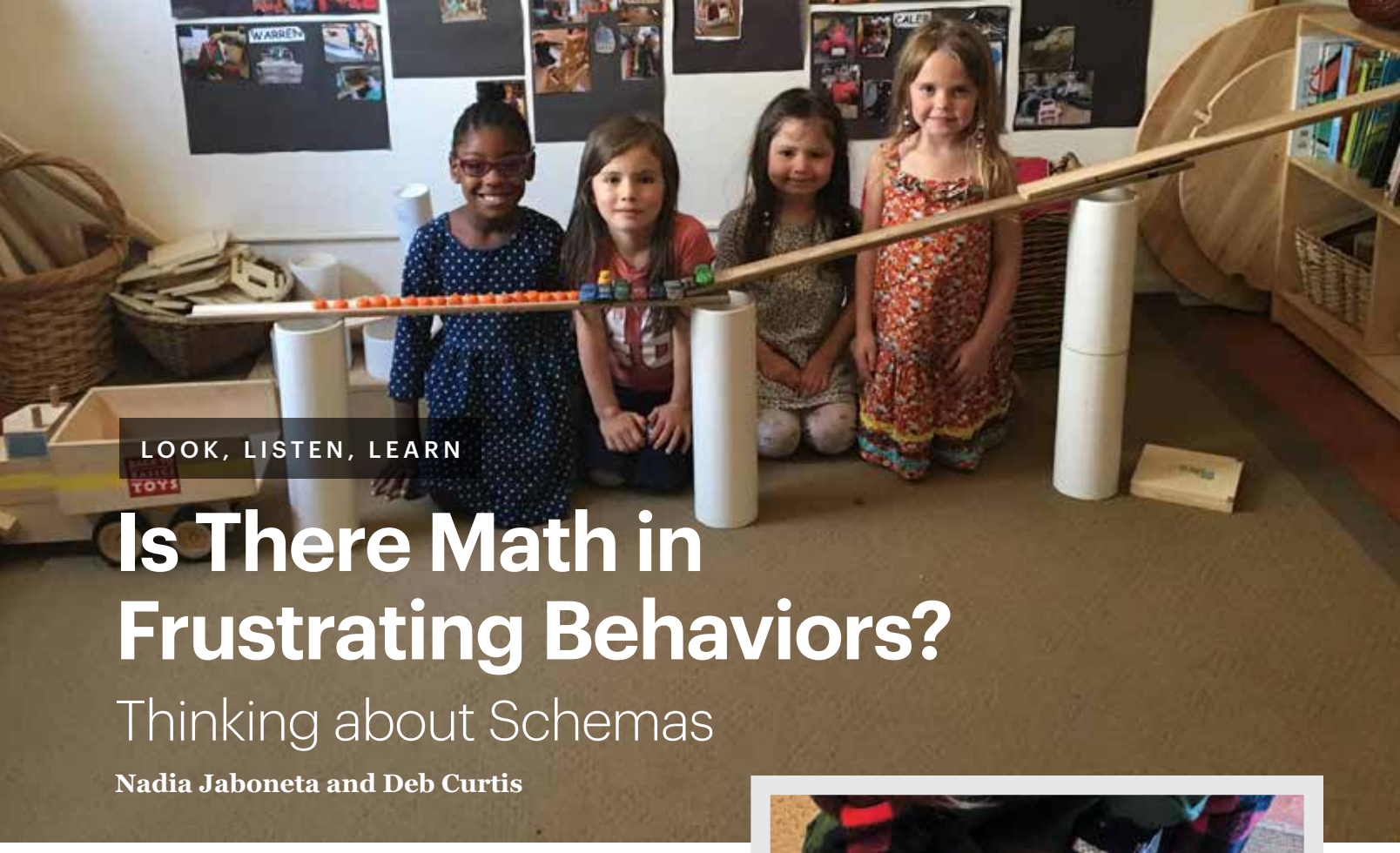


LOOK, LISTEN, LEARN

Is There Math in Frustrating Behaviors?

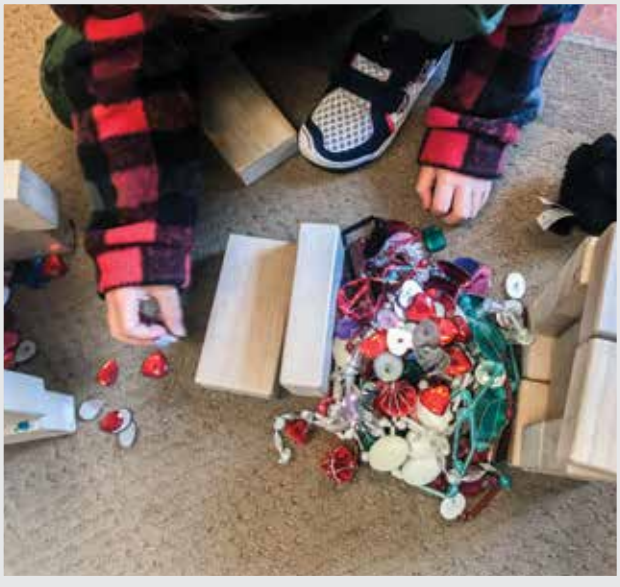
Thinking about Schemas

Nadia Jaboneta and Deb Curtis

Read the following story and teacher reflections, and use the Reflective Questions on page 26 to deepen your thinking and shape your teaching practices.

During our years as preschool teachers, we've found that some of children's daily actions can be frustrating. Perhaps you've felt the same when children . . .

- Dump out all the toys in a container, making a giant pile on the floor
- Put small items into purses or different containers, making them hard to find and use for their intended purposes
- Move toys and materials from place to place, with no obvious plan for using them
- Paint their hands and arms
- Paint over a picture they just finished, leaving no trace of their beautiful original work
- Destroy a jelled mold or ice form created for a science experiment
- Mix different paints into paint containers that had been carefully organized by color



- Crash a carefully built block structure—their own or a peer's
- Tilt back on chairs, risking a dangerous fall

It seemed that no matter what we did or said to stop these behaviors, children continued to engage in them. We spent a lot of time and energy acting like a preschool police force to keep these disruptive actions to a minimum—until we learned about schema theory.

Psychologist Jean Piaget described a schema as a thread of thought that is demonstrated by repeated actions and patterns—it appears in children's play and art. These repeated actions suggest that children's play is a reflection of deep, internal, and specifically directed thoughts. When children explore schemas, they build their understandings of abstract ideas, patterns, and concepts. Some schemas we've seen children explore include:

- **Transporting:** Picking things up, moving them, and putting them down (dumping books out of the book basket)
- **Transforming:** Discovering how materials can change their shape, color, or consistency (chipping at Styrofoam balls, squashing playdough and clay, mixing paint, making mud)
- **Trajectory:** Exploring horizontal, vertical, and diagonal movement (standing on and jumping off chairs, tables, milk crates; zooming cars and rolling balls across the floor)
- **Scattering:** Using arms or legs to scatter things (knocking materials off shelves and tables)
- **Rotation and circularity:** Experimenting with things that spin, turn, and roll (spinning themselves, spinning wheels, throwing balls) and exploring curved lines and circles (drawing, painting, shaping clay)
- **Enclosing and enveloping:** Surrounding objects with other things, such as blocks, or getting inside a defined area, like a box (filling up containers; hiding, covering, or wrapping up themselves or objects)
- **Connecting:** Joining things together and tying things up (lining up objects, stacking blocks, using tape to attach things to each other)
- **Orientation and perspective:** Exploring themselves or objects from different angles (climbing on objects, hanging upside down from bars, looking through holes and transparent objects, laying down while building, crawling under tables)

Deb's and Nadia's reflections:

When we started observing children's play with schema theory in mind, we began to see patterns in almost everything children did. We realized that some actions—ones we had often found challenging and tried to stop—have significance that we hadn't understood before. For example, when Ella throws a toy airplane to make it fly, we now understand that she is demonstrating a trajectory schema. So we find ways to support her schema explorations, such as flying paper airplanes outside rather than stopping them indoors.

A **schema** is a thread of thought that is demonstrated by repeated actions and patterns.

Reflective Questions

Use the following questions from the Thinking Lens™ to reflect alone or with a colleague.

Know yourself

- What repeated patterns in children's play have you found frustrating? How have you responded? What impact have your responses had on children's play?
- How does understanding schemas help you think about the differences between how children and adults see the world?

Find details of children's competence

- Which competencies do you think are reflected by children's persistent drive to explore schemas? Which competencies do each of the schemas reflect in children?

Seek children's points of view

- In what ways might children understand the schemas they explore? How do you think children see themselves and each other in these moments?

Examine the environment

- Study the photos from Nadia's classroom on pages 24 and 25. What do you notice about the kinds of materials that invite schema play?
- Observe children at play in your own environment. What materials and equipment do you have that encourage children's schema explorations? What might you add to enrich children's schema play?

Consider opportunities and possibilities for next steps

- Provide children with open-ended materials that invite exploration of schemas. Observe and document children's interactions with the materials to identify when they are engaged in exploring schemas. What new understandings and ideas do you have as a result of your observations?
- What can you do to support children's schema explorations?

When we realized that dumping things out of containers and knocking things off of shelves are threads of thought children use to develop understanding, we became more curious and less bothered by these behaviors.

We have also learned that many of the schemas children explore relate to math concepts that are important for developing academic skills. Children learn math concepts during play. They describe and compare the sizes of objects, investigate dynamics, study spatial relationships, and explore motions, such as flipping. With our knowledge of schema explorations, we see the important connections between children's schema play and the math knowledge they will need.

Some of these behaviors are still challenging to deal with. But we keep in mind that when children explore, they are learning the rules, bounds, and possibilities of the world. And so they act on surprising and unusual ideas that continue to alarm or delight us.

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Photographs: Courtesy of the authors