IJoC | Transmedia Critical

Limitations of Transmedia Storytelling for Children:
A Cognitive Developmental Analysis

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Transmedia storytelling involves unfolding narratives across multiple media platforms, with each text making a distinctive and valuable contribution to the whole. Transmedia narratives for children have several limitations, as they require advanced media-literacy skills and appropriate cognitive, emotional, and moral development. Transmedia consumers are more involved in the story than single-medium consumers, resulting in more engagement, intrinsic motivation, and media enjoyment. Many modern entertainment franchises have been created for cross-generational appeal, with media extensions specifically targeting child audiences. This article discusses children's cognitive limitations and their relevance for transmedia narratives. These limitations are illustrated using an analysis of Disney's *Cars* transmedia franchise.

Keywords: transmedia storytelling, transmedia franchises, children's media, developmental psychology, media psychology, case study

Introduction

Digital technology is currently reshaping the landscape of children's media more profoundly than ever before. Young children are exposed to media content on various platforms and channels, and they are often literate in a broad range of media technologies before entering school (Singer & Singer, 2011). Media producers are aware of this potential and have implemented concepts from transmedia storytelling for preschool- and schoolchildren (e.g., *Bob the Builder, Sesame Street,* and *Pokémon*). In transmedia storytelling, a story unfolds across multiple media platforms, with each text making a distinctive and valuable contribution to the whole (Jenkins, 2006). Transmedia users are more involved in the story than

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single-medium consumers, resulting in more engagement, intrinsic motivation, and media enjoyment (Dena, 2009). Many modern media franchises (e.g., *Harry Potter, Star Wars*) have been created to appeal across generations by using different media extensions and content to reach different target audiences, including younger children. Transmedia formats for children may even enrich educational concepts such as game-based learning (e.g., Gee, 2003) or experiential learning (Kolb, 1984). High engagement and media enjoyment result in children's more elaboratively processing information and thus encourage self-regulated learning (Zimmerman, 2000). Despite this potential, transmedia content also present limitations for child audiences: Its complex narrative structure cannot simply be adapted to be suitable for children. From the perspective of developmental psychology, younger children in particular lack adults' ability to use, understand, and participate in transmedia franchises. Their cognitive development limits the narrative content and the complexity of stories they can understand (Nieding & Ohler, 2012). Thus, content producers have to consider children's information-processing capabilities, memory capacities, and attention spans of children in addition to children's language proficiency and knowledge of narrative and media conventions. If producers' content exceeds these limitations, children's comprehension is compromised.

This article focuses on these cognitive limitations and discusses which narrative transmedia strategies can be implemented for children of various ages. The article first addresses transmedia storytelling and the relevance of current cross-generational transmedia franchises to child audiences. Second, the article discusses children's cognitive development and media use and the cognitive requirements for users of transmedia narratives in general. Finally, the article illustrates these limitations using the example of Disney's *Cars* (Anderson & Lasseter, 2006; Ream & Lasseter, 2011; Rae, Adams, & Lasseter, 2008, 2013), a global transmedia franchise aimed at children and adolescents.

Transmedia Storytelling and Transmedia Franchises

Transmedia storytelling involves coordinated storytelling across multiple media platforms (Jenkins, 2003; Dena, 2009) with "a particular narrative structure that expands through both different languages (verbal, iconic, etc.) and media (cinema, comics, television, video games, etc.)" (Scolari, 2009, p. 587). Transmedia storytelling is not just another term for branding or franchising, as it focuses on expanding the scope and meaning of a narrative.

The stories told in each medium are not redundant and instead construct a transmedia story world (Scolari, 2009; Jenkins, 2009a, 2009b, 2011). In contrast to classic media franchises, which are often based on reproduction and redundancy, transmedia franchises aim to further develop the story world in each new medium (Jenkins, 2011). The addition of new elements in each text as part of the world-building process to foster an understanding of the narrative as a whole is part of an "additive comprehension" (Jenkins, 2011). Each piece is often called a sub- or paratext (Gray, 2010) or a media extension to a primary text, or "the mother ship" (Jenkins, 2011). They include professionally produced and user-generated content. Another contrast to the franchise model is transmedia's portmanteau model, where all pieces of the story are equally vital to the story experience as a whole and are usually planned as a whole before production (Dena, 2011; Pratten, 2010). Whereas classic media franchises are based on licensing content to third parties (who cannot change or add anything beyond the primary text),

transmedia franchises encourage co-creation and collaboration. However, coordinating a consistent canonic story world is a huge challenge for producers.

Dinehart (2008) understands transmedia recipients as viewers/users/players (VUPs) who each interpret the narrative uniquely because of their respective natural cognitive and psychological abilities. However, not all consumers are interested in transmedia narratives: Participating in transmedia storytelling requires an investment of resources (e.g., time, money) to piece the puzzle together. Evans (2011) argues that audiences do not uniformly welcome these new modes of reception—they have to consider possible benefits for their individual media enjoyment preferences, e.g., participating with others or solving puzzles.

Jenkins (2006) mentions the use of attractors (elements that draw an audience together) and activators (elements that give the audience something to do) to engage an audience. Multiple components of transmedia narrative strategies have been proposed to fulfill these roles. Scolari (2009) identifies the four following components concentrated on stories:

- interstitial microstories to fill gaps between periodic installments of content, e.g., television episodes,
- parallel stories,
- peripheral stories that can transform into spin-offs, and
- user-generated content platforms to allow VUPs to enrich the fictional world (e.g., with fan fiction).

Furthermore, Jenkins (2009a, 2009b, 2011) suggests seven general principles of good transmedia storytelling: (a) spreadability and drillability, (b) immersion and extractability, (c) world building, (d) continuity and multiplicity, (e) seriality, (f) subjectivity, and (g) performance or interaction.

These components provide a basic framework for analyzing transmedia storytelling, and we will apply them to our analysis of the *Cars* franchise.

Children and New Media

Today's children and youth are surrounded by a variety of media content that didn't exist a generation before: Rideout, Foehr, and Roberts (2010) found that children between 8 and 18 years of age spend the most time with media daily (7.5 hours per day on average) and consequently characterized today's children and youth as *Generation M*.

Transmedia consumers require advanced media-literacy and multiliteracy skills (Scolari, 2009) to interpret and process narrative information from multiple media systems and platforms. Depending on their developmental stages, children often lack these skills and can therefore not understand or participate in transmedia experiences like adults can. Nevertheless, more and more children's franchises transform into transmedia franchises. Traditionally, each encounter with a narrative was self-contained. Now, even *Bob the Builder* and *Sesame Street* introduce children to characters and stories extended on websites and

in mobile apps with animated sometimes interactive picture stories and in computer games and toys (e.g., Hit Entertainment, 2008). Although each extension can be enjoyed separately, they often are designed to be used in combination, thus following a transmedia-franchise approach.

Through such extensions, transmedia franchises allow for multiple entry points into the narrative. Even before they can begin to understand a central narrative, toddlers can experience the narrative through the depiction of characters (e.g., on clothes, linens, and baby toys). Often, parents provide entry points based on their personal preferences (e.g., an affinity for Winnie the Pooh) by buying baby blankets or stuffed animals within those franchises. When children are socialized with characters at an early age, they will later recognize those characters in other media and probably show interest in their stories. Media producers have used this marketing strategy for decades (Jacobson & Mazur, 1995).

Current surveys show a clear trend that in general, computers have replaced television as a primary medium, especially for older children and adolescents. In one such survey, Rideout, Foehr, and Roberts (2010) show that American children and teenagers between 8 and 18 years old use computers three times more often and video games 2 times more often than they did 10 years before. Additionally, children now often possess their own mobile devices (e.g., smartphones, music players, tablet computers) and use the Internet to watch videos and television (on average, 24 minutes per day). European studies show the same trend. Feierabend, Karg, and Rathgeb (2012) show that the preference for television in early childhood (6–7 years) transfers to computers in preteen years (12–13 years). Between one and two thirds of younger children (3–4 years) use Internet products, especially videos, games, and apps (Holloway, Green, & Livingstone, 2013). There is already a diverse catalogue of media available specifically tailored to the youngest of these three age groups (CHILDWISE, 2012).

Children between 2 and 3 years of age like to watch video clips and can comprehend simple narratives. A study on video comprehensibility and attention in toddlers from Pempek et al. (2010) shows that infants younger than 2 years can hardly distinguish between coherent narratives in videos and random video sequences yet.

Recent research on children's relationship with new media can also be applied to transmedia content. The rising use of online media helps children to develop digital literacy; it supports the appropriation of knowledge and skills, playful encounters, and social interaction; and it promotes creativity, self-expression, and identity making (Holloway, Green, & Livingstone, 2013). It also positively affects achievement at school (Cavanaugh, Gillan, Kromrey, Hess, & Blomeyer, 2004).

Herr-Stephenson, Alper, Reilly, and Jenkins (2013) documented transmedia learning for children aged 5 to 12 years and argue that transmedia experiences can be designed for learning and "provide fertile grounds for children to explore, experiment, and often contribute as the story unfolds across media" (p. 1). Focusing on transmedia play, an experience that includes media without storylines (e.g., open-ended videogames), these authors argue that transmedia productions challenge children to use textual, visual, and media literacy skills to decode and remix media elements, combining and rearranging them, and to learn media conventions.

The entertainment patterns of children are a "play with information" (Jenkins, 2006, p. 134)—when using media, children have different needs, intentions, and interests than adults. Preschoolers and schoolchildren need mediation from parents, educators, and institutions to learn to structure the large amount of media information available (i.e., cognitive apprenticeship) (Brown, Collins, & Duguid, 1989). Developmentally appropriate media act as a starting point for children to assess media content and help children to compare media experiences with one another. These experiences lie within the *zone of proximal development*, or ZPD (Vygotsky, 1978; Zaretskii, 2009). Vygotsky (1978) defines the ZPD as "the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance" (p. 86). When a task lies within a child's ZPD, appropriate assistance will help the child achieve the task. Through mediation, children have to learn to train their skills of selection, evaluation and classification of media, as well as active participation. These skills can be summed up by the term *media literacy*. Potter characterizes media literacy as a developmental ability to be able to adapt "to our changing world by being skilled at assessing the meaning in any kind of messages, organizing that meaning so that it is useful, and then construction messages to convey that meaning to others" (Potter 2013, p. 15)

Cognitive Development and Media Use

Nobody is born a media user. Through maturation and experiences in childhood, we learn to process content in real and mediated situations. Cognitive development in childhood and adolescence happens in continuous stages. As there are many theoretical approaches to this concept, we will focus on Piaget (1953), Perner (1993), and Potter (2013) to provide a combined approach to our analysis.

Piaget (1953) identifies four stages of cognitive development (see Table 1).

Table 1. Stages of Cognitive Development (Piaget, 1953)

Typical Age Range	Description of Stage	Developmental Phenomena
Birth–2 years	sensorimotor stage	• object permanence • motoric abilities
2–7 years	preoperational stage	• egocentrism • language development • symbolic thinking
7–12 years	concrete operational stage	• overcoming of egocentrism • logical thinking • understanding of numbers, volume, conservation of mass
12 years +	formal operational stage	• abstract thinking and hypothetical thinking • strategy development and advanced planning

In Piaget's (1953) model, infants and toddlers up to 2 years reside in the sensorimotor stage, which is characterized by the increase in motoric and verbal abilities and object permanence. During the preoperational stage (2–7 years), children develop symbolic thinking and a basic understanding of causality, but they lack logical reasoning. They are able to represent ideas with words and images. In the concrete operational stage (7–12 years) children are able to organize objects into series. They have now overcome egocentrism and thereby obtained the ability to analyze situations from different viewpoints. This developmental progress greatly contributes to media understanding because children are now able to include more than one dimension in their analyses or evaluations and to think more rationally about media content and structures than before. In Piaget's formal operational stage, adolescents of 12 years and older integrate many operators into their own thinking. They now are capable of theoretical, hypothetical, and counterfactual thinking. Thus, according to Piaget, their mental structures reach the level of adults, but this still does not mean that adolescents can process media content like adults, as other approaches argue.

Perner's (1993) approach to cognitive development focuses on representational thinking. A representation is an entity that stands in a causal relation to something else (Perner, 1993, p. 18). We unconsciously construct mental representations of our environment. External representations are depictions of mental representations in a medium. For example, a sketch of a car is the external representation of the artist's mental representation of a real car. Representational thinking understands media as a two-step process (with dual representation) of the media producer (DeLoache, 2002). Children have to learn this cognitive ability to interpret media images (see Table 2).

Table 2. Representational Levels (Perner, 1993).

Typical Age Range	Description of Level	Developmental Phenomena
2–18 months	primary representation (single model)	• model includes only environmental information • thinking is in the here and now • pictures are understood as something different from objects
18 months– 4 years	secondary representation (multiple models)	• different models include different information • thinking is in the past, present, and future • pictures are understood as representations of objects
4 years +	metarepresentation (model of a model)	• models include other models • thinking is about one's own and others' representations • more abstract pictures are understood • intentions in pictures are beginning to be understood as possible misrepresentations of the object

In the first stage, children learn from the environment that surrounds them. They classify objects and object relationships to generate concepts (Wellman & Gelman, 2007). These classifications form the basis of their representational thinking and allow differentiation between the real object and its external representation, but children's cognitive thinking is limited to the present (Perner, 1993). It therefore makes little sense to target complex media content to children in this stage because they can process only the colors, shapes, and sounds of the content. The second stage includes an understanding of the meaning of the object's relations, such as intentions, similarities, or abstractions. The use of multiple mental models starts in this stage, in the middle of the second year of life, and is characterized by the beginning of thinking in the past and future and differentiating between the real and pretend (Perner, 1993). When presented with mediated information, children between the ages of 18 and 24 months are able to use their first stable mental representations, which are needed for symbolic play[2] and delayed imitation.[3]

Children at this age understand two-dimensional stimuli such as drawings and photographs (DeLoache, Pierroutsakos, Uttal, Rosengreen, & Gottlieb, 1998; DeLoache, 2002; Pietschmann, 2013) and television pictures (Schmitt & Anderson, 2002). They can also distinguish between fictional narratives and nonfictional content in simple stimuli (Anderson & Pempek, 2005; Kirkorian, Anderson, Evand-Schmidt, & Pempek, 2005) but are limited in their understanding of complex narrative structures, as they only understand superficial features in films.

The last stage (which begins around the age of 4 years) involves thinking in metarepresentations and understanding media authors' intentions, actions, and motives (Perner, 1993). This altered cognitive competence allows children to think about their own points of view and the perspectives of other persons—their *theory of mind*, or ToM (Premack & Woodruff, 1978; Sodian, 2005). At this point children are able to process a wider range of media content than before because they can understand text structures and characters and their motives.

Yet another approach to cognitive development is Potter's (2013) *development of media literacy* model (see Table 3)

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[2] *Symbolic play* is the child's ability to use objects, actions, or ideas to represent other objects, actions, or ideas in play (e.g., to use a wooden block as a toy car).

[3] *Delayed imitation* is the copying of an observed gesture, action, or behavior after a time delay.

Table 3. Development of Media Literacy (Potter, 2013).

Typical Age Range	Description of Stage	Developmental Phenomena
Birth–2 years	Acquiring fundamentals	• learning about objects and persons • recognition of shape, form, size, color, movement, spatial relations • rudimentary concept of time
2–3 years	Language acquisition	• recognition of speech sounds and attachment of meaning to them • reproduction of speech sounds • interest in music and sounds • recognition of certain characters in visual media and ability to follow their movements
3–5 years	Narrative acquisition	• development of an understanding of fiction vs. nonfiction, real vs. make-believe • understanding of the connection of plot elements, including time sequencing, motive-action-consequence
5–9 years	Development of skepticism	• discounting of claims in ads • awareness of like and dislike (characters, shows) • enjoyment of shows and special characters
9 years +	Intensive development	• seeking of information on certain topics • interest in particular topics • high awareness of ability and quick processing
	Experimental exploring (advanced skill)	• seeking of different narratives and forms of content • interest in new emotional, moral, and aesthetic reactions
	Critical appreciation (advanced skill)	• evaluation of messages • detailed understanding of historical, economic, political, artistic context of message systems • ability to compare and contrast message elements simultaneously • construction of summary judgment
	Social responsibility (advanced skill)	• formation of a moral standing that certain messages are more constructive for society • analysis of media landscape • recognition of one's own influence on society

Similar to Piaget and Perner, Potter (2013) conceptualizes the development of media literacy with a stepwise increase of cognitive, emotional, moral, and aesthetic skills from a basic level in the first years to an advanced level in later childhood and adolescence. Potter emphasizes that the development is a fluid process in which some abilities manifest simultaneously.

In Potter's first three stages—*acquiring fundamentals*, *language acquisition*, and *narrative acquisition*—children acquire the basic skills for processing media technology and content. When watching films, 3-year-olds process individual elements such as motion, color, music, and sound effects and are more interested in action than dialogue. They cannot yet process plot structure or the motives of characters (Wartella, 1981). At the age of 4 years, this exploratory mode of watching changes to a searching mode. Children's motives influence their attention, and they are able to concentrate on continuous storylines (Potter, 2013). In the next two stages, the skills children have acquired are trained and developed further. The fluid process of understanding media is based on intensive engagement with content, generation of opinions, and formation of one's own perspective on content. Once they reach the level of *intensive development*, children can process complex media content, but they don't yet have a high awareness of the potential of media influences on people and vice versa. They now have a well-developed understanding of fictional plots and are able to recognize the motives of characters and their influence of the narrative (Potter, 2013).

Advanced skills developed in the *experimental exploring* stage enable adolescents to think more critically about media content and structures. Young people seek out different media forms and content motivated by surprises and new moral, emotional, and aesthetic reactions. In the *critical appreciation* stage, adolescents and adults develop the core ability of critical reflection and the detailed understanding of connections between media, politics, and the economy. In *social responsibility*, they develop an understanding of the constructive process of media, knowledge of the moral influences of media content, and the awareness of their own options for making an impact on society. Some people may remain at the stage of intensive development and never acquire all the advanced skills and.

Each of these theoretical models concentrates on different aspects of cognitive development. Piaget's constructivist model consists of four stages, from birth to 12 years, and focuses on cognitive operations, allowing for generalized conclusions about the development of thinking. It has been criticized for ignoring differences in cognitive development among individuals and does not include the fact that cognitive development may vary from domain to domain (e.g., Bee & Boyd, 2013, p. 171ff). The age ranges can therefore be interpreted as typical but not absolute. Perner's (1993) cognitivist model divides representational thinking into three stages, from birth to 4 years. It concentrates on the ability to understand and interpret media images through representations. Potter's (2013) theory of media literacy divides the development of media literacy into three basic skills for understanding media content on a rudimentary level, two process-oriented skills with extended abilities, and three advanced skills for exploring, thinking critically about, and understanding the constructive process of media.

Each theory contributes to our understanding of which cognitive abilities are available to average children at specific ages (see Figure 1).

Primary Rep.	Secondary Representations	Meta-Representations
• Thinking in here and now • Understanding pictures as objects	• Thinking in past, present, and future • Pictures as representations	• Theory of Mind • Understanding of intention of pictures • Understanding of misrepresentations of objects

Birth 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

	• Use of symbols	• Understanding of narration	• Beginning of skeptical thinking

		• Interest in specific domains • Experimental exploration of narration	• Critical appreciation of art, politics, economics, history • Development of social responsibility and moral standpoints • Understanding of social influences
• Object permanence • Motoric abilities • Use of language for demands	• Egocentrism • Language development • Symbolic thinking • Understanding of causality	• Overcoming of egocentrism • Logical thinking and reflexion • Increased classification skills • Understanding of invariance	• Abstract, hypothetical, and counterfactual thinking • Development of strategies and advanced planning
Sensorimotor Stage	**Preoperational Stage**	**Concrete Operational Stage**	**Formal Operational Stage**

Figure 1. Combined process of cognitive development.

Children acquire important cognitive abilities as their cognitive faculties mature and they have new experiences. The fundamental abilities to process media develop between the ages of 1 and 2 years, the time span in which children become able to comprehend the mediated nature of media, for example, pictures in books and images on screens (Völkel, 2012). Children achieve another milestone in cognitive development at the age of 4 years, when they acquire the cognitive abilities for metarepresentations. At this stage, children can understand other perspectives and thereby understand the motives and intentions of others. A more reflexive processing of media begins when children reach the stage of concrete operations (7–12 years). They are then able to include more operations in their thinking that help them to understand the content and economic factors of media productions more deeply. Once they reach Piaget's level of formal operations (beginning at 12 years) and develop advanced skills of media literacy, they have developed a critical mindset about media and their effects.

Cognitive Requirements of Transmedia Narratives

Theories of cognitive development point to several key requirements when interacting with narrative media in addition to the cognitive requirements for fully comprehending and processing media narratives. Transmedia narratives span multiple media channels, including television series, films, books, video games, and online content. The limitations of technology available to children also limit their participation in transmedia narratives. Computers, smartphones, and tablet PCs may act as additional screens for modern television narratives or as primary media for online narratives and participatory practices (Winslow, 2013). For example, the franchise of *Bob the Builder* provides additional content for children on its website. Although parents can provide access to mobile games and video games through their own devices, it is not reasonable to allow younger children unrestricted or unsupervised access to the Internet and potentially unprotected media content. Therefore, although user-generated content is an integral part of transmedia storytelling (Jenkins, 2009b; Scolari, 2009), children cannot access it as easily as adults. In addition, legal restrictions often require online users to be at least 13 years old to access

message boards or similar community content. As these content and legal restrictions constrain many complex transmedia concepts to audiences of people in their teens and older, transmedia producers must concentrate on other media channels suitable for children and incorporate toys and everyday items. Additionally, many cognitive limitations apply to transmedia narratives targeted at children.

Cognitive-developmental approaches serve as frameworks for understanding how each developmental stage enhances children's abilities to process media narratives, which is essential for understanding all kinds of transmedia stories. However, children under 4 years of age are mostly limited to comprehending simple narratives because they lack metarepresentations and the ability to build multiple mental models (Perner, 1993). They are also not fully able to understand visual perspective (changes in size and form in relation to distance and viewpoint) or to combine visual-spatial information with the ability to understand narratives based on phonological information (Flavell, 1988). Thus, children prefer single, self-contained stories and have a hard time constructing narratives from multiple sources over an extended period of time such as the episodic, evolving narratives described by Jenkins's (2009b) principle of seriality. Transmedia franchises for children therefore cannot make good use of this episodic structure.

In addition to purely cognitive processes, transmedia storytelling is also limited by children's perceptional and motor abilities: Children under the age of 2 years lack the sharp, high-contrast vision needed for concentrated media use (Norcia, Tyler, & Hamer, 1990). At the ages of 6 to 7 years, their hand-eye coordination reaches the level of adults, allowing them to manipulate intricate objects or to play more demanding video games (Collins, 1984).

Attention spans are also important for transmedia narratives. Between the ages of 2 and 3 years, children start watching television purposely. Formal elements (cuts, voices, repetitions, music, etc.) can hold their attention because of attentional inertia (Anderson & Choi, 1987). For children to have an active and productive participative role in media narratives, cognitive abilities such as abstract logic, reasoning, and strategic planning (developed at 12 years and up) are essential. Peripheral, parallel, or alternative stories are key components of transmedia storytelling (Jenkins, 2009a, 2009b; Scolari, 2009), but may prove too complex for preschoolers: While preschoolers can follow a continuous narrative, it is hard for them to take on another person's perspective and experience the same story again—described as the principle of subjectivity (Jenkins, 2009b)—and to integrate stories happening in different time frames. This is true for single-medium narratives and even more for transmedia narratives. Perspective taking requires a stable understanding of the variety of perspectives, theory of mind, and counterfactual thinking, all of which are reliably developed around the age of 11. For younger children, a combination of subplots within a narrative is demanding and may overtax them, depending on the plots' complexity. These younger children also process references to books within a film only on the surface of the text (e.g., by recognizing the reappearance of a character or location). Transmedia storytelling's function of spreading a narrative is not comprehensible for preschoolers, as such an understanding requires advanced media-literacy skills not acquired until early adolescence. Even more complicated for younger children to follow is the retelling of the same story (i.e., the principle of multiplicity). They cannot well integrate variations in the personalities or appearances of characters into their knowledge of a given story world, as they perceive such variations as something completely new, which may even conflict with their prior knowledge of the narrative. Only

with the development of advanced media-literacy skills can they process transmedia storytelling on a global level. Nevertheless, young children can still find parts of the transmedia narrative very enjoyable even if they do not fully comprehend the global narrative.

Transmedia Franchise Analysis: Disney's *Cars*

To show the possibilities and limitations of transmedia franchises for children, we have used Disney's *Cars* as a case study for evaluating narrative strategies and their cognitive requirements. Disney's cross-platform franchising allows it to target multiple market segments, and *Cars* provides a good example of this marketing mix, for instead of just reaching younger children, as Disney's princess movies do, *Cars* appeals to a bigger market. As of February 2014, the *Cars* franchise included two feature films, two television series, short films, five video games, mobile applications, two theme park attractions, and a spin-off film (*Planes*). Because the franchise started with the first feature film and expanded on that, it can be classified under the transmedia franchise model (Dena, 2011). Figure 2 summarizes the narrative transmedia elements of the franchise.
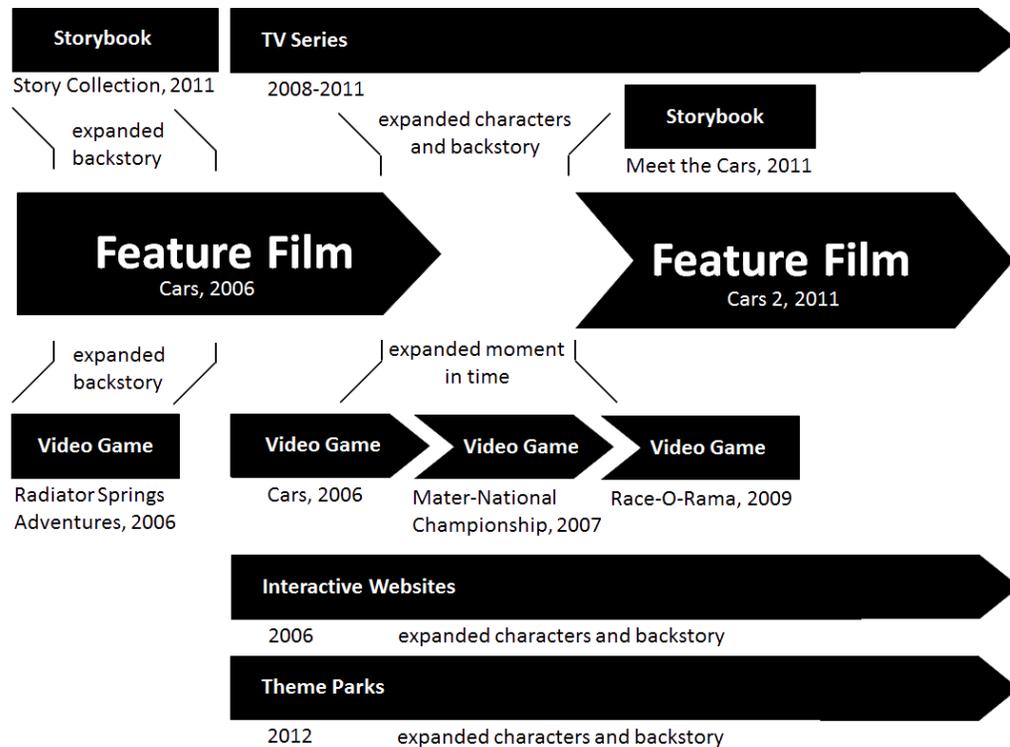
Figure 2. Narrative extensions of the **Cars** *transmedia franchise.*

Main Narrative Elements in *Cars*

The first movie, *Cars* (Anderson & Lasseter, 2006; MPAA rating G), centers on the story about Lightning McQueen, a racecar who gets lost on the way to a famous race and ends up in a small town on Route 66. There, McQueen has to help the locals get to the race.

The story includes many subplots, which provide variety, but their support of the main narrative is not always apparent. Children aged 3 to 5 years can understand the subplots individually, but to connect them to the main narrative requires the logical thinking and narrative-acquisition skills that children develop from ages 5 to 7. The main narrative follows a classic three-act structure of setup, confrontation, and resolution (Field, 2006) that is easy to follow and predict. Children's stories and fairy tales almost exclusively follow this structure. There are few important characters, and all have unique features (e.g., colors, voice, quirks) and relatively one-dimensional personalities to facilitate comprehension. In most subplots, new characters (more than 40) are introduced. Understanding the roles of all the characters in the narrative and their relations to each subplot and to the main plot require multiple receptions. However, this is beneficial from transmedia storytelling and media-literacy acquisition points of view: It is worth watching the film again because there is always something new to notice. But there is a tradeoff between plot comprehension and the possibility to dig deep into the film.

Lightning McQueen, the protagonist, is depicted as focused but also arrogant at the beginning of the movie. He learns to appreciate others during his stay in Radiator Springs and forms friendships that eventually help him in the important race at the end of the film. Instead of winning the race, McQueen helps an injured friend and becomes the likeable hero of the crowd. To understand this character growth, children need perspective-taking and narrative-acquisition skills, usually gained around the age of 7 years.

McQueen is bright red and features racing wheels and lightning-bolt decals, making his appearance memorable for children (see Figure 3). Additionally, he is a great role model. McQueen is the face of *Cars*, which is also why the franchise is mostly associated with him and the color red: The repetition of colors, forms, music, and perspectives across media extensions facilitates familiarity for children.

Figure 3. Lightning McQueen and his best friend, Mater (Disney, 2013).

Another important character is Mater, a tow truck that quickly becomes best friends with McQueen and acts as his sidekick in the franchise (Figure 3). He is depicted as a loyal and supportive but clumsy friend, and he models friendship and moral development. The fact that Mater is a tow truck also underscores his function as a supporting character for the protagonist. Furthermore, it also makes for a great toy car for children. His rusty color, broken headlight, and crooked teeth clearly differentiate Mater's appearance from that of the other cars, and when combined with his unique personality, the character is easy identifiable.

The *Cars* characters are well suited for children and are easily recognizable by shape and color alone (Figure 4). They also feature individually recognizable patterns of nonverbal behavior, conveying emotional states and moods very well.
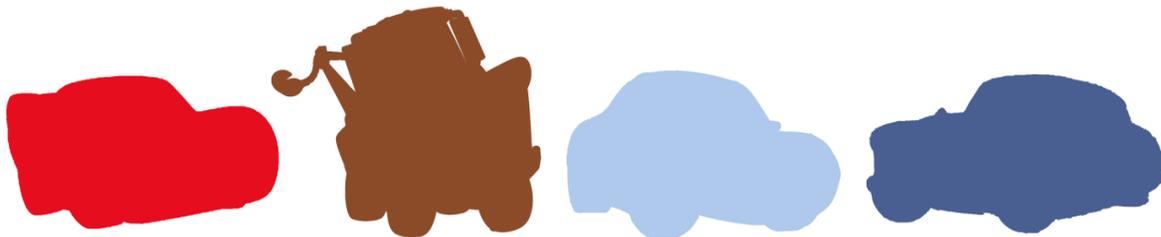
Figure 4. Shapes and colors of the Cars *characters (Source: authors).*

        Cars 2 (Ream & Lasseter, 2011, MPAA rating G) debuted five years after the first film, building on its large fan base. The story begins with McQueen having won four Piston Cup titles and continues with a spy story and car races all over the world. In contrast to the first film, it has been criticized for being very fast paced and having many action scenes with explosions, gunfire, and even a death scene in which the antagonist, a mad scientist, tortures another character for information and kills him in the process (Curiouser Institute, 2012). Many references in the film (e.g., the homage to the spy film genre) are clearly targeted at older audiences. On the positive side, the narrative of the film also involves renewable energy sources and climate change, which can be a good starting point for children to discuss these issues with parents or teachers.

Critical Aspects for Children's Understanding of the Films

        With 117 (*Cars*) and 106 (*Cars 2*) minutes of playtime, both films are typical feature-film length and are considerably longer than previous Disney classics, such as *The Little Mermaid* (1989, 83 min) and *Tarzan* (1999, 88 min). Pixar films also got longer over the years (*Toy Story,* 1995, 81 min; *Monsters University*; 2013, 104 min) because of their broader target audience and new trends within the film industry. *Cars* is rather long and overtaxes the concentration and attention span of smaller children. While most 4-year-olds are physically and mentally able to enjoy a film (they are able to connect multiple mental models, construct metarepresentations, and possess ToM), they rarely have the patience to sit in one place for more than an hour in a cinema. When watching at home, children can watch smaller portions of the film at a time.

        Both films feature rapid-paced storytelling and use a variety of standard cinematic techniques (e.g., composition, continuity) that require viewers to have a basic understanding of causality and logical reasoning. Thus, rapid pacing may be effective for holding attention, but it complicates comprehension. The films also employ split-screen information during the races, which might overwhelm younger children, for it requires them to process two streams of information concurrently. Children develop symbolic thinking and understand causality between the ages of 2 and 7 but still lack logical reasoning and don't fully recognize the motives of the characters and their influence on the narrative at those ages. Around the ages of 6 and 7, the pacing and visual stimuli should no longer be a problem for their comprehension of the narrative.

        Both films use lots of references to the outside world, which is appealing to older audiences, but younger children usually do not have the enough knowledge of the world to understand the references. For example, the narrative includes many details of car racing, including economic concerns and media staging of racing events or sport events in general. Children lacking abstract logic, reasoning, and counterfactual thinking (developed in the formal operational stage, at 12 years [Piaget, 1953] and some advanced skills developed at 9 years [Potter, 2013]) have problems understanding these media and economic factors but can learn them through parental mediation. Verbal allusions and other references are also problematic, as they require specific knowledge of the world and language that cannot always be learned through parental mediation. For example, one inhabitant of Radiator Springs is Luigi, an Italian Fiat 500 who owns a tire shop known for its Leaning Tower of Tires—a reference to the Leaning Tower of Pisa. Luigi also worships Ferrari, one of many references to the company in the film. These references are

a good example of elements specifically designed for older audiences. Nevertheless, a viewer's not understanding them does not hinder his or her understanding of the main narrative. In particular, children up to the age of 4 are more concerned with the surface elements of films such as color, sound, movements, and main characters. A complete understanding of the narration, the motives of single characters, the developments in characters' personalities, and other more complex elements are only fully understood in later childhood, around the age of 8 to 10 years.

Transmedia Extensions

So far, we have only discussed the main texts of the *Cars* franchise and identified the elements designed for children and older audiences. To understand the whole picture, we take a look at media extensions that make *Cars* a transmedia franchise (as illustrated in Figure 2). All extensions can act as entry points into the franchise and require little previous knowledge of the films.

As with most children's franchises, the first film was released in movie theaters, and a wide range of toys and other merchandise featuring the film's cartoon car characters have been introduced. Storybooks retell the stories of the films but also expand the narrative with new stories. The *Cars Storybook Collection* (Disney Book Group, 2011b; target audience 3–7 years) features short stories (about 20 to 25 pages per story with a few sentences and large pictures on each page) about minor characters and challenges for Lightning McQueen. Lots of pictures and small information units allow for additive comprehension and build a consistent story world. Other books, such as *Meet the Cars* (Disney Book Group, 2011c), feature characters not shown in the films, thus also enabling world building. Besides these transmedia extensions, there are also books that work as classic cross-media extensions, retelling the story in another medium (Disney Book Group, 2006, 2011a).

The video games allow the players to explore the world of *Cars*. The first game (Rainbow Studios, 2006) is an open-world racing game where players roam freely, talk to other characters, and accept race challenges to advance the narrative. The story is a continuation of the first film's story and begins when McQueen finds himself at the start of the next Piston Cup season. The game is rated without age restrictions but requires a lot of hand-eye coordination from players. Younger children may like to drive around and look at the open world of Radiator Springs, but players must have well-developed sensorimotor skills to master the races in the game. Beginning at the age of 7, children have the necessary skills developed in the preoperational developmental stage to fully comprehend the narrative of the game, which is basically a sequel to the film and uses the same memorable elements (e.g., characters and locations) to facilitate familiarity while telling a new but very similar story. The game makes lots of references to the first film and enables children to play with their favorite characters. Two sequels using the same formula followed the first game.

The television series *Car Toons: Mater's Tall Tales* (Rae et al., 2008; 2013) is an episodic transmedia extension that features a fan-favorite character telling short stories featuring alternative versions of the franchise's protagonists (e.g., Mater as a wrestler or detective) that are peripheral stories (Scolari, 2009). Using tropes of children's cartoons such as fast cuts, bright colors, and a single simple

narrative and lasting five minutes each, the episodes are suited for younger children and require only minimal prior knowledge of the franchise.

Toys as Transmedia Extensions

The *Cars* merchandise includes toys for toddlers (e.g., slide cars), preschoolers (e.g., coloring pictures, toy cars, children's books), and schoolchildren (e.g., school bags, pens), but only some of them contribute to the narrative of the franchise (Figure 5).

Figure 5. Some of the merchandise of the **Cars** *franchise (Photograph by authors).*

In transmedia, toys serve as story tokens—small objects to which certain characteristics are ascribed (Long, 2004). The toy cars have visual and personality traits based on the main narrative, themes, and values of the franchise, which children internalize as "play scripts" (Kline, 1995). These scripts confine the possibilities for pretending to symbolic play and imaginative play that conforms to children's understanding of the characters.

Few of the *Cars* toys have digital components that, for example, say catch phrases from the movies. Most are classic toys that don't provide new narrative elements for the franchise as a whole.

Self-Produced Media and Participation

User-generated content is integral to transmedia narratives but is not a part of Disney-produced *Cars* extensions. In terms of Jenkins's principles of transmedia storytelling (2009a, 2009b), through performance and interaction, audience members share their own stories with each other, but for an audience that cannot yet use the Internet, this interaction is limited to local sharing. However, children

can exchange their knowledge and views of the *Cars* world by playing with each other using the toys. Adolescents and adults with advanced media-literacy skills can create and read fan fiction (fanfiction.net lists more than 900 stories relating to *Cars*) and see fan art and videos in the *Cars* universe. These productions introduce new themes (e.g., romance, death), provide backstories for minor characters, and imagine humans in the *Cars* universe. While some of the narratives are suitable for children, most are targeted to the same age group as their producers and rated Teen. Other forms of user-generated content include YouTube users reviewing *Cars* merchandise and toys (e.g., Disney Cars Toy Club, Disney CollectorBR) as a service for parents and collectors.

Discussion of the *Cars* Franchise

Although *Cars* does not fully apply all of Jenkins's (2009a, 2009b) transmedia principles or Scolari's (2009) strategies, it performs transmedia storytelling well and is a good example of a modern transmedia franchise. Disney incorporated many key components of transmedia storytelling into *Cars* to build an engaging world that transcends the boundaries of classic franchises. The primary texts are the films, designed to appeal to a broad audience and not only to children. To achieve this general appeal, the films include many references to the outside world, allusions, and characters and fast cinematography that might overtax the narrative understanding and attention spans of young children. The films do not reference or acknowledge other media extensions, so they can be watched without any other knowledge of the *Cars* world, and there are no visible gaps in the story. It is doubtful that a broader appeal would still be achieved if the films were designed specifically for those on a cognitive-developmental level of children ages 3 to 5. However, young children still have fun watching and rewatching the films, even if they do not completely understand the narrative.

Countless media extensions enrich the main narrative of the films, each specifically designed to target an age segment that can process the extension's narrative well enough. The video games tell a story that takes place between the events of the films (an interstitial microstory [Scolari, 2009]). Storybooks retell the main narrative of the films without adding new elements to them (classic cross-media), but many other books do add new stories and elements, fostering additive comprehension of these peripheral stories (Scolari, 2009). The stories within the franchise are self-contained and not episodic, so all are possible entry points.

Jenkins's (2009b) principle of seriality refers to chunking of narratives for storytelling; however, this would probably overburden especially the concentration and attention span of younger children. The principles of immersion and extractability do work well within the franchise, as there are countless toys and media extensions to engage with. Theme park attractions (Cars Land at Disneyland's California Adventure park and Cars Quatre Roues Rallye at Disneyland Paris) allow children to experience and interact with the story world in the flesh.

The toys in the franchise do not provide new narrative elements and thus do not fulfill the full potential of today's available technology. Academic prototypes of smart toys that combine digital and classic play environments and mixed reality have been around for several years (e.g., Vaucelle & Jehan, 2002; Kara, Aydin, & Cagiltay, 2013). In addition, recent successful commercial examples hint at the

potential of interactive toys. "Connected toys" use technology to allow children to connect media platforms. For example, *Skylanders: Spyro's Adventures* (2011) and its successor, *Giants* (2012), are video games that allow players to collect physical toy figures and place them on a USB pedestal to bring that character into the game, ready to be controlled. Game information is then saved in each toy so children can share and exchange it. *Disney Infinity* (2013) is another example of a game that uses a connected toy to bridge digital and classic toys for transmedia storytelling purposes.

Toddlers up to 2 years (in the sensorimotor, primary representation, and acquiring-fundamentals stages) have insufficient narrative-comprehension skills for *Cars* but enjoy its colorful objects, sounds, and voices. Between 2 and 4 years, children learn to take other perspectives and thus can understand character motives and plot elements. They still cannot comprehend complex narratives but enjoy the storybooks and a wide range of toys and short episodes of the television series. Between 5 and 7 years, they refine their motor skills, can understand causality, and begin thinking skeptically. In this age range, they can understand most plots of the films and enhance their narrative experiences with the video games, theme parks, and television series. Later (at 9–12 years), they develop specific interests and begin to explore narration experimentally. In adolescence (the formal operational stage), their advanced media literacy skills enable them to participate in fan fiction and other user-created art.

General Implications

Transmedia narratives for children have to be adapted formally, legally, and content-wise to the developmental stage of their target audiences. The example of *Cars* shows that with the exception of the two main films, which target a broad audience that includes children, this adaptation can be easily achieved by using different media extensions for different age groups, with each extension serving as an entry point into the franchise. The repetition of colors, forms, music, perspectives, and narratives facilitates familiarity for children. Visual references between media do not require a coherent understanding of the text but allow for the recognition of characters, even for the children of 2 years. The comprehension of simple narratives (at 3–5 years) and more complex narratives later (at 7–9 years) builds to create a coherent understanding of the text and allows for an understanding of references to content in other media (at 7–12 years). As additive comprehension is possible at this third stage, these children can fully use transmedia narratives. Then, those in late childhood and early adolescence (9–12 years) with advanced media literacy skills can engage in participation with the narrative.

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