CHAPTER 7

What Type of Narrative do Children Prefer in Active Video Games? An Exploratory Study of Cognitive and Emotional Responses

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INTRODUCTION

Childhood obesity is an international epidemic (Ogden, Carroll, Kit, & Flegal, 2014), which increases the risk of several cancers (National Cancer Institute, 2004); shortens lifespan; impedes functional ability; diminishes quality of life (Danaei et al., 2009); and tracks into adulthood (Freedman, Khan, Dietz, Srinivasan, & Berenson, 2001). Physical activity (PA) is critical in preventing childhood obesity and lowering the risk of certain cancers (Andersen et al., 2006; Estabrooks, Fisher, & Hayman, 2008). Unfortunately, increasing PA can be challenging and we have to consider tools that would aid us in increasing PA from adolescence to adulthood. To this end, some of the most promising digital tools for increasing PA, are active video games (AVGs).

AVGs provide an innovative method, which offers promise of increasing PA and enhancing health outcomes (Bailey & McInnis, 2011; Biddiss & Irwin, 2010; Foley & Maddison, 2010; Graf, Pratt, Hester, & Short, 2009). As of 2009, a typical US child lived in a home with an average of 3.8 televisions and 2.3 video game consoles (Kaiser Family Foundation, 2010). Some 87% of children aged 8-18 had a video game console at home and 50% had one in their bedroom (Kaiser Family Foundation, 2010). As of

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2013, all major game console manufacturers offered products that could be used for exercise (Greenwald, 2013). Compared with traditional media, AVGs provide an innovative venue for childhood obesity prevention (Lu, Kharrazi, Gharghabi, & Thompson, 2013; Thompson, 2014b).

While AVGs could prevent childhood obesity, a child's motivation to play an AVG decreases quickly (Chin, Jacobs, Vaessen, Titze, & van Mechelen, 2008; Graves, Ridgers, Atkinson, & Stratton, 2010; Madsen, Yen, Wlasiuk, Newman, & Lustig, 2007). Motivation is crucial to being physically active (Epstein & Roemmich, 2001), but evidence is lacking as to the long-term effectiveness of traditional PA interventions (Brown & Summerbell, 2009; Shaya, Flores, Gbarayor, & Wang, 2008). Innovative approaches are needed to enhance and sustain a child's motivation to play AVGs energetically (Epstein, 1998; Ryan & Deci, 2000). Narratives possess unique motivational properties that may encourage long-term AVG play (Lu, Baranowski, Thompson, & Buday, 2012).

Narratives, or stories, are among the oldest, but still most pervasive, forms of communication (Fisher, 1985). A narrative provides information about characters and plot that promote immersion (Lu, Thompson, Baranowski, Buday, & Baranowski, 2012). Although there has been a recent surge in the exploration of narratives in health communication (Baranowski, Buday, Thompson, & Baranowski, 2008; Green, 2006; Moyer-Gusé & Nabi, 2010), few studies have taken children's narrative preferences into consideration, or explored the responses to narratives in video games. Children's perspectives deserve scholarly attention because they offer first-hand insight from the population of interest (Buckingham, 2013). This project presents formative research addressing this key gap in the literature.

THEORETICAL PERSPECTIVES AND CONCEPTS

Narratives

A narrative refers to "any cohesive and coherent story with an identifiable beginning, middle, and end" (Hinyard & Kreuter, 2007, p. 778). Narrative is one of the most distinctive human characteristics (Lyotard, 1984), and the ability to enjoy narrative is universal (Cosmides & Tooby, 2000; Pinker, 1997).

Characters and plots are the main components of a narrative. A character is a crucial structural property (Jacobs, 2002) and provides a narrative's driving force (Surmelian, 1969), serving as an "internal" source of information or beliefs (Green & Brock, 2000). The plot ("narrative discourse") is the way

in which the story is conveyed. Plots can be described as the basis for all fiction (Horning, 2010) and play a pivotal role in story delivery by organizing events into a logically unfolding developments (Brown, 1987) or temporal order (Labov, 1972).

Narratives can have a significant impact on cognition, affect, and health behavior through *transportation* (Green & Brock, 2000), also called *immersion* (Lu, Thompson, et al., 2012), a unique quality that enables the suspension of dis/belief (Green, Garst, & Brock, 2004), instills vivid personal experiences (Epstein, 1998) and creates a deep affection for a story's characters (Oatley, 2002). Health communicators are increasingly turning to narrative as a persuasion tool (Kim, Bigman, Leader, Lerman, & Cappella, 2012).

Narratives and Active Video Games

Both narratives and video games share the immersive quality that attracts an audience member's engagement. A 2008 review showed that many health games have attempted to merge the immersive properties of story and fantasy with behavior-change technology (Baranowski et al., 2008). While narrative immersion seems directly applicable to the AVG gaming experience, systematic empirical research in this area has been scarce (Lu, Baranowski, et al., 2012). Game researchers debate the feasibility of narrative integration into video games: some believe that games and narratives do not work together, while others argue that both entities share many similarities and are essentially the same (Juul, 2001; Schell, 2005). Media researchers tend to focus primarily on the contribution of video games to violence (Anderson, Gentile, & Buckley, 2007), but few empirical theories have been developed in game studies, let alone in AVG research. A recent systematic review on games used for childhood obesity prevention found that less than 10% of the games studied included narratives (Lu et al., 2013).

The addition of a narrative to an AVG could foster intrinsic motivation to play the game by reducing cognitive load and hence lead to: more active engagement in metacognitive regulation (Pillay, 2002); engendering diverse emotional arousal and a sense of presence, as assessed by skin conductance and heart rate; eliciting character identification through various narrative elements (Hefner, Klimmt, & Vorderer, 2007); absorbing players in an immersive fictional world (McLellan, 1993); and promoting perceptions of PA as necessary and fun (Laurillard, 1998). Narrative elements, such as action, character, conflict, and genre could also encourage players in their role as in-game actors to enhance and maintain learning (Bielenberg & Carpenter-Smith, 1997).

Adding narratives to an AVG is an important area not yet thoroughly investigated by game developers and health researchers. This project aims to conduct research to address this gap.

Children's Engagement with Narratives

Most research on children's narrative engagement has come from education and psychology, and has focused on printed materials (Thorndike, 1941). Older children were studied more often than younger children, due to a lack of valid and reliable assessment instruments for younger ages (Zimet, 1966). In a study by Clark and Rumbold (2006), only 5% of pupils reported not reading fiction (Clark & Rumbold, 2006). Children preferred fantasy, magic, scary, sorcery, school, romance, and true story genres (Hopper, 2005), and most reported fiction was easier and more fun to read than other text types (Moyer, 2007). Most children's fiction narrative follows a linear path, with events happening in chronological order (Horning, 2010).

Narrative engagement can be conceptualized as both cognitive and emotional stimulation (Djikic, Oatley, Zoeterman, & Peterson, 2009). Fiction provides varying degrees of challenges by demanding high-level reading skills, intertextual references, and allowing complex engagement with the story (Hopper, 2005). Narratives also offer affective stimulation (Oatley, 1999), e.g., exposure to narrative fiction correlates positively with empathic ability and social support, while exposure to non-fiction is associated with loneliness and lack of social support (Mar, Oatley, & Peterson, 2009). Children's identification with characters is a primary catalyst for their response to narratives (Heilman, 2003).

Narratives, thus, pervade the media landscape and have the potential to instigate significant changes. Compared with other types of media, well-crafted narratives integrated into fun, AVGs may be an important means of reaching out and engaging audiences, especially children. This study explores the possibilities in a childhood obesity prevention context. This study is among the first to address this important topic and therefore, has the potential to provide critical insights into future AVG game design.

METHOD

Project Description

This study is the first stage of a larger project funded by the National Cancer Institute at the National Institutes of Health (NIH), to systematically explore the effect of narratives on children's motivation to play AVGs. It proposes

the creation of professionally-made animated narrative video clips (i.e., brief, animated clips that convey information about the story arc) to accompany an existing AVG. Four video clips of comparable duration were created for an AVG that was endorsed by the American Heart Association (AHA) for stimulating moderate to vigorous PA: Nintendo's *Swordplay: Showdown* in *Wii Sports Resort* (Schectman, 2010). To ensure an appropriate video clip, our study targeted 8-11 year olds. We performed cognitive interviews with 20 children to gauge their interests and preferences (Borgers, de Leeuw, & Hox, 2000; Willis, 2005). The 8-11 age group was targeted because children younger than 8 have cognitive limitations with respect to responding to survey questionnaires (Borgers, de Leeuw, & Hox, 2000) and children older than 11 have entered early adolescence and are subject to many physical, mental, emotional, and social changes (Centers for Disease Control and Prevention, 2010).

Participants

A total of 20 participants aged 8-11 were recruited from three participating elementary schools in a large, diverse, public school district in Midwest United States. The majority of students came from low-income families. The research team anticipated 20 would be adequate to achieve theoretical saturation (i.e., the point at which no new information is attained) (Kreuger & Casey, 2009).

The targeted, in this study, population reported positive experiences playing AVGs, being familiar with *Wii* games, and playing games or AVG more than their friends. Around half had not played *Wii Sports Resort* before, while the other half had played it. All of the children received a souvenir for their participation in the screening process. Table 7.1 presents their demographic information in greater detail.

Narrative Video Clip Preparation

Four narrative plots were developed to presage the selected *Swordplay: Showdown* AVG. *Swordplay: Showdown* requires players to wave a *Wiimote* controller as a sword to knock out enemies coming at them in different environmental settings (e.g., bridge, mountain, ruins, etc.). Since the essential movement was to wield a sword, "sword fighting" became the theme for the four narratives. Fantasy was selected as a common genre for all four stories (Hopper, 2005). Each story featured a different fantastical theme believed to be appealing to children (i.e., adventure, fable, mystery, and comedy) and presented events chronologically (Horning, 2010). All of

Table 7.1 Children's demographic information ($n = 20$)

Characteristic		Count	Percentage (%)
Gender	Female	6	30
	Male	14	70
Race	African-American	9	45
	Caucasian-American	9	45
	Hispanic-American	1	5
	Biracial	1	5
Age		$M = 9.5$ (Range: 8.3-11.2)	
Weight status[a]	Healthy weight (20-74 BMI%)	7	35
	Overweight (86-94 BMI%)	6	30
	Obese (95-98 BMI%)	6	30
Wii Sports Resort experience[a]	Never played it before	9	45
	Played it before	9	45
	Not sure	1	5
Video-game experience[a]	How much have you played Wii games?	$M = 5.3$ (1: Little or no; 7: A lot)	
	How familiar are you with Wii games?	$M = 6$ (1: Not; 7: Very)	
	Compared to your friends, how much have you played Wii games?	$M = 5$ (1: Much less; 7: Much more)	

[a]All except one went through a screening process that measured height, weight, and AVG experience (the one was not at school when the screening took place).

the narratives were created with the goal of encouraging the player to play the game harder and longer. Each video clip lasted between 1.2 and 1.8 min (M=1.5), serving as a "teaser" of the whole story. All featured the same voiceover, recorded from text-to-speech engine. All stories ended with a cliffhanger and dissolved into a "To be continued …" screen, suggesting future narrative development.

In the *Swordplay: Showdown* game, all non-player game characters (NPC) are rendered as stick figures, as is the player's avatar. However, the player avatar is not shown directly. Instead, the player is represented in the AVG as a semi-transparent stick figure whose back faces the screen. This provided the study's animators freedom in creating a generic Wii protagonist character without the need for race or gender identification (Lu, Thompson, et al., 2012) to integrate with gameplay.

One narrative was entitled, *The Legend of Yu*, an *adventure* story about the player character as heir to a magic kingdom who is kidnapped when only 3 weeks old by an evil assistant to the royal family. The assistant switches

his own child for the player, hoping the King and Queen would never find out. In the story, kindly pig farmers who raise the player far from the capital find the player. Growing up, the player becomes an expert swordsperson, and is soon known throughout the land. One day, a note from the palace arrives inviting the player to the castle to become the (fake) royal heir's playmate. The player's journey back to the castle begins a quest to regain the royal birthright. The journey promises to be difficult. The evil assistant is determined to prevent the player's return, unleashing an army of sword-wielding stickmen.

The Stones of Eitan is a *fable* about two legendary magical stones said to be the source of all knowledge when held together. The land is harshly ruled by evil ninjas. In the story, the player character is a wandering swordsperson who stumbles upon the stones in a river. The player puts the stones together and begins to learn how to stop the evil ninjas—but alas, the ninjas attack and steal one of the stones. The player's quest to retrieve the missing stone begins. The ninjas do not make it easy. They want the remaining stones.

The Door is a *mystery* about the player trying to go to sleep. It begins in an ordinary bedroom of a modern-day child. A magical door suddenly appears and sucks the player into a strange world filled with stick people carrying swords. The player tries to befriend a passing stickman, asking him, "Where is the door back to my room?" But the stickman attacks. The player successfully fends him off, as more stickmen attack. The battle is on, stickmen inexplicably attacking as the player searches for the magic door home.

Wuhu Boo-hoo is a *comedy* that opens in an airplane flying over Wuhu Island. The player is one of two passengers in the plane and wears a parachute. The other passenger announces the plane is over the drop zone and opens the door. As the player is about to jump out, the passenger casually mentions that sword-wielding stickmen have killed everyone on the island—and wishes the player good luck. The player sits down and refuses to jump. The passenger then says there was a billion dollar reward for whoever can save the island. The player thinks for a moment, and jumps.

To avoid order effect, the four video clips were played to each child randomly. After children finished viewing all of the video clips and completed the cognitive interviews, they were given four photo cards showing the title and content of each story to rank clips from most favorite to least favorite, by arranging them on a table. Research assistants documented their order of

choice (1 = Most Favorite to 4 = Least Favorite), which was later entered into a computer database.

Cognitive Interview

A second session was scheduled 1 month after the screenings. Each of the 20 children was shown the four narrative video clips and were individually cognitively interviewed in each participating school's classroom, by trained research assistants (Willis, 2005). Each interview was conducted using a standardized script consisting of open-ended questions developed by the researchers (Table 7.2). Probes were used to expand and clarify responses. Children watched the four video clips playing on a laptop and answered questions after watching each clip. Sessions lasted between 27 and 49 min. Trained research assistants audio-recorded each session and took notes as they interviewed each child. Each child received a $10 gift card at the end of the session.

Cognitive Interview Coding

All cognitive interview sessions were audio-recorded and transcribed verbatim by a professional transcription service. The transcripts were reviewed for accuracy and later sent to an independent company for thematic coding using NVivo 10. The company was established in 1996 and is one of the first independent research companies utilizing qualitative software. To ensure the neutrality of the analysis, neither the transcription service nor the qualitative company were aware of the research question or relevant literature.

The independent company conducted the thematic coding as follows: in accordance with the cognitive interview questions for each story (the same six questions were asked for each video clip, see Table 7.2 for details), six node titles were created for each story with abbreviated titles to mirror the script. The interview scripts from 20 children in regard to the four stories were broken into a total of 80 mini-interviews (20 interviews per each

Table 7.2 Cognitive interview questions

1.	Could you tell me about the story you just saw? How would you describe the story to a friend?
2.	What, if anything, do you like about the story?
3.	What, if anything, do you not like about the story?
4.	Is there anything we should add or change?
5.	What do you think happens next?
6.	How do you think the story will end?

story). The 80 mini-interviews were imported and coded using NVivo 10. Each set of story documents was coded to the six node titles. Additional subcategories for each node were created and coding was refined within the questions, resulting in a total of 191 subcategories for the 80 documents.

RESULTS

The cognitive interviews provided rich and insightful comments, identifying key characteristics of stories, such as characters and actions, plot or storyline, setting, stages, player levels, and ending. They also included comments regarding graphics, sound, and emotional responses. All children answered all questions.

Video Clip Preference

Distribution of participants and average rank score were calculated for each narrative (Table 7.3). A lower score indicates higher preference. Although closely clustered, *The Door* received a higher preference score (2.3) than *The Stones of Eitan* (2.4), *Wuhu Boo-hoo* (2.5), or *The Legend of Yu* (2.8). *The Stones of Eitan* received fewer positive qualitative responses than *The Door* (about one-third of the children said that they liked everything about *The Door*, while not as many said the same thing for *The Stones of Eitan*). *Wuhu Boo-hoo* received divided opinion: 40% of the children liked it the most, while 35% liked it the least. Interview transcripts indicated children's response to the question, "What, if anything, do you not like about the story?" was shortest for *The Door* compared with the other three. Therefore, *The Door* was chosen for the next stage of the research project.

Responses toward the Favorite Narrative, The Door

Children seemed to understand the plot, liked the story in general, and were able to recount it in detail. The narrative triggered different affective responses as it unfolded. Children had the impression that the story was vivid

Table 7.3 Children's narrative video clip preferences

Title	1 (Most favorite)	2	3	4 (Least favorite)	Average
The Door	4	9	4	3	2.3
The Stones of Eitan	5	6	5	4	2.4
Wuhu Boo-hoo	8	1	4	7	2.5
The Legend of Yu	3	4	7	6	2.8

and real, and that it could happen in real life. They also mentioned the video clip matched the visual style of the original game:

> *I just saw this new trailer on TV. It's like this game on the Wii …*
>
> ***(African-American boy, 10 years old, normal weight)***

Children's responses to questions concerning what they liked about the narrative centered on three themes: action, character, and the vividness of the fantasy element. *Action* was a theme many mentioned as their favorite part of the story. Most liked the actions of the narrative protagonist fighting against opponents. Interestingly, although the animators aimed for a gender- and race-neutral look for the protagonist, almost all children referred to the protagonist as a "he". (Perhaps this had something to do with the male voiceover.)

> *I liked how when he yells when he was fighting. I liked those parts.*
>
> ***(African-American boy, 10 years old, normal weight)***

The game's *protagonist* was another popular theme many children commented on. The "one versus many" setup was appreciated:

> *I like how it's like you have to fight all these people and there's just yourself going against them.*
>
> ***(African-American boy, 11 years old, obese)***

Children tended to have a positive evaluation of the main character. For example, one liked that the character was able to acquire sword fighting skills quickly:

> *The thing that stuck out most was that he didn't know how to sword fight, but he just found the sword and he started fighting and he was beating all of them and he kept on fighting.*
>
> ***(African-American boy, 10 years old, obese)***

Children also applauded the protagonist's perseverance:

> *I like the story because he kept on fighting and fighting … That he never gave up.*
>
> ***(Biracial boy, 8 years old, overweight)***

Children responded positively to the *fantasy* setting of *The Door* and how vividly it was presented:

> *I like the door that is surreal … I hope it would be real … Like in a … movie. That dreams are so powerful they come true.*
>
> ***(Hispanic-American boy, 9 years old, normal weight)***

When children were asked what they did not like about the narrative video clip, their feedback primarily focused on the affective response to the protagonist and the opponents. To create tension, stickmen launched an

unprovoked attack on the player/protagonist immediately after trying to make friends. The story encouraged players to wonder why and to try to solve the mystery in a later part of the story. Children, however, did not seem to like this. On one hand, they were concerned about the health and wellbeing of the protagonist:

> *I didn't like that part because maybe the kid got hurt or he got killed.*
>
> ***(Caucasian girl, 11 years old, obese)***

Other children disliked that the protagonist was unexpectedly attacked by the stickmen:

> *It didn't really make a lot of sense when they just randomly attacked because I would wanna know why they attack.*
>
> ***(Caucasian boy, 10 years old, overweight)***

They wanted to know the reason behind the stickmen's attacking behaviors:

> *(I wonder) why he has to fight his way, like somebody has to tell him.*
>
> ***(African-American boy, 11 years old, obese)***

As a result, when asked if they would like to suggest any change to the narrative video clip, the main response focused on providing the reasons for the unexpected actions of the stickmen:

> *I think there should be a way. Why he has to fight his way, like somebody has to tell him … There should be an AI (artificial intelligent character) next to him … then the AI tells him what it's about.*
>
> ***(African-American boy, 11 years old, obese)***

Children suggested an alternative to gain allies for the protagonist:

> *He might meet a companion.*
>
> ***(African-American boy, 10 years old, overweight)***

When asked how the story should develop and how it should end, most children said ongoing fighting would be the natural progression of story development.

> *(He will) keep on fighting them, and they'll keep on coming.*
>
> ***(Caucasian boy, 8 years old, normal weight)***

Some children would like to bring the suggested new ally/companion into the next stage of fighting, even with romantic context:

> *(H)e thought she (the companion) had good skills. And they're (opponents) boys and said, 'Hey, you trying to take my girl?' And he said, 'That's not your girl. That's my girl.'*
>
> ***(African-American boy, no age or weight info)***

As for the ending of the story, most children suggested a happy ending. Almost all children felt the protagonist would find the door to get back home:

> *(Y)ou're searching to find a part to the door. Like there are parts of the doorframe, and parts of the doorknob, and then you also need to find a key.*
>
> ***(Caucasian boy, 11 years old, normal weight)***

Several children added a more complicated narrative layer to the story, making it a dream:

> *He'll just come back and it's like a dream type of thing.*
>
> ***(Caucasian boy, 10 years old, overweight)***

A few children also suggested a sad alternative, in which the protagonist was killed:

> *That he ends up getting killed.*
>
> ***(African-American boy, 8 years old, obese)***

Other children mentioned recognition as another element of the story progression:

> *He survived and he got crowned for it (by) a magical person who is in charge of the stages.*
>
> ***(African-American girl, 10 years old, overweight)***

Response toward the Remaining Narratives

The interview transcripts of the other three stories were examined with special attention to why the children did not find the stories appealing, and a pattern emerged. The main issue was about the protagonist's motivation and subsequent inconsistency with game's PA requirement, swordplay. In other words, the protagonist's motivation was not well presented or justified enough to get players interested playing a game about sword fighting.

For *The Legend of Yu*, children had questions regarding why the royal family's assistant switched the protagonist.

> *I mean, it didn't make a lot of sense to me when he switched his baby … from the other baby … so it didn't make a lot of sense to me there.*
>
> ***(Caucasian boy, 10 years old, overweight)***

Part of the reason might be the antagonist of the story, the assistant, was not given a clear justification to be the bad person.

> *I don't like that he was really a bad guy … because he was really a good guy.*
>
> ***(Hispanic American boy, 9 years old, normal weight)***

Similarly, children questioned the motivation of the ninjas who ruled the world and stole the stone from the protagonist in *The Stones of Eitan*.

> *I don't know why (they) just came and attacked them and took the stone away from them.*
>
> ***(Caucasian girl, 11 years old, obese)***

Such criticism was especially prominent in *Wuhu Boo-hoo*, in which the protagonist was lured purely by money to save the island.

> *(What) I really didn't like is when he said there will be a cash prize and just jump out of the airplane …*
>
> ***(African-American girl, 8 years old, obese)***

From the interview transcripts, children seemed to understand the four narratives well and preferred the fantasy-mystery genre. Their responses came both from the cognitive and the affective domains. Action was their perceptual theme for the stories. They demonstrated significantly different empathic reactions to the protagonist, as opposed to the antagonist. For example, they were able to perceive several good characteristics from the protagonist as he fought against the opponents. On the other hand, they showed negative reactions toward the attackers or the opponents, partly because the attackers' motives were not clearly illustrated. The animated clips were able to induce player anticipation of fighting to continue and even become elevated in subsequent levels. Players were also expecting a companion to fight alongside the protagonist.

DISCUSSION

Several insights can be drawn from children's responses regarding narratives for AVGs. First and foremost, movement, or action in the story, is a crucial element to realize an AVG's potential health value. Video game writers should take this into consideration when developing the stories. Indeed, a common theme emphasized by all of the children about all of the stories, was that they involved lots of action. Since narratives must be created in accordance with the gameplay requirements, AVG stories should emphasize moderate to vigorous body movement. These findings suggest that to make the players move as much as possible, the AVG should employ narratives and integrate player movement seamlessly with the story. Players' perceptions must be taken into consideration, which highlights the need for more qualitative research in story-based AVGs (Thompson, 2014a).

Second, to ensure a narrative is organically related to physical movement, the motivation of the protagonist's actions must be clear and credible. A common issue the children had was justifying the player's action in each story. This has some similarity to the difference between intrinsic and extrinsic motivation (Ryan & Deci, 2000). Embedding engaging narratives into behavioral change games could promote development of players' intrinsic motivation to play (Lu, Baranowski, et al., 2012), but it must be done carefully. A protagonist should carry out actions (or PA) as a natural progression of story development (e.g., pick up the "sword" to defend his or her character's life), instead of being lured by extrinsic factors (e.g., motivated by money). If character or plot development causes confusion regarding the protagonist's motivation, it becomes difficult for the players to become fully engaged, breaks their immersive experience, and ultimately lessens their motivation to play.

Third, the narrative should keep children's developmental capacities in mind. To create suspense, each video clip deliberately left some background details out, hoping players would be more engaged by discovering details as the narrative progressed. For example, the stickmen's attack on the protagonist in *The Door* was not explained. Similarly, why and how *The Legend of Yu's* evil assistant switched babies, or why the *Stones of Eitan*'s ninjas suddenly appeared, and how Wuhu Island became invaded, were never described. Adult audiences might be able to make the mental bridges as part of their sense-making process, but the extra effort appeared taxing to these children (Bruner & Haste, 2010). At the risk of lowering suspense, brief clips affirming character motivations could be inserted to avoid the assumption that children will discover the future story, which may prevent some children from fully enjoying the narrative and game. It would be important to assess if such insertions prevent those who are cognitively developed enough to understand the story from fully enjoying the story, and to what extent such "mental paving" is needed.

Fourth, it is crucial to create a protagonist character the children like, and with whom they can identify. When a narrative provides appropriate details and depictions of the protagonist's positive qualities, child players should be able to identify with the character faster, be more willing to look up to them, and be more able to carry out actions on behalf of the character (Hoffner, 1996). When players internalize a character's motivation and make it their own, subsequent physical activities may come naturally (Cohen, 2001). Research is needed to test this proposition experimentally and ascertain what character attributes maximally motivate children's PA. Research is also

needed to identify what makes a realistic blend of characteristics or personalities for a likeable character.

Fifth, companionship could be an important design feature for AVG narrative design. Recent studies indicate game players in a cooperative mode are more intrinsically motivated to play (Staiano, Abraham, & Calvert, 2012). Perhaps a good narrative could help translate cooperative play into a game. When multiple characters are introduced and share similar goals, players may be more likely to work together, accomplish common goals, and have a better experience. The game *Journey* (Thatgamecompany, 2012) provides an illustration of companionship during gameplay. The method, by which companionship should be introduced into AVGs so that children do not feel alone, but are engaged in the narrative together, remains to be assessed.

Finally, narrative development should be built into AVG progression as part of a continuum. The story should be interesting enough to get the players started, as well as to continue to play the game, but not be too eager to conclude the narrative by skipping actual physical movement. The challenge is giving players enough information to start, and then keep them engaged and wanting more gameplay at the end of each level, thereby increasing the level of PA as the story progresses. An AVG narrative should naturally lead players to additional cycles of gameplay.

CONCLUSION

Narratives have the potential for behavioral intervention in AVGs, but the key is integrating narrative development. This study is a first step towards the development of a series of systematic inquiries into the behavioral potential of narratives via AVGs for combating childhood obesity and reducing risks of certain types of cancer. Child participants seem eager to participate in such projects and are able to provide meaningful responses. Narratives can enhance AVGs, as long as they align with gameplay, naturally induce intrinsic motivation, accommodate children's developmental capacities, and present personable characters. Future research should provide insight for the design of innovative and effective media products for various health interventions.

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