Immersion in Digital Fiction: A Cognitive, Empirical Approach

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Abstract: In this article, we profile what we define as an "empirical cognitive poetic" approach to immersion in digital fiction by combining text-driven stylistic analysis with insights from theories of cognition and an empirical study. We provide empirically substantiated insights to show how immersion is experienced cognitively and site-specifically by using Andy Campbell and Judi Alston's (2015) digital fiction installation *WALLPAPER* as a case study. Our approach is unique in that it marks the first systematic attempt at analysing immersive features in digital fiction using a replicable method and, perhaps more importantly, at empirically investigating these immersive features. While current theories of immersion suggest that it is a completely absorbing experience, we show that immersion is an intermittent process, stimulated by multiple immersive features which interact. We also argue that any investigation into immersion in digital media must address the doubly-embodied nature of that reading experience and propose the category of 'doubly-deictic I' to define first-person pronoun use that signals double-situatedness. We empirically verify that immersion in digital fiction can be categorised as either narrative or ludic immersion. However, we also show that spatio-temporal immersion must take place before any other forms of immersion can. We also offer a new analytical method for immersive features in digital fiction by developing deictic shift theory for the affordances of digital media. We add the categories of 'interactional deixis' and 'audio deixis' to account for the multimodal nature of immersion in digital fiction. We also show how extra-textual features can contribute to or enhance immersion and thus propose that they should be accounted for when analysing immersion across media. While we focus on one case-study in this article, we suggest that the analytical framework and reader response protocol we have developed can be applied to other texts.

1. Introduction

In this article, we profile an empirically grounded, cognitive poetic approach to immersion in digital fiction by combining text-driven stylistic analysis with insights from an empirical reader response study[1]. More specifically, we offer a

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new approach to analysing immersion systematically by developing deictic shift theory for the affordances of digital media and provide empirically substantiated insights to show how immersion is experienced cognitively. We profile our approach to immersion in digital fiction via its application to a case study: Andy Campbell and Judi Alston's (2015) 3D immersive fiction, *WALLPAPER*, which was exhibited as an interactive installation at Bank Street Arts Gallery, Sheffield (UK) in November 2015. We therefore extend the analysis of digital fiction to include exhibited works, which allows us to consider the contextual and site-specific factors associated with a public reading experience.

The broader context of this study is the AHRC-funded "Reading Digital Fiction" project (2014-17) (Ref: AH/K004174/1), which aimed to develop new empirical literary methods to examine reader engagement and interaction with digital fictions, to produce new readings of digital fictions against a cognitive narratological backdrop, and to open digital fiction to a broad public readership through exhibitions, installations, pop-up bookclubs and library workshops in England and Wales. This study combines all aspects of the project. Providing an empirical basis for our approach, we combine the analysis of the primary text with results from a reader response study on *WALLPAPER,* which was conducted as part of the project's public engagement activities. By offering a cognitive, empirical account of immersion in digital fiction in general, we contribute to and expand the scope of reader-response research in stylistics in which "rigorous and evidence-based approaches to the study of readers' interactions with and around texts … [and] the application of such datasets in the service of stylistic concerns … contribute to a stylistic textual analysis and/or wider discussion of stylistic theory and methods" (Whiteley & Canning 2017: 73).

2. Immersion and digital fiction

Immersion is a well-debated and sometimes contested term and is defined differently in relation to different media and thus different narrative experiences. Early investigations into immersion and related concepts such as 'flow' (Csikszentmihalyi 1990) and 'presence' (Lombard & Ditton 1997) tended to emerge from the fields of cognitive psychology and/or computer science. However, over the last two decades, the development of both 'cognitive' and 'transmedial' narratology/stylistics within the Humanities has resulted in an increased focus on examining readers' cognitive experience of texts as well as focussing on texts produced across a range of media. There has therefore been an increased focus on immersion from within those disciplinary contexts. While early theories of immersion across media tend to suggest that immersion is a completely absorbing experience and also that it is experienced consistently across media (e.g. Murray 1997), given the vast range of medial experiences now available to readers/viewers/players/listeners, research is now more sensitive to the medium-specific nature of immersion.

In this article, we explore immersion in digital fiction, which we define as fiction written for and read on a computer screen, that pursues its verbal, discursive,

and/or conceptual complexity through the digital medium and would lose something of its aesthetic and semiotic function if it were removed from that medium (Bell et al. 2010). Digital fiction can be largely text-based (e.g. hypertext fiction) or utilise multimodal forms of storytelling (e.g. narrative videogames). In this study, we investigate immersion in the latter: digital fiction that utilizes the three-dimensional graphics of videogame technology to produce an explorable storyworld, with the aim of uncovering a story at the heart of gameplay. In what Ryan (2015) defines as a "playable story" (234-35), reader-players navigate a storyworld by controlling an avatar from a first- or third-person perspective as in many other types of videogame, but the emergent story, as opposed to the satisfaction of completing tasks or beating an enemy, represents a more salient part of the experience.

Immersion in digital media – including videogames, virtual reality, and text-based digital fiction – has been of rising interest since the late 1990s and early 2000s, following the publication of seminal theoretical works such as Murray's (1997) *Hamlet on the Holodeck* and Ryan's (2001, 2015) *Narrative as Virtual Reality*. Both Murray and Ryan define immersion in terms of the metaphorical concept of "transportation", with Murray conceptualising it as the "experience of being transported to an elaborately simulated place" (1997: 98) and Ryan (2015) as a form of "fictional recentering" by which "consciousness relocates itself to another world…and reorganizes the entire universe of being around [it]" (73), ultimately involving a "[relocation of] consciousness itself to another world" (73).

While the metaphor of "reading-as-transportation" has some empirical basis (e.g. Gerrig 1993, Green et al. 2004), reliance on that metaphor has been seen as problematic (e.g. Ermi & Mäyrä, 2005; Thon, 2008, Calleja, 2011). Thon (2008), for example, argues that no literal transportation of the reader or [computer game] player takes place whilst he/she is reading or playing. Instead, he "propose[s] to conceptualise the computer game player's experience of psychological immersion as resulting from a shift of attention to and the construction of situation models of certain parts of the game" (33). Thon's emphasis on a shift of attention is important because it accounts for the way that reader-players can lose a sense of reality as they read or play a text (cf. Grimshaw et al., 2011) and also the way in which their attention moves from one part of the storyworld to another.

However, while we agree that it is not accurate to conceptualise immersion as a complete relocation to another world, we also argue that it is necessary to see immersion in digital fiction in terms of cognitive and imaginary transportation, or, as we will show, a deictic and thus ontological shift, because the reader-player of a three-dimensional digital fiction is always embodied in a separate ontological domain in the form of an onscreen avatar. More specifically, reader-players are what Ensslin (2009) defines as "doubly-situated", "'embodied' as direct receivers, whose bodies interact with the hardware and software of a computer [and] … 're-embodied' through feedback which they experience in represented form, e.g. through visible or invisible avatars" (158).

For Ryan, spatio-temporal immersion is "a sense of being present on the scene of the represented events" (Ryan 2001: 122) and this corresponds closely to Thon's spatial immersion: a "player's shift of attention … to game spaces" (Thon 2008: 35). Both Ryan's spatio-temporal and Thon's spatial immersion then relate to a reader-player being spatio-temporally placed within the gameworld. For Thon, narrative immersion is the "shift of the player's attention to the future development of the story and the characters in it" (Thon 2008: 40) and corresponds closely to Ryan's categories of spatial, temporal, and emotional immersion which are a "response to setting" (Ryan 2015: 86), "that which keeps readers turning pages or spectators speculating about what will happen next" (Ryan 2015: 100), and "subjective reactions to characters and judgements of their behaviour ..., emotions felt for others …, emotions felt for oneself" (Ryan 2015: 108) respectively. So, here we see how narrative elements in a storyworld or gameworld can contribute to a player being immersed in that world.

While narrative and spatio-temporal immersion are components of immersion across narrative arts and media, Ryan and Thon also pay attention to an important medium-specific component of videogames which is ludic immersion. For Thon, ludic immersion is "a shift of the player's attention to the interaction with the game and … the possibilities for action within it" (Thon 2008: 36) and for Ryan "deep absorption in the performance of a task" (Ryan 2015: 246). So, if interactivity is absorbing and pleasurable, it can help to immerse a reader-player within the digital storyworld. Thon also adds social immersion to his typology, which encapsulates a player's shift of attention to other players as social actors in the game, the relationship between them, and the construction of a situated social space that is constituted through the communication and social interaction between players specifically (Thon 2008: 39).

Since the reader-player of a digital fiction is embodied in both the actual and the fictional world, any account of immersion must take into consideration the complexity of the reader-player's dual ontology. Ryan and Thon use slightly different taxonomies for different types of immersion, with Ryan (2001, 2015) distinguishing between spatio-temporal, spatial, temporal, emotional, and ludic immersion and Thon between spatial, narrative, ludic, and social immersion. However, their subcategories only reflect the fact that immersion is achieved via different activities and thus different forms of attention within the storyworld with neither accounting for the doubly-embodied nature of the reader-player's experience. Thus, while they propose that immersion is multifaceted or "multidimensional" (Thon 2008: 33), they do not explicitly account for the role that the actual world plays in the experience.

3. Our cognitive approach to immersion in digital fiction

Ryan and Thon's theories of immersion can, as this article will show, be used as a basis for categorising different kinds of immersion in digital media. However, while they demonstrate how immersion works by applying their categories to texts, they do not provide a systematic method for analysing immersion. Thon does show "what elements of computer games lead to which kinds of

immersion" (Thon 2008: 33), but he focuses on common elements as opposed to presenting an analysis of specific features in a particular game. In Ryan's approach, she considers both "the mental operations and textual features responsible for immersion" (Ryan 2015: 85) and provides an analysis of some of the linguistic and narratological features responsible for some different kinds of immersion in a range of examples. However, neither Thon nor Ryan offer a comprehensive framework with which to analyse immersion as a multidimensional experience in a particular text. Moreover, working within a purely theoretical context, neither Ryan nor Thon base their categories on empirical research, beyond evidence from their own experiences.

The research reported here, however, is based on a reader response study developed specifically to investigate immersion in digital fiction. We offer a medium-specific empirical basis for our theoretical conclusions and a framework for analysing immersion across media. We have thus developed what we consider a 'third wave'[2] of digital fiction research (Ensslin & Skains 2017: 296) which compares, contrasts, and/or synthesises narratological theories and analyses of works with data obtained from reader response research[3]. More specifically, we propose a "symbiotic" (Gavins & Stockwell 2012) cognitive poetic approach to immersion in digital fiction, which combines text-driven analysis with theories of cognition and empirical research.

Cognitive poetics as a discipline approaches literary reading by combining stylistic and narratological methods and analysis with insights from cognitive linguistics and/or cognitive psychology to investigate the ways in which meaning is generated in readers' minds when they read texts (e.g. Stockwell 2002, Gavins & Steen 2003, Brône & Vandaele 2009). Unlike approaches to reading that do not engage in close textual analysis, cognitive poetics is distinguished by its commitment to uniting cognitive theories and stylistic analysis. As Stockwell (2009) surmises, "cognitive poetics … has been particularly successful in accounting for meaningfulness and information-monitoring in literary reading especially when it is built on a stylistic sensibility" (13; cf. Gavins & Stockwell 2012).

Within cognitive poetics we note a disciplinary distinction between researchers who use theoretical insights born from empirical studies in cognitive science alongside an analysis of literary texts – what we might call theoretical cognitive

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[2] A 'first wave' of hypertext theory used poststructuralist textual models as a means of conceptualising hypertext fiction (e.g. Bolter 2001; Landow 2006) and also situated digital fiction readers in a binary relationship with their print counterparts (e.g. Douglas 1992). Critical of the abstractness of the 'first-wave', a 'second wave' of theoretical work subsequently produced various methodological approaches to digital fiction and associated narratological, stylistic and semiotic analysis of individual works (e.g. Bell et al. 2014; Ensslin 2009; Ciccoricco 2007).
[3] While previous reader-response studies have shown how and why reading digital texts is different to reading print in general by using insight from literacy studies (e.g. Walsh et al. 2007, Mackey 2007), few have shown how readers read born-digital fiction (fiction made with and for the medium-specific affordances of digital, interactive technologies) in the sense of understanding and processing its medium-specific narrative structures and literary meanings. Where digital fictions are considered, empirical studies have largely focussed on the defamiliarising effect of hypertext fiction's multi-linear form (e.g. Gardner 2003; Pope 2006; Miall & Dobson 2001) or used theoretical accounts from cognitive psychology to explain born-digital literary reading (e.g. Mangen 2008; Schneider 2005).

poetics (e.g. Stockwell 2002, 2009; Gavins & Steen 2003) – and research in which empirical work is conducted so as to gather specific reader response data about a particular text to inform analyses and associated theoretical conclusions (e.g. Whiteley 2011, Emmott et al. 2006; cf. Bortolussi & Dixon 2003) – what we define as 'empirical cognitive poetics'. The research reported here lies within the second of these two categories. Within this context, we address what we see as a potential limitation within existing cognitive narratological approaches to immersion – and cognitive narratology more generally – which is the tendency to craft theories about how text processing works without empirical evidence to substantiate them beyond an introspective account of the analyst's personal experience. We also broaden the scope of (empirical) cognitive poetics/narratology to include interactive digital texts, and specifically the digital texts performed by readers in a public exhibition context.

The empirical cognitive poetic methodology that we propose here is grounded in Bortolussi and Dixon's (2003) psychonarratological distinction between "reader constructions", which are "subjective and variable mental processes" as responses to the text (37) and "textual features", which are "objective and identifiable characteristics of the text" (37). Applying this approach to immersion, we distinguish between 'reader constructions of immersion' which we retrieve via a reader response study and 'immersive features' that we show can be isolated via multimodal stylistic analysis. We argue that there are elements in the text that trigger immersion and that these can be analysed systematically but, crucially, that the reader-player's accounts can show empirically how immersion is experienced and conceptualised and thus how particular features in the text are responsible for immersion. Both our empirical work and our analytical framework inform our new insights into immersion.

The preliminary definition of immersion that we adopt is based on both Ryan's and Thon's notion of immersion in digital media, and games in particular, as being a relocation and shift of attention into a storyworld. The reader-player is embodied as an avatar within the storyworld and thus she or he shifts imaginatively into that ontological domain. At the same time, however, we show that attention can shift to different aspects of the storyworld, causing different kinds of immersion as a result of the experiences that generate them.

The fact that the reader-player cognitively shifts into a storyworld means that an analytical approach is needed that can account for that process. Providing a new analytical method for immersive features in digital fiction, we utilise Deictic Shift Theory (Duchan et al. 1995, henceforth DST) and, in particular, expand Stockwell's (2002) cognitive deictic framework. A number of theorists note the usefulness of DST in relation to immersion, particularly in terms of conceptualising perspective taking (e.g. Busselle & Bilandzic 2009: 323) and/or projection into storyworlds (Herman 2002: 14-15, 271-74). Ryan's (2015) analysis of spatio-temporal immersion also relies on an analysis of some forms of deixis, which implies that DST might be a suitable framework for the systematic analysis of Ryan's categories of immersion. However, DST has not yet been developed as a comprehensive approach to immersion in any media.

DST is appropriate because its basic premise is that a reader's deictic centre (or origo – the 'I'/'Here'/'Now') is shifted into the storyworld when they read a text. As Segal (1995) explains, "in fictional narrative, readers and authors shift their deictic centre from the real-world situation to an image of themselves at a location within the story world" (15). Irrespective of where the text's deictic centre – or origo – begins at the start of a narrative, DST proposes that it shifts as the narrative progresses. A deictic 'push' is a shift into the storyworld (or onto a further embedded narrative), and a deictic 'pop' is a move in the opposite direction, shifting the deictic centre back from within the storyworld to the actual world of the reader, for example.

Stockwell develops DST as a cognitive poetic approach to literary texts by providing a comprehensive framework for analysing the different categories of deixis and the associated linguistic cues that are responsible for deictic shifts into, within, and out of a storyworld. These comprise: "perceptual deixis – expressions concerning the perceptive participants in the text"; "spatial deixis – expressions locating the deictic centre in a place"; "temporal deixis – expressions locating the deictic centre in time"; "relational deixis – expressions that encode the social viewpoint and relative situations of authors, narrators, characters, and readers"; "textual deixis – expressions that foreground the textuality of the text"; and "compositional deixis – aspects of the text that manifest the generic type of literary conventions available to readers with appropriate literary competence" (45-46). Importantly, however, and as our analysis below will show, while these categories can be used to analyse deictic shifts caused by verbal media, because Stockwell's approach is developed to analyse linguistic features in print texts, it requires development if it is to be used for the analysis of digital fiction. We show that, in digital fiction, deictic shifts can be initiated not only by linguistic features, but also by visual, aural, and interactive elements. A medium-specific cognitive deictic framework must therefore account for these non-verbal features.

Moreover, when reading print, any deictic shift is purely cognitive. As Stockwell (2002) notes, "readers can see things virtually from the perspective of the character or narrator inside the text-world, and construct a rich content by resolving deictic expressions from that viewpoint" (47, our emphasis; cf. e.g. Zubin & Hewitt 1995: 130). However, as we have argued above, because reader-players of a 3D digital fiction are embodied as an avatar within the storyworld, they can visually experience the storyworld from the perspective of the character, much as in a standard first-person adventure or shooter game. Further, because reader-players of digital media are doubly-situated inside the storyworld as an avatar and outside the storyworld as reader-player, we take both the storyworld and actual world into account in our analysis.

4. Methodology: Immersive features and immersive experiences in *WALLPAPER*

Most existing empirical studies on immersion in print media use quantitative methods to measure the extent to which people feel transported to a storyworld

and/or absorbed in a narrative (e.g. Green & Brock's [2000] transportation scale; Busselle & Bilandzic's [2009] narrative engagement scale; Kuijpers et al.'s [2014] story world absorption scale). Within the context of digital media, research on immersion is also largely quantitative and/or a stimulus text is developed for the experiment, rather than a naturally occurring text being used (see Cairns et al. 2014 for an overview). Poels et al. (2007) use a focus group methodology to investigate players' experiences of immersion in videogames and thus adopt a qualitative approach. However, their protocol asked participants about their experiences of gaming in general as opposed to asking them to talk about a particular text.

In our empirical research, we are interested in how readers conceptualise immersion in naturally occurring texts – that is texts that have not been created purely for empirical research. We thus take a qualitative approach to a particular case study text by analysing the language that reader-players use to talk about that experience. *WALLPAPER* by Andy Campbell and Judi Alston is a first-person 3D digital fiction which utilises videogame technology to tell a story about protagonist PJ Sanders, a computer engineer at a company called Poppitech, who returns to his remote family home in the UK following the death of his elderly mother. To find out more about his elusive past, reader-players adopt Sanders' first-person perspective (as an avatar) and explore the house and its surroundings. The aim of the ludic part of the experience is to find a key to open the parlour room which has remained locked since Sanders' childhood. However, the experience is mostly made up of spatial exploration of the storyworld and reader-players come across various visual and textual objects in the house (e.g. postcards, letters, notes, floating circles of text) which reveal information about Sanders and his family.

Reader-players who find the key to the parlour deploy a prototype of a "Visual Memory Extractor (VME)" that Sanders has been working on for Poppitech. This machine projects a film onto the walls of the parlour room and reveals that Sanders had a twin sister who died when a small child and his mother's sadness is thus explained by the grief she felt but had always hidden from her son. It is at this point that the narrative relevance of the metaphoric title – *WALLPAPER* – is fully realised. Like layers of *WALLPAPER*, family memories are peeled back in the house until the original layer of the story is discovered. The title thus evokes concepts of dishonesty wrapped by projections of domestic cleanliness and integrity, but it also evokes palimpsestic readings of layered multimodal projections of voices of the past, of the here and beyond.

WALLPAPER was launched as an installation at Bank Street Arts in Sheffield, England, in November 2015. During the exhibition, the work was projected onto a large screen inside a dark, enclosed purpose-built room within the gallery. The reader-player sat opposite the screen and used a mouse and keyboard to navigate the storyworld. Depending on the number of visitors in the gallery, reader-players might be joined in the room by others. However, the interface allowed only one person to operate the computer, and therefore only one person was responsible for navigation and the first-person perspective of Sanders. Often, videogames are played in a private setting, most obviously in

people's homes. However, interactive digital media is increasingly accessed in public spaces, such as temporary and permanent exhibitions[4], and also in the form of eSports. The research reported in this article thus addresses the changing nature of media consumption in the digital age and allows us to consider the contextual factors – such as a site-specific location – that potentially influence immersion in a public space.

Four reading groups (14 participants in total) took part in our reader response study; three were established reading groups who had been meeting since 2008, 2011, and 2014 and one "pop-up" reading group which was set up as part of the Reading Digital Fiction project specifically. Following Peplow et al. (2015), we regard reading groups as "providing insights into readers' activity" (3), while also recognising that "participants' reports cannot be regarded as direct reflections of their mental process as they read" (Whiteley 2011: 33). We thus offer suggestions for how language use might reflect immersive experiences, while also recognising the limitations of any empirical study that seeks to investigate cognitive processing.

In terms of our protocol, we asked all participants to experience *WALLPAPER* at the gallery individually and subsequently meet as a group to discuss it. The participants had varying levels of experience with videogaming and with digital reading. Mixed age and gender groups were chosen for the study in order to gain access to a range of different perspectives on *WALLPAPER*. Moreover, because *WALLPAPER* combines straightforward gameplay and reading, participants did not necessarily need to have experience of videogaming. None of the participants had read much if any digital fiction before, so this was a new experience for most participants. Equally as important, then, the mixed groups allowed us to address the Reading Digital Fiction project's aim of widening access to digital fiction. We aimed to maximise the "naturalistic" (Allington & Swann 2009) nature of the study by allowing "readers to interact freely" (Peplow et al. 2015: 6) and thus offering "greater ecological validity" (Peplow et al. 2015: 6). However, because we aimed to "generat[e] hypotheses based on informants' insights" (Flick 2009: 203) on a particular topic, we also introduced a level of experimental intervention. More specifically, a researcher was present at each group and she guided the discussion according to a semi-structured protocol.

Participants were told that the researchers were interested in immersion in *WALLPAPER* but that they could talk about whatever interested them about the experience. The researcher had a set of topics and associated questions for discussion, but adopting a semi-structured approach meant that the researcher was also "free to allow for unplanned talk" (van Peer et al. 2012: 82) and thus the conversation could expand beyond our initial research interests. To lessen

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[4] See, for example, the Digital Revolutions exhibition at The Barbican (London) in 2014 (https://www.barbican.org.uk/digital-revolution), the Electronic Superhighway at The Whitechapel Gallery (London) in 2016 (http://www.whitechapelgallery.org/exhibitions/electronicsuperhighway/), and the Computerspielemuseum (Berlin), which is a permanent museum: http://www.computerspielemuseum.de/1210_Home.htm. The Reading Digital Fiction project also staged an exhibition of digital literature in 2014: https://readingdigitalfiction.com/the-future-of-reading-online-exhibition/

any influence that the presence of the researcher might have had over participants' behaviour and their talk, the researcher met with the reading groups before the data collection to introduce themselves and get to know each other. Despite deploying this method, as the Hawthorne effect suggests, inevitably the readers would have undoubtedly been influenced by the presence of the researcher at the discussion group. It should be noted, however, that even the mere presence of a small recording device may still raise awareness that participants are being recorded and thus impact upon the interaction. The Observer's Paradox (Labov 1972) can never be fully dissolved and the researcher's presence in the research process – whether present at the recording or not – can never be entirely eliminated. We define our approach as 'semi-naturalistic'; it allowed us to collect data on a specific topic while bearing in mind the limitations of a researcher-led session.

All sessions were audio-recorded, transcribed and subsequently coded using NVivo. We focussed on identifying evidence of the following different kinds of immersion by using existing typologies from stylistics, narratology, and game studies which also focus on narrative experiences in games: "spatial immersion" (Thon 2008; Ryan 2015); "temporal immersion" (Ryan 2015); "spatio-temporal immersion" (Ryan 2015: 93); "emotional immersion" (Ryan 2015: 106); "ludic immersion" (Ermi & Mäyrä 2005; Thon 2008; Ryan 2015); "perceptual-environmental immersion" (Lombard and Ditton 1997); and "social immersion" (Thon 2008: 39). To these categories, we also introduced two new ones – "extratextual immersion" (which we propose below) and "collaborative immersion" (see Ensslin et al., in preparation) – to account for the way that various modes and also co-players in the actual world respectively can contribute to immersion in the storyworld.

When analysing the data, we paid attention to both explicit language use about immersive experiences, and implicit linguistic cues in reader responses that indicate a perceived relationship to elements of the storyworld and thus evidence of an immersive experience. We offer an empirical basis for our conceptualisation of immersion by synthesizing accounts of immersive experiences from reader-players with the analysis of textual immersive features. Our approach is unique in that it marks the first time immersive features in digital fiction have been systematically analysed using a replicable method and, perhaps more importantly, empirically investigated.

Since we focus on a case study that utilises both ludic and narrative features, we substantiate the theoretical distinction made between ludic and narrative immersion by focussing on responses to spatio-temporal, emotional, temporal and ludic components of *WALLPAPER*. We also show the importance of extra-textual features for immersion and thus contribute new insight as to how immersion works in terms of double-situatedness. While we largely adopted a grounded approach to the data by developed coding categories according to existing theory, our results are data-driven. We thus begin by outlining relevant reader constructions of immersion. We then utilise our medium-specific cognitive deictic framework as a means of accounting for the immersive features that we argue are responsible for generating those responses. In this symbiotic

approach, we are able to empirically verify some existing categories of immersion and also generate new empirically verified insight into how immersion works cognitively. In addition, we also offer new cognitive deictic categories to account for the reader responses and thus further develop DST for its application to multimodal texts.

5. Analysis

5.1. Narrative and ludic immersion

While most participants in our reader response study did not always talk explicitly about being immersed in *WALLPAPER*, their pronoun use implicitly demonstrates "a sense of being present on the scene of the represented events" (Ryan 2001: 122) and thus of being spatio-temporally immersed. The most common form of pronominal use is what we define as 'doubly-deictic I'. Taking influence from Herman's (2002) concept of the doubly-deictic 'you', a doubly-deictic 'I' is used when a participant refers to both I-as-character and I-as-reader-player at the same time and thus signals double-situatedness. For example, Celia recalls her experience of the storyworld using the first-person: "See I went to every room" (WALLPAPER BSA-C, line 597)[5]. In this case, Celia remembers wandering around the storyworld as though she were there (as 'I'). However, Celia is also situated in the actual world. We thus see evidence of reader-players being doubly-situated when they experience a storyworld in the first-person; they feel part of the storyworld space and time and seem to have internalised the actions they made in the game world.

Using DST, we suggest that spatio-temporal immersion is encouraged as soon as reader-players begin *WALLPAPER*, but that this is partly achieved via emotional and temporal immersion and thus features associated explicitly with narrative immersion: the "shift of the player's attention to the future development of the story and the characters in it" (Thon 2008: 40). The text begins with a black screen, accompanied by background music and an American female voiceover as follows: "Dear Mr. Sanders, I am very sorry to hear about the loss of you mother. I appreciate that it is a difficult time and you will need to travel to the UK to settle matters on your family estate." As a purely verbal opening to the text, the "relational deictic" (Stockwell 2002: 46) expression "Dear Mr Sanders" establishes "the social viewpoint" (46) of the female speaker with high register lexis (e.g. "I appreciate" and "settle matters") and grammatical constructions (e.g. lack of contractions; complex sentences) establishing a formal relational deictic centre between the speaker and the addressee. At this point in the voiceover, a visual representation of the storyworld is displayed. It is night-time, and we see a Georgian house in a rural setting with a modern car parked in the drive. As the voiceover continues, we learn that this letter is from "Jane Richardson Smith, Director of Human Resources" at a company called Poppitech and that Sanders is behind on the development of a prototype.

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[5] The data from this study can be accessed at: http://doi.org/10.17032/shu-160006

In addition to establishing information about Sanders, the letter is important for positioning the reader-player's psychological perspective within the storyworld and thus the first step towards emotional immersion, the "subjective reactions to characters" (Ryan 2015: 108) and "emotions felt not for oneself but for others" (108). In terms of temporal deixis, the letter is written in the present tense but reader-players experience it – as Sanders would – at a point after it was written. There is thus a temporal deictic pop from the past (and a document written in the present tense) to the present (in which the letter is an artefact from the past). Stylistically, the use of the second-person address (e.g. "you will need to travel") presupposes an addressee and readers are therefore pushed into a perceptual deictic position that is aligned and thus shared with Sanders. The use of the definite article throughout also assumes shared knowledge. Perceptually, therefore, as an introduction to the storyworld the letter establishes the first 'push' of the reader-player into Sanders' point of view.

Halfway through the voiceover, the player-character can begin to control the first-person avatar by using the mouse and keyboard and thus physically explore the storyworld. In terms of interactivity, *WALLPAPER* uses what Thon (2009) calls a "subjective point of view" in which the reader experiences the storyworld from both "the spatial and perceptual perspective of the player's avatar" (282) and also a "subjective point of action" in which "the action position of the player coincides with that of the player's avatar" (290), so that the reader-player controls the actions of the avatar directly. A subjective point of view and point of action both work as pushes because they unite the player and the avatar. The player is able to influence her view of the storyworld by moving the mouse in the actual world, but they have a subjective point of view and point of action in the storyworld. They are thus inside the storyworld as a player-character and outside the storyworld, in the actual world, as a player. They are doubly-situated. As soon as the reader-player begins to control the avatar, their interactive role causes a perceptual and temporal push from Jane Richardson Smith and Sanders' correspondence to Sanders' point of view in the present storyworld. The 'you' becomes doubly-deictic (Herman 2002: 342), referring to both Sanders and the doubly-situated player-as-Sanders at the same time. The combination of linguistic cues and reader-player agency thus contextually anchors the reader-player in the storyworld. They experience spatio-temporal immersion because of their interactive role but also because they have been pushed perceptually and temporally into the scene.

However, while narrative immersion is primarily responsible for their double-situated position, as soon as reader-players starts to control the avatar, they begin to experience ludic immersion, "a shift of the player's attention to the interaction with the game and … the possibilities for action within it" (Thon 2008: 36). Indeed, in addition to feeling present in another ontological domain, participants frequently show evidence of their attention being directed to interactive or ludic aspects of the storyworld.

For example, recalling his exploration of the house, Tom notes, "You know, trotting up and down the same rooms over and over again, and I got completely like target-fixated on finding the key, and there were various words in the

background and thoughts - I had no interest in them at all" (WALLPAPER BSA-B, lines 31-33). Tom describes the focus of his attention being fulfilling a task or goal and, specifically, finding the key to the parlour. We therefore see evidence of ludic immersion which Thon (2008) defines as a "shift of player's attention to the interaction with the game" (36) which is "mainly experienced through the various kinds of challenges that computer games confront their players with" (37). Tom is aware that there were textual elements in the storyworld that they could explore – i.e. "words in the background". However, he distinguishes between the ludic and textual elements by recalling that he was "target-fixated" on the former and "had no interest" in the latter. We thus see a divergence from or suspension of attention to components that may contribute to exploring the storyworld. Importantly, while ludic immersion is the most dominant form of immersion being recounted here, spatio-temporal immersion is still retained; the doubly-deictic 'I' signals movement through space and time as though the reader-player is situated in the storyworld as well as the actual world. The doubly-deictic 'I' was often used in our data when reporting interaction with the ludic elements. Our data thus suggests that spatio-temporal immersion is a component of both narrative and ludic immersion and that it must take place before any other forms of immersion can take place.

Moreover, while interactivity can apparently contribute to immersion, it can also cause a pop out of rather than a push into the storyworld. In our data, participants sometimes reported feeling frustrated with particular forms of interactivity if they were not aware of the rules governing it or if the rules did not seem to make sense to them. As Eleanor remarks, "Well I went round the house before I discovered I had to get the damn briefcase out of the- I couldn't- I didn't- well, I couldn't work out how to open the boot and get the briefcase" (WALLPAPER BSA-A, lines 166-8). Eleanor reports not being able to get into the house because the game had told her, with onscreen text, that she had not collected the briefcase. When reader-players approach the car parked in the driveway of the house, text appears on-screen which reads "open the boot". If the reader clicks the mouse button, the boot opens and thus an interactive feature allows them to explore the storyworld according to their own agenda. However, Eleanor had evidently not seen this instruction.

Thus, while interactivity can act to unite the reader-player with the avatar and thus spatio-temporally push them into the storyworld, in Eleanor's frustrated response, we see evidence of deictic shifting out of the storyworld back into the actual world and all forms of immersion being lessened, if not lost through irritation with the rules governing the game. The onscreen text reminds her that she occupies a position outside of the storyworld – as a player, rather than character – from which she can enact commands. This textual deictic feature which "foreground[s] the textuality of the text" (Stockwell 2002: 26) is thus responsible for a simultaneous pop but perhaps only because it was received by Eleanor at a point after it was useful to her. Conversely, because on-screen instructions are a common feature in videogames, it is likely that they do not always interrupt immersion. Rather, short instructions such as "open the boot" are meant to be conducive to uninterrupted game play and may actually

enhance rather than interrupt immersion by focusing player attention on a specific interactive feature.

5.2 Audio deixis and extra-textual immersion

The analysis above shows participants responding to what are largely visual elements in the text – the visual representation of the storyworld and onscreen instructions. However, participants also explicitly commented on the different kinds of audio in *WALLPAPER*.

Previous empirical research has shown that in-game sounds can have an immersive effect in videogames (e.g. Nacke et al. 2010) and our research confirms this. *WALLPAPER* has permanent audio which accompanies and works alongside the visual, verbal, and interactive features. Some audio is "non-diegetic", which is "represented as being outside the space of the narrative" (Stam et al. 1992: 62), and our data shows several participants having an emotional response to the background music:

> Abi: [...] and the music built- you know, it was just really //decent
> Brendan: //Spooky
> Abi: Yeah
> Ivor: Spooky
> Abi: //Yeah, yeah
> Ivor: //Atmospheric
>
>   (WALLPAPER BSA-A, lines 282-7)

In the extract above, the participants dialogically construct an impression of the atmospheric effects that the background music had on them. They agree that the music is appropriate (e.g. "decent") for creating a sense of storyworld. That the music creates a "spooky" atmosphere suggests that it contributes to the participants' temporal immersion – "a discourse's ability to play with the reader's expectations" (Ryan 2015: 100) – and also spatial immersion because it creates a sense of the spatial landscape they find themselves in (i.e. a house with supernatural elements, on the North Yorkshire Moors). In terms of deictic positioning, the background music pushes the reader-player into the storyworld by creating a sinister and suspenseful atmosphere in combination with the visual darkness of the setting.

Other audio in *WALLPAPER* is diegetic, it "emerg[es] from a source within the story, and temporally simultaneous with the image it accompanies" (Stam et al. 1992: 62). These sound effects are part of the diegetic level of the storyworld and represent what the character can hear in that ontological domain. Importantly, some of these diegetic sounds are created in response to the player's actions (e.g. sounds as footsteps when the player-controlled avatar walks around; the car boot opening and closing in response to the player's input). Collins (2013) defines these sounds as having "kinesonic congruence" (57). While we do not have direct evidence of participants talking about these kinds of sounds in our study, we would argue that they are likely to represent

deictic 'pushes' because, as elements that work to spatio-temporally and ludically immerse the reader-player, they are used to unite the player with the character in the storyworld.

Other diegetic sounds occur without the input of the player and are defined by Collins as "kinesonic incongruent" (35). In *WALLPAPER*, a kinesonic incongruent sound occurs when Sanders coughs or breathes heavily because these effects happen without the reader-player's input. Some participants in our study perceived some kinesonic incongruent sound effects as counter-intuitive. Oscar, for example, notes:

> I think at a certain point to be honest the breathing sort of broke immersion because it's- breathing is such an intimate sound.... If you- if this- if Sanders is essentially trying to be an avatar for the player, if I'm not breathing like that then it just seems a bit odd (WALLPAPER BSA-PopUp, lines 368-72).

In this example, we see both an explicit and implicit ontological detachment of the reader-player from the avatar. Oscar explicitly talks about immersion being "broke[n]" because he feels as though the diegetic sounds are too "intimate" for him to be an embodied part of himself. In terms of implicit markers, in the second sentence he refers to the avatar as "Sanders" as opposed to using the double-deictic I, with the first-person pronoun used here to refer to himself in the actual world only. We thus see a shift away from the protagonist as possible deictic centre which is caused by kinesonically incongruent diegetic sounds. We argue therefore that kinesonic incongruent sounds cause deictic pops, lessening their immersion, because they separate the reader-player from the avatar; they remind her/him that the character exists and – in this case – acts independently of them.

Lastly, and perhaps most significantly, our empirical work suggests that sound effects that are not programmed into the text can contribute to immersion. While Calleja (2011) notes that "intrusions from sources unrelated to the game environment detract attention from the game" (171), he also claims that "incorporation [does not always] require sensory stimuli to arise solely from the game environment" (171) and that "the player can integrate [input arising from outside the game environment] into their game experience" (172). Examples from our data empirically substantiate Calleja's proposals.

Experienced as a gallery installation, the reader-player of *WALLPAPER* sits in a dark room with a large screen in front of them. This setting acts to focus their attention on the storyworld and thus the reading context creates an extra-textual deictic push into the storyworld. In addition, several participants also commented on noises in the gallery that were not part of *WALLPAPER* but which influenced their experience: "Oh yeah, I heard- I heard things on the ceiling and I thought it was in-game sound effects, that there were spooky things going on upstairs" (WALLPAPER BSA-A, lines 493-94). In this example, Brendan refers to noises in the building that were not part of the text but which were brought in as part of diegetic soundscape by participants' attention scope. Here the sounds deictically push the reader-players further into the storyworld

by expanding its ontological boundaries to include the noises heard overhead. It is important to note that these contextual sounds are incorporated into the experience because the reader-player is already immersed spatio-temporally as well as narratively or ludically. That is, the extra-textual sounds do not cause immersion in isolation. However, we would maintain they do contribute to and sustain feelings of anticipation associated with the suspenseful narrative and, ultimately, contribute to spatio-temporal, emotional, and temporal immersion within the storyworld.

To reflect the fact that these non-game sound effects from the actual world can contribute to the reader-player's immersion in a storyworld, we add extratextual sound as an immersive feature. We thus suggest that immersion in a storyworld can be created by a combination of scripted features and also extra-textual, incidental or non-planned features. Gestalt principles suggest that we attempt to create coherence even out of objectively dissociate elements. Indeed, while we observe extra-textual sounds as immersive in *WALLPAPER*, we argue that extra-textual sound effects are capable of enhancing immersion in most if not all media, particularly if the storyworld is suspenseful or spooky. For example, the reader of a scary print novel may experience a fright when they hear a noise in their house. Thus, while we have analysed extra-textual features in relation to digital fiction in this article, we also argue that extra-textual features are relevant to immersion in any media.

6. Empirical and theoretical findings

Our empirical research shows that reader-players can be positioned inside and outside *WALLPAPER*'s storyworld via a combination of textual, audible, visual, interactive, and site-specific features. We thus propose that immersion in digital fiction is a fully embodied, multimodal experience that is stimulated by features inside and outside the text, but also that the doubly-embodied nature of immersion in digital fiction is fundamental to the experience and must be considered in any future studies. Our empirical research suggests that a reader-player's relationship with an onscreen avatar is dynamic and changes throughout interaction. In this respect, we argue that identification with an avatar can be perceptual (i.e. emotionally identifying with the character); spatio-temporal (i.e. feeling part of the space and time of the world) and/or simply referential (i.e. knowing that we are embodied in the storyworld by an avatar, but not necessarily experiencing a spatio-temporal or perceptual deictic shift).

Our empirical research has verified the distinction made between narrative and ludic immersion in existing theoretical accounts. However, we have also shown that spatio-temporal immersion is the most important form of immersion. That is, reader-players are always also spatio-temporally immersed when they experience narrative or ludic immersion. In order to emphasise the importance of the spatio-temporal shift into the storyworld for immersion in 3D digital storyworlds, we propose amending Ryan and Thon's definitions of immersion. We suggest immersion in 3D digital storyworlds represents a spatio-temporal shift into a storyworld with attention on different aspects of that storyworld once

that spatio-temporal shift has taken place. The reader-player is embodied as an avatar within the storyworld and thus she or he shifts both spatio-temporally and imaginatively into that ontological domain. At the same time, attention can shift to different aspects of the storyworld, causing different kinds of immersion as a result of the experiences that generate them.

In order to analyse immersive features systematically, we have proposed a new framework. While we have used Stockwell's cognitive deictic framework as a basis, the affordances of the digital medium have necessitated some additions to his print-based approach. First, while there have been no previous empirical studies on the immersive effect of interactivity in digital fiction, empirical studies of both interactive television (Hand & Varan 2008) and interactive print narratives (Green & Jenkins 2014) suggests that interactivity can enhance immersion in narrative. Our findings suggest that interactivity can lead to or enhance spatio-temporal and ludic immersion in digital fiction, but that interactivity can also inhibit immersion. In order to account for the capacity for interactivity to push or pop a reader-player in or out of a storyworld and thus contribute to the spatio-temporal and ludic immersion evidenced above, we propose the category of 'interactional deixis' as an addition to Stockwell's typology. Interactional deixis defines aspects of a text that utilise reader-player agency so that reader-players have an effect or influence on the storyworld. In *WALLPAPER*, this would include the visual perspective that is generated by the subjective point of view and point of action and also the way in which a reader's interactive role can affect the storyworld (e.g. opening the boot of the car).

Secondly, we have shown that diegetic, non-diegetic, and extra-textual sounds push and pop the reader-player in or out of the storyworld and thus contribute to or lessen immersion. To account for the immersive – and anti-immersive – potential of sound in narrative, we add 'audio deixis' to Stockwell's framework. In our study, we have shown that kinesonically congruent sounds act as audio deictic pushes. We suggest they are particularly immersive because they work in combination with interactional deixis and thus act as a further means of spatio-temporally immersing the reader-player. Likewise, because kinesonically incongruent sounds do not work in combination with the reader-player's interactive role, they can act as audio deictic pops because they foreground the reader-player's separation from the storyworld. Different modes thus do not necessarily perform the same function. Rather the complexity of the multimodal experience in its entirety must be taken into account.

Thirdly, we have shown that extra-textual modes, such as extra-textual sound and the visual environment in which a reader-player sits when they experience a narrative, can also contribute to immersion. We therefore propose that immersive features can be extra-textual. While we have indicated where this occurs in *WALLPAPER*, we also suggest that analyses of all reading experiences, irrespective of medium, should account for this phenomenon.

While the analyses above have isolated the immersive capacity of particular semiotic modes, we would like to emphasise that modes can work both with and against each other in *WALLPAPER* and that reader-players are therefore not

always immersed in an interactive experience to the same degree. Rather, reader-players are deictically pushed and popped inside and outside a storyworld at different times during a multimodal reading experience. That said, while our use of the term 'multimodal' might suggest that modes work together, it does not recognize the individual power of each mode. Rather than all modes working jointly with the same level of influence on the reader-player, we suggest instead that during different sections of an interactive narrative experience, particular modes and affordances have more prominence than others in terms of their ability to push, or immerse, the reader into the storyworld.

Lastly, while the attribute 'medium-specific' implies that our cognitive deictic framework is deviant from or non-standard in relation to current models, which are all based on the reading of print, we would instead like to argue for the prototypicality of our digital storyworld model. When proposing DST as an approach to literary narrative, Duchan et al. (1995) take theories of communication that have been developed to account for face-to-face communication (e.g. communication theory, speech act theory) and develop them for application to a literary text (5-13). For example, as Segal (1995) notes,

> in ordinary usage, deictic terms are interpreted from the speaker's and hearer's environmental situation. … [I]n fictional narrative, readers and authors shift their deictic centre from the real-world situation to an image of themselves at a location within the story world (Segal 1995: 15).

Thus, like many other cognitive poetic approaches (e.g. text world theory) in which face-to-face communication is the "prototypical discourse type" (Werth 1999: 84-85; cf. Stockwell 2016: 147) and which these theories use as their basis, in DST the speaker-to-hearer model is adapted so that the literary text acts as the channel of communication between the author and the reader.

We have shown that immersion in a first-person digital fiction such as *WALLPAPER* is caused by a range of semiotic channels that materially place the reader-player in the storyworld as a re-embodied avatar in addition to the reader-player constructing an image of that storyworld. Crucially, face-to-face embodied perception is also experienced in multiple modes and with both sender and receiver situated in the same ontological domain. In printed texts, on the other hand, deictic shifts are produced largely by written language only and the reader certainly cannot be visually embodied in the storyworld. We argue therefore that experiencing or being immersed in a storyworld created by a three-dimensional digital environment more closely resembles an embodied face-to-face discourse interaction than being immersed in a storyworld generated by print. The former simulates rather than simply describes a face-to-face interaction.

It is thus Duchan et al. (1995) and Stockwell's (2002) application of cognitive deixis that is less prototypical and thus more 'medium-specific' because it deviates from the prototype of face-to-face communication far more than the embodied reader-player of the three-dimensional digital fiction. The model that we propose here for digital fiction thus correlates more closely with embodied

perception and deictic shifts as they happen in the prototype of face-to-face communication. Moreover, our model shows the value of three-dimensional digital storyworlds for cognitive literary studies more generally. Rather than focussing exclusively on the atypical scenario generated by print, we argue that research into embodied perception and immersion in literature should engage more with three-dimensional multimodal, interactive literary works, such as *WALLPAPER*, that utilise multiple semiotic channels (including written language) and which more closely resemble prototypical embodied perception.

7. Conclusion

Theories of immersion across all media usually suggest that immersion is a completely absorbing experience. In this article, we have shown that, because immersion is stimulated by multiple immersive features which interact with each other, it is actually a less totalising experience than previously assumed, with readers being pushed and popped into and out of a storyworld at various times during their encounter with the text. We have also shown how participants' diverging attention to particular parts or aspects of that storyworld – as well as the extradiegetic environment of an exhibition space, in this particular case – throughout their reading leads to different types of immersive experiences with different levels of intensity. Further research by our team is underway to further specify these levels and how they intersect (Ensslin et al., in preparation). Furthermore, future work will be needed to verify whether these conclusions are generalizable in other digital fictions and in other media.

In terms of contributing a more accurate, multidimensional theory of immersion, we have argued spatio-temporal immersion has to take place before any other form of immersion can ensue. The importance of spatio-temporal immersion must be emphasised in any future empirical or theoretical work. To more accurately account for the full context of any reading/playing/viewing experience, we have also proposed that extra-textual features should be accounted for when considering immersive features.

Applying cognitive poetic principles via the systematic analysis and insights from cognitive theories, we have provided a new cognitive model for analysing immersive features and, specifically, adapted DST to account for interactivity and multimodality both inside and outside a digital text. While we have proposed this approach as a medium-specific framework, we argue that immersion in simulative 3D digital fiction is closer to the prototype of face-to-face communication as an embodied experience than the reading of print fiction and suggest that researchers engage more with three-dimensional multimodal, interactive literary works, such as *WALLPAPER*, in order to expand the transmedial remit of cognitive poetics and narratology, both theoretically and empirically.

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