

# Children's Agency and Reading with Story-Apps: Considerations of Design, Behavioural and Social Dimensions

## Abstract

A comprehensive understanding of children's motivation to read e-books requires a multi-faceted and contextualized conceptualization of children's agency. In this study, agency was operationalized as a set of behaviour indicators of children's control (behavioural agency), adults' perceptions of reader identities afforded by the content and format of books (social agency), and specific multimedia and interactive features that afford personalisation (agentic design). In a comparative qualitative case study, seven pre-school children and their mothers were observed reading four story-based interactive e-books (story-apps). Multi-method analysis that combined design evaluation with observational and interview data, revealed that behavioural agency was demonstrated in the children's frequent, prolonged and repetitive physical engagement with the story-apps. Social agency became foregrounded in relation to constitutive reader identities. Agentic design was related to children's sense of autonomy. The findings have implications for how we theorize, operationalize and apply the concept of agency in children's e-books and reading for pleasure.

*Keywords:* agency, e-books, apps, reading engagement, reading motivation, early reading.

## 1. Introduction

E-books provide a popular way for young children to access and enjoy stories, with advanced interactive and multimedia features distinguishing them from print books. So far, a body of experimental research has investigated the effects of interactivity and/or multimedia on children's learning outcomes such as story comprehension or vocabulary acquisition (e.g., Shamir & Baruch, 2012; Takacs, Swart & Bus, 2014) and several qualitative studies have documented children's enjoyment of digital stories shared at home (Aliagas & Margallo, 2017). This study aims to expand the current literature on children's e-books with a focus on a so-far little explored aspect of reading digital stories: the reader's agency. This focus stems from the human-computer interaction premise that e-books (and digital media more widely) are not neutral, but are designed with a specific purpose and goal in mind (Barzilai-Nahon, 2006), which can either enable or constrain users' agency (Van Dijck, 2009). Furthermore, tapping the agentic features of books creates the spark for children's motivation and enjoyment of reading, which influence why children read and what they get out of reading (Oliver, 1974; Conradi, Jang, & McKenna, 2014).

Agency is a multi-faceted term that is theorised variously in the literature and this paper problematizes these diverse views and arrives at a working definition for the area of children's reading of interactive e-books. The threefold aim of this study is to 1, theoretically conceptualize agency in relation to specific design features of children's e-books; 2, operationalize agency for future empirical studies; 3, demonstrate children's agency with a set of four e-books. In response to the E-Read Consortium's (2014) explicit suggestion to incorporate mixed method and multidisciplinary work in children's e-reading (see Mangen & van der Weel, 2016), this comparative empirical study integrates insights from psychology,

education, literary studies and human-computer interaction to identify the key indicators of agency in the design of children's e-books and children's interactions with them.

Psychological and socio-cultural aspects of reading are considered in relation to children's reading *for pleasure* (e.g., Guthrie & Wigfield, 2000), also known as ludic reading (Nell, 1988). The Methods combine a theoretically-driven analysis of the e-books' features, mothers' interviews and video observations of repeated mother-child home reading episodes. A key distinguishing feature between this article and previous work is that agency is situated in relation to children's reading for pleasure of e-books. E-books, also known as interactive digital books, story apps or picture book apps, are stories with a narrative (story plot) enriched with multimedia and interactive features and accessible on touchscreen devices such as iPads, tablets and portable e-book devices such as Amazon Kindle. This paper uses the term *story-apps* to convey the e-books' interactive format and narrative-based content.

The paper begins with a synthesis of interdisciplinary perspectives on agency, followed by the methodology that outlines the operationalization of the indicators of agentic design, behavioural and social agency. The application of the indicators to children's reading of digital books with their mothers is provided, with a discussion of the study implications for future research of children's contemporary reading experiences.

### **2. Agency in children's book reading**

Following a comprehensive literature review, Koro-Ljungberg, Bussing & Cornwell (2010) developed a framework for analysing teenagers' agency in disclosing and constructing their life stories. They defined agency as the teenagers' 'active participation in the world' (p. 195). In the context of book reading, a systematic review of motivation-related terms led Conradi, Jang and McKenna (2014) to the definition of agency as 'a reader's perceived capacity to

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determine involvement in reading processes and activities' (p.154). Conradi, Jang and McKenna (2014) identified agency to be integral to self-beliefs, but separate from self-efficacy and self-concept. However, the authors did not distinguish between different reading purposes fulfilled by different types and genres of books. This is an important distinction given that there are various purposes for reading, including reading for survival, reading for learning, and reading for pleasure (Wallace, 1992).

This study focuses on reading for pleasure, that is texts and narratives that delight readers and foster reader identities and that are used in informal learning contexts to derive enjoyment from written stories (see Guthrie & Wigfield, 2000). In reading for pleasure, agency is understood as a *relational* variable between authors and readers and between pupils and teachers (Cremin, Mottram, Collins, Powell & Safford, 2009). This is different from the notion of students' individual agency in the classroom context (Reeve, 2003) or agency in engaged reading of adult readers (Ivey & Johnston, 2003). There are various types of agency that books can portray and propagate, for example scholars have studied political agency (e.g., Nakata, 2008), local and global agency (e.g., Gutierrez, 2013) and the power relationships that are constructed by specific backgrounds and cultures of writers in the books they produce (e.g., JanMohamed, 1985; Brooks, 2006). Literary and children's literature scholars have conceptualised readers' agency in relation to authors' choices of specific themes, events and story characters, and have examined how children's books transmit socio-cultural values about key demographic variables such as gender (e.g., Peterson & Lack, 1990), racial diversity (e.g., Tolson, 1998) and disability (e.g., Ayala, 1999).

The interest in children's authorship of autobiographical stories has risen with the authoring possibilities of digital media, as evidenced, for example, in a case study with an African

American mother by Lewis Ellison and Wang (2018) and in a community project with young people with disabilities by Satchwell (2018). It is imperative to consider the volitional choices all children make when using digital media and their parents' perceptions of children's agency. This article aims to address this research gap with a consideration of: 1, agency as a design and content characteristic that reflects how writers and app developers conceive of readers' identities; 2, children's behavioural agency as a set of observable choices that the child makes during reading story-apps and 3, adults' perceptions of socially constructed agency embedded in the content and features of e-books for children. This focus is related to, but distinct from, extant measures of children's verbal or hotspot-centric engagement with apps and research that focuses on children's academic and psycho-social outcome measures. The individual facets of agency selected for the present analysis are described in detail below.

### **2.1. Agentic design features**

Technology design influences the choices users can make when interacting with specific technologies such as story-apps. Technologies that provide children with choices and allow them to tailor the story content to their own needs or preferences are known as personalized or personalisable technologies. A typical example of personalisable e-books are story-making apps with which children can make their own multimedia books, based on their own texts, visuals and audio recordings, using structured or open-ended story templates (see Aliagas & Margallo, 2017).

Author (2017) identified five key variables that come to fore in personalized learning environments, including interactions supported by personalizable technologies. The so-called 5As of personalization are briefly defined as follows: 1, Authorship relates to

children's creation of their own content with technologies; 2, Autonomy relates to children's independent navigation of technologies; 3, Authenticity relates to children's own and unique interactions with technologies; 4, Aesthetics relates to children's direct involvement in changing the look and feel of technologies and 5, Attachment captures children's ownership of the technologies they interact with (Author, 2017). Personalized technologies can be personalized automatically (e.g., an algorithm that makes personalized suggestions to a child) or by an adult who co-uses a technology with the child (e.g., a parent adds a child's name to a story). In this study, the 5As of personalisation were adapted and operationalized in terms of the choices, control and volition driven *by the child* and in relation to specific design features of four story-apps.

### **2.2. Children's behavioural agency in book reading**

Based on a series of empirical studies with high school students, Reeve and Tseng (2011) formulated agency as a fourth dimension in learning, separate from students' behavioural, emotional, and cognitive involvement in a learning activity. Reeve and colleagues have subsequently developed an Agentic Engagement Scale that links students' choices and volitional engagement to course-specific achievement outcomes (e.g., Reeve & Lee, 2014).

There is no comparable description of young children's agency in reading e-books.

Researchers have noted diversity in parent-child engagement patterns with different reading devices (Roskos, Burstein, Shang, & Gray, 2014) and reading formats such as paper versus console books (Parish-Morris et al., 2013), but as yet, studies have not considered the choices, volitional attitudes and acts of parents and children interacting with multimedia interactive books available for iPads. It was therefore necessary to propose a comparative measure of agency that would be relevant for young children's behaviour in this context and

that would capture who is in control of the reading session. Previous rubrics and concepts that are related to children's agency were considered, including the notion of immersion in a technology-mediated activity as measured by Jin (2009); the indicators of behavioural, affective and cognitive engagement of US kindergarten children as developed by Aguirre-Muñoz & Pantoya (2016) and systematic observation scales for children with special needs, which include measures of the spontaneity and motivation in children's engagement with learning resources (Kishida, Kemp, & Carter, 2008). The final measure consisted of four easily observable facets of child's agency during a reading session: 1, the overall length of the reading session measured from the beginning of tapping on the book icon and finishing with ending the session by pressing the iPad "Home button"; 2, physical control of the reading interaction by the parent, child or both reading partners, gauged in terms of who held the iPad in their hands for the longest proportion of time; 3, virtual control of the story in terms of the length of time the child navigated the screen by either tapping or swiping the pages; 4, the child's choice of re-reading the story or parts of the story within the same session by pressing the 'read again' or 'resume' button. These facets were used to establish the broad behavioural indicators of children's choice of reading/interacting with the story-app.

### **2.3. Children's social agency with digital books**

In literary, arts and humanities studies, reader identities are context-related and mediated by subjective perspectives (Brown & Blessing, 2005). Readers' agency has been the subject of intense research in critical, feminist and geographical theories concerned with the ideological, political and cultural influences on the production and consumption of texts (e.g., Krauss, 1982; Hall, 1989; Barret, 1980). Children's reader identities studied through the lens of

educational and social sciences are understood to be constituted not only through the characteristics of texts but also through the wider socio-cultural milieu in which the texts are accessed (Scribner & Cole, 1981). From this perspective, a child's agency in a shared reading session ought to be recognised in terms of what Rowe (2008) described as "social contracts" that children and adults draw on, jointly construct and negotiate, when sharing texts together.

Travis' work is the most closely aligned with the notion of socially constructed agency during parent-child book reading. Travis' (1998) theorization extends the rich work of Jauss (1982) and Iser (1993) and advocates for agency to be understood as a socio-cultural product, not an individual's intention. She identifies four distinct types of readers that are envisioned by authors, enabled through specific text characteristics and negotiated by readers: the competent reader, compliant reader, resistant and constitutive reader. A competent reader is a reader who can successfully negotiate the narrative to derive a meaning from it; a compliant reader follows the narrative as it is; a resistant reader subverts it and a constitutive reader co-creates it. These categories were adopted in this study to establish how parents perceive of their children's identities as (early) readers in relation to the story-apps that they read with them.

### **3. E-books: definition and key features**

The quality of most commercially produced story-apps currently available for young children is low and many are not developmentally appropriate for young children (Sari, Takacs & Bus, 2017; Papadakis, Kalogiannakis & Zaranis, 2018). The four story-apps used in this study were carefully selected for their quality of content and format of representation. Three of the four story-apps were developed by the award-winning children's publisher Nosy Crow (Little Red Riding Hood, Cinderella and Play Theatre), and one was an app produced by



psychologists at the Open University called Our Story. A description of the story-apps is in Table 1. The description focuses on the interactivity and multimedia features of the four story-apps because these features have been most widely studied in relation to children's learning outcomes before, including two major meta-analyses (Bus, Takacs & Kegel, 2015; Takacs, Swart & Bus, 2015). Note that the multimedia and interactivity features outlined in this table relate to immediately observable user control features, which manifest differently depending on individual users' agency.

*Table1 to be inserted here*

#### **4. Summary of study aims and research questions**

Agency is a crucial feature for conceptualizing children's contemporary reading experiences that are characterised by multimedia choices and interactivity. Based on a multi-disciplinary literature review, agency in this study was defined as a multi-faceted phenomenon that includes behavioural, social and design indicators. Four children's story-apps were analysed to illustrate how these three agency indicators correspond to specific facets of children's perceived and actual interaction with the apps and their design features. Three sources of data (design feature analysis, observational data of mother-child interaction and interview data with the mothers) were used to answer the following three research questions:

1. Which design features of children's story-apps correspond to the theoretical concepts of agentic authorship, autonomy, authenticity, aesthetics and attachment? (RQ1)
2. How do story-apps influence children's choices and control of the reading session with their mothers? (RQ2)

3. How do mothers perceive their children's reader identities in relation to their children's use of story-apps? (RQ3)

### **5 . Methods**

#### **5.1. Study participants**

Four boys, three girls and their seven mothers took part in the study. The fathers were reported to read and use digital media with their young children too, but the study's focus on mothers was for pragmatic reasons: the mothers were available for the researcher's home visits during the day. The families lived in England and they were of White-British (5 mothers and children) or other White background (2 mothers and their children). Six of the mothers were aged between 31-40 years and one mother was aged between 41-50 years. Five mothers were educated to postgraduate degree, and two had undergraduate university degrees. The family income was between £20-£40k for four families and over £40k for three families. The children were aged three to five years, with the youngest child aged 3 years 2 months and the oldest child 5 years 10 months. None of the children had professionally identified educational needs. The observations took place at home and in two of the observation sessions the younger siblings of the participating children took part in the activities. The engagement patterns of these three siblings were excluded from the present analysis to ensure greater homogeneity within the data set, but it should be acknowledged that their participation might have influenced the engagement of their elder sister and brother.

#### **5.2. Study procedure**

All families were visited at home by the study author over the summer in 2017. The length and number of visits varied from six to two visits per family, with longest visit lasting four

and half hours and shortest visit half an hour. The study was informed by ethnographic approaches to home observations, where events are documented as they occur, while minimizing the influence of the researcher's presence on participants' behaviour (Hammersley & Atkinson, 2007).

The four story-apps were installed on the researcher's iPad and were brought to the home of each family and taken away after the end of each session. The mothers and children were encouraged to use the story-apps in the order of Little Red Riding Hood, Cinderella, Play Theatre and Our Story. Some mothers decided to read the stories together with their child, some mothers preferred to let their child read the books on his or her own while they were watching them. Some mothers read several books within a session, some mothers and children decided to use one app per visit. As a quiet and passive observer, the researcher did not interfere with any of the interactions. She collected data concerning children's engagement using a handheld camera, positioned from a side angle, so that the child's interaction with the iPad screen and face expressions were clearly visible. Each session lasted as long as the child made it last.

### **5.3. Analysis procedure**

#### **5.3.1. Design feature analysis**

To answer RQ1 and gauge the specific design features that correspond to agentic personalisation, a rubric was developed with descriptors for high/medium/low occurrence of the 5As variables (see Table2). The individual variables, such as, for example, the child's ability to independently use the app, were conceptualized in relation to typically developing children aged between two to five years.

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The analysis procedure involved downloading each app on the researcher's iPad and rating it in relation to the rubric criteria. A high presence of the 5As was described as agentic personalization, that is personalization which is likely to be volitional and driven by the child. The scoring was theoretically-driven and captured in an "app map" (see Rowsell & Wohlwend, 2017). App maps visually capture the shape of the scores and provide an overview of the highest and lowest scores for individual apps.

### **5.3.2. Video data analysis**

Children's behavioural agency was analysed drawing on the video data that the researcher video-recorded during her home visits. The length of each session with a story-app was measured in seconds and was an average score across all sessions video-recorded for each child-mother pair with the particular story-app. The researcher's fieldnotes were used to ensure that the videoed session corresponded to the actual time the children interacted with the apps. One session needed to be removed from the calculations as it was captured only partially by the video camera. The second indicator of children's behavioural agency differentiated who was in control of the physical interaction with the app during the observed session: the child, mother or both participants. This was assessed by watching the videos and noting down the length of time the child/mother or both held the device across all observed sessions with the four story-apps. Virtual control of the story was assessed by noting down the proportionate length of time that the child, mother or both used their hands to navigate the screen. The movements could include tapping, swiping or circular strokes; the main interest was in the control of the interaction rather than the type of haptic engagement (see Crescenzi, Jewitt & Price, 2014 for a detailed discussion of children's touch movements with apps). Repetition of reading was analysed in terms of whether the children chose to re-read the story

within the same session of reading each individual title, whether they finished the book themselves or were asked to do so by their mothers. This was assessed as a simple yes/no question for each child and story-app. This indicator did not distinguish the ways in which a child returned to the book (e.g., verbal request or tapping on the relevant icon on the screen). Repeated reading of individual stories could happen anytime within that session and could include children's re-reading of the entire story or parts of it. This is because children's choice to repeatedly access specific story scenes or to dwell on a specific story page was captured in the overall length of time the child spent with each story-app.

### **5.3.3. Interview analysis**

At the first and last visit to participants' homes, the researcher conducted semi-structured interviews with the participating mothers. The interviews were recorded with a hand-held audio-recorder and professionally transcribed verbatim. The transcribed interviews were analysed using thematic analyses, as described by Braun & Clarke (2006). Travis' (1998) four key reader identities - competent, compliant, constitutive and resistant reader – were used as deductive categories. The thematic analysis involved initial coding (that is organizing the data conceptually according to the four descriptive categories identified by Travis, and grouping similar extracts under the same category), and axial coding, that is selectively examining the data for saturation of categories (see Jones & McEwen (2000)).

In sum, the analytical tools used in this study are commonly used in qualitative psychology but have not been deployed for investigating children's agency with story-apps. The multi-disciplinary consideration of agency markers is a novel research development in the area of studying children's reading for pleasure and engagement with apps.

### **5.4.4. Ethics and reliability**

The study was approved by the (reference withheld) University Ethics Committee and followed the British Educational Research Association's (2011) guidelines and NCRM ethical guidelines on the collection and storage of visual data (see Wiles et al., 2008). To ensure that the analyses were consistent and unbiased, a second researcher checked through the apps' design features, video and audio transcriptions and the themes and categories derived from these. In addition, the members of the project's advisory panel verified the final interpretations. Reliability scores were not calculated but resolved through discussion and consensus among the team members. There was only one difference in coding, namely with a data extract that could fall both under the compliant and constitutive reader category. This was resolved through re-reading Travis' original work, re-watching the video clip and discussion in the research team.

## **6. Results**

### **6.1. Agentic design features**

The first analysis aimed to establish the relationships between agency and the 5As of personalization in light of the specific features of the four story-apps. A detailed description of the four apps is included below, followed by summary "app maps" illustrating the main scores.

#### **6.1.1. The Little Red Riding Hood**

The Little Red Riding Hood digital book (LRRH hereafter) by Nosy Crow scores low on authorship, aesthetics and attachment as it provides minimal choices for substituting, tailoring

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and owning existing content. In terms of autonomy, the book offers a lot of guidance and is intuitive to use but requires an adult's input for some tasks (e.g., the different reading options are text-based). The app contains a visual menu that allows children to 'jump' to individual scenes; they can turn pages back and forth and progress at a pace they wish. In some scenes, however, users need to complete all interactive tasks (e.g., placing all food items into Little Red Riding Hood's basket) before they can turn to the next page. In addition, this book gives users the choice of eight possible story endings: the main character defeats the wolf in all scenarios, but how the wolf is defeated varies. The variation depends on the path that users choose at a crossroads scene, where the Little Red Riding Hood asks the reader to help her choose one of eight possible options: flowers, acorns, spider, feathers, music, thistles, dandelions or bees. Each ending is linked to a different interactive game within the story illustration. For example, the music path takes the reader to a music machine that produces different tunes, which the reader is asked to imitate to help Little Red progress in her adventure. According to the rubric criteria, these options correspond to a medium level of authenticity.

### **6.1.2. Cinderella**

Cinderella by Nosy Crow offers children the possibility to flexibly choose scenes and enter the story at any point. There is a visual scroll-down/scroll-up menu of individual scenes that allows children to select specific pages. In the mirror illustrations on some of the pages, the front-facing camera is activated and the child's face appears in the illustrations. For example, in the scene where Cinderella's mean sisters prepare for the royal ball, there is a magic mirror, which can feature the reader's face. These features provide the basis of medium levels of authentic experiences of the story. Apart from the mirror feature, there is no option to

change the appearance of individual scenes or share the story with others and there is only one possible ending to the story. According to the rubric, the digital book thus scored low on authorship, attachment and aesthetics.

### **6.1.3. Play Theatre**

The Play Theatre story-app (Nosy Crow) contains aesthetically-appealing authoring options that offer children several options to create their own story. The authorship, aesthetics and authenticity dimensions are medium-level because children's choices are limited to templates provided by the publisher: the story-making process is based on graphics, music sounds and story characters developed by Nosy Crow. Although children cannot change the design, they can mix and match different elements as they wish and adjust the look of individual story characters with different accessories, scene backgrounds and accompanying music.

Autonomy is low in this app because it contains text-based navigation and requires the adult's explanation to start and save a new story. Stories can be saved with new titles and shared with others, corresponding to medium levels of attachment.

### **6.1.4. Our Story**

The Our Story app (The Open University) received the highest score for authenticity and authorship because it has no templates/exemplars and is therefore fully open to children's contributions of their own content. The app has icon-based navigation with big buttons in primary colours (medium levels of autonomy). The app includes several options for sharing the final story; users can either print it out or send to others. In addition, children can name their stories and indicate their sense of ownership by selecting and editing their own book covers. The app therefore scores high on the attachment dimension. The overall look of the



finished digital book can be adjusted to some degree: users can choose the font and size of pictures for printed versions and they can adjust the digital images and voice-overs as per their preferences, which corresponds to medium levels of agentic aesthetics. Figures 1-4 visually represent the scores for each story-app.

*Figures 1-4 to be inserted about here*

### **6.2. Behavioural agency**

The second analysis focused on facets of children's behaviour that indicate the choices the children made during their engagement with the four story-apps. The observations could not be analysed statistically because the data were non-parametric. As can be seen in Table3, the LRRH scored highest for the length of children's engagement with the story-app. It was the only story that most children chose to re-read within the same session. It was also the only story where most children were in control of almost the entire session both virtually and physically. The interaction with the Theatre Play and Cinderella books was dominated by the child, while only two children were in control of use with the Our Story. The length of use for Our Story was the shortest and no child chose to re-engage with the Our Story app. Figure 5 and Figure 6 capture the distribution of scores across the apps (Figure 5 contains scores per seconds and Figure 6 contains scores converted to frequency per five minutes).

*Table3 to be inserted about here*

*Figures 6 and 7 to be inserted about here*

### **6.3. Social agency**

To answer RQ3, Travis' categories were deductively applied to all mothers' interviews, in accordance with Travis' original definitions of reader identities. Overall, mothers' perspectives on children's agency varied, but there seemed to be a consensus in relation to what Travis terms the constitutive and compliant reader identity. All mothers were keen to ensure their children were not positioned as compliant readers by the story-apps (and digital media more broadly) and saw the greatest benefit of the four books in their potential to position children as constitutive readers. Extracts from interviews are provided to illustrate this finding, post-fixed with "R" for researcher interviewing the mothers and M1-7 for the individual mothers and Child1-7 for their children.

### **6.3.1. Resistant readers**

Travis discussed resistant readers as a characteristic of postmodern literature that aims to deconstruct and reconstruct realities. Postmodernists examine traditional identity categories such as gender and these were also questioned by the mothers in their accounts of children's agency with traditional fairy tales. Mother6, in particular, perceived LRRH and Cinderella as too gendered for her son and interpreted his disengaged response to the book as him resisting the "femaley" story characters. Interestingly, Mother7 described her son's preferences in terms of the apps' potential for humour and fantasy that allowed him to take the narrative to another reality.

Mother6: Um, I think he would've seen it [the LRRH app] as girlie, I think having a female protagonist, um, and it was slow progress and it was a bit tricky and ambiguous.

Researcher: Mm, mm.

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M: What the tasks were, by my interpretation and I think he found that if not frustrating, it meant he kind of disengaged.

R: Mm, mm do you think it was similar with the Cinderella one?

M: I personally found Cinderella more engaging. What did I think [child] ...? Again felt 'femaley' stuff feels very gendered for them at this age. Um, yeah so he would say, I think if it was just us he would say stuff like uh that's for girls.

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Researcher: What is it that you like about, what is it that he likes about it? What do you think?

Mother7: Um, I think he ... well from what I can see it's because they're funny and they're silly, um, and I guess also because of the illustrations as well as the ...

R: Mm, narrative, the content.

M: ... the story, narrative yeah. Yeah, they're very sort of silly and quite fantastical as well, so ...

R: Okay, okay interesting.

M: Um, I guess imaginative as well, so yeah.

### 6.3.2. Competent readers

Both Mother1 and Mother5 described their children's preferences in competency terms.

Mother1 perceived her boy's engagement to be associated with his mastery of simple tasks/games embedded in the story-apps and Mother5 recounted how her daughter prefers

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apps that are easy for her to 'get right'. Travis (1998) describes competent readers as those who know how to listen to the author/writer, which in the case of story-apps, might be interpreted as those who understand and harness the design of the technologies.

M1: Matching games and there's a jigsaw version as well, you drag and drop it, and I think because he can feel a sense of accomplishment from them, he can do them, that he really, he has gone back to those ones that he knows he can do. Whereas I think the story ones tend to be more sophisticated. I think he strugg- ...

R: Yes, yes with many layers yes.

M: He struggles a bit. He will focus on, you know as we saw last week, he will focus on one say page that he can do and the other ones he'll kind of he'll try them all out and work out ...

R: Which ones he's ...

M: ... which ones he likes and then he'll just go to the ones that he knows that he ... so he knows in his own mind I can do this one, that one's probably ... that one's a bit difficult for me, you know that one's too challenging and he will just self-select the ones that he feels ...

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M5: The ones that work best are just the ones that sort of are easiest in terms of just instinctive using, so she doesn't, you know I don't have to read instructions for her. She pretty quickly picks up what you have to do and what the aim of it is. Um, but she also, she quite likes ... some of the games that she does are really very easy and I think she also quite likes you know not necessarily being challenged, but doing stuff

that she knows that she's going to get right, so like if it's a pairing game or a jigsaw one, even though she can do some of the harder levels she'll quite often do the basic level just because she knows that she can you know get a quick score or whatever it is or you know get it right quickly.

### **6.3.3. Constitutive readers**

Constitutive readers distance themselves from the text, apply their own subjectivity and interpretation to the narrative and engage in a dynamic process of fusion between a text and the reader's mind (Travis, 1998). There was evidence in all seven interviews that the mothers liked *Our Story* the most, but that this preference was not always shared by their children. Conversely, all mothers recognised that their children very much enjoyed interacting with the LRRH, which they perceived as giving children choice and some possibilities to personalise the story ending.

M2: Oh yeah, I really liked *Our Story*, but he was just not going to engage with making a story, which is a shame. Um, I think that's great if they can be authors of their own stories. I think if they can start to kind of give the narrative and take control of that, I think that's good. I think that sets them up well in life in terms of how they have to work and to be able to do that at an early age is great.

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M4: He was making decisions in *Little Red Riding Hood* about which way to go and what to do, so I think that was quite fun for him.

### **6.3.4. Compliant readers**

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Travis describes compliant readers in feminist terms and points out how the dominance of male writers, particularly in the 1970s, positioned women as conventionally submissive, cooperative readers. Similar concerns were expressed by the mothers in relation to both the content and format of some of the story-apps. The content of the Cinderella narrative (and the main premise that a girl's happiness is constituted by marrying a rich prince) and the high interactivity in digital books (and digital media more widely) were perceived negatively and their greatest limitation was described in terms of the children's passive compliance.

M2: Er, I really didn't enjoy Cinderella. Um, I just didn't see the benefit of it, um, and I think [child] got bored of it as well. It was very long and the story just wasn't very captivating for many reasons, um, and it's quite old fashioned I think, kind of definitely bring it into the 21<sup>st</sup> century with the story choices.

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M3: The television it just sucks her in and she doesn't kind of engage with anything other than watching the television, um, and she doesn't want to talk or whatever with me when the television's on, so I guess the television like engages her very much, but I don't know. [...]so I think definitely with a book there's much more kind of dialogue and probably thinking, critically thinking maybe with the book over the TV. With the iPad I'm less sure, because I've not really seen so much of her using it, apart from when you came over and she was doing those books for the first time. Um, that was just me sort of seeing it ... so I guess there's more scope, because it's much more interactive than the telly, for her to think through things a bit more critically and stuff with the iPad[...].

## 7. Discussion

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This study builds on the proposition that children's reading for pleasure must be agentic, shaped and negotiated by their choices and intrinsic motivation, to make a lasting contribution to learning (Barrs, 2000; Cremin et al., 2009). Omitting this aspect in evaluations of children's engagement with story-apps runs the risk of undervaluing the potential of these new media to motivate children to read for pleasure and delight. Thus far, children's reading of e-books has been subject to theoretical discussions concerning the digital turn in literacy studies (Mills, 2010) and experimental studies examining the impact of multimedia and interactivity on children's cognitive and behavioural development (e.g., Takacs, Swart & Bus, 2015). In an effort to extend scholarly inquiry into interdisciplinary approaches to studying children's reading on and with screens, this study integrated key insights from psychology and socio-cultural approaches to identify distinct affordances of story-apps for children's agency. Following a comprehensive literature review, agency was defined to contain design, behavioural and social dimensions. Data triangulation included home observations of parents using four story-apps with their children, semi-structured interviews with the parents and a theory-driven analysis of the main features of the story-apps. This section clarifies how and why children's agency became foregrounded in the interactions, by drawing on Cremin et al.'s (2009) explanation that agency is a *relational variable* in reading for pleasure.

Agency in reading requires an active negotiation between the reader and the author and in the case of shared reading sessions that involve young children and adults reading with them, agency also needs to be negotiated between the child and the teacher/parent. When it comes to children's story-apps, there are some specific design features that enable or restrict children's agency through the provision of choice and control of the story characteristics. While choices and control afford personalisation, they do not need to be driven by the child

or even the adult to be personalised. Author (2018) describes how AI-enhanced algorithmic reading in the digital age offers spurious choices and illusory control of personalised texts. In this study, children's story apps were investigated in relation to the extent to which they allow children's choice and control in relation to the 5As of personalisation (authorship, autonomy, aesthetics, attachment and authenticity). The open-ended design of the Our Story app offered most opportunities for children to choose and create any story they liked, in any length and in any mode of expression (audio, textual, visual). However, although Our Story scored highest in terms of its agentic potential, its actual use by parents and children led to shorter, adult-dominated and one-off sessions. While the design of the app invited the child's contribution, the app's use was controlled by the participating mothers, who were keen to mediate children's composition. In contrast, children's control of the reading session was evident with the LRRH app, which scored highest on the autonomy dimension. Autonomy was defined as to include options for the child's control and choice of the narrative, such as, for example, the possibility to choose various story endings or skip pages. The participating children leveraged these features to control the story plot, and in doing so, also the pace and length of the individual sessions. The children also requested repeated use of the LRRH app, further demonstrating their intrinsic motivation to engage with this story. It is interesting to note that the LRRH's story plot was structured according to eight possible story endings. The ending was thus not fixed as it was with the Cinderella app and it was also not open-ended as it was the case with the Theatre Play and Our Story apps. The LRRH app offered structured choices that guided but did *not direct* the child's enjoyment of the story. Such a "Goldilocks solution" seemed to have been the most effective way of supporting young children's agency in a shared reading interaction at home. The children demonstrated their agency not only through their physical control of the iPad but also with their navigation of the story: the app



allowed them to skip scenes they didn't like and select from the visual menu their favourite games within individual scenes. This design solution offered children unique options for promoting and acting out their agency. In the interviews, the mothers acknowledged that their children enjoyed the LRRH app the most and spent most time interacting with it. They liked the fact that children were not positioned as passive, compliant, readers but rather could make their own choices with the narrative. As such, the app granted children autonomy that was volitional and not design-dominated. The resulting experience was mutually constituted between the child and the app. It is difficult to determine why the choice of pre-established story endings in LRRH resulted in more agentic behaviour by the child than unrestricted choices by Our Story/Theatre Play. A viable hypothesis is that because agency is relational, it is facilitated by choices provided either by the designer or the adult. LRRH's choices were easy enough to master by the child, foregrounding children's agency and de-emphasising the parents' mediation. The Our Story app's design, on the other hand, invited the mothers' and children's agency, which the mothers leveraged more than the children. Cremin, Mottram, Collins, Powell and Safford (2009) describe effective reading for pleasure pedagogy with teachers' encouragement of children's spontaneous talk about the stories they read and active mediation of their reading journeys. Such reciprocity was enabled with the unconstrained Our Story app but was hindered by the fixed choices provided by the other story-apps. The LRRH provided children with choices that they could manage on their own and enter into a reciprocal relationship with the narrative, *within a shared session* with their parents.

Based on his own observations of children's engagement in reading, Pennac (1994) described "readers' rights" conducive to children's intrinsic motivation to read, such as the right to read anywhere and anytime, but also specific behaviours such as the right to skip pages, the right not to finish a book, the right to re-read, the right to read at any pace and in any sequence. All

these rights were supported through the design of the LRRH app and based on the empirical findings, they significantly contributed to the behavioural and theoretical indicators of children's agency.

For some mothers this was the first time that they used an iPad with their child to read interactive stories and they offered rich insights into their conceptions of children's agency with new media. According to the mothers' perspectives on social agency, e-books should position children as competent, resistant and constructive readers, but not compliant readers. It was clear from the interviews that for mothers' perceptions and understanding of their children's agency, both content (e.g., depiction of female characters in Cinderella) and format (e.g., possibility to choose and edit in Our Story) were important. This finding indicates that readers' identities are related to the content *and* format of children's story-apps. In other words, children's agency with story-apps needs to be considered in relation to the narrative *and* the narrative's representation as both elements provide distinct opportunities for children's reading for pleasure. Together with the detailed description of specific design elements that correspond to children's choices and control of narrative in story-apps (e.g., choice of story endings, visual and audio representations of the storyline, icon-based navigation), these insights significantly advance our understanding of the choices children have when engaging with e-books.

### **7.1. Future directions**

#### **7.1.1. Research implications**

Overall, this study contributed a differentiated view on how contemporary design of story-apps positions young children's agency and more broadly, offered a nuanced approach to the

nascent line of interdisciplinary and multimethod research on children's reading on screen. Future research could use the behavioural/social/design conceptualisation of agency and the analytical techniques outlined in this study as a basis to empirically explore other facets of children's engagement with story-apps and perhaps digital media more broadly. If we consider the possibilities for children's autonomy with the Little Red Riding Hood, we can think of parallels with the printed book Choose Your Own Adventure books by R.A. Montgomery or the digital MetaWars Blood Nexus™ interactive e-book, which also afford children a choice of story endings. However, while the Montgomery book is limited to a set of options that can be exhausted relatively quickly, the MetaWars Blood Nexus story unfolds in almost limitless ways. The specific facets of children's agency and the design features that were explored in the present analyses could be thus adopted for other narrative contexts, such as personalised printed/physical books or video games.

### **7.1.2. Study limitations**

The within-subject design allowed the researchers to infer the relative importance of specific features of selected story-apps in a small sample restricted by the children's age range, geographical location and parent's gender. Comparisons across the child-parent dyads need to be interpreted with attention paid not only to the individual books, but also individual differences among the children and their parents. Future research could examine the extent to which child characteristics, such as their age, gender or reported reading interests, affect children's agency when reading digital books in diverse learning environments and with various family members. For future studies with older children, who are likely to be more verbally engaged with e-books, it might be helpful to consider children's linguistic engagement during the interaction and how children's and parents' comments during book

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reading relate to the agency parameters established with high school students (Reeve, 2013) and adult readers (Ivey & Johnston, 2015).

In conclusion, agency warrants a comprehensive investigation as a design, behavioural and social dimension having an impact on children's motivation to read for pleasure and engage with digital technologies. The comparative qualitative case studies presented here contribute theoretical, empirical and methodological insights into what story-apps might afford for children's agency. The knowledge gained from this work can usefully inform subsequent research into children's agency in reading for pleasure and children's engagement with e-books and apps.

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