Towards the Visual Design of Non-Player Characters for Narrative Roles

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ABSTRACT

Non-player characters (NPCs) serve important functions for game narratives and influence player immersion. However, the visual design of NPCs for specific narrative roles is often approached by relying on designers' previous experience or guesswork. We contribute to the understanding of player perception of narrative NPC roles in games, by proposing a methodological approach towards the visual design of NPCs to fit specific narrative roles. We demonstrate this approach through the visual design of characters for the three narrative roles of *mentor*, *companion*, and *enemy*. The results of an online survey (n=45) indicate trait expectations towards these narrative roles, and differences therein based on participant gender. Further, the characters were generally perceived as the targeted role based on visual design alone. This method of designing characters for narrative roles is beneficial to both game designers and researchers for further exploring effects of NPCs on player experience.

Keywords: Non-player characters; narrative roles; visual design; player experience; gender; trait expectations.

Index Terms: Human-centered computing—Human-Computer Interaction (HCI)—Interaction Paradigms—Hypertext / hypermedia; Human-centered computing—Visualization—Visualization design and evaluation methods

1 INTRODUCTION

Well-designed characters are the foundation of storytelling in many different digital media formats. In most games, the experience of such characters is crucial to the immersion in games. One dimension of immersion in games has been described as imaginative immersion (i.e., the phenomenon of becoming absorbed with the game's narrative elements, such as storytelling and characters [18]). As interactive media, games are able to provide users with the potential to more actively engage with media characters, for example through the cognitive process of identification with a game avatar [26, 29].

In the majority of games, there are characters other than the player character which populate the game world: non-player characters (NPCs). Players can interact with NPCs to varying degrees, but cannot directly control and embody them in the game world. NPCs are an important factor in strengthening player identification by providing interactive parasocial relationships in which the player can enact their own role or identity [20]. Research based on traditional, non-interactive media has found that observation of characters already causes an emotional response that is key to media enjoyment [26,29], mediated through immersion and viewers' capacity for transportability [21]. Media engagement is particularly strong when viewers feel the desire to emulate characters; this phenomenon of wishful identification has been shown to be a component of attraction of viewers to media characters [26]. According to narrative designers,

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players become similarly invested in game characters, especially over time [32]; the design of well-developed game characters therefore benefits player engagement and immersion. However, despite their prevalence in games, NPCs have not yet been investigated in great detail in empirical games research. In particular, research on the effect of visual NPC attributes on player perception is sparse.

In this paper, we explore the effects of NPC designs for specific narrative roles on player perception. In human interaction, a large part of our understanding of social contexts relates to person perception; visual appearance plays an important role in this understanding and strongly influences how we form impressions and expectations of other people [14]. However, there is very little research on NPCs in games in general, and even less on how person perception plays a role in our interactions with NPCs. We have a very limited understanding of how players perceive visual character designs.

The goal of most gamers and game developers of course supports the creation of complex, non-stereotypical characters. However, as a first step of the games research community towards exploring how to break stereotypes and design multi-faceted NPCs, we situate our research in the area of how these stereotypes are perceived in the first place. As this area has not been studied in detail, the literature does not provide any guidelines for how players may react to NPCs in specific narrative roles, nor how to design for them to be perceived as such. With this research, we suggest a methodological approach to the visual design of NPCs for specific narrative roles. This approach was tested for three narrative roles which are commonly represented in games: mentor, companion, and enemy. We derived potential traits that characters in these narrative roles should embody to match player expectations, and validated these against a wider audience in an online survey. Further, we inferred the NPCs' visual design to match these role–trait expectations. We found that while trait expectations differed based on participant gender, the narrative role understanding of the NPC's visual design did not. Further, participants refrained from rating female NPC designs more than twice as often as they did male NPC designs. This points towards a degree of uncertainty in the perception of female game characters that may be influenced by their under-representation in games overall.

Our approach allows game developers to evaluate NPC designs in terms of players' narrative understanding at an early game development stage without time-consuming modeling or animation. This kind of pre-playtesting NPC evaluation can then be used to inform subsequent character design, as factors such as dynamic body language, dialogue, and audio are added. Finally, this research contributes to our understanding of the narrative roles of NPCs in games and how people perceive these roles based on NPC appearance.

2 RELATED WORK

NPCs populate game worlds; they embody a wide variety of game functions, and affect player immersion through their presence and behaviour [28,33]. When behaving believably—consistent with their role in the game–,-NPCs support the player's immersive experience; previous research has evaluated how NPC behaviour can be designed for believability [28,49]. Gameplay patterns such as self-awareness and awareness of surroundings, as well as the use of natural language and persistent traits, are said to create believable NPCs [30].

However, previous work mostly focused on NPCs' perception and definition through actions and affordances for the player, rather than through their visual design [30, 50]. The role of player characters, i.e., avatars, has naturally received more focus in the literature, and studies have shown that identification with the player character predicts game enjoyment [11, 23]. Game narratives also support the process of identification; Hefner et al. have shown that narrative elements facilitate identification [23]. Further, research on television has shown that even passive observation of media characters can still induce identification: Hoffner & Buchanan have shown that wishful identification is a significant factor in audience involvement, and same-gender characters and perceived similarity in attitude appear to facilitate this [24]. NPCs may reinforce players' role and immersion in the game narrative, and thus their design supports avatar identification and game enjoyment.

2.1 Narrative and Ludological Functions

Researchers such as Warpefelt & Verhagen have classified functional roles of NPCs based on a ludological perspective, i.e., distinguishing them through their roles within game mechanics, such as imparting information, or supporting player goals [50]. They emphasize the need for NPC visual appearance to indicate their functional roles [49, 50]: players should be able to perceive whether an NPC is going to *provide a service* or *provide a combat challenge*. These affordances represented through visual NPC design impact player immersion [28,49,50]. However the literature still yields gaps regarding the impact of NPCs on game narrative and players' perception thereof, i.e., NPCs' affordances as narrative entities, and the effect of narrative roles on player experience [28]. Research on narrative roles is rare, and often focuses only on the player character [16]. Even researchers focusing on ludological functions agree that NPCs embody the narrative, and consider it equally important for NPCs to convey their narrative role to the player through their actions and behaviour [49]. Yet there is no empirical work on how the visual appearance of NPCs can support or break players' perception of narrative roles. We argue that visual attributes convey NPCs' narrative roles, and thus support and uphold player immersion.

Narrative Roles   Narrative character roles are defined in this paper as a set of role functions and attributes belonging to an entity within a narrative [37]. Each action in a story can be seen as a function of a particular role, and each role can be defined through functions (i.e., actions which support that role) and attributes (e.g. a mentor may typically be wise and old). For example, the action of one character killing another may have a different meaning for the narrative depending on the roles embodied by each character, for example the hero and the villain [38]. In traditional media, there are many examples and typologies of narrative roles (e.g. Propp's *dramatis personae* [38], Campbell's archetypes [13], or the archetypes based on the latter by Vogler [48]). For example, Propp's *dramatis personae* distinguish seven character archetypes or roles, among them the hero, the villain, and the helper [38]. Campbell's and Vogler's archetypes partially overlap with Propp's; for example, Campbell and Vogler ascribe teaching and gift-giving functions to the mentor, as such, this archetype can be mapped to Propp's helper, donor, and dispatcher. Following Aarseth's definition of games as ludo-narratological constructs [1], NPCs embody both ludological roles for the game mechanics they provide and narrative roles for the archetypical function they perform in a game narrative. It should be noted that an individual affordance provided by an NPC can be considered both a ludological and a narrative role. For example, an NPC describing the game's backstory might fulfill the ludological role of informing the player where to go next, but also serve a narrative role by simultaneously progressing the plot or providing character exposition. Further, narrative roles are not "rigid character roles", but rather temporary functions embodied by narrative entities [48].

In folklore and literature, narrative roles include archetypes such as the *mentor* or *ally* (first described by Campbell [13]; later adapted for screenwriting by Vogler [48]). Many such archetypes can also be found in modern games. For example, the *mentor* archetype is described through the character's teaching and gift-giving functions towards the hero. As such, Vesemir in *The Witcher 3* [15] teaches the player combat and how to cast signs, and thus embodies the mentor role. The *ally* is a helpful companion or sidekick (often an animal), but can also act as the hero's conscience, or as an audience character [48]. Dogmeat in the *Fallout* series (e.g. [9]), and Ellie in *The Last of Us* [34] are good examples of the ally. It could be argued that even non-characters sometimes embody this archetype by being particularly helpful items, such as the weighted companion cube in *Portal* [47] or the totem in *Monument Valley* [46]. On the hero-opposing side, characters-as-obstacles such as Faralda in *Skyrim* [10] can be considered *threshold guardians*, an archetype whose main function is testing the hero by providing an obstacle. Villains however, embody the *shadow* archetype; Vogler describes them as creating conflict and challenge [48]. This often antagonistic archetype can display a wide range of "evil", including the more realistic evil of the Origami Killer in *Heavy Rain* [40], and the all-destroying fantastical evil of Ganondorf in the *Zelda* series [35].

Characters often embody multiple archetypes throughout the course of a game; for example Navi in Zelda [35] is mainly an ally, but by teaching the player how to use weapons and providing advice, she also embodies the mentor role. GLaDOS in *Portal* [47] starts off as the mentor by performing an instructional role, but soon changes to the shadow by actively opposing the player.

2.2 Person Perception and Impression Formation

While game designers in the industry clearly have extensive experience in the visual design of NPCs, academic research on NPCs' narrative effect and visual design is sparse. For this reason, we draw implications from research in related areas, such as person perception and media psychology. Both in real life and when confronted with media representations, people form impressions of others based on their attributes such as physical appearance, behaviour, and speech [25, 26]. Impressions of personality and behaviour are strongly influenced by mere visual appearance: attractiveness, for example, is generally equated with being good, nice, and helpful [26]. Basing person perception on physical characteristics is particularly pronounced in children, but remains prevalent among adults [36, 42].

In media, person perception is utilized as a shorthand to convey character traits. Hoffner & Cantor have described targeted casting and costuming as a way for the television medium to portray character personality through visual appearance [26]. They also describe character perception and person perception as quite similar cognitive processes, thus the visual appearance of characters in media plays a significant role in conveying personality traits [25]. It should be noted that this can lead to stereotypical character depictions, which is not a goal we wish to support. However, a scientific exploration of how person perception applies to fictional characters can help researchers and designers understand how stereotypes occur and how they can be broken in more developed character depictions.

When comparing the cognitive processes involved in the perception of actual people and fictional characters, Hoffner & Cantor have described character perception in TV shows as being limited due to the lack of personal interaction, but also strengthened by contextual knowledge and insight into hidden moments [26]. One main difference between games and TV is the interactivity component, which has been shown to facilitate identification [23]. Compared to the role of television characters, this further emphasizes the potential of NPCs in games to induce and support identification. Games thus provide a unique potential for both leveraging contextual knowledge and hidden insight regarding NPCs, and also allowing for a degree of personal interaction. This places significant weight on the importance of character design and perception in games, particularly

visual design of NPCs for narrative roles.

As the literature on NPCs in games is still limited, we first began our research outside of the game context. There has been a great deal of research on the effect of virtual agent design on users of interactive (often educational) systems. Virtual agents' visual appearance has been shown to affect how people perceive and evaluate them; this can differ depending on players' own age, gender, and ethnicity [4]. Agents in an educational setting that were perceived as similar to the user correlated with increased self-efficacy [43]. Another study has shown gender differences in preferences for agent behaviour and dialogue in learning tasks [22]. While virtual agents generally do not exist within a traditional narrative, different instructional roles have been investigated closely particularly in educational contexts, and are similar to some narrative archetypes. For example, instructional roles such as the mentor, and the motivator have been shown to have a significant effect on motivation and learning, as well as self-efficacy, respectively [5]. The motivator agent in this study was designed to be supportive in its dialogue and animation, while the mentor was designed as a combination of supportive and knowledgeable. Overall, research here suggests that person perception of virtual agents is a subjective process affected by both traits of the agent (i.e., appearance and behaviour) and the interacting user and observer.

3 DESIGN APPROACH

To accurately predict and control for the influence of NPCs on the player, the games research community requires more information on how the visual design of NPCs affects player perception. For this purpose, we contribute a methodology for iterative design of NPCs for specific narrative roles. We suggest a first approach towards the iterative design of NPCs, with a focus on their narrative role and overall visual appearance. The approach consists of a two-step design. With this approach, researchers begin with a set of trait expectations for a specific narrative role, as well as a visual design for a character embodying that narrative role. These traits and the visual design are then evaluated via an online survey to target a wide audience without requiring researchers present for supervision.

Trait Generation & Visual Character Design   To ensure that a larger audience shares the researchers' or developers' impression of the targeted narrative role, this step should generate target traits which a role should embody, both regarding appearance and characteristics. For example, should a mentor character be old or young; do they necessarily have to be friendly? The visual design of the NPCs should be derived based on the intended role and traits. We propose that the first iteration of this validation step should focus on static images of the NPCs, as conducted in this paper. We purposefully chose not to include factors such as dynamic animation, or even embedding the designed character within a game narrative. This is because the literature emphasizes that character appearance alone already holds many variables which may influence player perception (including static body language). The addition of dynamic body language and dialogue, as well as elements of narrative storytelling, would allow for potential interaction effects of the different factors. Character designs should be designed to visually match their narrative roles before these factors are added in later design stages.

Validation   Given the generated traits and first NPC design, their appearance should be matched against both the intended role and traits. This step can be repeated to improve the design iteratively. Given a specific domain or target group, the approach can also investigate the influence of participant factors such as age, gender, or gaming habits. As mentioned, we suggest the use of an online survey to target a wide audience while also being economic in resources.

4 NPC DESIGN

We tested this method by designing NPCs for three narrative roles: *mentor* (m), *companion* (c), and *enemy* (e). These roles were chosen

Table 1: Trait expectations for the narrative archetypes mentor, companion, and enemy.

Traits	old	skilled	helpful	wise	deceitful	egotistical	nice	attractive	intelligent	naive	obstinate
Mentor	X		X	X			X	X	X		
Companion		X	X				X	X		X	
Enemy		X			X	X					X

because they are common but distinct characters in both modern video games and in literature [48]. Additionally, in future work, the small number of characters will allow for a game to be developed for subsequent study purposes, in which these pre-evaluated characters are presented in a complete narrative within a comparatively short game duration.

In the following, we describe the generation of a starting set of trait expectations for the narrative roles of mentors, companions, and enemies. We then created visual designs for NPCs in these roles based on the traits expectations and research on person perception.

4.1 Trait Generation

Potential traits were determined for each role for the *trait validation* phase. It should be noted that the traits are presented here as a translation of the original German language version. The traits were based mainly on Anderson's list of personality traits that have been reliably evaluated for their degree of likeableness [2], and the narrative role descriptions by Vogler [48].

Mentor Traits   The mentor is a positive narrative role, as such we began with the upper half of Anderson's list of personality traits. Related work has shown that attractive characters are generally perceived as good, nice, and helpful [26], we thus anticipated high values for *attractive*, *nice*, and *helpful*. Baylor & Kim described their mentor as supportive and knowledgeable [5]; this led us to add *intelligent* and *wise* to the mentor traits. As research in person perception has shown an association of age with knowledge (as also echoed by Baylor's design of their own mentor character [4], and Vogler's descriptions [48]), we suspected that a mentor character should be portrayed as *old* in comparison to other characters.

Companion Traits   Much like the mentor, the companion role is an ally to the player and a positive narrative role [48]. Based on Vogler's description of the ally, we similarly focused on the higher-valued traits of Anderson's list [2]: *nice*, *helpful*, and *attractive*. Baylor & Kim described the mentor role as an extension of the motivator role; their description of the latter matches Vogler's description. This strengthens the need for similar traits between the two roles. However, we expected a lower value for *old* for this role, and instead as a counterpoint added *naive*, as a potential distinction from the *wise*, *old* mentor, but with a trait that is still listed in the positive range of Anderson's likeable traits. Because of this role's description as a supportive role, we suspected that a companion would be expected to be *skilled* in addition to actively *helpful*.

Enemy Traits   The enemy role is the player's antagonist. Following Vogler's description of the *shadow*, this archetype is to some degree always in opposition to the hero: from merely disagreeing with the protagonists' methods to actively seeking their defeat [48]. As such we based the expected traits on the lower half of Anderson's list, i.e. traits with very low likeableness: *deceitful*, *egotistical*, *obstinate*. This character was described as a "worthy opponent"; we were thus also interested in the *skilled* trait for this character.

This led to a set of 11 potential traits for the roles (see Table 1).

4.2 Visual Character Design

First models of the three characters were designed for both genders, because of the previously mentioned facilitating effect of same-

gender characters on identification [24]. In future work, we hope to use these dual representations of each role for further studies investigating potential differences in narrative perception between male and female NPCs. Game characters are often portrayed differently based on their gender [6], which may introduce additional factors to players' perception of them (e.g. [8]); thus care was taken to portray both genders the same regarding clothing. Given the intended use for the same narrative, the characters were all designed in a similar style. As our design is based on person perception research, we aimed for a mostly-realistic portrayal. The characters were modeled based on freely available base meshes[1] using Blender[2] (Fig. 1a).

Mentor Design This character's visual appearance was based on a study which compared agent design for motivational and instructional roles, including the mentor [4]. The mentor was designed to look authoritative and knowledgeable, as well as slightly older than other characters. The clothing was designed like a uniform (e.g. jacket, hat, and long trousers), as they are perceived as more authoritative [12]. As beards are associated with older age and competence [41], the male version was designed with facial hair.

Companion Design The companion was designed to appear younger and more approachable than the other characters. As such we followed Baylor's example of more casual clothing in the form of rolled up sleeves and shorts. Body language was designed to present an open stance. The character was designed without either beard, hat, or the uniform-like jacket to avoid associations of authority.

Enemy Design The design of the enemy character was more difficult, as there is even less scientific work on which to base the appearance of an enemy. We thus turned to Disney character design, even though this may constrain results to a Western audience. Disney villains are often portrayed with gender-nonconforming attributes, e.g. male villains with more traditionally feminine physical characteristics, costuming, or gestures compared to the male protagonists [31, 39]. Disney's *evil* attributes are sometimes exaggerated due to the cartoon style, however we attempted to follow this approach in a more realistic manner by giving the female enemy short hair (masculine association) and the male enemy longer hair (feminine association), as well as both of them a slim waist and higher cheekbones for a more angular appearance [17]. Unlike the other two characters, this model was portrayed with their arms crossed to present a more defensive and unapproachable stance.

5 SURVEY

An online survey was conducted with four goals: 1) An evaluation of the role–trait expectations of a wider audience, in order to inform design choices for the NPCs regarding appearance, but also future choices in developing narrative and dialogue. General agreement of the participants on the traits belonging to a role would also indicate that the role is clearly defined. 2) The survey was designed to investigate role expectations corresponding to the designed character images—that is, whether character designs are perceived as matching the intended role. 3) Further, we were interested in exploring whether NPC gender has an influence on the perceived role. 4) Finally, since gender appears to be an important factor in wishful identification [24], we chose to have a closer look at participant gender as an influencing factor in our evaluation.

5.1 Measures & Stimuli

The online survey consisted of a questionnaire assessing participants' demographic background, their understanding of narrative roles, and their perception of the visual NPC designs described previously:

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[1]Female and male rigged base meshes by contmike, downloaded 06.11.2016. `http://turbosquid.com/Search/Artists/contmike`
[2]Blender v2.78, Blender Foundation. `https://www.blender.org/`

Table 2: The presented role descriptions for the trait and image evaluation; originally presented in German.

Roles	Role Description in Traits Survey Part	Role Description in Image Survey Part
Mentor	*A mentor is a person who aids and teaches you.*	*In video games, a mentor is a character who provides the player with background knowledge und helps them master specific skills, so that the goal of the game can be reached.*
Companion	*A companion is a person who complements you with their own abilities.*	*In video games, a companion is a character who complements the player with additional skills and abilities to reach the goal of the game.*
Enemy	*An enemy is a person who tries to stop you from reaching your goals.*	*In video games, an enemy is a character who works against the player and tries to stop them from reaching the goal of the game.*

Role–Traits Ratings For each role (*mentor*, *companion*, and *enemy*), the questionnaire assessed which traits they associated with that role. Given a one-sentence definition of each role (see Table 2), participants were asked to rate how well specific traits fit on a five-point Likert scale (1=not at all, 5=absolutely) in randomized order. Each role was rated for all traits generated in the previous section (regardless of the described expectations).

NPC Image–Role Ratings The participants were presented with three visual NPC designs, one for each character role (*mentor*, *companion*, and *enemy*). The visual designs were presented one at a time, and always belonging to the same gender (either all female NPCs or all male NPCs). Each character role was also described in a one-sentence definition that included the context of the role in a video game (see Table 2). Participants were then asked to rate how well each visual design and role description matched each role on a four-point Likert scale (1=not at all, 4=absolutely). As participants were not all expected to have a gaming background, they were given the option to abstain from a rating if they could not decide.

5.2 Participants & Procedure

We recruited 45 participants (16 female, 29 male) with a median age of 28 (*IQR*=25-34), via Facebook, (university & regional group) mailing lists, and word of mouth. Only 14 participants reported being students or PhD students (mostly in science and technology related fields). The other 31 participants described themselves as either employees or self-employed in a wide variety of fields, such as medicine, science and research, engineering, education, and IT. The participants' gaming habits were diverse; nine played less than once per month, seven never. Twenty-nine played more than once per month. They were assigned to the conditions randomly, with 21 participants (6 female, 15 male) shown only female NPCs, and 24 participants (10 female, 14 male) shown only male NPCs.

Participants were presented with the measures described above in an online survey. To keep the survey short and avoid potential interaction effects from NPC genders, they were randomly assigned to a condition of either only female, or only male NPC images. As compensation, participants were entered into a draw to win one of three Amazon vouchers to the amount of 5 Euros.

6 RESULTS

We report the results of the role–trait ratings, and in how far the NPC designs were perceived to match the intended narrative roles.

6.1 Role–Traits

The mean results for each trait and role are shown in Figure 3. The data was nonparametric; we performed Friedman's ANOVAs with Bonferroni correction applied for post-hoc tests. The traits can

(a) Left to right: the mentor, companion, and enemy.
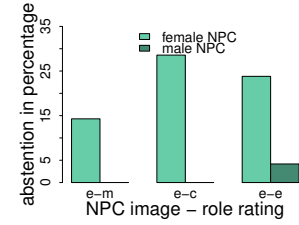
(b) Abstention rates for the enemy image (*e*) for each role rating (*m*, *c*, *e*).

Figure 1: (a) The NPC designs as modeled in Blender. (b) Abstention rates were highest for the *enemy* NPC; this effect was more pronounced for the female NPC where rates ranged 14–29%, vs. 0–4% for the male NPC.

be clustered by the roles between which the ratings differ significantly. The *mentor* ratings significantly differed from the *companion* and *enemy* ratings for the traits *intelligent*, *naive*, and *wise* (‡). As expected, the *mentor* role had the highest ratings for *intelligent* (m: *Mdn*=5, *IQR*=4–5; c: *Mdn*=4, *IQR*=3–5; e: *Mdn*=4, *IQR*=3–5), $\chi^2(2)$=24.57, *p*<.001, and *wise* (m: *Mdn*=5, *IQR*=4–5; c: *Mdn*=4, *IQR*=3–4; e: *Mdn*=3, *IQR*=3–3), $\chi^2(2)$=50.88, *p*<.001. The *mentor* role was rated significantly lower for *naive* (*Mdn*=1, *IQR*=1–2) compared to both *companion* (*Mdn*=2, *IQR*=2–3) and *enemy* (*Mdn*=2, *IQR*=2–3), $\chi^2(2)$=23.06, *p*<.001. We originally expected the highest rating for this trait for the *companion*. We also expected the *mentor* to receive the highest rating for *old*; this was the case (*Mdn*=3, *IQR*=3–4), but the difference was only significant compared to the *companion* (*Mdn*=3, *IQR*=2–3), $\chi^2(2)$=14.54, *p*<.001, with the *enemy* inbetween (*Mdn*=3, *IQR*=3–3).

The *enemy* ratings were significantly different than the *mentor* and *companion* ratings for several traits: *deceitful*, *obstinate*, *egotistical*, *helpful*, and *nice* (†). The *enemy* held the highest value for *deceitful* (m: *Mdn*=1, *IQR*=1–2; c: *Mdn*=2, *IQR*=1–2; e: *Mdn*=4, *IQR*=4–5), $\chi^2(2)$=77.47, *p*<.001, *obstinate* (m: *Mdn*=2, *IQR*=2–3; c: *Mdn*=3, *IQR*=2–3; e: *Mdn*=4, *IQR*=4–5), $\chi^2(2)$=49.96, *p*<.001, and *egotistical* (m: *Mdn*=2, *IQR*=1–2; c: *Mdn*=2, *IQR*=1–2; e: *Mdn*=4, *IQR*=4–5), $\chi^2(2)$=65.66, *p*<.001. The *enemy* was rated lowest for *helpful* (m: *Mdn*=5, *IQR*=4–5; c: *Mdn*=4, *IQR*=4–5; e: *Mdn*=2, *IQR*=1–2), $\chi^2(2)$=71.12, *p*<.001, and *nice* (m: *Mdn*=4, *IQR*=3–5; c: *Mdn*=4, *IQR*=4–5; e: *Mdn*=2, *IQR*=1–3), $\chi^2(2)$=68.11, *p*<.001. The two traits *skilled* and *attractive* did not show a significant difference in ratings between roles.

Influence of Participant Gender Mann-Whitney U tests were used to compare ratings of female and male participants (non-parametric, independent data); several significant differences were found for the mentor and companion roles (indicated by a black border in Figure 3). For these significant differences, female participants rated positive traits higher than male participants, for example, female participants' ratings for mentors as *skilled* were significantly higher (*Mdn*=4, *IQR*=4–4.25) than those of male participants (*Mdn*=3, *IQR*=3–4), W=144, *p*<.05, r=-0.33. One negative trait yielded a similar significant difference in the opposite direction; female participants' ratings of mentors as *deceitful* were lower (*Mdn*=1, *IQR*=1–1) than those of male participants (*Mdn*=2, *IQR*=1–2), W=308, *p*<.05, r=0.31.

6.2 Images–Roles

With one exception, the role ratings of the female and male NPC images showed an overall match with the intended roles (Fig. 2). The mentor image was rated highest for the mentor role for both gender variants, although the difference in ratings for each role was not significant (turquoise bars). The companion image (blue bars) was also rated highest for the intended role for both gender variants. For the female companion this difference was not significant, however a

Friedman's ANOVA (with Bonferroni correction for post-hoc tests) showed a significant difference in ratings for the male companion image: the ratings for the companion role (*Mdn*=3, *IQR*=3–4) were higher than both enemy role (*Mdn*=2, *IQR*=1–2, *difference*=34.0), and mentor role ratings (*Mdn*=2, *IQR*=1.75–3, *difference*=21.5), with a critical difference of 16.59, $\chi^2(2)$=31.55, *p*<.001. Results differed for the enemy images (orange bars). The female enemy image was rated highest for the enemy role (m: *Mdn*=2, *IQR*=1–3; c: *Mdn*=2, *IQR*=0–3; e: *Mdn*=3, *IQR*=1–3), but there was no significant difference. The Friedman's ANOVA for the male enemy image was also non-significant. While the male enemy image received the lowest mean score for enemy (*M*=2.61, as opposed to *M*=3.13 for the companion), the image held very similar median ratings for the enemy role (*Mdn*=3, *IQR*=2–4), the mentor role (*Mdn*=3, *IQR*=2–4), and the companion role (*Mdn*=3, *IQR*=2–4).

Influence of NPC and Participant Gender For each NPC image, there was no significant difference in ratings based on the gender variant of the image, or participant gender. Grouping by same-gendered (NPC and partipant of same gender, n=20) and opposite-gendered (NPC and participant of opposite gender, n=25) conditions showed a tendency for higher ratings for the mentor image as matching the intended role in the opposite-gendered condition than in the same-gendered condition. Inversely, the same-gendered condition showed a tendency for higher ratings for the companion and enemy images to match their intended role than the opposite-gendered condition. However, there were no significant differences in ratings between the two conditions. Overall, participants most often abstained from rating the enemy NPC for any role (Fig. 1b). Far more participants abstained from rating the female NPCs compared to the male NPCs. Invited to judge how well a male NPC image fit a role, a maximum of 12% refrained (enemy image). When asked to judge how well a female NPC fit a role, the abstention rate reached a maximum of 33% (the enemy), and never went below 14%.

7 DISCUSSION

Based on our results, we discuss participants' trait expectations for role descriptions, and role perceptions for the NPC designs.

Trait Expectations for Narrative Roles The results show that people generally rated the traits for each character as expected, yielding insight into how mentors, companions, and enemies can be designed to convey their narrative roles. Overall, the mentor and companion roles yielded similar trait expectations, with significant but small differences. The mentor was expected to be more *intelligent* and *wise* than the other characters, as well as least *naive*. The companion was rated both more *skilled* and more *helpful* than the mentor, indicating a more active role. The age expectation was rated a fairly neutral median for all roles, but nevertheless showed a significant difference between mentor and companion; thus mentors may be expected to be older relative to other characters. There was no correlation of the age rating of any role with the participant age.
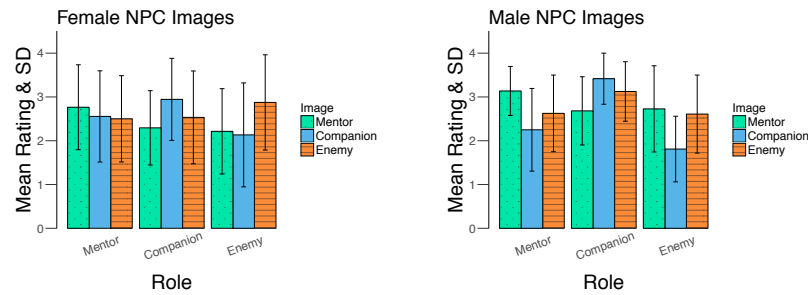
Figure 2: Role ratings for the female (left) and the male NPC image variants (right), each image indicated by colour. With one exception, the NPCs were perceived as most likely to be the role they were designed for. Only the male enemy NPC (left, orange bars) was considered most likely to be a companion, with mentor second and enemy a close third.
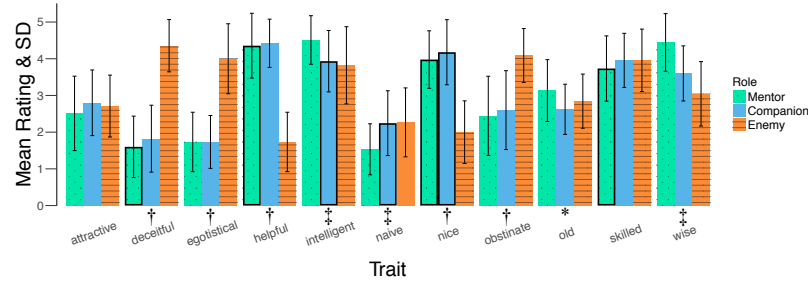

Figure 3: Average trait ratings and standard deviation for each role (significant mean differences between roles: ∗ indicates significant differences between *m* and *c*; †: *e* significantly differed from both *m* and *c*; ‡: *m* significantly differed from *c* and *e*). Black outline: values showed a significant difference between participant genders.

As expected, the enemy role was a counterpart to the other two roles, with high ratings for negative traits and low ratings for positive traits. Interestingly, *skilled* was rated with the same mean for companion and enemy, and both higher than mentor. While the difference was not significant, it implies that the enemy should be skilled enough to provide a challenge, matching Vogler's archetype description. The standard deviations were overall low, indicating that the participants agreed on how traits matched the roles.

Trait Expectations by Participant Gender There were differences in trait expectations based on participant gender. Female participants rated positive traits of characters with a positive narrative role higher than male participants; similarly, negative narrative archetypes received higher ratings for negative traits. For example, women rated mentors as more *skilled*, *helpful*, and *nice*, but less *deceitful* than men. Companions were expected to be more *intelligent*, but less *naive* by women compared to men. There was no significant difference in ratings of enemy traits based on participant gender, although tendencies here were reversed: women tended to rate negative traits higher than men (e.g. men (M=4.25, SD=0.77) rated the enemy as more *selfish* than women (M=3.86, SD=1.03)). Narrative roles may yield different expectations based on participant gender, or it may be a facet of gender differences in study participation (e.g. [45]). If the former applies, it could indicate that narrative character design could be adapted to gender.

Roles Conveyed by NPC Images The results show that the character design of the mentor and companion suited the intended roles; that is, the visual appearance worked to convey the specific narrative roles. Although the differences were overall small and non-significant, both mentor images were rated most likely to be a mentor, as were the companion images for being a companion. The differences in rating between the NPC variants of either gender did not achieve statistical significance, indicating that the effect of NPC gender based on visual appearance alone is negligible. For the enemy, results were less clear. Both versions of this NPC received the most abstentions from rating. As this role was also most difficult to design for, it is fitting that it was most difficult to rate. While we cannot pinpoint a cause based on our results, they emphasize the need for empirical work in designing antagonistic game characters.

Influence of Participant Gender on NPC Perception Unlike the trait expectations, participant gender had no significant effect on the role ratings based on the NPC image prompts. This would indicate that there is no need to design NPCs differently based on gender. This mirrors other results in related work which shows that gender may not have a dichotomous effect on the gameplay experience. Instead, individual attributes such as beliefs and attitudes [11], as well as game literacy [27] are more significant.

Same vs. Opposite Gender Condition There was a tendency for the mentor image to receive a higher mentor rating in the opposite-gendered condition than in the same-gendered condition, i.e. male participants rated the female mentor more highly and female participants rated the male mentor more highly than participants rated mentors of their own gender. Inversely, participants prompted with NPCs of their own gender (i.e. the same-gendered condition) tended to rate the companion and the enemy higher on the intended roles. However all of these differences were small and non-significant. It is hard to say whether these tendencies are due to weaknesses in NPC design, pure chance, or indicative of gender expectations in games (e.g. towards the gender of game antagonists).

Female NPCs Rated Less Often More than twice as many participants abstained from rating female NPC images than male NPC images, which may have influenced the image ratings. This was particularly pronounced for the enemy NPC (Fig. 1b). Potentially, this could reflect the imbalance in characters' gender representation in games and other media (e.g. [3, 6]). With less female characters present in games, players may be less confident in recognizing which narrative role they embody.

Enemy/Villain Gap The male enemy was least well designed in terms of being perceived as the intended role; the male enemy image was rated most likely to be a companion. In both gender variants, this NPC received the highest abstention ratings. This

narrative role's character design was also the one involving the most guesswork, pointing towards a gap in the existing literature. That the female enemy image was rated as intended while the male enemy was not leads us to speculate whether the realization of the Disney-based design was suitable for the female character, but not the male: Perhaps the non-conforming attributes (e.g. short hair) were more obvious in the female version; a comparison with a male enemy with longer hair might produce more conclusive results. However, just as likely, the application of cartoon gender conventions for conveying villains in a comic style does not work with more realistic characters. Nevertheless, comparing this character's perception by participants culturally less influenced by Disney movies may be interesting.

Ethical Implications   Finally, we acknowledge potential ethical implications of our work. It appears that the Disney-based design shorthand in conveying the status of roles such as enemy or villain through nonconforming attributes is effective. However, game designers should be careful in their use of this design shorthand. In particular, they should consider what underlying messages they communicate about gender attributes and personality traits relating to specific roles, especially as different media influence gender-role learning in children [3, 31]. We emphasize that our intent is not to promote stereotypical characters that transparently convey their roles. However, in order to empirically investigate the design of more complex characters and how they are perceived by players – and in the future, to design games that intentionally break with character stereotypes – the community first requires a foundational understanding of how the cognitive process of person perception interacts with game character perception.

Limitations   The study's sample of participants was fairly diverse, but still of a relatively small size. Before conclusive implications can be drawn, the study will need to be iterated with a larger sample size. The trait generation was mostly based on Vogler's descriptions and Anderson's list of personality traits rated for their likeableness. There may of course be other relevant or better-suited traits which factor into these narrative roles, as we will address below. Further, given the recruitment method, the participants were drawn from the same cultural background. It may be interesting to compare results between participants of different cultural influences, as this could alter expectations of narrative roles.

As literature on conveying narrative roles through visual appearance is sparse, the NPC design for this survey was necessarily based on inferences from an amalgamation of multiple sources. Considering this, it is remarkable that the enemy NPC was the only that was not perceived as matching the intended role. Nevertheless, the process may have included mistakes or unexpected interaction effects. Further, with a design based on person perception research, we did not overly accentuate differences between characters. Our results may not generalize to more exaggerated designs.

Participants were asked to rate each image for the three roles; this presentation could have already helped to distinguish between characters. Future work will have to explore how well design are recognized when no or a larger range of roles are presented as options. Further, the NPC designs were presented as images only, as our research question focused on the effects of visual design, and our approach is meant to be a low-cost and easily iterated method. In future work, however, as effects of the visual design of NPCs become better understood, it will be interesting to investigate other factors involved with NPC design. Presenting NPC designs with their movement animations (e.g. idle animations) or in combination with dialogue (e.g. a catchphrase) is likely to provide more pronounced effects, as non-verbal behaviour (e.g. dynamic body language and facial expressions) is also important in agent design and how people interact with them [7]. However, research on designs incorporating these factors should follow a step-by-step approach to investigating each added attribute. Adding multiple factors at the same time may elicit interaction effects that make it difficult to pinpoint causes when

NPCs designs are perceived in a certain way. Nevertheless, future research will need to explore how results of this work manifest in the context of a complete game narrative (with the addition of animation, dialogue, and storytelling, as well as characters' ludological roles).

Theoretical Basis for Future Trait Generation   Using Anderson's work as the basis of this work's trait generation led to a single dimension of personality traits, that is, likeability. However there are likely many other relevant personality trait dimensions that could be of interest, such as warmth and competence [19], or Schwartz's value relations [44]. In future work, we will attempt to draw trait expectations from player interaction with existing game characters. However this necessitates answers to several other preliminary questions, for instance, what amount of exposure is needed for players to become sufficiently familiar with an NPC to judge their personality in the context of the narrative. For example, this may depend on factors such as gameplay duration, characters' screen time, and narrative progression. This would constrain the study to participants of higher game literacy, and complicate generalizability.

8   CONCLUSION

With this paper, we present a novel approach towards the visual design of NPCs for specific narrative roles. Our research will help to improve players' understanding of game narratives, and contributes to the games research community's understanding of players' perception of NPCs based on visual appearance. This is particularly valuable considering the importance of NPCs for game narratives, and the relative scarcity of research in this area. With this work, we hope to spark discussion among the community on how to further improve the design of NPCs in narrative roles.

In summary, we contributed a method for designing NPC appearance for specific narrative roles. Based on the use of an online survey, the approach is economic in terms of resources, and was able to validate a starting set of role-trait expectations against those of a wider audience, and evaluated the NPC visual designs in terms of narrative role perception. The ability to evaluate character designs at an early developmental stage is beneficial to both game designers and games researchers interested in the effects of NPCs, their visual design, and their narrative roles. By exploring character stereotypes, we offer a first step towards understanding how person perception processes interact with game characters. In particular, we explored which traits participants associated with the narrative roles of mentor, companion, and enemy, and investigated the success of our NPC designs in being perceived as the intended role. Results of the role–trait expectations show that participants of this survey shared the same common understanding of the traits suggested to match the narrative roles of mentor, companion, and enemy based on our research. Design suggestions can be drawn regarding the similarities of mentors and companions, for example regarding relative age and personality traits such as intelligent, helpful, and skilled, and how trait expectations differ for the enemy narrative role.

The comparison of trait expectations between participant genders showed that women rated positive traits higher for positive narrative roles than men, and negative traits higher for negative narrative roles. The results point to open research questions towards the reason behind this effect. Game designers and developers should keep this in mind when recruiting study participants and playtesters.

Despite the lack of substantiated sources on which to base the NPC designs, the results appear to have succeeded in portraying the intended narrative roles, lending weight to the methodological approach of their design. While there was no significant difference in the role ratings, there were clear tendencies in the NPC roles associated with each image except the enemy. NPC gender appeared to have little effect on their perception, although it should be noted that this result is based on static appearance only. We expect that NPCs will more easily be perceived as specific roles as other factors to indicate the role are added, e.g. dynamic body language, dialogue,

and of course narrative. The findings regarding participants' comparative lack of confidence in rating narrative roles for the female enemy NPC is of particular interest, as it opens up new areas of future research to understand why this was the case, and whether the representation of female game characters mediates this phenomenon.

Finally, the results offer insight into players' understanding of the visual design of the specific narrative roles of mentors, companions and enemies, and emphasize the need for further investigation into narrative roles of NPCs and their effect on player experience.

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