Routledge
Taylor & Francis Group

It's Complicated: Plot and Formal Feature Complexity in Early Childhood Television Content

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ABSTRACT
The recent surge in television content targeting young children has led to questions about the appropriateness of the content for children's developmental capabilities. The study comprehensively analyzed the manifestations of complexity – both in the plot and in formal features – in content aired on child-targeted television channels (from about 2 to 6 years of age). A qualitative analysis of content from 216 television shows from the six Israeli children's television channels identified much complexity in children's programming. Plot complexity involved intertwining sub-plots and characters, a weak problem-solution link in the narrative, and unclear messages. Formal feature complexity involved fast-pace, quick camera cuts, and an overload of visual elements. The study uniquely identified the shifts between "real" and "fantasy" worlds in children's television shows as comn contexts of complexity that integrate both plot and formal feature indicators. Manifestations of complex messages in children's television shows are discussed in light of toddlers' and young children's cognitive development. The findings are also discussed in light of the traveling lens model associated with children's learning from television content.

Recent years have seen a surge in television channels targeting young children worldwide (Briel, 2017). The result has been a flood of television content devoted to young viewers. Alongside this increase in offering, a shift has taken place from an educational to an entertainment approach to children's programming, in line with the expanding view of children as consumers (Gozansky, 2017). The quality of much of the new content is often questioned, as an increase in the number of channels inevitably

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results in more market competition and in difficulty balancing the needs of child viewers with those of producers and broadcasters (Rutherford, 2012). Thus, it is important to examine to what extent the messages to which children are exposed on television today are developmentally appropriate for them.

A global survey of children 4–11 years old reported that 72% of children identified television viewing as their top favorite entertainment activity; more than half reported watching television for at least two hours daily (Viacom, 2016). Ninety-two percent of 4–6 year olds reported watching their favorite episodes again and again. Television viewing has been shown to associate with stereotype and self-perception development among young children (Rodgers, Damiano, Wertheim, & Paxton, 2017). Moreover, children often use television content as a cultural tool in their social interactions and play sessions with peers (Kampf, Huck-Taglicht, & Blum-Kulka, 2006). On their end, parents tend to perceive child-branded channels as a safe and educational environment for their children (Rideout, Vandewater, & Wartella, 2003). As such, many parents do not question their children's exposure to these channels, even without adult supervision. However, both theory and research, as reviewed below, indicate that exposure to television content that is mismatched with the target audience's abilities can lead to less comprehension among young viewers (Cooper, Uller, Pettifer, & Stolc, 2009).

The current study thus seeks to analyze the cognitive development-related complexity of television content aired on child-targeted television channels for young children, from about 2 to 6 years of age. In addition to this developmental focus, the study makes an important contribution to the literature by examining a broad range of complexity indicators in television content, combining plot and formal features. This wide-ranging examination is an extension of past studies which have each tested one or a limited set of complexity indicators in a constrained sample of shows. Within each of these realms – plot and formal features – the current study examines a wide range of characteristics likely to be important for young viewers, including the shift from real to imaginary contexts within an already-fictional narrative. Further, the study is unique in its examination of the full range of television channels targeting this specific age group in Israel and in its use of a qualitative methodology which enables an in-depth analysis of a large body of content in a systematic and theoretically-driven manner.

Young children's cognitive development and television viewing

Toddlers and young children in the preschool years experience significant developmental advances that likely play a role in their ability to deal with

and be impacted by television content. Central among these is cognitive development, which relates to children's processing and interpretation of information from the media (Berk, 2005). According to Piaget (1952), the cognitive developmental pre-operational stage largely corresponds to this age range.

Ages 2 to 4 mark the beginning of comprehension of child-targeted television content by young viewers (Anderson & Subrahmanyam, 2017). Comprehension is guided by improved representational thinking and an enhanced understanding of the dual representation of television content (Linebarger & Vaala, 2010). Toddlers' information processing and memory abilities improve as does attention to television content. Around age 3 there is readiness to learn from the screen and many studies point to toddlers' ability to learn from television content that is tailored for them (Mares & Pan, 2013). Only by ages 5 and 6, the educational abilities are much improved (Berk, 2005). Indeed, research has shown that preschool children's exposure to educational content is associated with increased vocabulary, improvements in social behavior, school readiness, and academic knowledge (Anderson & Subrahmanyam, 2017).

On the other hand, some scholars have suggested that television exposure – most likely exposure to entertainment content – may be associated with lowered executive functions among preschoolers, such as deficits in attention (Lillard & Peterson, 2011). An explanation for this negative relationship may be that pre-schoolers' attention is easily drawn to perceptually salient cues such as formal features at the expense of resources allocated to processing information content on screen, especially in the early phases of the pre-operational stage (Linebarger & Vaala, 2010).

Another explanation for limited learning outcomes as a result of television exposure is linked to pre-operational children's developmental characteristics of egocentrism (i.e., interpreting events only through their own point of view) and centrism (i.e., focusing on one aspect of the event at the expense of all others) (Piaget, 1952). The child's perception of the world – and, by extension, their treatment of television content – is through a subjective and self-centered lens. Thus, the extent to which the content is simple and repetitive, and the extent to which the message is relevant to children's lives and is concrete – with an immediate link between the different verbal and visual elements in the content – is important for children's understanding of mediated messages (Fisch, McCann Brown, & Cohen, 2001; Linebarger & Vaala, 2010).

It is also important to consider children's perceived realism of television content – to what extent the content is perceived as representing situations, characters, and interactions that can truly exist – as it is intertwined with their cognitive development (Tidhar & Lemish, 2003). Children's entrance into the pre-operational stage is characterized by a magic window approach

by which television is perceived as placing a "true" mirror to the world (Strasburger, Wilson, & Jordon, 2014). It is now believed that around age 4, children can differentiate between "real" situations and mental/imaginary ones that are unlikely to happen (Schlesinger, Flynn, & Richert, 2016). However, rather than reflecting an understanding of the essence of "realness," such perceived realism judgments are mostly based on physical or generic characteristics of the content (Chandler, 1997).

Another type of perception of television realism for this age group is the content's social realism – the extent to which a character or event is thought to be akin to people or occurrences in the real world (Schlesinger et al., 2016). Though pre-operational children generally differentiate real and fantastical characters, there are variations in these beliefs which may be associated with varied outcomes for young viewers such as the preference for less socially real characters or the conclusions children draw about televised events. Bierwirth and Blumberg (2010) found that 3–5 year olds judged cartoon transgressions as more meaningful for the well-being of characters than realistically-judged transgressions, though this is unrepresentative of reality. Moreover, even if young children in the pre-operational stage (especially in its later years) are capable of differentiating real and pretend events and characters, a question remains about how they interpret and handle multiple fantasy worlds, or the "rich ontology of fictional worlds" which television offers to its viewers (Skolnick & Bloom, 2006, p. B10).

Complexity in young children's television content

Content complexity can be considered a mode of storytelling that diverges from traditional and conventional episodic forms of television production (Mittell, 2015). Storytelling combines plot, narrative elements, and formal features and special effects. Mittell writes that complexity of content can be appealing for viewers as it draws them into the content, heightens their involvement in and enjoyment of the show, and rewards regular viewers with a "complex but coherent comprehension" (p. 50) of the content. But as "complex television requires viewers' effort and attention for ongoing comprehension" (p. 180), it is not clear if this highly active form of viewership is a realistic expectation for young viewers considering their cognitive capacities. Rather, complexity can also serve as an obstacle to understanding the show's messages, especially for young viewers and for non-regular viewers of the show.

Mittell (2015) suggests that, in prime-time programming, content complexity is manifested, for example, in the content's abandonment of traditional norms of episodic conflict resolution. In children's programming, complexity can occur when the process leading from problem to solution involves sidetracks to unsuccessful solutions on the way to a more efficient

one, which may distract the young viewers and obscure the problem-solution link. As another example, Mittell suggests that discourse time leaps, or telling the story from multiple perspectives, contribute to content complexity. In the context of children's shows, content complexity might also manifest itself in transitions across worlds that diverge in reality versus imagination status (Skolnick & Bloom, 2006). Such leaps might interfere with orientation (Mittell, 2015), and lead to confusion as the cognitive load required to follow and integrate these different worlds in children's minds might be overwhelming.

Alongside development and children's personal characteristics (Alade & Nathanson, 2016) scholarly interest has recently increased in the complexity of children's television content as a determinant of their understanding of media content, and especially in the extent to which the content matches young children's developmental capabilities (Kostyrka-Allchorne, Cooper, & Simpson, 2017). Most of the studies in this realm have been effects investigations focusing on one of two elements: the effects of the shows' plots (their narrative structure, organization, and meaning) and the effects of the shows' formal features (e.g., editing pace, visual cues).

Plot complexity

Mittell (2015) includes in his definition of content complexity the inter-weaving of multiple points-of-views and stories. An abundance of plot elements can be distracting as children need to divide their attention among many sub-plots and characters (Bickham, Wright, & Huston, 2001). On the other hand, repetition or redundancy in the content, provided it is not too excessive so as to be boring, can be helpful for young children in terms of following and understanding the narrative (Campbell, Wright, & Huston, 1987). Also important is the organization of content in shows. Developmentally, preschool children's attention to, comprehension, and recall of mediated content benefits from concreteness and immediacy (i.e., a close proximity between referent and verbal address in the content) (e.g., Linebarger & Piotrowski, 2009). Elementary school children, and certainly those younger in age, experience challenges in understanding narratives in the face of nontraditional content structures that complicate the causal sequence of scenes (Low & Durkin, 1998). Moreover, throughout the preschool years, children's ability to integrate additional elements to understand plot lines (e.g., characters' behavioral motivations) continues to develop (van den Broek, Lorch, & Thurlow, 1996). Thus, it is important that problem and solution appear adjacent to one another in the content rather than adding plot elements that separate them, making it difficult for preschool children to conceptually link the two. Moreover, it is important that the narrative in television content sends a clear and unified message

and that messages are marked explicitly and consistently so that the child viewer can extract them clearly (e.g., Nowak & Phelps, 1994).

Finally, an element associated with plot complexity is the distinction between reality and fantasy. As indicated, children's perceived realism of television content develops incrementally with age and is associated with learning from television content (Mares & Sivakumar, 2014). But whereas the effects of perceived realism received some attention in studies, content analyses have generally not identified the forms in which fantasy is presented in young children's television programs or the ways in which shows transition between reality and fantasy and differentiate them in their content, as is an innovative part of the current study's goals.

Formal features complexity

Studies conceptualize formal features as the use of auditory and visual cues on the screen to accompany the narrative, including edits, camera movement, cuts, and sound effects (Kostyrka-Allchorne et al., 2017). As they supplement the narrative, formal features may serve to highlight important plot elements but they can also add complexity if they are too subtle or delayed, such as fantasy sequences which lack a clear demarcation (Mittell, 2015). Formal features also include the pace with which elements are presented and the transitions across the elements, which contributes to movement and pace on screen.

Studies have found that entertainment programs directed at young children – as opposed to educational ones – are characterized by a relatively fast pace, many changing scenes and characters, and a large amount of audio and visual stimuli (e.g., McCollum & Bryant, 2003). Surprisingly, even DVDs targeting children younger than 3 years of age were found to include a high concentration of salient features inappropriate for children of this developmental stage (Goodrich, Pempek, & Calvert, 2009).

As noted by Schmitt, Anderson, and Collins (1999), "movement and cuts influence attention both as salient features and also as enhancements to comprehension of events such as those conveyed by overt purposeful character behaviors" (p. 1166). Usually, these formal features are thought to challenge and over-stimulate young children and may be detrimental for their understanding of television content and their executive functions, in the short- and long-term (e.g., Lillard & Peterson, 2011). This is because formal features carry a symbolic meaning; the same formal feature can indicate different meanings and different formal features can indicate the same meaning. For example, Beentjes, de Koning, and Huysmans (2001) tested young children's understanding of two features indicating a dream sequence – a dissolve or a cut – and found differences in their interpretation of the same event. This is because in order to interpret the formal

feature and its intended meaning in the narrative, "the viewer should construct the meaning of a formal feature in a specific television program from the context of the story in combination with his or her knowledge of possible applications of formal features" (p. 624). As noted earlier, both the cognitive maturation and the media experience of young children are limited and thus they are likely to be especially challenged by formal features. Beentjes et al. (2001) found that formal features attracted 4- and 6- year olds' attention to the screen but understanding of these features varied both by age and by specific formal features and its intended meaning in the narrative.

Theoretical framework and research questions

Models predicting young viewers' learning from media content acknowledge the importance of content complexity in determining outcomes. The traveling lens model links comprehension of content with attention to it (Huston & Wright, 1989). Alongside individual factors (e.g., SES, reading level), content factors including originality, repetitiveness, and expectedness all work together to determine content comprehension with a preference for a moderate level on each continuum to achieve maximal attention, time, and effort devoted to the content (Linebarger, Moses, Liebeskind, & McMenamin, 2013). When children understand the content and are interested in it, they are more likely to pay attention to it and learn from it. Content that is too familiar and simple will not be attractive to young viewers who will likely be bored with it. Conversely, content that it too complex is likely to frustrate young viewers, leaving them unwilling to devote attention to it (Bickham et al., 2001).

In light of the literature reviewed above, and considering the traveling lens model (Huston & Wright, 1989), characteristics, both narrative and formal features, may matter in determining the extent to which children understand and interpret television content (Mittell, 2015). The current study will explore the television content directed at children between 2 and 6 years of age to identify how complexity – which may then be linked to comprehension – is manifested in the content. The following research questions will be addressed:

RQ1: How is plot complexity manifested in television content for young children, considering: (a) plot structure, (b) message clarity, and (c) the distinction between reality and fantasy?

RQ2: How is formal feature complexity manifested in television content for young children, considering: (a) editing pace, (b) extent of visual elements, and (c) the separation between reality and fantasy?

Method

Sample

The study examined the content of six television channels in Israel that define their main target audience as toddlers and young children from about 2- to 6-years of age (channels: Hop, Disney Junior, Nick Junior, Jim Jam, Junior, the Israeli Educational Television). The channels represent the entire landscape of television channels targeting this age group on Israeli television at the time of the study. From each channel, eight hours were randomly selected throughout one month (January 2017). Between Sunday and Thursday content was chosen from 4pm to 7pm, hours when children are usually out of the formal educational frameworks and in their leisure time. Content from the Israeli Educational channel was analyzed from 1pm to 4pm as these hours tend to focus on the specific relevant target audience for this channel. On Saturdays (the Israeli weekends) content was analyzed from 8am to 10am. Overall, 216 television episodes and additional transitional content units were analyzed. Institutional Review Board approval from [institution blinded] was not sought because the content analytic project reported in this study did not involve human subjects.

Procedure

The qualitative content analysis was guided by, and extended, the theoretical framework and past research (Krippendorff, 2004; Schreier, 2012). It was performed over about 5 months by five undergraduate research assistants who were professionally trained on shows not included in the sample and supervised throughout the process by the authors. The coders assisted in handling the large sample with the authors following up on the patterns that have been identified to ascertain salient examples of complexity in the content. As part of a larger content analysis (consult Authors for full information), the coders were trained to identify patterns in children's television content, were familiarized with the topics analyzed and with methods to identify various message characteristics of complexity in the plot and formal features. Coders were also trained regarding children's development and to identify and analyze elements in the content that present complexity for these young viewers. Once training was completed and an understanding among them about the procedure and coding was formulated, the sample was randomly divided between the coders for analysis.

Most shows were analyzed by one coder. A randomly selected subsample (one hour of programming from each channel) was coded by all coders at regular intervals to ensure continued inter-coder agreement.

During the period of analysis, the research team met regularly to discuss results, uncover trends and unusual findings, and share relevant examples. In these weekly coder team meetings, the shared programs were discussed to ascertain agreement among coders but individually-coded shows were also discussed as each coder presented examples supportive of themes in the content they coded. Examples were then discussed among the coders to confirm agreement that they support a theme. When needed, the coders provided background information about their individually-coded shows so that there was context within which to understand the examples. However, as many children's show are repeated in the programing schedule, most coders were familiar with most series and they understood the context of examples. As is common in qualitative content analyses, when disagreements were encountered they were resolved through a discussion among the coders.

Coding

A thorough qualitative content analysis was performed with regard to two aspects (see Table 1). Whereas the general categories below were developed from past research and theory, additional manifestations, especially those related to the shifts between reality and fantasy in the content (both in the plot and in formal features), were also identified as they emerged from the data throughout the coding process.

Plot complexity

The narrative (number of plots and sub-plots, their intertwining with one another, and the extent of overlap versus uniqueness of each plot); characters – the importance of characters to the plot, the mention of their names and unique roles, and the depth of characterization of each one in the narrative); and message clarity (ambiguity in the message, explicit and conclusive messages that enable drawing conclusions regarding values and social behaviors, clear connections across message elements, repetition of messages in the narrative, including a summary of important messages; and the relationship between problem and solution – the extent to which the problem and its solution are linked to one another in the plot, are presented adjacent to one another without distraction in the narrative, and are conceptually connected to one another); and the distinction between reality and fantasy were examined (that is, the shift between a "real" world and a "fantasy" world in the narrative and the extent to which the two worlds present a coherent story while maintaining a clear separation between the two worlds).

Table 1. Additional examples of complex messages in children's television shows.

Plot Complexity	- Narrative complexity: • Multiple and intertwining plots and sub-plots: *Alisa Knows What to Do!* (Junior): The narrative involves three sub-plots that take place in three different locations. The episode jumps from one sub-plot to another, as separate stories unfold in each concurrently. At the end, the narrative links the three spheres together. • Multiple characters: *Barney & Friends* (JimJam): In a 25-minute episode 10 different characters – anthropomorphized and human – participate and are introduced by their name. In addition, a brief clip-within-the-show introduces additional people. • Lack of a clear connection between problem and solution in the narrative: *Zack & Quack* (the Israeli Educational Television): Zack and his friends embark on a journey to return Quack's pop-up flower seeds and protect the flower from a book-worm. The episode ends with the group finding the seeds and helping the worm turn into a friendly butterfly. But between the problem and the solution, the group travels through different worlds, experiencing many challenges as they make several attempts to stop the book-worm from eating the pop-up creations. - Message unclarity: • Inconclusive messages, no explicit conclusion: *Pingu* (JimJam): Pingu the penguin begins the episode as he innocently helps a neighbor and receives a thank-you gift. When his mischievous attempt to earn a second gift fails, Pingu and his friend turn to harassing the neighbor in ways that end up hurting the neighbor and others. Though the young penguins observe the events and consequences unfold, the episode ends with them doing a small gesture to the neighbor and walking away. Pingu is not punished for his disrespectful behavior and the two are not clearly shown to regret their behaviors or to have learned a lesson. - Reality/fantasy distinction: • Lack of a conceptual separation between "reality" and "fantasy" in the narrative: *Kate & Mim-Mim* (Disney Junior): In the real-world frame of the show, Kate's father gives her a cardboard box and tells her to surprise him with creative uses for it. Kate takes up the challenge by shifting to an imaginary world in which her small rabbit doll Mim-Mim turns into an adult-sized anthropomorphized talking rabbit. Here, the two and their imaginary friends use the cardboard box to solve a problem. At the end of the episode, Kate jumps out of the box into the real world with Mim-Mim, who has returned to be a regular, small doll. She tells her parents that she used her imagination to play with the box just like her imaginary friend. The two worlds – the real and imaginary – are seen as a natural continuation of one another in terms of Kate's experience.
Formal Feature Complexity	- Editing pace: • Rapid-paced editing: *Jack and the Never-Land Pirates* (Disney Junior): Though the majority of the episode is mildly-paced with a linear progression across camera shots and scenes, there are several scenes (e.g., the song scene, the chase scene) in which the editing pace rapidly increases. In these, frames quickly change and the rhythm is swift. • An overload of visual elements on the screen: *Chuck Chicken* (Junior): Chuck Chicken tries to save the city by stopping Rotten Robert from stinking it up. In their long fight scene, there is an abundance of visual effects on the screen. Large green stinking hands fly around quickly and haphazardly, trying to grab, push, and hit Chuck and his friend. There are also multiple visual indicators of speed and pain (e.g., quick twisting colors as Flick is spun around, sparks of fire to indicate Chuck's fast getaway from the stinking arms). Throughout the scene, there is a recurring flashing blue beam-like frame to indicate extreme speed. Moreover, yellow beams in extreme close-up repeatedly indicate Chuck's special powers.

Table 1. (Continued).

- Reality/fantasy separation:
  - Lack of visual separation between "reality" and "fantasy" in the content: *Yaya & Zouk* (JimJam): Siblings Yaya and Zouk play with a magnifying glass. As Yaya closely looks at her doll dinosaur, Raymond, through the glass, the doll grows and becomes anthropomorphized in front of their eyes, in their bedroom. The next frame shows the three in a jungle with the giant and hungry dinosaur chasing the siblings. Beyond the change of frame, there is no clear visual or auditory transition into what is apparently an imaginary world. Upon wishing to return to the real world (at the episode's end), Zouk is enlarged by the magnifying glass and he holds the giant dinosaur in his arms. In the next frame – again without any formal feature transition – the siblings walk into their real-world kitchen holding the original-sized Raymond doll.

Formal feature complexity

The analysis focused on pace (edits, cuts between different situations and events, speech and motion pace of characters), the use of visual elements (that is, the extent of visual components present on the screen at any given time and the transition across these elements), and the visual separation between reality and fantasy worlds (e.g., if and how are the transitions marked using audio or visual cues). Coding focused on the episode level as the unit of analysis. The qualitative nature of the analysis meant that decisions needed to adhere to a strong test of face-validity and be agreed upon by the coders. In their coding, coders engaged in a comparison of each episode to the overall pattern of representation in the sample in order to determine that it presents a unique case of complexity that is qualitatively distinct.

Results

Plot complexity

Structural complexity

The storylines found in various programs in the sample are complex as they include a number of main plots and intertwining sub-plots along with the inclusion of multiple, diverse characters. It should be noted that the length of the shows broadcast on these child-targeted channels is usually short, on average only 12 minutes long. The combination of multiple plots and characters in such a short duration means that there is usually minimal repetition of the messages and events in each episode, as they are presented very quickly, and that character development is restricted. For example, *Care Bears and Cousins* (Hop) includes 15 Care Bears – the show's good characters – who are aided by their 11 cousins in their struggle against 3

evil characters. There are nearly 30 regular characters in this program. Many of the Care Bears and evil characters appear in each episode of the show and their cousins appear in different configurations each time.

Another example of narrative complexity can be seen in the show *Elena of Avalor* (Disney Junior), which presents an extreme example of parallel editing. The program presents two parallel stories, which detail, simultaneously, two different situations that take place in different locations and with different characters. The episode "Island of youth" includes two main plots that develop in parallel. In one, as Elena plans a surprise party for Esteban, the two visit a secret island, Esteban drinks too much from the fountain of youth, begins to de-age, and Elana fights to save him. Meanwhile in the mansion, in the second plot, family and staff members argue about which songs will be played in the party. The shifts between the two plots are not clearly marked as narrative transitions. There is also no narrator voiceover to explain these transitions.

Many of the sampled television episodes employed the narrative device of problem-and-solution. In these narratives, a problem is presented and the best solution is searched. The search involves several failed attempts until the most appropriate solution is presented, resulting in a vague connection between the two. The demonstration throughout the episode of the various failed attempts to solve the problem before revealing the appropriate solution is distracting and contributes to complexity. In addition, the correct solution is often not intuitive as it requires prior knowledge or is not applicable to the children's reality (i.e., it involves magic or superpowers).

An example for the problem-and-solution complexity in the sample can be seen in the show *PJ Masks* (Disney Junior). The show presents three elementary school pupils who turn into superheroes at night. The three operate in an imaginary night world in which they solve a problem that originated in the real world earlier in the day. The problem (e.g., an object missing, canceling a trip) is described briefly at the opening of the show and the solution appears at its end, in the following morning and after many conflicts with the villains. Whereas the problems encountered by the characters are representative of everyday situations faced by children worldwide, the solutions in the show are often less realistic as they take place in an imaginary world and often involve the use of advanced technology such as drones and computerized headquarters. Moreover, the characters all have unrealistic superpowers that help them solve the problems such as the ability to fly or disappear.

As an example, in an episode of *PJ Masks* entitled "Catboy's two-wheeled wonder," the problem introduced during the day is that someone stacked cars on top of one another. The team encounters the car tower on their bike ride and sets out to find out who did it. Though they find the responsible

party – Romeo – early on, the team encounters additional difficulties on their way to extracting the light-machine from his evil hands. Adding to their struggle, Catboy keeps disappearing at critical moments, as he explores the special powers of his bike. After many trials and tribulations, the team grabs the light-weight machine from Romeo and returns the situation to normal. In the final scene, upon returning to the real day world in the following morning, Catboy uses his bike to score a winning goal in a soccer game. As can be seen, the episode presents a complex path from encountering a problem to achieving a solution, as along the way, additional complications are introduced. Moreover, the connection between the car-stacking problem and the magical bike solution is neither intuitive nor realistic, adding to the complexity of the content.

Message (un)clarity

The lack of a clear message is sometimes manifested through inconclusive or ambivalent messages, which do not present a clear statement as to whether the characters' behavior is good or bad or ones in which a bad behavior goes unpunished. Examples of this are when, throughout an episode, a competitive behavior turns offensive but the character is not punished for their actions, when a playful behavior turns naughty, or when a character's self-confidence turns into arrogance. All of these are complex ambivalent messages that blur the lines between desirable and forbidden. For example, in the episode "Stuntmania!" of the show *Blaze and the Monster Machines* (Nick Junior), race cars compete against each other in race tracks. Race car Brave – the star of the competition – asks to be the first to drive the "super track." Its competitor, Crusher, also wants to be the first so he builds a special robotic boot which kicks everything out of its way, including Brave. When Crusher claims it is OK to cheat in order to reach a goal, the robotic boot kicks him out of the race track. The cars continue to compete outside the official track until Brave wins the competition and is cheered by the audience. The episode does not explicitly explain that cheating is illegitimate and that one who engages in unfair competition, can end up losing it. Rather, there is ambivalence when competition turns from a legitimate playful behavior to an "all means are justified to win" situation.

Reality/fantasy distinction

An additional form of plot complexity in television shows targeting young children was found in the transition within the shows from the real world of the characters to an imaginary world. Importantly, whereas most content presented in children's show is fictional, many programs include a second level of "unreal content" as the characters spend much of the episode in an imaginary world. The characters' "real" world often serves as only the frame

of the narrative, with most of the main plot taking place in the characters' imaginary world. The two worlds – the "real" and the imaginary one – are often shown as a natural narrative continuation of one another. Often, characters encounter a problem in their real world (e.g., at school or at home) and then try to solve it in the imaginary world where everything is possible and there are no boundaries and limitations.

Another example is when characters who are dolls in the real world are anthropomorphized within the imaginary world (and usually return to being regular dolls at the end of the episode upon return to the "real" world). For example, in the show *Harry and His Bucket Full of Dinosaurs* (Jim Jam) in an episode entitled "Can you hear a drip?," the main character, 5-year old Harry, has a bucket with toy dinosaurs. On a stormy day, the house roof leaks and Harry's mother puts buckets to catch the water. Harry realizes that his dinosaur bucket was used for this purpose and runs to rescue the dinosaurs. He encounters only Taury, the anthropomorphized red dinosaur, saves him, and together, the two jump back into the bucket and into "dinosaur world" to their friends. The main plot takes place in the imaginary dinosaur world, which has in this episode taken the form of an ocean. At the episode's end, Harry and the dinosaurs are discharged from the bucket back into the real-world house and the dinosaur team returns to their regular doll size.

Formal feature complexity

Editing pace

Formal features that exhibit a level of complexity for the young target audience included a fast pace of editing, quick transitions across different scenes, and a large number of visual elements. For example, the program *Sendokai Champions* (Junior) involved rapid-paced editing and cross-cutting. The program is about a group of children who compete in aggressive soccer games against aliens. The show is structured as an ongoing story and, therefore, the opening of each episode is comprised of several intertwining consecutive brief shots involving multiple characters. The episode "The Twilight of the Hakuru" begins with two characters who are in the midst of a battle full of special effects including the use of colorful laser shooting. Editing incorporates tilt shots in which the characters are shown diagonally and in close-up. Immediately following this, the camera zooms out in a longshot. These transitions between the close-up and long shots add to the rapid pace of editing which characterizes the characters' action. The use of cross-cutting is also utilized to show other characters battling in yet a different location. A split screen technique is also used with two characters shown in close-up on half of the screen.

Overload of visual elements

Another example of formal feature complexity is the overload of visual formal elements that appear on the screen, as exemplified by the show *Bakugan* (Junior). The show centers on the lives of small dragon creatures – Bakugan – and on their four partners who fight evil Bakugans and struggle against an evil witch. Many visual effects characterize the battles. In an episode of "New Vestoria," the Bakugans are filmed using a split screen, showing in close-up shots two or more fighters pulling guns and shooting cards, which produce a bright, multicolored light. The fighters quickly throw colorful balls and pull out swords as the balls turn into dragons using blasting fire and bright lights. A few minutes into the episode, another battle – similar in its overload of visual effects – takes place with the heroes of the series fighting against a different villain.

Reality/fantasy separation

Another manifestation of formal feature complexity is evident in the lack of visual separation between reality and fantasy in the content. Limited research has attended to the formal feature transition into the fantastical worlds within children's programs (e.g., Wilson & Weiss, 1993). However, although the real and fantastical worlds within these shows are conceptually different from each other, in many shows there is no clear visual separation between them. Rather, at times, the two worlds are similar in time and location but the characters all of a sudden appear to be accompanied by additional (often anthropomorphized) characters.

For example, the transition into the imaginary world in the program *Dan and Mosely* (the Israeli Educational Television) helps solve a problem that exists in reality but the lines between these two worlds are blurred from a formal feature perspective. The hero, Dan-Dan, is usually seen in his bedroom, where he shares a personal problem with his doll Mosely. Then, Dan-Dan builds a small tipi on his bed, shoves his head into it, and transitions with the now-anthropomorphized Mosely to a fantasy world in which he observes a situation similar to his problem. The two characters remains in the same location and time and the fantastical world is only marked by a change in characters as Dan-Dan is now surrounded by human elves. Dan-Dan learns from the elves about the situation and then returns to the real world to solve his problem. The switch between the two realms – the real and the imaginary – is very subtle.

Discussion

Television programs are a main attraction for young viewers who spend a significant amount of time watching this content through various platforms (Ziv, Hirschauge, & Orpaz, 2013). Young viewers attribute

significance to this content, watch it repeatedly, and develop relationships with the main characters (Wartella, Richert, & Robb, 2010). This raises important questions regarding the developmental appropriateness of such programs, which are promoted and perceived by parents as suitable for preschoolers (Rideout et al., 2003). All television channels targeting young children ages 2–6 in Israel were analyzed using an in-depth, theoretically-driven, qualitative methodology.

According to the current study, complex content exists in television channels targeting preschoolers. Building on previous studies which have each looked into a restricted set of elements – either plot or formal features – the current study combines an examination of multiple indicators of complexity to provide a comprehensive picture of children's shows. Moreover, the current study extended past studies by identifying unique contexts of complexity in children's programming – namely, the existence of multiple worlds with varying degrees of realness. The transitions between the characters' real worlds and their imagined ones, which is a common occurrence in children's shows in the current study, uniquely combines plot and formal feature complexity and poses a potentially exceptional challenge for young viewers' comprehension of shows. The complexity identified in the current study may be linked with the shift from an educational to an entertainment focus in children's programing (Gozansky, 2017). As a result of trying to grab children's attention and achieve popularity in an extending market, these shows include many plot and formal feature elements which might lead to a level of complexity that exceeds young children's cognitive abilities.

Plot and narrative complexity is evident by the introduction of multiple characters throughout each episode. Considering the relatively short duration of these programs, it is plausible that children are exposed to the various characters in a superficial manner. This can undermine the ability of children to establish parasocial relationships (PSRs) with the characters, which is one important way for viewers to engage with television programming (Mittell, 2015). PSRs are friendship-like relationships that develop overtime and represent an ongoing, intimate bond characterized by reduced uncertainty on the part of the viewer (Eyal & Rubin, 2003). To establish such a relationship, the character should be essential to the plotline or directly address the children. In the absence of meaningful relationships with characters, children might struggle to understand the content or learn less from it (e.g., Lauricella, Howard Gola, & Calvert, 2011). In addition, presenting a variety of characters brings about multiple points of views, challenging young viewers who are cognitively limited to focusing on their own point of view (Piaget, 1952). Also, the introduction of numerous characters is inconsistent with young viewers' expectation to view familiar characters and plotlines (Linebarger et al., 2013).

Programs targeting young children also involved multiple plotlines, despite their short duration. Such as overload of plots leaves little opportunity for repetition of content within the episodes, though such redundancy could enhance preschoolers' comprehension of the content, according to the traveling lens model (Huston & Wright, 1989).

Moreover, sub-plots are often intertwined with each other and lead to a time separation between the introducing of a problem and its solution and to ambivalent messages which could lead to difficulty in deducing a conclusive and consistent message from the content. These features can confuse young viewers, especially in light of the relatively short duration of the program and its fast pace. These features also make it difficult to successfully process the complex televised content due to limited memory, the need for concreteness and explicit statements, and young children's limited concentration abilities (Piaget, 1952). According to the traveling lens model, the expectation to learn the solution to the problem presented on a television show can increase understanding of the content (Huston & Wright, 1989) and once the two are disconnected, comprehension might be challenged.

Analyzing the programs' formal features, it was found that the content includes numerous and varied visual elements which lead to an overload that likely challenges the ability of young viewers to process the televised messages. Complexity was manifested through fast paced editing and rapid transitions between scenes, consistent with past content analyses (e.g., Goodrich et al., 2009). According to the traveling lens model (Bickham et al., 2001), and based on children's expectation that the content would be easy to process (Viacom, 2016), a medium level of complexity is optimal. But, due to their high visual complexity, children's attention to these programs may be distracted, they may be unwilling to invest the needed amount of mental effort to process the content, making it difficult for them to fully understand it.

Another significant feature was the transition between fantasy and reality. The characters' transition between these worlds involves both complex plot elements and confusing formal features, cutting across both foci of the current study. This highlights again the overload that exists in content targeting preschoolers which is likely to increase cognitive demands on young children to understand the narrative as predicted by the traveling lens model (Huston & Wright, 1989). Whereas most television content targeting children is "unreal" (e.g., animated, Lemish, 2011), the imaginary worlds within the shows' plots are even more unrealistic, at least according to the structuring criterion. That is, the imaginary worlds in the current sample often involve high technology, super powers, and no boundaries to the characters' behaviors and actions, which diverge from the characters' (and young viewers') real world. This, therefore, likely poses a double

challenge to young viewers in terms of their reality perception, their under-standing of the spaces within which plots take place, and their processing of the content as relevant to their lives (Strasburger et al., 2014). Moreover, though Wellman and Estes (1986) identified early indications for 3.5 year olds' ability to argue about an imagined cookie in television content, shows in the current sample present an even greater complexity with intra-fic-tional links and multiple fantasy worlds which are not clearly delineated. Thus, questions may arise about children's ability to make sense of the different real and imaginary content (Skolnick & Bloom, 2006).

Limitations and future research

One of this study's strengths is its in-depth qualitative analysis of television content targeting young children. However, the study did not involve an investigation of the effects of exposure to the content on young viewers. Whereas content complexity might challenge young children, it may also be related to heightened enjoyment of and involvement in the viewing (Mittell, 2013). It could also be that viewers who co-view episodes with capable adults understand the shows' meanings more fully or accurately despite the complexity involved in the content (e.g., Anderson et al., 2000). Such possibilities should be examined in future studies of the impact of the content – its plots, formal features, and their combination – on children.

Second, the unit of analysis of the current study was the episode, as a meaningful viewing unit. However, it is important to also consider the series as a unit of analysis. Young children tend to become loyal viewers of the programs they like (Viacom, 2016) and as such, their intimate famil-iarity with certain shows might help them overcome the challenges posed by any one episode (e.g., Anderson et al., 2000). As Mittell (2013) sug-gested, habitual viewers might enjoy the benefits of fully understanding the meaning that is hidden by layered complexity and which escapes the eyes of an occasional viewer.

Third, it is important to conduct quantitative content analyses to verify and support the evidence of complexity identified in this study. Finally, one of the study's contributions is in reflecting the current status in terms of complexity in children's shows, accounting for both plot and formal fea-tures. In this, the study can serve as a starting point toward the creation of a scale that links these components together and enables an assessment of complexity in children's shows. Such an index can be used to guide parents in supervising their children's content exposure and to create or adjust content rating systems, which are at the heart of current public and policy debates (Teeni-Harari & Yadin, 2019).

Funding

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