

WNET/CYBERCHASE

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WNET: *Cyberchase* and Young Children

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November, 2002

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I. BACKGROUND

Following a successful pilot debut in March of 2000, PBS launched a full broadcast schedule of *Cyberchase* in January of 2002.

Featuring an intrepid trio of children, their trusty sidekick robot bird, and a small cadre of bumbling villains, the brightly colored, animated program is targeted at eight to eleven year old children. Through the careful integration of mathematical concepts into the story line of each episode, the program has been developed with the specific goal of increasing the understanding of, and enthusiasm for, math-based learning and problem solving among children in third through fifth grade.

The program has been quite successful in reaching its target audience, earning high ratings and familiarity among this cohort. In addition, it has received positive reviews for its clarity in approaching mathematical concepts, its diverse cast, and its wacky, age-appropriate adventures.

Yet as the series has gained traction, it has become evident that *Cyberchase's* appeal is not limited to the intended age group. Based in part around its visually appealing animation, its humor, and its characters – as well as its after-school and Saturday morning broadcast schedule – the program has also attracted, and developed a loyal following among, younger viewers.

As the mathematical concepts integrated into the plot lines were created with the explicit intent of engaging older children, *Cyberchase's* inadvertent resonance with this younger audience has raised questions in the minds of the program's producers. In the main, their concern revolves around the impact that these concepts – which are deeply imbedded in the fabric of *Cyberchase* – have on the viewing experience of these younger fans. Moreover, with recent research suggesting that mathematical learning and knowledge begins far before formal instruction, the producers also questioned how the directed and targeted presentation of these mathematical concepts would resonate or impact on the mathematical learning of a viewership younger than the intended audience.

In the interest of exploring these issues, WNET engaged Applied Research and Consulting (ARC) to conduct research with pre-kindergarten, kindergarten and 1st grade students.

II. OBJECTIVES

This research took as its broad mission an exploration of how younger viewers of *Cyberchase* respond to, recall, process and/or comprehend the narrative, problem solving, and mathematical concepts presented in a typical episode of the show. In examining children's reactions to the program, we looked at their responses (across and within age and divisions) to the following questions:

Narrative

- What do children engage with and/or recall of the events that transpire in a given episode?
- What do they perceive as being the main thematic or narrative struggles?
- How do they respond to the events and characters depicted?
- How do they respond to the various narrative formats (animated vs. live-action) utilized within each episode?

Problem Solving

- How do young children respond to the Cyberchase team's efforts at resolving the problems presented in a given episode?
- How do they characterize the team's motivation to pursue these efforts?
- How do they categorize the team's problem-solving abilities?
- What do young children recall of the team's efforts at solving problems?
 - What is their engagement with these aspects of the program?
 - What is their comprehension of these aspects?

Mathematical Concepts

- How do young children respond to the mathematical concepts featured in the program?
- What do they recall of these mathematical concepts?
 - What is their engagement with these aspects of the program?
 - What is their comprehension of these aspects?
 - Are there content areas in which these concepts resound more or less strongly?

- Does young children’s understanding of the mathematical concepts presented impact on their attitudes toward or interest in the *Cyberchase* program?

III. METHODOLOGY

In order to achieve the above objectives, ARC conducted a combination qualitative and quantitative research program with young children in two public elementary schools in the New York City metropolitan area.

- Elmsford, NY: a middle-income, suburban community with a racially diverse student population.
- Jersey City, NJ: a low- to middle-income, urban community with a predominantly African-American and Hispanic student population.

Sample

- Children in pre-kindergarten, kindergarten and first grade (ages 4 through 6) were included in the study.
- Both boys and girls participated in roughly equal numbers and in mixed gender groups.
- Research locales were chosen to reflect the diversity (socio-economic, ethnic, etc.) of the program’s intended audience.

Grade distribution of sample:

Location	Pre-K	Kindergarten	1st Grade	Total
Elmsford NY	15	28	17	60
Jersey City NJ	18	22	16	56
Total	33	50	33	116

Qualitative Procedure

This portion of the research was conducted according to the following protocol:

- In order to assure a basic level of familiarity with the program, copies of two *Cyberchase* episodes – “*Codename: Icky*” and “*Snow Day, To Be Exact*” – were distributed to participating children a week in advance of the research.
 - Parents were asked to have their child watch the video at least once before the in-school research date.
 - Parents were also given a brief questionnaire in which they provided key behavioral and attitudinal data about the their children and *Cyberchase*.
- On the days of the interview, children met with researchers in small groups of two to four. In these initial mini-groups, researchers talked in-depth with children about the *Cyberchase* episodes that they watched at home, carefully transcribing and attributing their ideas and reactions.
- Following the initial mini-groups, the children watched a third episode of *Cyberchase*, “*The Poddleville Case*.” During the screening, researchers observed the children and took note of their responses to the program.
- After the children viewed the video, researchers reconvened the mini-groups. Using a variety of qualitative techniques – including retelling, role-play, projective exercises and direct questioning – researches probed for children’s reactions and responses to the various elements of the episode screened. Again, their ideas and reactions were carefully transcribed and attributed.
- Following the discussion, researchers presented the children with a set of shapes – four circles, four triangles, and four squares – and asked the children to utilize the blocks however they saw fit. Children’s responses were observed and noted
 - After this, the researcher began a pattern with the blocks and asked the children to respond to it.

Quantitative Procedure:

- As mentioned above, extensive notes were taken by each researcher, carefully detailing, transcribing, and attributing (by name, age, and gender) all of the comments made by each child interviewed.
- Following the completion of the research in both locations, the entire research team convened to share and discuss these transcriptions.
- Based on a protocol developed with elementary mathematics consultant Fran Curcio, the transcripts for each of the 116 children who participated in the study were evaluated.
- Each child's comments and reactions were coded in the interest of concretely quantifying their comprehension of the Cyberchase episode screened in-class ("The Poddleville Case"). Specifically, researchers coded children's responses to the program in terms of their level of comprehension of the three distinct categories of inquiry described above:
 - Narrative: an ability to concretely describe the action or plot of the story.
 - Problem-solving: an ability to concretely describe the idea that the *Cyberchase* team engages with and/or solves specific problems in order to achieve their goals.
 - Mathematical concepts: an ability to concretely describe the actual mathematical concepts utilized in this episode (in this case, the use of patterns or sequencing).
- Based on a discussion among the members of the research team, each child's responses were then assigned a 0, 1 or 2 for each of these three categories.
 - A 0 was assigned when it was determined that there was no evidence of comprehension within the category.
 - A 1 was assigned when it was determined that there was some evidence of comprehension within the category.
 - A 2 was assigned when it was determined that there was strong evidence of comprehension within the category.
- These data were then aggregated by grade level.

IV. FINDINGS

There was a wide-ranging familiarity with the series among young children, regardless of whether or not the child had an older sibling in the *Cyberchase* core audience age range. While some children had never seen the show prior to our placing the “at home” episodes with them, the overwhelming majority of children noted having seen the program *prior* to viewing the tapes we sent home, a claim that was borne out in their viewing behavior. Many children sang along with the theme song during viewing, pointed out the roles of various characters, and generally proclaimed their awareness of the show.

“I’ve seen this before!” –Boy, 4
“I watch this show at home.” – Girl, 6

A. Narrative

Throughout the tested age range, the great majority of the children evidenced a genuine enjoyment of the *Cyberchase* program. They eagerly engaged in conversation about the episodes they’d viewed at home, and this enthusiasm continued through the course of the research discussions regarding the episode screened in-class.

“We’re going to talk about Cyberchase, right? I like that show.” –Girl, 5

Overall, comprehension of the tested *Cyberchase* narrative (“*The Poddleville Case*”) was quite strong.

- Over 90% of the children were able to articulate a basic understanding of the narrative elements in this story (1 or 2 on a three-point scale of 0 to 2).
- 59% of the total cohort demonstrated a strong understanding of the narrative (2 on a three-point scale).

The older the child, the more readily s/he was able to demonstrate his/her comprehension of the narrative component of the show.

On a 3 point scale of 0 to 2:

- Pre-k children averaged a score of 1.24.
- Kindergarten children averaged a score of 1.4.
- First grade children averaged a score of 1.82.

- 85% of first graders demonstrated a strong understanding of the narrative portion of the show (a top-rating of 2 on our 3 point scale).

- Children in this age range seemed to comprehend the narrative of any given episode of *Cyberchase* as adhering to a particular structure. In this:
 - The villains in the story – The Hacker and his henchmen – are seen as setting up the content of the plot, and placing it in motion by somehow acting against the characters they encounter.
 - The *Cyberchase* team is subsequently placed in a new and unfamiliar setting wherein they are required to save the day, in a manner somewhat akin to superheroes.
- The story line then revolves around a “contest” between the *Cyberchase* team, and the villains in which the team has to beat the villains back in order to win.

1. Characters

- The Hacker, Buzz, Delete, Digit and Icky were the characters with the highest level of recall in the episodes viewed, though only The Hacker (herein “Hacker”) and Icky the slug (herein “snail”) were remembered by name.

“I would be Hacker.” – Boy 5

“The bad robots are funny.” –Girl, 5

“I like the bird because he can fly like a helicopter.” – Boy 6

“I loved the snail Icky, and I like Hacker. Sometimes he’s mean.” – Girl 6

- Inez, Jackie, and Matt were recalled generally as an undifferentiated team (often, “The Cyberchase”). The overwhelming majority of respondents did not remember any of them by name.

“There were three kids, the boy and two girls. They had to do cyberspace.”

–Girl, 4

“There was three. The Cyberchase.” –Boy, 5

- As such, these three characters registered mainly in terms of the central, yet functional role they played in the unfolding of the plot.

“The Cyberchase’s job is to get Hacker. They have to stop him.” –

Boy, 5

“They do their job: save the world.” –Girl, 6

- Still, the three child characters were seen (together) as having aspirational characteristics such as being intelligent or humorous.

“They solved problems, because they were smart.” –Girl, 5

“They were funny. The kids were funny.” –Boy, 4

- Notably – and in exception to the above – there was a very strong identification on the part of African-American girls with the character of Jackie. Though they did not recall her by name,

these girls were very happy to see a character that reflected their racial identity.

"I'd be the black girl." - Girl 6

"That one [points to a picture of Jackie] is me." - Girl 4

2. Episodes

“Code Name: Icky”

Children expressed a strong enthusiasm for “Code Name: Icky”, and when given the opportunity to discuss the “at home” episodes nearly universally, they wanted to speak about this episode first.

- Within the narrative of this episode, they were particularly drawn to:
 - The character of Icky (including his name);
 - The underwater food formations; and,
 - The familiar undersea characters.

“I liked the snail [Icky]. He was funny.” –Girl, 5
“Everything looked like food: hot dogs and french fries and pizza.” – Boy 4
“I saw the Little Mermaid blowing bubbles.” –Girl, 6

- The children seemed compelled by the specificity of the quest featured in this episode – to save Icky – and with the direct nature of the struggle between good and evil depicted within this struggle.

“The bad green guy wanted Icky, and the kids had to rescue him.” –Boy, 5
“They had to save the snail.” –Girl, 4

- Though children were caught up with the rescue of Icky, the struggle over “power” or “the power of Cyberspace” – which thematically underlies all of the *Cyberchase* episodes – prompted little recall or resonance.

“The bad guy tried to get Icky, but only the kids can get Icky.” –Girl, 4

- A significant number of children described a particular delight for the portion of this episode in which Icky camouflaged himself to elude Hacker.

“I liked it best when the snail was hiding.” –Boy, 4

- Children also fondly recalled the portion of the episode revolving around the use of Digit's cookbook.
 - Some children – particularly older children – seemed to understand the functional purpose of this book's use.

"That was cool the way they used the bird's book to talk to the snail." –Girl, 5

- Prompted or unprompted, children in this age range had little to no recall of the coded letter story line depicted in the *Cyberchase: For Real* segment included in this episode.

"Snow Day To Be Exact"

The recall for this plot points and narrative content of the *"Snow Day"* episode was decidedly less marked and specific than it was for *"Icky"*.

- Within the narrative, children focused mainly on the action that revolved around playing in the snow: snowboarding, slipping and sliding, throwing snowballs, etc.

"They went to where all the snow was. They were sliding." – Boy 4

"It was about snow. They had a snowball fight." – Girl 5

- Children in this age range comprehended the struggle in this episode as revolving around returning the sunisphere to its proper spot in order to make the snow and cold retreat.
 - Again, the struggle over the "power of cyberspace" had little to no resonance for these children.

"They had to put the ball back." –Girl, 4

"The bad guys stole the yellow thing, and if they don't put it back on the hill it will be cold all day." –Girl, 6

- A number of children enjoyed the performance of the seals and enjoyed the trick of using the fish to get the sunisphere back.

"The seals were throwing the ball and they gave them fish to get it back." –Boy, 5

- While the ski lift was unfamiliar to these children as a mechanism, the action that took place on it was also notable and compelling to them.

"They went for a ride on the roller coaster [sic] up the mountain." -Girl, 5

- The "Cyberchase: For Real" segment feature in this episode had no significant recall for children in this age range. Save one or two brief responses, children did not mention it.

"The Poddleville Case"

Nearly all children attended enthusiastically to this episode during its screening in their classroom, and following the viewing, eagerly related the storyline to researchers, focusing their narratives on their favorite moments.

- Almost to a one, children's most strongly recalled moments were those including humor or action, with a preference for moments containing both. These included:
 - Buzz and Delete being snapped back by the elastic;
 - The torquing and twisting of the Poddlings' houses;
 - Jackie's attempts to escape from jail;
 - The Hacker and his cronies being launched to space.

"The little robots got the rubber band." -Boy, 5

"The black girl was always trying to get out!" -Girl, 5

"The houses started to twist. They were like [makes twisting motion]." -Girl, 6

- Children were particularly compelled by the struggle over the pods ["eggs" in their parlance], and – as with the "Icky" and "Snow Day" episodes – interpreted the plot as revolving around The Hacker stealing, and the kids returning, the pods.

"Hacker tried to get all the eggs." -Girl, 6

"The kids had to stop the bad guy, and give the eggs back." -Boy, 4

- In addition, most children were extremely interested in the above described narrative "contest" between the kids and The Hacker.
 - Younger children saw this solely as a race – who could get the eggs first – while older children were more likely to interpret it more as a mental contest, a struggle to figure out how to solve the problem.
 - Again, the struggle was against The Hacker and revolved mainly around this planet and its problems, not around the power of cyberspace.

"They had to put the eggs in the hole before Hacker." -Boy, 4
"They were looking for the triangle number one and they didn't have it.
Then they were looking for the right place to put it." -Girl, 6

- The Triangle One Poddling was seen as a major player in this narrative, integral to both the plot and the problem of the story.

"The little number one triangle was their helper." -Boy, 5

"They had to use the little triangle one in because they didn't have that egg. They put her in there and that made it work." -Boy, 6

- Children enjoyed the "Cyberchase: For Real" segment, attending to it during viewing.
 - Many of the children mimicked the clapping of the host while they watched, especially when he encouraged them to join in.
 - However, very few of the children mentioned this sequence in the post-viewing discussions.

"They were playing drums to make a pattern." - Girl 5

B. Problem Solving

Children's responses to, and comprehension of, the *Cyberchase* team's efforts at engaging with, resolving and/or solving the various problems presented in the tested episode varied widely. It should be noted that for many children in this age range the concept of problem solving was not seen simply as a means to advance the narrative or plot of the episode, but rather as the overall end or purpose of the episode itself.

- Overall, 71% of children had some awareness or recall (a score of 1 or 2 on our three point scale) of the fact that problem-solving transpired in the stories.
- 42% of children exhibited a strong understanding (a score of 2 on our three point scale).

On average, children's level of understanding that problem solving was integral to the resolution of the dilemmas faced by the characters on *Cyberchase* increased directly and markedly with age.

On a scale of 0 to 2:

- Pre-k children had an average score of .76.
- Kindergarten children had an average score of 1.06.
- First graders had an average score of 1.61.

- While children had varying degrees of awareness and recall of the team's efforts at problem-solving, children across the tested age range interpreted the team's actions and reactions to the situations presented as reflecting a high degree of intelligence.
 - Many children – pre-k, kindergarten, and first grade kids alike – viewed the *Cyberchase* team members as smart.
 - Children also felt that they could learn something from these characters.

"They're smart." –Boy, 4

"This one [points to Inez] is the smartest. She's got glasses." –Girl, 4

"They [the Cyberchase team] teach you stuff." –Boy, 6

- As mentioned above, the struggle or competition between good and evil was an important and engaging underpinning to the narratives presented for children in this age range.
 - In this, many children understood and related the idea that the *Cyberchase* kids (and their adversaries) have to figure

things out or solve riddles in order to win and/or achieve their goals.

"The kids had to use pictures in the book to match to the food. They used the pictures to get Icky." -Boy, 5

"The bad guys tried to figure things out, but they didn't." -Girl, 5

- While they may not have fully comprehended the reasoning that underlay the decisions the characters made when confronted with problems, many children throughout the tested age range related to and connected with the intentional, cause and effect nature of these decisions.
 - Children understood that there was a thoughtful strategy motivating characters' decisions, rather than simply instinct or reaction.

"They had to put shapes on the wall to get in the gate." -Girl, 4

"The kids got Icky back with numbers." -Boy, 4

C. Mathematical Concepts

Children's responses to, and comprehension of, the specific mathematical concepts presented in the episode tested varied widely across the tested age range as well.

- Overall, 65% of children had some awareness or recall (a score of 1 or 2 on our three point scale) of the specific mathematical concept (the use of patterning) presented in the tested episode.
- 35% of children exhibited a strong understanding (a score of 2 on our three point scale) or comprehension of the role of this mathematical concept.

On average, children's level of understanding of the use of patterning and the mathematical skill or concept upon which this practice is predicated increased directly and markedly with age.

On a scale of 0 to 2:

- Pre-k children had an average score of .48.
 - Kindergarten had an average score of 1.00.
 - First grade children had an average score of 1.58.
-
- Many of the children who expressed an understanding or comprehension of the nature of this mathematical concept were also able recognize and recall the key manner in which it served the narrative elements of the episode's plot.

"The kids knew what to do because they solved the pattern." -Girl, 4

"The kids made the right pattern and saved the world." -Boy, 6

- Above and beyond recognition, many children were able to define and extrapolate upon the practice of patterning demonstrated in the episode.

"They used patterns. A pattern is when something is the same, then different, then the same again. Like the same eggs with different numbers." -Boy, 6

"They put the numbers and shapes in order, like the pattern. They needed the right eggs to solve the pattern, to put them in the right places."

-Girl, 5

- A number of children recognized that what was being presented to them – integrated into the narrative of this show – was, quite simply, mathematics.

“It’s a math game.” –Boy, 6

“They did some math and found out how to do their pattern.” –Girl, 6

- The mathematical concept presented in this episode seemed much more approachable and comprehensible to children in this age range than those presented in the “at home” episodes.
 - This was evidenced by children’s wider recall for, and understanding of, the mathematical concept presented in this show as compared to the others.
 - Of the other two episodes presented, the code-based mathematical concept in the “Icky” episode was much more readily understood by children in this age range.

“They made a code from the cookbook. The places looked like food.” –Girl, 5

“They flashed their lights to tell the snail which picture to use.” –Girl, 6

- The concept of estimation featured in “Snow Day” was much less readily comprehended. Very few children noted or understood its practice or meaning in the episode.
- Notably, children’s level of awareness, recall, understanding or comprehension of the mathematical concepts utilized in any of the tested *Cyberchase* episodes seemed to have very little impact on their attitudes toward or interest in the program overall.
 - Children who gave little to no indication of comprehending the concepts presented still enjoyed viewing the program, and children with a great degree of understanding did not seem to enjoy the program any more or less because of this.

“I like that show!” –Boy, 4

“It [Cyberchase] tells you that patterns are fun.” –Girl, 6

- Following their viewing of the episode, the researchers presented children with the opportunity to utilize a set of color-coded shapes.

- Given this opportunity, many children – especially younger children – utilized the shapes to create representations of familiar objects such as houses, ice-cream cones, and people.
- Other children – especially older children – created patterns (unprompted) with the shapes, laying them out in a repeating sequence.
- Some children utilized this opportunity to mimic patterns shown in the program such as those on the squak pad (when Matt and Inez were trying to gain access to the Podlings' gate), or those used during the closing sequence (when Jackie and The Hacker were competing to enter the power dome).

"Look, [points at repeating sequence], a pattern!" –Girl, 4
"I did triangle, circle, square, square; triangle, circle, square, square, like on the show." –Boy, 6

- Many children related to or understood their work with these pattern blocks – whether creating patterns of their own, or continuing patterns created by the researcher – as a game, and/or an extension of the activities featured on the episode.

"We're playing a pattern game!" –Girl, 6
"[Pointing at peer making a pattern] That's a Cyberchase game. Making patterns." –Boy, 5

- While their actions cannot be tied solely or directly to their viewing of the program, a connection was noted between the viewing of the video and the post-viewing enthusiasm for pattern-making.

"Shapes! Patterns! Patterns! I want to make a pattern!" –Boy, 6

- When given the chance to express a favorite or intriguing portion of the show through drawing, many children also relished the opportunity to draw patterns of their own.

"Look, it's a pattern. I'm drawing flower, circle; flower, circle." –Girl, 6

- A few children made the connection between the pattern concepts depicted in the animated section and the musical patterns demonstrated in the *Cyberchase: For Real* portion.
 - For the most part, children in this age range did not mention a theoretical or conceptual relationship between these two portions of the episode.

"They're doing music patterns." -Girl, 6

D. Parent Assessments

This study produced an unusually high percentage of completed parent questionnaires, with a 42% return rate.

- Parents named a range of television programs and videos of which *Cyberchase* reminds them, including:
 - Sesame Street
 - Dragon Tales
 - SpongeBob Squarepants
 - Dora the Explorer
 - Blues Clues
 - The Little Mermaid
 - Jimmy Neutron
 - Arthur
 - ZOOM
 - The Magic Schoolbus
 - Rocket Power

- Parents offered a variety of clear explanations for why they associated *Cyberchase* with these programs. Nearly all of their associations revolved around attributes they considered positive, such as the program's:
 - Educational content
 - Messages/lessons
 - Problem solving

"In one way it reminds me of Dora since they're both very educational."
Parent of Boy, 4

"It reminds me of Arthur and Dragon Tales because of the way the characters help each other and learn valuable life lessons." – Parent of Girl, 4

"It's like Dragon Fly, since they have to deal with clues and numbers."
Parent of Girl, 5

- 55% of parents reported that their child watched the video tape "a few times," and 12% reported "many times" with the remainder replying "one time" or declining to answer.

"He wanted to watch it over and over and over again." –Parent of Boy, 4

"She only watched it once, but she liked it, and asked if she could see the tape again." –Parent of Girl, 5

- 76% of parents reported that their child talked to them about the program after having watched it.
- The parents whose children spoke about the program noted the following areas of appeal in their child's estimation:
 - The Hacker
 - Other characters (mainly Digit and Icky)
 - The math or problem solving agenda
 - The fact that the kids – in particular the girls – on the show are intelligent.

"She liked that the girls are smart." –Parent of Girl, 5

"He liked the character Hacker." –Parent of Boy, 4

"She liked solving the number code." –Parent of Girl, 6

- 12% of parents also reported that their child played *Cyberchase* make-believe.

"She got in a box and said, I'm going to find Icky." –Parent of Girl, 5
"She played that they have to figure out the code." –Parent of Girl, 6

- When asked if they would encourage their child to watch the program, 78% said "yes," usually citing the educational content and the reflection and reinforcement of the positive effects of teamwork.

"By watching this cartoon he's going to be learning at the same time."
–Parent of Boy, 4

"I appreciate how the show introduces computer and math concepts in a simplistic and entertaining way." –Parent of Girl, 4

- A few parents also took this opportunity to applaud the program's lack of violence.

"It has action and adventure without weapons and violence." –
Parent of Boy, 5

V. SUMMARY

Narrative:

- Young (4-6 year old) children have a wide-ranging familiarity with the series *Cyberchase* regardless of whether or not they have an older sibling in the core audience age range (8-11 years old).
- Children in this age range seemed to comprehend the narrative of any given episode of *Cyberchase* as adhering to a particular structure. In this:
 - The villains in the story – The Hacker and his henchmen – are seen as setting up the content of the plot, and placing it in motion by somehow acting against the characters they encounter.
 - The *Cyberchase* team is subsequently placed in a new and unfamiliar setting wherein they are required to save the day, in a manner somewhat akin to superheroes.
 - The story line then revolves around a “contest” between the *Cyberchase* team, and the villains in which the team has to beat the villains back in order to win.
- Overall, comprehension of the narrative in the *Cyberchase* episode tested was quite strong.
 - Over 90% of children were able to articulate a basic understanding of the story.
 - 59% demonstrated a strong understanding.
- The older the child, the more readily s/he was able to demonstrate his/her comprehension of the narrative component of the show. On a three point scale (0 to 2):
 - Pre-K children averaged a score of 1.24
 - Kindergarten children averaged a score of 1.4
 - First graders averaged a 1.82.
 - ◆ 85% of first graders received a top score of 2.

Characters:

- The villain (The Hacker), the side-kicks (Buzz, Delete, Digit), and some incidental players (Icky, the Triangle-1 Poddling)

were the individual characters most often recalled by children in this age range.

- The central child characters (Inez, Jackie, and Matt) were viewed aspirationally as smart or funny,
 - Yet based on the episodes viewed, they remained generally undifferentiated to children in this age group, and were recalled mainly for their central and functional role in the unfolding of the plot.
- Notably, there was a *very* strong identification on the part of African-American girls with the character of Jackie.

Episodes:

- Children evidenced a genuine enjoyment of the *Cyberchase* program, eagerly engaging in conversation about the episodes they viewed at home, as well as the one screened for them in-class.
- Children were compelled by the three episodes screened to varying degrees. Ranking children's overall level of interest and engagement with the three episodes screened, they would be, in descending order:
 - "*The Poddleville Case*"
 - "*Code Name: Icky*"
 - "*Snow Day, to be Exact*"
- Young children were most compelled by the portions of the screened programs that featured humor or action, and were particularly interested in those segments that contained both.
- They also strongly identified with the narrative struggle of the *Cyberchase* team against Hacker, and viewed this as a fight or contest between good and evil.
 - Episodes in which this struggle took as its focus the rescue or saving of a specific sympathetic character (such as Icky) were particularly compelling to children in this age group.
- Prompted or unprompted, children had little recall for the live-action *Cyberchase: For Real* segments which ended each episode.

Problem Solving:

- Children's responses to, and comprehension of, the *Cyberchase* team's efforts at engaging with, resolving, and/or solving the various problems presented in a given episode varied widely across the tested age range.
 - Overall, 71% of children had some awareness or recall of the fact that problem solving transpired in the stories.
 - 42% of children exhibited a strong understanding of this.
- On average, children's level of understanding that problem solving was integral to the resolution of the dilemmas faced by the characters increased directly and markedly with age. On a scale of 0 to 2:
 - Pre-K children averaged a score of .76
 - Kindergarten children averaged a score of 1.06
 - First graders averaged a score of 1.61
- For many children in this age range the concept of problem solving was not seen simply as a means to advance the narrative or plot of the episode, but rather as the overall end or purpose of the episode itself.
- Regardless of their level of comprehension or recall of the concept of problem solving, children throughout the tested age range interpreted the *Cyberchase* team's response to situations as reflecting a degree of thought or intelligence.
 - In this, many children understood and related to the idea that the *Cyberchase* kids need to figure things out in order to achieve their goals.

Mathematical Concepts:

- Children's awareness of and responses to the specific mathematical concept (patterning) presented in the tested episode varied widely across the tested age range as well.
 - Overall, 65% of children had some awareness or recall of this concept.
 - 35% of children exhibited a strong understanding or comprehension of the role of this concept in the episode.

- Children’s level of understanding of the use of patterning increased directly and markedly with age. On a scale of 0 to 2:
 - Pre-K children averaged a score of .48
 - Kindergarten children averaged a score of 1.0
 - First graders averaged a score of 1.58
- The mathematical concept of patterning had the highest level of recall. (It should be noted that this was the episode screened in-class for children, and was discussed immediately following this screening.)
 - Of the two “at home” episodes, children had greater recall of the code-based concept in “*Icky*” than that of estimation presented in “*Snow Day*”.
- Children’s level of awareness, recall, understanding or comprehension of the mathematical concepts used in a given episode seemed to have little or impact on their high level of overall interest in the program.
- In their play and drawings following the screening of the tested episodes, children returned to the math-concept (patterning) presented, and many of them (particularly the Kindergarten and 1st grade children) indicated their enjoyment of working with this concept.

Parent Assessments

- Parents were generally very positive in their responses to the *Cyberchase* program, singling out its educational content, its positive messages, its lessons about teamwork, and its focus on problem solving among its key equities.
- Three quarters (76%) of parents surveyed reported that their child discussed the program with them at home subsequent to having watched it
- A high proportion (78%) of parents said that they would encourage their child to watch the show, citing the above mentioned reasons – as well as the absence of violence and weapons in the program – as influencing their decision.

**Summary of Quantitative Research Findings:
(average scores by grade level; scale of 0-2)**

	Narrative	Problem Solving	Mathematical Concepts
Pre-K	1.24	.76	.48
Kindergarten	1.4	1.06	1.00
1st	1.82	1.61	1.58