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Imagining Differently: Relationships between Reading and Gaming Habits, Mental Imagery Construction, and Perspective-Taking When Processing a Fictional Narrative Scene

Introduction

Text-evoked visualisation is the construction of mental imagery by readers in the act of reading, in direct response to textual cues. The construction of mental imagery in response to text is potentially mediated by a range of factors. Recent empirical research into text-evoked visualisation (e.g., Green et al. 2008; Kuijpers et al. 2014) and the effects of reading habits (e.g., Kuijpers et al. 2019) and gaming habits (e.g., Happ and Melzer 2014) presents new opportunities for collating results and developing insights. This article reports an empirical investigation of the potential mediating role of reading habits and computer game playing habits (hereafter 'gaming habits') in text-evoked mental imagery construction and perspective-taking, and to a lesser extent the intersecting factors of the person and tense of the text in question. This introductory section summarises related previous research, including predominantly empirical research on text-evoked visualisation; mental imagery ability and construction in general; related predispositions and traits; and relationships between mental imagery construction, particular traits and reading habits and gaming habits. This discussion then focusses on perspective-taking, in particular, within mental imagery construction, in relation to reading and gaming habits. The related hypotheses being tested in the current study are then outlined. The second section of this article outlines the empirical methodology used in the study. The third section presents the results and the fourth section offers a theoretical discussion of these results, including reflections on the limitations of the study. The final section presents conclusions and directions for future research.

As part of their description of mental imagery, Kuijpers et al. (2014) compare experiences of mental imagery in response to film and textual narrative and point out that "when watching a film, viewers are usually presented with more fully formed images […] than when reading a book. The reader is required to use mental capacities to imagine what is described in the text, whereas other mental faculties are appealed to in the case of a viewing experience" (2014, 92). This is not to say that mental imagery is not evoked or entailed in the process of watching films. Mental imagery construction during film-watching experiences can involve mental attention, focus, selection, processing, recognition, re-construction and/or elaboration in response to predominantly visual cues. However, mental imagery construction as part of reading experiences is more comprehensively the cognitive work of the reader.

The capacity to construct images in the mind, known as 'visual imagery ability' or 'mental imagery ability,' has been investigated within the field of psychology since 1880 (McAvinue and Robertson 2007, 191). Several subjective measures of visual imagery

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ability have been developed, investigating participants' perceptions of the level of detail, clarity, vividness, etc. of an image they have constructed and the ease with which they can construct or maintain that image (McAvinue and Robertson 2007). One such measure, for example, is employed by Green et al. (2008), who solicit self-assessment through responses to a multi-item scale, drawing some items from Paivio's Individual Differences Questionnaire (1971). One item in this questionnaire, for example, is "I can close my eyes and easily picture a scene I have experienced" (Green et al. 2008, 526). Other investigations explore brain area activation during imagery construction (e.g. Just et al. 2004). However, the perspective from which the image is visualised (e.g. from above, close up, etc.) has not been a significant part of previous studies of mental imagery ability. The ability to create mental images in response to reading text, specifically (as opposed to listening to verbal cues, or recalling memories, etc.), has also not been focussed upon, and so relationships between particular textual cues and mental images constructed in response remain under-explored.

Mental imagery evoked during reading, specifically, has previously been investigated as a facet or measure of immersion, absorption or transportation (Gerrig 1993; Esrock 1994; Green et al. 2008; Kuijpers et al. 2014). For example, for Green et al., transportation into a storyworld "entails imagery, emotional response, and attentional focus" (2008, 512) and Kuijpers et al. argue that the construction of mental imagery when reading "can aid a deeper immersion into the story world" (2014, 92). Green and Brock's (2000) influential Transportation Scale measures the degree to which the reader feels involved in the story, how far the real world intrudes upon their reading experience, the emotional effect of the story upon the reader, and, significantly, their construction of mental imagery in the process of reading the story (Sanford and Emmott 2012, 244). Similarly, mental imagery is included by Kuijpers et al. (2014) as one of four factors of storyworld absorption, alongside attention, transportation, and emotional engagement.

Absorption and/or transportation in reading or gaming experiences may be impacted upon by predispositions and personality traits such as openness to experience (one of the traits within the Five Factor Model, e.g. Goldberg 1981), need for cognition, and other predispositions. Different measures of such predispositions have been developed. For example, Dal Cin et al. (2004) use a transportation scale to measure the predisposition to be transported into a storyworld, and Witmer and Singer (1998) use the Immersive Tendency Questionnaire to gauge the predisposition to be transported into the storyworld of a video game (Kuijpers et al. 2019). Need for cognition is "the tendency to enjoy and engage in effortful cognitive activity" (Green et al. 2008, 518) and is usually measured through self-assessment in response to dedicated multi-item scales such as those developed by Cacioppo and Petty (1982) and Cacioppo, Petty, and Kao (1984). Need for cognition is shown to have a direct relationship with two of the Five Factor Model traits: openness to experience and conscientiousness (Sadowski and Cogburn 1997). Green et al., summarising a range of studies, find that need for cognition "tends to have a low to moderate positive correlation with transportation" (2008, 518). In comparing participants' felt transportation during reading a novel and watching a film adaptation of the novel, they found that "individuals high in need for cognition were more transported by reading, whereas individuals low in need for

cognition were more transported by watching" (529) and individuals "low in need for cognition tend to prefer tasks that request less cognitive effort" (523), measured by self-report. Because mental imagery construction during reading is believed to be involved in absorption and/or transportation, it follows that mental imagery construction may be impacted upon by these predispositions and traits.

Some studies have investigated relationships between trait openness, absorption and reading habits, specifically. On the basis of a review of these studies and related research, Kuijpers et al. (2019) find that openness to experience predicts:

> (1) familiarity with the different genres and forms of fiction (Fong et al. 2013);
> (2) preference for literature with high cultural status (e.g., literary fiction or 'classical literature' as opposed to popular fiction, Schutte and Malouff 2004);
> (3) preference for literary texts rather than non-literary texts (Kraaykamp and van Eijck 2005; Swami et al. 2012); and
> (4) perceived importance of literary reading (Wild et al. 1995).
> (adapted from Kuijpers et al. 2019, 85).

Empirical work by Mar et al. (2006, 705) suggests a correlation between a tendency towards high levels of engagement in stories (as measured by self-report) and high levels of exposure to printed fiction (cited in Kuijpers et al. 2019, 77). Kuijpers et al. (2019) propose that this correlation may be further explained through trait openness to experience, arguing that personality traits in what they term "the global openness to experience domain (i.e., big five openness and its fusions with other traits)," both support reading habits of regular "in-depth narrative reading" and may also "facilitate absorbed narrative reading" (2019, 76). After conducting their own empirical testing, Kuijpers et al. conclude that global openness to experience does indeed predispose participants to "habitual selection and in-depth comprehension of narrative fiction" which, they assert, therefore "facilitates absorbed reading of narrative fiction" (2019, 85). Relationships between reading habits, absorption or transportation and mental imagery construction may be complex and difficult to conclusively explain but Mar et al. (2006) propose that, at the least, reading fiction enhances imaginative thinking. Zwaan (2004) offers an explanation for this via his cognitive Immersed Experiencer Framework, which proposes a system of text-invoked neural network activation through which the story is simulated and integrated with existing mental models (qtd. in Bal and Veltkamp 2013, 2). Compiled together, this research suggests that those who read fiction frequently are more likely to construct mental images, and potentially richer mental images, when reading fiction, than those who do not read fiction frequently.

It is probable that trait openness to experience is a similar predictor of not only habitual and highly absorbed reading but also habitual and highly absorbed gaming. The nature of engagement with computer games, though, is quite distinct. Williams et al. (2008) argue that video games offer greater potential immersion than TV and film. Computer games are highly interactive, and so entail an increased cognitive load in comparison to the more passive consumption of media such as TV and film. Immersion in computer games also involves indirect reward for that attention and interaction through direct rewards for successful actions which are partially an outcome of that attention and interaction. These rewards come in forms such as sound effects, in-game

bonuses, access to the next level, and so on (Melzer et al. 2010). These rewards also inculcate learned responses, strategies and behaviours. Reading is less immediately and explicitly rewarding in terms of self-efficacy beliefs and also potentially in terms of need for cognition (or, more specifically, in terms of need for a particular kind of cognitive and motoric interaction).

There are significant differences between playing computer games and reading fictional narrative with respect to implicit imagery construction requirements. While there is arguably no need to construct visual imagery in processing fiction (though sense-making may require it in some circumstances), the words on the pages are the only cues from which to construct any imagery. Computer games provide imagery for the players more directly, rather than requiring them to cognitively construct this imagery from cues. Players may, however, engage in imagery construction both as part of their conceptual enrichment of the characters and storyworld, hypotheses about subsequent scenes, visualisation of possible actions, etc. and in the sense described above in relation to imagery construction when watching films (mental attention, focus, selection, processing, recognition, etc.). In comparison to relationships between reading habits and mental imagery construction, it is therefore harder to make predictions about relationships between gaming habits and mental imagery construction.

Moving beyond mental imagery construction in general, some research focusses upon the particular perspective from which a fictional scene is visualised within mental imagery construction. Kuijpers et al. initially describe perspective-taking as "a dimension similar to imagery," proposing that, specifically, "it could be argued that perspective taking is part of the mental imagery process, if readers place themselves in the position of the protagonist in the fictional world" (2014, 92). Significantly, they included "I saw what happened in the story through the eyes of the main character" as the final item in the mental imagery subsection of their absorption scale during the development phase, but this item is ultimately omitted from their final scale. They suggest that film viewers are "forced into a certain perspective […] whereas readers have more freedom in that respect" (2014, 92-93). Kuijpers et al. (2014) therefore identify perspective taking as a potential aspect of imagery construction and suggest differences in perspective-taking freedoms between reading and watching films, though they do not investigate perspective-taking further and do not consider what linguistic and other cues may potentially influence perspective-taking in reading.

One linguistic cue for perspective-taking within reading which has received critical attention in narratology, psycholinguistics and stylistics is use of the first-, second- or third-person voice. Broadly speaking, this research suggests that use of the first- or second-person voice is more likely to prompt readers to visualise scenes from an 'internal' perspective than use of the third-person voice (e.g., Brunyé et al. 2009). This 'internal' visualisation, in the sense of Brunyé et al. (2009), is either through the perspective of the character or character-narrator within the storyworld who is referred to as "I" (i.e., referring to themselves as "I") in the case of the first-person voice, or through the perspective of the character within the storyworld referred to as "you" in the case of the second-person voice. However, investigations of the likelihood of the reader taking an internal perspective in reading first- or second-person texts, and comparisons between the effects of first- or second-person texts in this regard, suggest

that internal perspective-taking is mediated by several factors, including the length of the text (Sanford and Emmott 2012), the psychological characteristics of the reader (Segal et al. 1997), and the discourse context (Brunyé et al. 2009). Furthermore, Segal et al. (1997) investigate the impact on readerly perspective-taking of the intersecting factors of first- or third-person voice and past or present tense. They conclude that there is a relationship between tense and readerly felt involvement in the narrative but find the nature of that relationship to be unclear.

The perspective from which the storyworld of a computer game is depicted must be considered in different terms to those of narrative fiction. The term 'game space' is used to describe the spaces within the storyworld of the game with which the player can interact. Game spaces are, as described by Thon, "often […] three-dimensional environments in which the player can more or less freely move certain objects such as his or her avatar (i.e. representative in the game space)" (2009, 281). The grammatical categories of first-person, second-person and third-person voice, Thon points out, "cannot be applied to audiovisual presentation of [game] space in such a straightforward manner" (282) in comparison to literary narrative. Point of view in gaming is therefore more commonly described (metaphorically) in relation to camera position, capturing "the spatial position from which the game space is presented" (Thon 2009, 281). Building on this, Thon adopts Neitzel's (2002) distinction between subjective, semi-subjective and objective points of view in gaming. The depiction of the game space from the viewpoint of the avatar is termed a subjective point of view (282). This is the point of view used in games conventionally or popularly called "first-person shooter games" and other "first-person" games (284-285). A semi-subjective point of view involves the camera being "linked to" and moving with the avatar but at a position external to it (284), usually "slightly above and some way behind the avatar, showing it in relation to its surroundings" (283). An objective point of view involves the depiction of the game space from a perspective external to and disconnected from any avatar, e.g. from an aerial perspective (284). Notably, viewpoints can be manipulated and switched between in many games, as part of the player's control mechanisms within the interactive gameplay, though this kind of viewpoint switching is rare in first-person shooter games (284-285).

The current study investigates ways in which reading and gaming habits may mediate mental imagery construction and perspective-taking within that mental imagery construction when reading a short fictional scenic narrative. The research reviewed in this section suggests that reading habits such as relative frequency of reading narrative fiction may mediate the likelihood of mental imagery construction when reading. The first hypothesis tested in this study is therefore as follows:

> H1: Participants who do not read frequently are less likely to visualise anything when reading than participants who read frequently.

The research reviewed in this section also prompts further questions, however, regarding the ways in which reading habits may mediate perspective-taking within mental imagery construction when reading. To begin to explore this, focussing specifically on those who report some visualisation (as opposed to zero visualisation), the second hypothesis is:

H2: Among participants who visualise the scene at at least one stopping point [as per the experiment design described in section 2], frequent readers are more likely to visualise the scene from the character's perspective than infrequent readers.

This research also suggests an absence of past research on and potential for fruitful insights into relationships between gaming frequency, gaming preference (i.e. for subjective computer games or otherwise), mental imagery construction, and perspective-taking within mental imagery construction when reading. As mentioned above, partly because imagery is provided as part of the gaming experience, it is difficult to make predictions about relationships between gaming frequency, gaming preference and the likelihood of mental imagery construction in response to reading. However, given that game space imagery is provided from subjective, semi-subjective or objective points of view, it may be reasonable to predict that frequent game players who prefer and frequently play subjective (i.e., first-person) computer games may be used to seeing a storyworld from the perspective of an avatar, and may thus be more likely to construct mental imagery from the perspective of the character or character-narrator within the storyworld who is referred to with "I" or "you," in comparison to players who do not prefer and frequently play subjective games. One reason for this potential correlation could be that being accustomed to experiencing a storyworld through an internal perspective may mean that imaginatively visualising a storyworld in this way carries the least cognitive load. Specific conditions within stimulus text materials, i.e. person and tense variables, might, however, further mediate this perspective-taking. To explore this, the second set of hypotheses is comprised as follows (within which the perspective of the character or character-narrator within the storyworld is referred to as 'the character's perspective' for ease):

H3: Of participants who prefer subjective computer games, those who play computer games frequently are more likely to visualise the scene from the character's perspective than those who play computer games infrequently.

H4: In response to condition 1 (the first-person, present-tense text), participants who prefer subjective computer games are more likely to visualise the scene from the character's perspective than those who do not prefer subjective computer games.

H5: In response to condition 3 (the second-person, present-tense text), participants who prefer subjective computer games are more likely to visualise the scene from the character's perspective than those who do not prefer subjective computer games.

H6: Participants who prefer subjective computer games are more likely to visualise the scene from the character's perspective in condition 3 (the second-person, present-tense text) than in condition 1 (the first-person, present tense text).

Method

The first part of the experiment was comprised of a process of reading and image-selection and involved 129 participants (aged 18-80). 106 of those participants also completed the second part of the experiment – a questionnaire exploring reading and gaming habits. All of the participants were native English speakers and were university students, academic or non-academic university staff, or members of the general public. Participants were offered a £5 voucher for a popular online store, plus entry into a prize draw for a £50 voucher for the same store. Such incentives help to recruit participants

beyond those with sparer time and those with a predisposition towards being helpful, both of which could correlate with other contextual factors and traits which may have a direct bearing on the experiment focus and result. For example, people rich in spare time are potentially more likely to read and play computer games more frequently than those with little spare time.

The stimulus materials were comprised of four variants of a replica of a short narrative in which a character moves through a landscape. The text was a route description in which the character is presented as traversing a coastal path and exploring a lighthouse, expressed through intransitive processes (e.g. walking, climbing, looking). The stimulus materials avoided attitudinal markers and other constituents of characterisation in order to limit readers' mind-modelling and resultant potential psycho-social identification with (or, conversely, alienation from) the character (Cohen 2001; Cohen 2006; Oatley 1999; Tal-Or and Cohen 2010). The four text variants were identical in wording but for the four conditions of person and tense combinations. Variant A (condition 1) was in the first-person, present tense mode. Variant B (condition 2) was in the first-person, past tense mode. Variant C (condition 3) was in the second-person, present tense mode. Finally, variant D (condition 4) was in the second-person, past tense mode (the third-person voice being outside the scope of this study). The relative frequency of deictic cues and other features potentially manipulating attention and conceptualisation which can have a bearing on visualisation and perspective-taking, such as reference points and scanning chains (Langacker 1987), were tightly controlled.

Each participant was allocated one of the four text variants. Each text variant was divided into five short paragraphs. The experiment required each participant to read an instruction screen and run through a tutorial round of the experiment process. The first paragraph of the text variant was then presented on screen. The participant read the paragraph, and then clicked on a button labelled 'finished reading' which took them to the next screen. This next screen presented a filtering process, showing a set of options describing the vantage point from which the participant may have visualised the scene. If the participant visualised the scene from a perspective external to the character, they could select a 'distance from character,' choosing from 'close,' 'mid,' 'far' or 'don't know,' and also a 'height,' choosing from 'bird's eye,' 'character's eye level,' 'elevated' or 'don't know.' Alternatively, if the participant visualised the scene from the perspective of the character, they could select 'character's viewpoint.' Finally, if the participant did not visualise the scene while reading that paragraph, they could select 'no image.' Providing that they had not selected 'no image,' the participant then clicked on a button labelled 'show the gallery.' The selection process determined the range and number of images in the gallery then shown.

The image gallery displayed CGI-rendered illustrations of the scene depicted from angles corresponding to those selected during the filtering process. A set of 30 images corresponded to each text paragraph, identical across variants, depicting the scene from the character's point of view, and also from above, below, behind, in front of and to the side of the character at various angles and distances. The images were not detailed, designed as representative rather than realistic depictions. The character was an androgynous, grey silhouette-style figure. Following the filtering process, the

participant was shown a minimum of two and a maximum of nine images, from which the participant had to select that which most closely corresponded to their visualisation of the scene. In case at this point the participant wished to revise their selection, the filter options were displayed at the top of the image gallery, along with an 'n/a' option should they now decide that they did not visualise anything. Following selection of an image (or 'n/a'), the participant was then shown the next paragraph of text. If the participant selected 'no image' at the filtering stage, they were then shown the next paragraph of text directly, without seeing an image gallery. The process of reading a paragraph, selecting from visualisation and vantage point options, and selecting an image was repeated five times.

In analysing whether or not participants visualised the scene in response to the narrative texts, categories of degree of visualisation were distinguished as follows. Participants who reported not visualising anything at any of the five stopping points were categorised as reporting 'no visualisation.' Those who reported visualising the scene at only one of the five stopping points were categorised as reporting 'little visualisation.' Participants who reported visualising the scene at two, three, four or all five stopping points were categorised as reporting 'some or consistent visualisation.'

In analysing whether or not participants visualise the scene from the character or character-narrator's perspective (hereafter 'the character's perspective' for ease), participants were categorised as follows. Those who visualised the scene from the character's perspective at none of the five stopping points were categorised as visualising the scene from the character's perspective 'not at all.' Those who visualised the scene from the character's perspective at one or two of the five stopping points were categorised as visualising the scene 'partially' from the character's perspective. Those who visualised the scene from the character's perspective at three or four of the five stopping points were categorised as visualising the scene 'mostly' from the character's perspective. Participants who visualised the scene from the character's perspective at each of the five stopping points were categorised as visualising the scene 'wholly' from the character's perspective. Participants who visualised the scene from the character's perspective either not at all or partially (i.e. at up to two stopping points) are categorised as 'unlikely' to visualise the scene from the character's perspective. Conversely, participants who visualised the scene mostly or wholly from the character's perspective (i.e. at three or more stopping points) are categorised as 'likely' to visualise the scene from the character's perspective.

After the text-evoked visualisation part of the experiment process had been repeated five times, the second part of the experiment presented the participant with the questionnaire. Along with other demographic data (e.g. age, gender identity, etc.), this questionnaire elicited details about the participants' reading and gaming habits.

To measure reading frequency, participants were asked how often they read fiction, how often they read poetry, and how often they read non-fiction narratives. In each case, participants could select one of five options: 'every day,' 'a few times each week,' 'a few times each month,' 'In the last 6 months I haven't read any [fiction/poetry/non-fiction narratives]' and 'In the last 5 years I haven't read any [fiction/poetry/non-fiction narratives]' (the genre corresponding to the question in the last two response options). Scores were allocated to the five response options and an average frequency score was

calculated for each participant. Additional weightings were factored in so that, for example, any participant who responded 'every day' or 'a few times each week' for any of the three genre categories was automatically classified as a 'frequent' reader, and any participant who responded 'In the last 6 months I haven't read any [fiction/poetry/non-fiction narratives]' or 'In the last 5 years I haven't read any [fiction/poetry/non-fiction narratives]' for all three genres was automatically classified as an 'infrequent' reader.

To measure gaming frequency, participants were asked how often they played computer games and were given the same set of five options as per reading frequency, with one further option, 'I never play computer games.' Participants who responded 'every day' or 'a few times each week' were classified as 'frequent' players. Participants who responded with 'a few times each month,' 'In the last 6 months I haven't played any computer games,' 'In the last 5 years I haven't played any computer games' or 'I never play computer games' were classified as 'infrequent' players.

The participants were also asked which type of computer games they played the most. Response options were '2D and mobile phone games,' '3D first-person games' and '3D non-first-person games.' (Within the questionnaire, the term 'first-person games' was used to refer to subjective computer games as first-person games is the more widely recognised term.) Participants who selected '3D first-person games' were categorised as preferring subjective (i.e., first-person) computer games, and all other participants were categorised as not preferring subjective computer games.

A version of the stimulus materials and image gallery was piloted with thirty participants to test the design of the stimulus materials and investigate predicted correlations between person and tense conditions and participant perspective-taking on a small scale. The results indicated sufficient correlation between person and tense conditions and participant perspective-taking to establish grounds for a larger experiment. The questionnaire was piloted separately to test that the questions were fully and easily understandable.

Results

The first part of the experiment (excluding the questionnaire) yielded data on correlations between the person and tense condition of the text variant which each participant was allocated and the perspective from which they visualised the scene (if any). This data is reported in a separate article (Macrae 2016). This section reports the results of tests on the hypotheses detailed in section 1, exploring relationships between data on mental imagery construction and perspective-taking and data on reading and gaming habits provided in response to the questionnaire. A one-tailed Fisher's exact test was used in each case, unless otherwise stated. Full statistical analysis with count data is provided in the appendix.

The first set of tests explored relationships between reading frequency and visualisation. The first test explored H1: Participants who do not read frequently are less likely to visualise anything when reading than participants who read frequently (or, expressed conversely, that participants who read frequently are more likely to visualise something when reading compared to participants who do not read frequently). Testing for a directional association between level of visualisation (no or little visualisation vs.

some or consistent visualisation) and frequency of reading gives p=0.0033. This suggests that there is a directional association between frequency of reading and level of visualisation and supports H1.

The second test explored H2: Among participants who visualise the scene at at least one stopping point, frequent readers are more likely to visualise the scene from the character's perspective than infrequent readers. Testing for a directional association between participants' reading frequency (among those who visualise the scene at at least one stopping point) and whether or not they visualise the scene from the character's perspective gives p=0.0031. This shows that there is a directional association between reading frequency and likelihood of visualising the scene from the character's perspective and supports H2. This hypothesis was further corroborated through one-tailed testing of two related hypotheses. Resulting p-values supported H2a: Frequent readers are more likely to visualise the scene from the character's perspective than infrequent readers (i.e., without excluding from the data participants who did not visualise anything), and supported H2b: Frequent readers are more likely to visualise the scene wholly from the character's perspective (i.e., consistently, at each stopping point) than infrequent readers (see appendix).

These tests did not differentiate between participants who were given the different text conditions (i.e., the first-person, present tense text; the first-person, past tense text, etc.) and so the greater likelihood of frequent readers visualising the scene from the character's perspective, in comparison to infrequent readers, is the case irrespective of the person and tense of the text participants were given.

The second set of tests explored relationships between gaming frequency, gaming preference (i.e. for subjective computer games or otherwise), visualisation and specific text conditions.

The first of these tests explored H3: Of participants who prefer subjective computer games, those who play computer games frequently are more likely to visualise the scene from the character's perspective than those who play computer games infrequently. Testing for a directional association between participants' gaming frequency and whether or not they visualise from the character's perspective, among participants who prefer subjective computer games only, gives p=0.8325. This does not support H3 and instead supports the null hypothesis H0: Of participants who prefer subjective computer games, those who play computer games frequently are not more likely to visualise the scene from the character's perspective than those who play computer games infrequently.

The next test explored H4: In response to condition 1 (the first-person, present tense text), those who prefer subjective computer games are more likely to visualise the scene from the character's perspective than those who do not prefer subjective computer games. Testing for a directional association between participants who prefer subjective computer games and whether or not they visualise the scene from the character's perspective, among participants in condition 1 only (the first-person, present-tense text), gives p=0.9934. This does not support H4 and instead supports the null hypothesis H0: In response to condition 1 (the first-person, present tense text), those who prefer subjective computer games are not more likely to visualise the scene from the character's perspective than those who do not prefer subjective computer games.

The count data suggest that in fact the converse of H4 may be true. To check this, a two-tailed test was run to test the hypothesis that there is an association between the variables (irrespective of the direction of that association) (H4a). This test gives p=0.049 which supports the hypothesis that there is an association between the variables. A further test was then run to test the converse of H4, that in response to condition 1 (the first-person, present tense text), participants who do not prefer subjective computer games are more likely to visualise the scene from the character's perspective than those who do prefer subjective computer games (H4b). This test gives p=0.038, which supports H4.

The next test explored H5: In response to condition 3 (the second-person, present tense text), participants who prefer subjective computer games are more likely to visualise the scene from the character's perspective in comparison to those who do not prefer subjective computer games. Testing for a directional association between participants' preference for subjective computer games and likelihood of visualisation from the character's perspective, in condition 3 only, gives p=0.4394. This does not support H5 and instead supports the null hypothesis H0: In response to condition 3 (the second-person, present tense text), participants who prefer subjective computer games are not more likely to visualise the scene from the character's perspective in comparison to those who do not prefer subjective computer games. To check whether the converse may be true, as per H4, a two-tailed test was run to initially test the hypothesis that there is an association between the variables (irrespective of the direction of that association) (H5a). This test gives p= 0.7241. This does not support H5a, and instead supports the null hypothesis H0: There is no association between preference for subjective computer games and likelihood of visualising the scene from the character's perspective in response to condition 3.

The final test explored H6: Participants who prefer subjective computer games are more likely to visualise the scene from the character's perspective in condition 3 (the second-person, present tense text) than in condition 1 (the first-person, present tense text). Testing for a directional association between participants who prefer subjective computer games in condition 1 (the first-person, present tense text) in comparison to participants who prefer subjective computer games in condition 3 (the second-person, present tense text) with regard to their likelihood of visualising the scene from the character's perspective gives p= 0.1667. This does not support H6 and instead supports the null hypothesis H0: Participants who prefer subjective computer games are not more likely to visualise the scene from the character's perspective in condition 3 (the second-person, present tense text) than in condition 1 (the first-person, present tense text). Again, to check whether or not the converse may be true, as per H4, a two-tailed test was run to test the hypothesis that there is an association between the factors (irrespective of the direction of that association) (H6a). This test gives p=0.2425. This does not support H6a, and instead supports the null hypothesis H0: There is no association between participants who prefer subjective computer games in condition 1 (the first-person, present tense text) in comparison to participants who prefer subjective computer games in condition 3 (the second-person, present tense text) with regard to their likelihood of visualising the scene from the character's perspective.

Discussion

The tests either suggest that there is a directional association between two factors or suggest that there is no association. This section explores these results, suggests possible reasons for directional associations or lack of associations, and concludes by reflecting on the limitations of the study.

The first set of tests analysed hypotheses exploring relationships between participants' reading frequency and the degree and nature of their mental imagery construction in response to the text stimuli. Statistical analysis supported H1, finding a correlation between a low reading frequency and a low tendency to visualise scenes in response to the text stimuli. This could be due to multiple possible causal relationships. It may be that some people have a lower capacity or tendency to visualise scenes when reading. This may result in a lesser cognitive reward for reading, which may discourage frequent reading. Conversely, those who have a tendency to construct mental imagery when reading may find reading a more engaging, cognitively rewarding and richly entertaining experience, which may encourage more frequent reading. The capacity or tendency to visualise scenes when reading narrative texts may be a learned response, developed through frequent reading (potentially at a particular phase of cognitive development). A lack of frequent reading in developmental phases may therefore result in a reduced tendency to visualise when reading, which may in turn discourage later reading (cf. Djikic et al. 2013; Fong et al. 2013; and investigations of relationships between reading frequency and empathy in children by van der Bolt and Tellegen 1995).

The statistical support for H1 counters suggestions by Burke and others that mental imagery construction is an inevitable and necessary part of reading. Burke claims that "mental imagery that is produced while reading literature is a robust phenomenon" and proposes that one "can easily test this" through self-reflection on feelings he implies all will have had about differences between "one of your favourite novels" and a filmic adaptation of it (2010, 57). Burke cites Iser's similarly strong claim in support of his assertion: "in reading literary texts, we always have to form mental images" (Iser 1978, 137; cited in Burke 2010, 58). As a small proportion of the participants in this study reported no or little mental imagery construction, it would seem that mental imagery construction is not an inevitable corollary of reading.

H2 proposed that frequent readers were more likely than less frequent readers to visualise the scene from the character's perspective. The person and tense deictics of the different text conditions may encourage corresponding perspective-taking. Theory of focalisation and perspective would suggest that all of the text conditions employed corresponded with depiction of the scene from the perspective of the character (or character-narrator). However, arguably text condition 1 (the first-person, present tense text) corresponded most directly with the character's perspective. Hoeken et al. argue that the first-person mode has "proven to be a strong driver of identification" (i.e. of readers' identification with the character or narrator to whom the first-person pronoun refers and from whose perspective this and other deictic language is oriented) (2016, 296). Hoeken et al. cite the empirical work of De Graaf et al. (2012) and Hoeken and Fikkers (2014) in evidence. Use of the past tense (as in conditions 2 and 4) expresses

retrospective mediation from a point of view external to the storyworld-internal version of the character. In the case of first-person, past tense narration, the narrator is remembering past experiences, mediated through the younger version of themselves. In complex and sometimes inconsistent ways, use of the second-person voice (as in conditions 3 and 4) can evoke a sense of immediacy and identification with the character and in turn the impression of seeing through the eyes of the character, and/or of being external to that character (Herman 2002, 331-371). Analysis of the results of the first part of the experiment (i.e. excluding the questionnaire) suggested that the tense of the text stimuli was a significant factor in predicting participants' visualisation from the perspective of the character or otherwise (Macrae 2016).

The results of statistical analysis of the data relating to H2 suggest that reading frequency is a further significant predictor, and that this may interact with the variables of person and tense. As both the first- and second-person voices are considered vehicles for readers' felt identification and/or reader-address, the high rates of participants visualising the scene from the perspective of the character is in line with theoretical opinion on and evidence of the typical effects of these linguistic cues. However, one possible reason for this correlation between higher reading frequency and higher likelihood of visualising the scene from the character's perspective may be that frequent readers may be accustomed to, and may be driven to read precisely for, the experience of identifying with textually constructed fictional characters (Oatley 1995; Oatley 1999; Tal-Or and Cohen 2010). Alternatively, one possible reason for the converse correlation between lower reading frequency and lower likelihood of visualising the scene from the character's perspective may be that within the reading experiences of infrequent readers, other factors override linguistic cues as person and tense deixis. To further test how far reading frequency interacts with the variables of the person and tense used in the text stimuli with regard to perspective-taking when visualising scenes, further empirical exploration is required, with larger sample sizes for each category than this study was designed to obtain.

If mental imagery construction is linked to absorption, as discussed in section 1, certain aspects of the experiment design may have impacted more on infrequent readers than frequent readers and vice versa. Experiments conducted by Green et al. suggest that transportation is increased when the "pre-existing emotional state" of the participant "matches the affective tone of the narrative" and when the participant's pre-existing emotional states are "low arousal positive states such as contentment," (2012, 52), potentially increasing openness to experience and reducing the distractions of strong emotions. While the text was designed to be as emotionally neutral as possible, it is feasible that being faced with a text-based experiment lowered the contentment and/or increased the anxiety of participants who are infrequent readers, or at least more so in comparison to frequent readers.

Furthermore, the cognitive effort required by the experiment may have negatively impacted upon absorption and therefore potentially upon mental imagery construction for infrequent readers. In discussing flow (as defined by Csikszentmihalyi 1982), which is found to be closely related to transportation and absorption, Green et al. suggest that "a state of immersion is most likely when a task is not too demanding for an individual, nor too easy" (2008, 519), that is, "flow requires a match of challenges and skills" (532).

Green et al. also argue that "fluency of processing is an important element of transportation" (532), citing Busselle and Bilandzic (2008) and Vaughn et al. (2007). The results of an experiment by Green et al. suggests that "having a match of cognitive effort required with desired level of effort may increase ease of processing and thus increase transportation" (2008, 532). The text-based nature of the experiment may have therefore presented more of a cognitive challenge and mismatch regarding required effort and/or processing abilities for infrequent readers in comparison to frequent readers, which may in turn have impacted upon mental imagery construction.

The second set of tests analysed hypotheses exploring relationships between participants' gaming preferences (i.e. for subjective or non-subjective games) and their perspective-taking within mental imagery construction in response to the text stimuli (H4, H5 and H6). The results suggest that, contrary to predictions, relative preference for or against and frequency of playing subjective games does not predict relative likelihood of text-evoked visualisation of the scene from the perspective of the character, except in the case of responses to the first-person, present tense text. In this case, participants who prefer subjective games (frequency of playing aside) are less likely to visualise the scene from the perspective of the character than those who prefer non-subjective games.

A variety of possible causes may explain the absences of association and the negative association outlined. As discussed in section 1, active mental imagery construction in response to linguistic cues is very different to the experience of mental imagery in game playing. Green et al. argue that "transportation includes mental imagery (Green and Brock 2000; Green and Brock 2002), but it remains an open question whether it is important for that mental imagery to be self-generated (as in print)" (Green et al. 2008, 516). In comparing reading and watching video, Green et al. suggest that watching video potentially "limits the imaginative investment the viewer is able to provide," arguing that reading "allows a reader to participate more fully in creating a mental image of the story" and that this "active engagement may encourage transportation" (517). However, notions of text-evoked mental imagery construction as active and computer game playing experiences of imagery as passive over-simplify and misconstrue the differences. Green et al. point out that research on gaming "presence" (similar to absorption or transportation) and identification with characters has often focused on the player's felt ability to interact with the storyworld, e.g. "the ability to manipulate virtual objects" (514), and in particular the capacity to interact with and perform as and through an avatar (Klimmt et al. 2009; Ryan 2015). It may be that participants who regularly play computer games are most used to interacting with the imagery and characters of the storyworld as part of their experience. Therefore, without that interactivity (along with the absence of the other kinds of cognitive engagement and rewards conventional to gaming, as described in section 1), absorption in reading may be less easy or less rewarding and imagery may lack a significant experiential component in comparison to gaming. The potentially jarring negative impact of this lack of interaction with imagery and characters may be accentuated in the case of first-person, present tense narration, as this is in theory closest to the internal avatar-based perspective of subjective games. This may explain the correlation between preference

for subjective games with lower rates of visualising the narrative scene from the character's perspective in response to the first-person, present tense text.

Given that mental imagery construction may be related to absorption, as discussed in section 1, the design of the experiment, interrupting reading to elicit responses at five points, may have disrupted absorption and therefore impacted upon mental imagery construction. De Graaf et al. (2009) found that specific tasks which interrupted the reading process (e.g. identifying punctuation and spelling errors) were likely to "weaken the [participant's] sense of presence in the narrative world" (Sanford and Emmott 2012, 244-245). That said, soliciting responses only after reading a complete text, rather than through interruption during reading, creates different problems with the reliability of the data (Dixon and Bortolussi 2016; Kuiken 2016).

As Burke points out, constructing and experiencing imagery while reading literature is a subconscious act (2010, 60). In soliciting reflection on that process, the experiment is likely to distort that process. The trial round illustrates to the participants that the experiment is designed to elicit their reporting of text-induced mental imagery, and so the distortion may not arise simply at the point of retrospective reflection when prompted at the stopping point, but in anticipation of this requested reflection, during processing and image generation. There is a risk of participants potentially unnaturally focussing their attention and shaping their responses according to what they may believe to be the desired outcomes.

A further potential limitation in the design of the experiment is the absence of emotional content within the narrative, and the lack of character-building attitudinal markers. Busselle and Bilandzic (2008) consider emotional responses to be a significant aspect of transportation, and Bal and Veltkamp explore "emotional transportation" (2013, 4) in relation to story-evoked empathy and sympathy. Previous research, theoretical and empirical, has explored links between reading habits, theory of mind and social empathy (e.g., van der Bolt and Tellegen 1995; Sklar 2013; Nünning 2014). As explained in section 2, the lack of attitudinal markers and other constituents of characterisation within the text stimuli was deliberate in order to limit readers' psycho-social identification with or alienation from the character. However, the absence of drivers for empathetic identification and emotional transportation may hinder other kinds of transportation and/or absorption, which in turn may limit related imagery construction.

There are methodological limitations to the questionnaire, also. For example, the questionnaire solicited data on reading and gaming habits via reflective self-report of retrospective estimates. Such estimates may not be accurate. Participant completion of a daily reading and gaming diary may have provided a more accurate measure, but it would have required greater participant effort for a sustained period. One further drawback of both measures, as noted by Stanovich and West (1989) and Stansfield and Bunce (2014, 17), is that, when asked how much time they spend reading, participants' responses may be influenced by what they consider to be a socially acceptable amount of time.

A further drawback of the questionnaire's measure of reading habits is that it only covered particular kinds of texts. The categories of fiction, poetry and non-fiction narrative were used to probe experiences of the kinds of reading which most typically evoke construction of mental imagery of narrative scenes. However, many other kinds of non-literary reading involve evocation of mental imagery. One example is a detailed

description, within a specialist car magazine, of the shape of a new model of a car. Participants who regularly read any kind of non-literary texts which evoke mental imagery may have a similar capacity and tendency to construct mental images in response to narrative text stimuli as participants who frequently read fiction, poetry and non-fiction narrative, but this data was not captured by the questionnaire.

Conclusions and Directions for Future Research

Bearing in mind the limitations of the study, the results discussed here suggest that those who read fiction, poetry and non-fiction narrative frequently have a greater tendency to construct mental imagery when reading than those who do not read such texts frequently. The various potential causal explanations for this correlation warrant investigation, particularly given the potential developmental aspects of mental imagery ability. In addition, the study suggests that those who read fiction, poetry and non-fiction narrative frequently are more likely to visualise a scene from the perspective of the character than those who do not read such texts frequently, irrespective of the person and tense of the narrative text. For frequent readers, psycho-social drivers may potentially add to the effects of linguistic cues prompting visualisation from the character's perspective. For infrequent readers, other factors may override the linguistic cues which encourage visualisation from the character's perspective. The latter potential interaction is particularly worthy in further investigation, not least as it may correlate with other interpretative differences.

This study also suggests that frequent experiencing of storyworlds through the perspective of a storyworld-internal avatar in gaming does not correlate with a tendency to visualise a scene from a storyworld-internal perspective of a character when reading, even when the narrative voice cues such a perspective. Furthermore, this study suggests that there may be interesting interactions between frequent experiencing of subjective games and mental imagery construction and perspective-taking when reading, within which narrative voice (i.e., person) may be a mediating factor. The nature of those interactions warrants further exploration for the insights they may be able to offer into different experiences of imagery.

In the light of this study, future research investigating relationships between reading and gaming habits and mental imagery construction and perspective-taking could usefully incorporate baseline measures of relevant personality traits and predispositions, including trait empathy (e.g., via the Interpersonal Reactivity Index, Davis 1980; Davis 1983; Davis 1994), openness to experience (e.g., John et al. 1991), need for cognition (e.g., Cacioppo, Petty and Kao 1984), visual imagery ability (e.g., the Vividness of Visual Imagery Questionnaire, Marks 1995), etc. A within-subjects design would better exploit resultant data on correlations with these traits. A study in which large sample groups were generated according to reading frequency and preference, gaming frequency and preference, and interactions between factors, and which measured preferences via a scale and solicited a frequency measure for each subcategory, would yield more nuanced and statistically powerful results. Comparison of responses to third-person, past and present tense modes was beyond the scope of the current study but would facilitate a more comprehensive picture of mediating factors

and interactions. Lastly, given the developmental implications, testing text-evoked mental imagery ability and perspective-taking in children of different ages could provide significant insights into cognitive and linguistic development.

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Appendix

Statistical analysis

A Fisher's exact test is used for statistical analysis of the count data, as an alternative to the Chi-squared test, as the tests involve samples of $n<5$ in one or more cells. In most cases the analysis is testing a hypothesis which states a directional association (i.e. one group will do something more than another group). A one-tailed test is appropriate for this testing. The exceptions are hypotheses H4a, H5a and H6a which use a two-tailed test to test merely for an association (of any direction). The measure of statistical significance used is $p \leq 0.05$.

> H1: Participants who do not read frequently are less likely to visualise anything when reading than participants who read frequently.
> H0: Participants who do not read frequently are not less likely to visualise anything when reading than participants who read frequently.

	No/little visualisation	Some/consistent visualisation	Total
Infrequent readers	6	21	27
Frequent readers	2	77	79
Total	8	98	106

Table 1: Directional association between participants' frequency of reading and likelihood of visualisation of the scene

A one-tailed Fisher's exact test to test for a directional association between participants' frequency of reading and likelihood of visualisation of the scene gives p=0.0033. This shows a directional association between frequency of reading and level of visualisation and supports H1.

H2: Among participants who visualise the scene at at least one stopping point, frequent readers are more likely to visualise the scene from the character's perspective than infrequent readers.

H0: Among participants who visualise the scene at at least one stopping point, frequent readers are not more likely to visualise the scene from the character's perspective than infrequent readers.

	Visualisation is only partially or not at all from the character's perspective	Visualisation is mostly or wholly from the character's perspective	Total
Infrequent readers who visualise at at least one stopping point	22	4	26
Frequent readers who visualise at at least one stopping point	42	37	79
Total	64	41	105

Table 2: Directional association between participants' frequency of reading and likelihood of visualising the scene from the character's perspective

A one-tailed Fisher's exact test to test for a directional association between participants' frequency of reading (among those who visualise the scene at at least one stopping point) and likelihood of visualising the scene from the character's perspective gives p=0.0031. This shows a directional association between reading frequency and likelihood of visualising the scene from the character's perspective and supports H2.

H2a: Frequent readers are more likely to visualise the scene from the character's perspective than infrequent readers.

H0: Frequent readers are not more likely to visualise the scene from the character's perspective than infrequent readers.

	Visualisation is only partially or not at all from the character's perspective	Visualisation is mostly or wholly from the character's perspective	Total
Infrequent readers	23	4	27
Frequent readers	42	37	79
Total	65	41	106

Table 3: Directional association between participants' frequency of reading and whether or not they visualise the scene from the character's perspective

A one-tailed Fisher's exact test to test for a directional association between participants' frequency of reading and whether or not they visualise the scene from the character's perspective gives p=0.0024. This supports H2a.

H2b: Frequent readers are more likely to visualise the scene wholly from the character's perspective (i.e. consistently, at each stopping point) than infrequent readers.

H0: Frequent readers are not more likely to visualise the scene wholly from the character's perspective (i.e. consistently, at each stopping point) than infrequent readers.

	Visualisation is mostly, only partially or not at all from the character's perspective	Visualisation is wholly from the character's perspective	Total
Infrequent readers	25	2	27
Frequent readers	54	25	79
Total	79	27	106

Table 4: Directional association between participants' frequency of reading and whether or not they visualise the scene wholly from the character's perspective

A one-tailed Fisher's exact test to test for a directional association between participants' frequency of reading and whether or not they visualise the scene wholly from the character's perspective (i.e. consistently, at each stopping point) gives p=0.0087. This supports H2b.

H3: Of participants who prefer subjective computer games, those who play computer games frequently are more likely to visualise the scene from the character's perspective than those who play computer games infrequently.

H0: Of participants who prefer subjective computer games, those who play computer games frequently are not more likely to visualise the scene from the character's perspective than those who play computer games infrequently.

	Visualisation is only partially or not at all from the character's perspective	Visualisation is mostly or wholly from the character's perspective	Total
Preference for subjective games + infrequent game player	60	39	99
Preference for subjective games + frequent game player	5	2	7
Total	65	41	106

Table 5: Directional association between participants' frequency of reading and whether or not they visualise the scene from the character's perspective

A one-tailed Fisher's exact test to test for a directional association between participants' frequency of reading and whether or not they visualise the scene from the character's perspective, among participants who prefer subjective computer games only, gives p=0.8325. This does not support H3 and instead supports the null hypothesis H0.

H4: In response to condition 1 (the first-person, present tense text), those who prefer subjective computer games are more likely to visualise the scene from the character's perspective than those who do not prefer subjective computer games.

H0: In response to condition 1 (the first-person, present tense text), those who prefer subjective computer games are not more likely to visualise the scene from the character's perspective than those who do not prefer subjective computer games.

	Visualised the scene from the character's perspective only partially or not at all	Mostly or wholly visualised the scene from the character's perspective	Total
Condition 1 + no preference for subjective games	8	12	20
Condition 1 + preference for subjective games	12	4	16
Total	20	16	36

Table 6: Directional association between participants who prefer subjective computer games and whether or not they visualise the scene from the character's perspective, among participants in condition 1

A one-tailed Fisher's exact test to test for a directional association between participants who prefer subjective computer games and whether or not they visualise the scene from the character's perspective, among participants in condition 1 only (the

first-person, present tense text), gives p=0.9934. This does not support H4 and instead supports the null hypothesis H0.

H4a: In response to condition 1 (the first-person, present tense text), there is an association between preference for subjective computer games and likelihood of visualising the scene from the character's perspective.

H0: In response to condition 1 (the first-person, present tense text), there is no association between preference for subjective computer games and likelihood of visualising the scene from the character's perspective.

A two-tailed Fisher's exact test to test for an association between preference for subjective computer games and likelihood of visualising the scene from the character's perspective, in response to condition 1 only, gives p=0.0485. This supports H4a.

H4b: In response to condition 1 (the first-person, present tense text), those who do not prefer subjective computer games are more likely to visualise the scene from the character's perspective.

H0: In response to condition 1, (the first-person, present tense text), those who do not prefer subjective computer games are not more likely to visualise the scene from the character's perspective.

A one-tailed Fisher's exact test to test for a directional association between participants in condition 1 who do not prefer subjective computer games and their likelihood of visualising the scene from the characters' perspective gives p=0.038. This supports H4b.

H5: In response to condition 3 (the second-person, present tense text), participants who prefer subjective computer games are more likely to visualise the scene from the character's perspective.

H0: In response to condition 3 (the second-person, present tense text), participants who prefer subjective computer games are not more likely to visualise the scene from the character's perspective.

	Visualised the scene from the character's perspective only partially or not at all	**Mostly or wholly visualised the scene from the character's perspective**	**Total**
Condition 3 + no preference for subjective games	13	9	22
Condition 3 + preference for subjective games	6	6	12
Total	19	15	34

Table 7: Directional association between participants' preference for subjective computer games and likelihood of visualisation from the character's perspective, in condition 3

A one-tailed Fisher's exact test to test for a directional association between participants' preference for subjective computer games and likelihood of visualisation

from the character's perspective, in condition 3 only, gives p=0.4394. This does not support H5 and instead supports the null hypothesis H0.

H5a: In response to condition 3 (the second-person, present tense text), there is an association between preference for subjective computer games and likelihood of visualising the scene from the character's perspective.

H0: In response to condition 3 (the second-person, present tense text), there is no association between preference for subjective computer games and likelihood of visualising the scene from the character's perspective.

A two-tailed Fisher's exact test to test for an association between preference for subjective computer games and likelihood of visualising the scene from the character's perspective, in response to condition 3 only, gives p=0.7241. This does not support H5a and instead supports the null hypothesis H0.

H6: Participants who prefer subjective computer games are more likely to visualise the scene from the character's perspective in condition 3 (the second-person, present tense text) than in condition 1 (the first-person, present tense text).

H0: Participants who prefer subjective computer games are not more likely to visualise the scene from the character's perspective in condition 3 (the second-person, present tense text) than in condition 1 (the first-person, present tense text).

	Visualised the scene from the character's perspective only partially or not at all	**Mostly or wholly visualised the scene from the character's perspective**	**Total**
Condition 1 + preference for subjective games	12	4	16
Condition 3 + preference for subjective games	6	6	12
Total	18	10	28

Table 8: Directional association between participants who prefer subjective computer games in condition 1 compared to participants who prefer subjective computer games in condition 3 and their likelihood of visualising the scene from the character's perspective

A one-tailed Fisher's exact test to test for a directional association between participants who prefer subjective computer games in condition 1 (the first-person, present tense text) in comparison to participants who prefer subjective computer games in condition 3 (the second-person, present tense text) and their likelihood of visualising the scene from the character's perspective gives p= 0.1667. This does not support H6 and instead supports the null hypothesis H0.

H6a: There is an association between participants who prefer subjective computer games in condition 1 (the first-person, present tense text) in comparison to participants who prefer subjective computer games in condition 3 (the second-person, present tense text) with regard to their likelihood of visualising the scene from the character's perspective.

H0: There is no association between participants who prefer subjective computer games in condition 1 (the first-person, present tense text) in comparison to participants who prefer subjective computer games in condition 3 (the second-person, present tense text) with regard to their likelihood of visualising the scene from the character's perspective.

A two-tailed Fisher's exact test to test for an association between participants who prefer subjective computer games in condition 1 (the first-person, present tense text) in comparison to participants who prefer subjective computer games in condition 3 (the second-person, present tense text) with regard to their likelihood of visualising the scene from the character's perspective gives $p=0.2425$. This does not support H6a and instead supports the null hypothesis H0.

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