another person.	1	0.880**	0.751**	0.871**	0.782**
2. Fairness/reciprocity	… deny another person their rights.	0.880**	1	0.925**	0.968**	0.918**
3. Ingroup/loyalty	… betray his group.	0.751**	0.925**	1	0.926**	0.937**
4. Authority/respect	… cause chaos and disorder.	0.871**	0.968**	0.926**	1	0.906**
5. Purity/sanctity	… do something disgusting.	0.728**	0.918**	0.937**	0.906**	1

**p < 0.01.

TABLE 3 | Summary of hierarchical regression analysis for variables predicting badness ($N = 105$).

	Model 1 (Head)			Model 2 (+Body)			Model 3 (+Judgment)			Model 4 (+Accessories)		
Variable	B	SE	β	B	SE	β	B	SE	β	B	SE	β
Eye	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.02
Eyebrows	0.00	0.00	−0.03	0.00	0.00	−0.05	0.00	0.00	−0.06	0.00	0.00	0.02
Nose	0.01	0.01	0.11	0.01	0.01	0.12	0.01	0.01	0.13	0.01	0.01	0.15
Mouth	0.01	0.01	0.23*	0.01	0.00	0.19*	0.01	0.01	0.18*	0.01	0.00	0.19*
Ears	0.00	0.00	0.07	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.05
Skin problems	0.01	0.00	0.37*	0.01	0.00	0.37**	0.02	0.00	0.46**	0.02	0.00	0.43**
Facial hair	0.00	0.00	0.01	0.00	0.00	0.10	0.00	0.00	0.10	0.00	0.00	0.13
Hair	−0.01	0.00	−0.14	−0.01	0.00	−0.20*	−0.01	0.00	−0.14	0.00	0.00	−0.03
Weight				0.00	0.01	−0.08	0.00	0.01	−0.05	0.00	0.01	0.04
Build				0.01	0.01	0.10	0.01	0.01	0.11	0.00	0.01	0.05
Height				0.01	0.01	0.17	0.01	0.01	0.18	0.01	0.01	0.13
Head-body ratio				0.00	0.01	−0.06	−0.01	0.01	−0.10	−0.01	0.01	−0.11
Stance				0.01	0.00	0.32**	0.01	0.00	0.30**	0.01	0.00	0.22*
Skin color							−0.01	0.00	−0.11	−0.01	0.00	−0.09
Masculinity/Femininity							0.00	0.01	−0.01	0.00	0.01	0.05
Attractiveness							−0.01	0.00	−0.10	0.00	0.00	−0.07
Skin exposure							0.00	0.01	0.01	0.00	0.01	−0.02
Age							−0.01	0.00	−0.20*	−0.01	0.00	−0.15
Clothing										0.00	0.00	0.08
Jewelery										0.00	0.00	−0.07
Face cover										0.01	0.00	0.19
Tattoos										0.00	0.01	0.02
Weapon										0.01	0.00	0.21*
Body alterations										0.00	0.00	0.01
R^2		0.390			0.556			0.603			0.669	
F for change in R^2		7.68**			6.80**			2.06			3.19*	

*p < 0.05, **p < 0.01.

regression analysis to identify our final set of most predictive character features.

We present further details on the statistical procedures used at the beginning of each subsection in the Results section.

Results

We present the results of both studies together for simplicity, and since much of our analysis examines correlation between the ratings collected in each study. We refer specifically to morality ratings (gathered in Study 1) and visual attribute salience (gathered in Study 2) in order to reference the source of the data.

The number of ratings collected per image varied slightly between images in both studies; *Study 1*: min = 54, max = 60; and, *Study 2*: min = 52, max = 62.

Descriptive Statistics for Morality Ratings

For Study 1, mean and standard deviation for each moral domain were calculated per image. Recall that ratings were made on a 7-point Likert-scale ranging from strongly disagree (1) to

strongly agree (7) with a "lack of morality statement," e.g., "This character would hurt another person."—high scores suggest perceived immorality.

In the morality rating task, participants were only familiar with 16.454%, and of those characters they were familiar with, they rated their familiarity low ($M = 68.056$, $SD = 10.113$).

For our overall stimulus set, we have the following results for each moral domain: "Care/harm" ($M = 5.030$, $SD = 1.110$), "Fairness/reciprocity" ($M = 4.618$, $SD = 1.042$), "Ingroup/loyalty" ($M = 4.185$, $SD = 0.830$), "Authority/respect" ($M = 4.675$, $SD = 1.082$), "Purity/sanctity" ($M = 4.100$, $SD = 1.021$). Surprisingly this might indicate that current (human) villain designs in video games do not convey that they are clearly immoral (mean ratings for each or only slightly on the immoral side of neutral). This is in contrast, perhaps, to previous studies of animated Disney villains who are unmistakably evil-looking (Hoerrner, 1996).

To better understand how the different morality domains might be related, we looked for correlations between the five items and found high correlations between domains; see **Table 2**. After evaluating the reliability of across scales (Cronbach's-α = 0.972), we calculated a single "morality" score for each character by taking the mean across of all five dimensions ($min = 2.20$, $max = 6.16$, $mean = 4.52$, $SD = 0.969$). The distribution of "morality" is negatively skewed ($skewness = −0.377$), which is in line with our expectations, considering that the source of our images are examples of video game villains.

Character Examples of Moral Dimensions

To explore how individual characters moral dimensions compare to the data set at large, we calculated categories based on standard deviations for each domain. We created four categories reflecting the morality for each domain: moral ($<$-2 SD), slightly moral ($−1$ SD to 0), slightly immoral (0 to $+1$ SD), and immoral ($> +2$SD), we binned morality to identify divergence from the mean and variation between morality domains; i.e., being corrupted in one domain, but uncorrupted on all other domains. In **Figure 2**, categories were solely created for illustration purposes and are not used in any further analysis.

To exemplify the presence of different moral characteristics, we present twelve characters with varying pronunciations in the five moral domains (see **Figure 2**). Tsumugi Shirogane was viewed consistently as being uncorrupt ("Care/harm": moral, "Fairness/reciprocity": moral, "Ingroup/loyalty": moral, "Authority/respect": moral, "Purity/sanctity": moral). These categories mean that this character is perceived as a character that would **not** physically hurt others, would **not** deny another person's rights, will **not** betray her group, would cause chaos and disorder, and is **not** disgusting. Ryuji Goda on the other hand, is almost completely the opposite ("Care/harm": immoral, "Fairness/reciprocity": immoral, "Ingroup/loyalty": slightly immoral, "Authority/respect": immoral, "Purity/sanctity": immoral); this character is perceived as strongly immoral.

Some characters show interesting patterns where they score differently on different moral dimensions. Aaron Keener ("Care/harm": immoral, "Fairness/reciprocity": slightly immoral, "Ingroup/loyalty": slightly moral, "Authority/respect": slightly

immoral, "Purity/sanctity": slightly moral), who is perceived as careless, slightly denying other their rights, and willing to cause chaos and disorder. But he is not perceived as disloyal or disgusting. Yunica and Heiss follow similar patterns. Our results show how the dimensions of badness can be used to analyze and compare characters and find character designs that provide both strong and nuanced perceptions of morality. We leave further commentary and interpretation on these examples to the Discussion, after the results regarding visually salient features have been introduced.

Predicting the Morality Through Aesthetic Characteristics

To investigate the relationship between aesthetic features and a character's perceived morality, we performed hierarchical regression analysis with our 24 visual attributes grouped into four blocks: head, body, interpretative characteristics (e.g., age, masculinity-femininity), and presentative characteristics (e.g., clothes, tattoos); see **Table 3** for the full list of visual attributes in each of the blocks. Blocks were entered as predictor variables of perceived badness. Our results show that head characteristics, body characteristics, and presentative characteristics have the most predictive value when predicting badness ($p = 0.011$, $R^2 = 0.669$). As displayed in **Table 3**, the salience of the mouth, skin problems, the stance, and weapons, are the best predictor of badness.

Our final model (Model 4), shows that a combination of the mouth ($\beta = 0.19$), skin problems ($\beta = 0.43$), stance ($\beta = 0.22$), and a weapon ($\beta = 0.21$), are the strongest predictors of morality ($R^2 = 0.669$). While these visual attributes are the most predictive for morality, related visual attributes should also be considered when analyzing characters or planning the visual design of an immoral character.

The Relationship Between Aesthetic Elements

We next analyzed our data for trends that demonstrate which aesthetics elements are perceived as most salient together in antagonist designs. We showed that the mouth, skin problems, stance, and weapon, are the most predictive variables for morality. However, several of the visual attributes in the model show interdependencies; e.g., when a facemask is present, the mouth cannot be seen, or stance might be related to the presence of a weapon. We calculated correlations between visual attributes to discover attribute that are closely related to the most predictive visual attributes. Considering that there are many minor correlations between the salience of different visual attributes, we only discuss visual attributes that correlate $r > 0.25$ with visual attributes relevant for the prediction of morality. See **Table 4** for the correlation table, and **Figure 2** for examples of characters with different salient visual attributes.

Skin problems are correlated with the salience of mouth ($r = 0.58$), nose ($r = 0.41$), ears ($r = 0.28$), hair ($r = 0.28$), and tattoos ($r = 0.34$). Suggesting that skin problems appear in prominent parts such as the face and are used in combination with other facial features as we can see in a character like Vitalis.
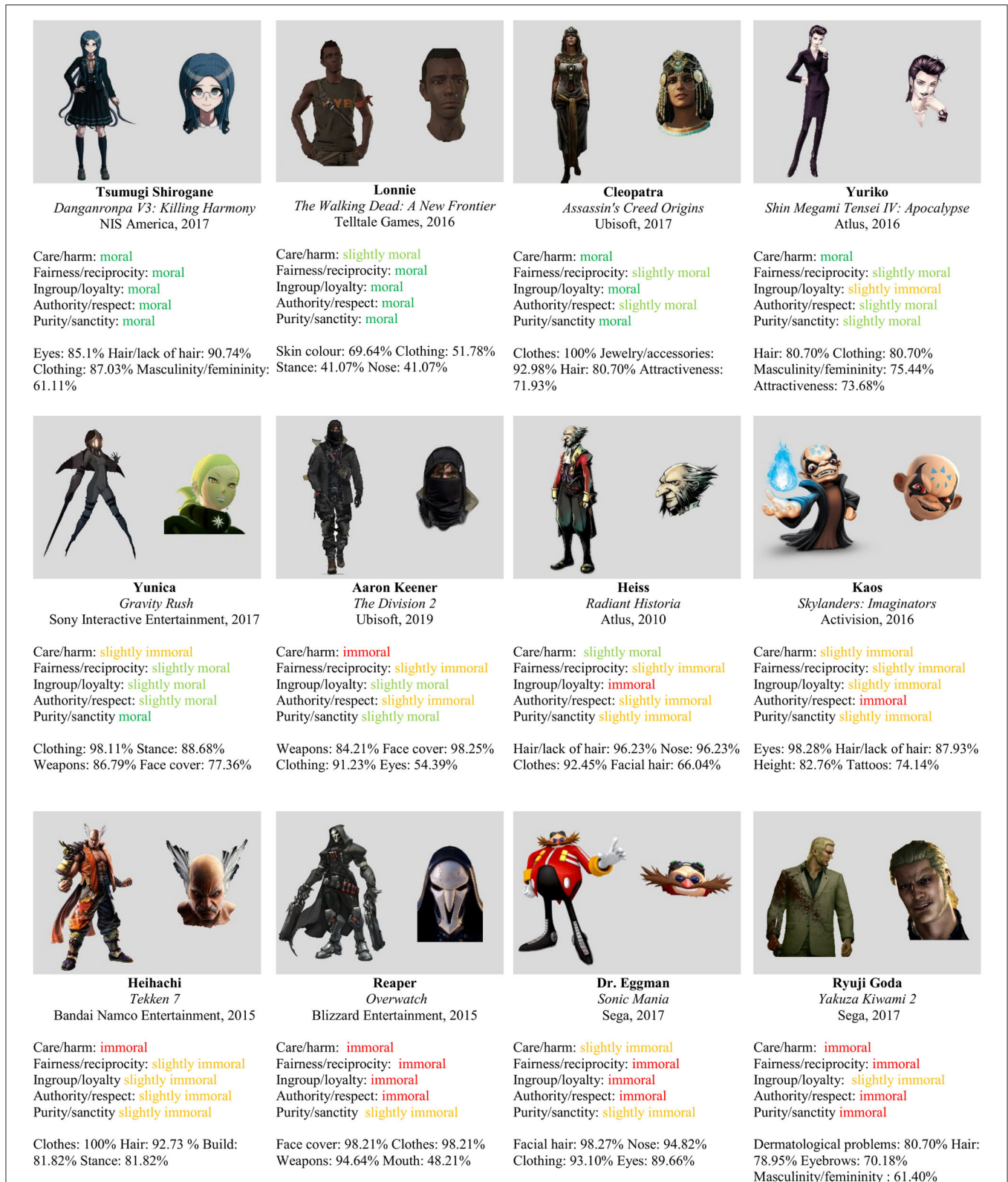
FIGURE 2 | Examples of video game characters and their morality by domain. Expression by domains is color coded from red (immoral) to green (moral). Character images were adapted from fandom.com under the Creative Commons CC BY SA license.

TABLE 4 | Pearson correlation of attributes.

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.
1. Eyes	1.00																							
2. Eyebrows	0.14	1.00																						
3. Nose	0.10	0.22	1.00																					
4. Mouth	**0.30**	0.18	**0.30**	1.00																				
5. Ears	**0.29**	0.24	**0.26**	0.10	1.00																			
6. Skin problems	0.17	0.20	**0.58**	**0.41**	**0.28**	1.00																		
7. Facial hair	−0.02	**0.37**	**0.33**	0.08	0.05	0.18	1.00																	
8. Hair	**0.27**	0.17	−0.01	0.04	**0.28**	−0.05	0.12	1.00																
9. Weight	0.20	0.12	0.13	0.19	−0.02	0.05	0.16	−0.06	1.00															
10. Build	0.20	0.15	**0.25**	0.20	0.13	0.21	0.05	0.09	**0.55**	1.00														
11. Height	0.30	0.15	0.03	0.21	0.20	0.06	−0.01	0.18	**0.51**	**0.54**	1.00													
12. Head-body ratio	**0.45**	0.13	0.12	**0.29**	0.13	0.05	0.09	0.18	**0.54**	**0.39**	**0.58**	1.00												
13. Stance	0.24	0.00	−0.06	0.11	0.15	−0.02	−0.19	0.16	0.16	**0.33**	**0.48**	0.16	1.00											
14. Skin color	**0.26**	0.10	0.12	**0.41**	0.11	**0.25**	−0.02	0.13	0.12	**0.34**	0.12	0.09	0.13	1.00										
15. Masc.-Fem.	0.12	0.21	−0.07	0.06	0.02	0.03	0.05	0.22	0.14	**0.45**	0.13	0.04	0.20	0.18	1.00									
16. Attractiveness	0.24	0.04	0.07	0.24	0.09	0.11	−0.12	**0.27**	−0.01	0.04	0.14	−0.01	0.17	0.18	**0.30**	1.00								
17. Skin exposure	0.20	−0.10	−0.08	0.02	0.15	−0.01	−0.19	0.12	0.01	**0.40**	0.13	0.10	0.23	0.23	**0.37**	0.16	1.00							
18. Age	0.16	0.03	0.18	−0.12	0.10	**0.25**	0.16	0.09	0.07	0.02	0.03	0.08	−0.09	−0.10	0.04	0.01	0.06	1.00						
19. Cloth	0.18	0.05	−0.20	0.03	0.01	−0.07	−0.15	0.12	0.12	0.14	**0.36**	0.04	**0.48**	−0.05	0.10	0.16	0.09	−0.05	1.00					
20. Jewelery	**0.31**	0.12	−0.15	0.08	−0.01	−0.11	0.00	0.01	0.11	0.14	0.12	0.01	0.23	0.22	**0.28**	**0.28**	0.19	−0.01	**0.50**	1.00				
21. Face cover	0.07	**−0.33**	−0.20	0.03	−0.15	−0.09	**−0.25**	**−0.39**	0.02	0.09	0.09	0.10	0.13	0.03	−0.21	−0.14	0.23	−0.17	**0.27**	0.23	1.00			
22. Tattoos	0.20	0.14	0.19	0.22	**0.34**	0.23	−0.01	0.18	−0.04	0.19	**0.29**	0.15	0.17	**0.27**	0.09	0.05	**0.27**	−0.06	0.05	0.09	0.05	1.00		
23. Weapons	0.00	**−0.28**	−0.08	−0.09	−0.18	−0.07	**−0.29**	**−0.26**	−0.12	0.03	0.04	−0.09	**0.25**	−0.03	−0.03	−0.09	0.01	−0.18	0.02	0.02	**0.41**	0.06	1.00	
24.Body alterations	0.11	−0.20	−0.03	−0.03	0.04	−0.03	−0.20	−0.09	0.11	**0.29**	0.13	0.03	**0.30**	0.04	0.01	0.01	0.12	−0.12	0.22	0.13	**0.44**	0.06	**0.35**	1.00

p < 0.01 is highlighted in bold.

Stance correlates with build ($r = 0.33$), height ($r = 0.48$), clothes ($r = 0.48$), and weapons ($r = 0.25$). Stance highlights a character's build and height and makes impressive or distinct physiques standout or appear intimidating—an approach to convey morality. Clothing can be used to further highlight certain aspect of the character's physique, such as partially revealing skin, Heihachi's power pose, for example, is underlined by his clothing that partially reveals his impressive muscles that suggest that he is able to inflict physical pain. Characters with weapons are often presented in stances that relate to the weapon's fighting style, e.g., Yunica shows a fencing posture while holding a sword-like weapon (see **Figure 2**).

Weapons are also correlated with face coverings ($r = 0.41$) and body alterations ($r = 0.35$). One class of characters using weapons are assassins such as Reaper or Aaron Keener, who cover their faces to avoid recognition. However, face coverings can also prevent clearly visible facial expressions, which means that other visual attributes must convey morality; e.g., the stance and weapons of a character can display aggression and the ability and willingness to harm others, such as Yunica and Aaron Keener (see **Figure 2**).

While there are many visual attributes, representing archetypes, eliciting a specific perception of a character, and how we experience characters aesthetically leads to relationships between attributes that can be further explored to understand the visual construction of antagonists. In **Table 5** we present the relationships of salience and badness for each visual attribute. The table contains the regression coefficients for either a linear or quadratic relationship between salience and badness, and a sparkline visualizations that displays an overview of the relationship. The left end of the x-axis for the sparkline is more badness, the right end is less badness; higher on the y-axis indicates higher salience for the given level of badness.

DISCUSSION

The results of our analysis provide an exploration and data-driven insights in players perceive perception of characters morality.

Our work explores the relationship between salient visual attributes of villains and their perceived morality. We provide insights into the relationship between salient visual features, showing which aspects are combined to define perceived morality, and which features predict perceived badness of a character.

In the subsections below, we organize our discussion around how people perceive game antagonists and how designers might leverage our results in their design practices. We then discuss limitations of our current studies and the new directions that our work makes possible for future work.

The Design and Perception of Game Antagonists

Overall, the game antagonists in our stimulus set were viewed as only slightly corrupt, or just slightly more immoral than a neutral rating. The binning of characters by their overall morality, illustrates an only slightly negative skew toward immorality, and

in fact roughly 47 of the 105 characters were viewed as being moral than immoral (see section Character Examples of Moral Dimensions). While we had some examples where characters were viewed consistently and strongly as immoral, the tendency of our sample is only subtly evil characters. We do not believe this means that our stimulus set is somehow limited or that games do not represent antagonists who are as "bad" as in other media. Rather, we believe that this shows that games often provide more nuanced visuals and storytelling when it comes to their antagonists, which can be easily seen in some of our examples (see **Figure 2**). Our stimulus set is in stark contrast to other image stimulus sets used for understanding perceptions of character morality. For example, Disney villains were uniformly viewed as strongly evil (Hoerrner, 1996). In this example, however, the approach is to communicate very clearly to the (sometimes young) audience exactly who the villains are.

While we did not study behavior and acts of evil or immoral behavior, the fact that game designers often explore less overt visual representations of "bad" is interesting, because interactivity provides other means to display evil behavior and the time spent with a game is significantly longer than watching a movie, which allows to discover the evil side of a character over time—similar to TV shows. Of course, and importantly, antagonists in stories are not always "evil" (Martin Del Campo, 2017). That being said, we did review the characters in our stimulus set, and our interpretation of the back stories of almost all, if not all, characters suggested that these characters did indeed take actions that harmed others, were disgusting, were betrayals to their group, etc.; i.e., they were immoral in action, even if their visual design did not suggest it. The fact that the visuals of characters do not always portray outward and strong aggression, for example, reflects the range of ways that game designers tell stories and they support those stories visually through their character designs. Indeed, it is a surprise in the story of the game *Danganropa* that a particularly friendly looking character (Tsumugi Shirogane) is indeed the antagonist. In contrast, other stories might present characters who have seemed very immoral, in both appearance and action, but might still perform good acts. For example, disillusioned with the evil covenant, The Arbiter (a grotesque alien) switches sides joining forces with Master Chief, the main protagonist in *Halo 2* (Bungie, 2004).

Our analysis of character ratings in each of the five morality domains are highly correlated with one another. This suggests that when we judge a character as morally corrupt the distinction between moral dimensions is often unclear—evil is evil. This is, however, out of line with previous work in assessing idealized protagonists (and not game protagonists) using the CFMQ-S instrument (Grizzard et al., 2019), where the domains were not strongly correlated. The strong correlations could mean that game designers more uniformly represent all domains of morality when creating antagonists. We discuss how this opens up possibilities for designers below.

The Constructions of Villainous Stereotypes

Tamborini's model of intuitive morality and exemplars (MIME) (Tamborini, 2011) provides a short and long-term perspective on morality and adds intuitive and emotional aspects to the

TABLE 5 | Non-standardized regression coefficients for individual characteristics and badness, and sparkline visualizations for the highest significant order effect.

Characteristic	Linear	Quadratic	Unstandardized coefficients			Sparkline
	p	p	Intercept	a	b	
Eyes	0.07	0.026*	110.679	−34.64	4.485	
Eye brows	0.236	0.147	15.926	2.705	−	
Nose	<0.001**	<0.001**	20.162	−2.588	1.257	
Mouth	<0.001**	<0.001**	92.957	−39.649	5.515	
Ears	0.045*	0.123	−0.998	4.072	−	
Dermatological problems	<0.001**	<0.001**	14.398	−10.97	3.16	
Facial hair	0.303	0.088	13.037	4.08	−	
Hair	0.277	0.483	76.133	−3.412	−	
Weight	0.078	0.015*	73.933	−37.654	4.024	
Build	<0.001**	<0.001**	63.921	−28.102	4.031	
Height	0.001**	0.003**	15.437	−3.976	1.037	
Head–body ratio	0.139	0.005**	89.735	−39.588	4.868	
Skin color	0.086	0.012**	89.278	−33.819	4.262	
Masc.–Fem.	0.639	0.891	39.602	0.768	−	
Attractiveness	0.821	0.577	38.511	0.433	−	
Skin exposure	0.624	0.117	6.542	0.758	−	
Age	0.345	0.584	33.552	−1.75	−	
Stance	<0.001**	0.001**	11.13	10.072	−0.24	
Clothes	0.057	0.156	57.771	4.335	−	
Jewelery	0.839	0.979	26.187	0.468	−	
Face cover	0.016*	0.008**	75.715	−35.959	4.864	
Tattoo	0.005**	0.009**	19.196	−11.624	1.82	
Weapons	0.003**	0.012**	−33.225	15.743	−0.71	
Body alterations	0.015*	0.01**	33.329	−16.569	2.288	

The left end of the x-axis for each sparkline is more badness, the right end is less badness; higher on the y-axis indicates higher salience for the given level of badness.
*p < 0.05, **p < 0.01.

processing of character judgments. When applying MIME to interpret our stimulus set it is important to keep in mind that, following exemplification theory (Zillmann, 1999) frequent exposure to moral examples increase the effect of media exposure, e.g., the frequently displayed character with baggy pants, muscle shirt, and bandana who kills, robs, and sells drugs, has created the powerful iconic image of the ghetto gangster.

Considering the most predictive characteristics in our stimulus set (i.e., weapon, dermatological problems, stance, and the character's mouth), we can consider how these characteristics contribute to villainous stereotypes. While the relationship between carrying a weapon and the stance of a character can be directly linked to "badness" through social norms—a weapon suggests hostility, and a powerful or combative stance demonstrates aggressiveness the role of dermatological problems and the mouth, are unexpected and culturally insightful. The mouth plays an important role in communicating emotions or intent in western cultures (Yuki et al., 2007), e.g., signaling

approach-ability by smiling, or emotions such as anger, fear, or disgust. For character design, the mouth opens up opportunities to communicate the internal state a character, e.g., the evil grin of the Disney character Ursula. Model of intuitive morality and exemplars would suggest that when dermatological issues are used to depict villains, an automatic negative response to other characters with skin problems would result. This means that villains with acne, burn scars, etc., might lead to other uses of those same visual attributes, leading to coherence between domain and exemplar salience. The consequence of this can result in real consequences for individuals in their day-to-day lives with skin problems, who could be more likely perceived as villains (Funk and Todorov, 2013). Such stereotypes would need to be counteracted by creating content where domain and exemplar salience conflict; e.g., characters with skin problems that are inherently good. An example character that already shows a manifestation of such conflict is Marvel's anti-hero Deadpool, who, under his mask, has substantial scarring. Deadpool, fights for good, but is also tortured and mischievous, his scarred face underlies his ongoing conflict with society that find his appearance repugnant. It is important to note that different skin issues are perceived differently, while acne, pock marks, or scars have been connected to criminal stereotypes before (MacLin and Herrera, 2006), more fine-grained analysis show that individuals with acne are perceived as shy or insecure (Dréno et al., 2016).

In games, dermatological issues can be used to conjure associations with badness, but especially scars provide opportunity to reshape the perception of scar tissue—for example, when used as aesthetical signifiers or to memorize special events. Scars could, for example, be visible on characters as a badge of defeating a difficult final boss or for taking part in a challenging battle. In different cultures, scars also have different meanings. Scarification—the deliberate act of scaring someone for aesthetical purposes—has roots in traditions of African tribes and has found its way into body modification culture. Directions that games could use, for example, to provide new character options increasing diversity through customizability (Dickerman et al., 2008; Birk et al., 2016; Passmore et al., 2018), by allowing characters to be created that defy negative stereotype associated with dermatological issues, or to create a visual language around the beauty of scars.

While dermatological problems tie into stereotypes and negative expectations, the mouth is one of the most important features used in facial expression and to communicate non-verbally. Smiling, baring teeth, or pulling the corners of our mouth down, are facial expression that can be inviting, display aggression, or disdain. In our analysis the mouth is a strong predictor of badness, showing a reversed u-shaped relationship between the relative salience of the mouth prominence and badness, i.e., the mouth is salient for those who rated the character as being the most moral (good) and the least moral (bad), but in-between the extremes the mouth tends not to be salient. Considering the importance of facial expressions to communicate intentions, e.g., aggression vs. friendliness, we can assume—and the quadratic relationship confirms this—that the mouth will also play an important role to judge morally "good" characters.

How Game Designers Can Use the Results

Our results expose new ways that designers can try to push their designs to leverage commonly used visual attributes in order to get a reliable and effective morality interpretation for their antagonists. Designers might also use our results to identify new design alternatives that have not been previously well-explored. In this section we speculate how our results can be used by game designers.

Characters who people perceived as the most immoral leveraged many common visual features. The most immoral characters disproportionately featured salient eyes, noses, mouths, ears, skin problems, builds, head-to-body ratios, ages (especially appearing older), clothing, face coverings, tattoos, and weapons. These results highlight a large number of features that designers can leverage and try to strengthen and make more salient in their designs to make certain a character is perceived as immoral (based on their visual appearance).

Characters seen as the most moral did not leverage many salient visual attributes. This makes sense as characters who are viewed as immoral leveraged visual attributes often in combination or exaggerated ways, making them standout (e.g., consider the exaggerated head-to-body ratio of Neo Cortex who was viewed as strongly immoral). Attractiveness was the only physical attribute we found that was used disproportionately more for the most moral characters (roughly at the same rate as the most immoral characters, but disproportionately more than other characters). Given that people tend to consider "beautiful" people as "good" (Diessner et al., 2008), it is insightful that many participants rated beautiful characters, that had fewer other salient features, as more moral. This highlights that designers might consider designing antagonists that players view as being moral, while providing a salient physical attribute commonly associated with immoral characters. For example, participants who rated characters as having salient tattoos did not rate the same antagonists as having attractiveness as a salient feature (e.g., Kaos). So, designers might explore the combination of both attractiveness and a feature like tattoos in antagonists. It is important to note that attractiveness was not a pre-requisite for being viewed as moral (e.g., Lonnie was perceived to be moral, but was rated relatively low in terms of having salient attractiveness; see **Figure 2**).

As previously described, our analysis of character ratings in each of the five morality domains were highly correlated with one another. This means that designers tend to present characters that are uniform across all domains. However, our analysis revealed interesting exceptions to this trend. For example, the weapons and stances of Yunica (**Figure 2**) strongly suggest that they are willing and ready to harm others, while ratings of the other morality domains suggested that they would be unlikely to do something disgusting and would remain loyal to their groups. Similarly, Yuriko's slicked hair and businesswoman attire, suggested to people that she appeared less loyal, but unlikely to physically hurt people. Exploring ways that characters could be designed to create other variations of morality across the domains may provide interesting possibilities and directions for designers.

Finally, designers might leverage our results directly to plan and gauge how their planned visual attributes for an antagonist would be perceived by players. This might be important for game designers who seek to include a range of visual attributes. While we have not provided a predictive model, below we elaborate on our planned future work to build tools to support and evaluate character design activities that leverage predictive models that can be built based on work such as ours.

Limitations

Our choices for inclusion/exclusion when creating our stimulus set likely had an effect on our results. Our stimulus set does not represent all antagonists in all games. Recall that we excluded non-humanoid characters, and indie game characters, games that were not among the most popular games, and games published before 2014. Together these decisions likely had some influence on our observations and models. Firstly, as described, we did this to ensure that we had games in our stimulus set that are of a high quality and represent current trends in the industry. Second, this still represents a large set of games and/or games that are exemplary for the investigated time frame. Any attempt to operationalize current practices in a large space will necessarily need to make trade-offs. We believe that our results provide both important new insights for designers and researchers and provide a template of a new style of study for modeling the aesthetic practices in game design that can have important applications.

We see another important limitation of our work to be the use of static images. In many of the games players gather further impressions of characters through the way they move. Our use of static images, while drawn from a wide variety of games, does not fully capture other aspects of the visual design of antagonists. In particular, body language, movement, or speech might be used by artists and animators to more fully communicate information. For example, a character's stance is often tightly integrated with animation, to help convey tensed or relaxed muscles. Further, we provided only two images upon which judgments can be based. Even in games that do not use animation, different graphical still shots are used to display expressions of emotion (e.g., anger, happiness, surprise, aggression, etc.). Future work should consider displaying a richer set of media to solicit judgments from raters.

Further, in our analysis we do not consider the behavior or actions of characters, which obviously play prominently in how people would perceive their morality. However, this type of analysis is out of scope of our current research. We were focused purely on how game designers embody their character's morality through visual design. An interesting, but extremely challenging, line of research might explore common story telling techniques around characters to understand how these impact key elements of player perception of those characters.

Finally, we see our participant sample as a potential limitation of our work. While we believe our sample did achieve a reasonable mixture of gaming backgrounds, it could be that this demographic may not uniformly represent the cultural views and experiences that readily exist amongst gamers, or in gaming culture. That is, it seems likely that people familiar with games might carry their pre-existing knowledge of archetypes, tropes, stereotypes, running narratives, etc. that exist between games, and that people who are more familiar (enculturated) with gaming culture, might reveal completely different and, perhaps, more nuanced views and understanding of characters. While we have found no evidence to suggest that this is the case, future work might also incorporate perspectives of gaming culture and how it might affect perceptions of character design and moral judgments. Additionally, we did not control for moral leanings in our convenience sample from Mechanical Turk. Previous work has found that MTurk samples tend to be similar to student samples regarding political leaning, but proportionally more secular (Lewis et al., 2015). Nevertheless, given samples similarly sized to ours (186 participants in Study 2) future work should capture moral foundations to provide a better understanding of the respondents and how their moral leanings might have influenced their ratings.

Future Work

In this work we focused on antagonists, since they are underexamined yet play a critical role in many modern games. Our work is the first that we are aware of to take this particular approach of formulating a stimulus set that captures visual design practices, gather data describing people's perceptions of key design features and interpretation of those feature based on the stimulus set, and to characterize it using descriptive analysis and correlational models. We believe this work demonstrates an approach to an exciting direction of research that aims to build an understanding of game design practices and to make new computational support tools for game design possible. This is similar to the goals in the field of computational aesthetics, yet we believe that rather than automating many of these classically human-led endeavors, we wish to conduct research that will better support current practices and provide new directions for game design.

Along with the broader goal of exploring game designs and aesthetics through computational approaches, we believe there are a number of direct next steps that our work offers. First, we focused on antagonists in this work; however, previous work in media studies focused on idealized, animated protagonists; however, this other previous work did not focus on current practices in video games. We believe it would be extremely interesting to repeat our study with both game protagonists and antagonists, and to draw comparisons across studies. We would also like to expand and mature our work on antagonist design (and video game character design more generally), providing guidelines for designing formidable video game villains, protagonists, and non-player characters. Our work accounts for physical appearances and not character actions or mechanics in the game, we believe we can explore game mechanics and behavior and actions in story elements of the game to more holistically describe character designs. Finally, we would like to explore how our statistical approach might inform the design of tools to assist designers in assessing designs. These could take the form of predictive tools to provide informed estimates about the potential morality of a particular design and/or enrich data for modeling through crowdsourcing perception of visual attributes and morality.

CONCLUSIONS

Antagonists are critical elements of many games, but as of yet no previous work has explored one of the key ways that players experience characters, through their visual design. Our work provides a first empirical characterization of how game designers represent game antagonists and how people perceive these characters in terms of their morality. To do this we conducted two studies on Mechanical Turk to solicit ratings. The first study collected people's judgments on the perceived morality based solely on the visual design for each of the 105 characters in our stimulus set. The second study gathered judgments on which visual attributes are more salient. Our analysis provides a valuable characterization of current design practices and how players perceive game antagonists, and provides a number of key ways that designers can strengthen their antagonist's visuals and ways that they can break from current trends to explore new ways to visually represent their characters. Our research extends current research practices that seek to build an understanding of game design practices, and provides exciting directions exploring how design and aesthetic practices can be better studied and supported.

DATA AVAILABILITY STATEMENT

The raw data sets collected from the populations in both studies have been made publicly available at: https://dx.doi.org/10.17605/OSF.IO/V2B7A.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Research Ethics Board University of New Brunswick (REB 2019-118). The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

The creation of the stimulus set and initial literature review was led by RP, with the support of MB and SB. The experimental data collection system and experimental system was led by SB, with assistance from MB and RP. The statistical analysis was led by MB, with assistance from SB and RP. All authors contributed to the article and approved the submitted version.

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SUPPLEMENTARY MATERIAL

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