

# Brown eggs and ham

## Colorblind children encounter unseen challenges in the classroom

By Joss Fong | Posted February 4, 2013



A Valentine made in school by a colorblind child  
[Image credit: Karen Rae Levine]

As a kindergartner at Green Acres Elementary in Lebanon, Ore., William Jeffrey Harding failed a scholastic aptitude test and was placed in special education. His parents, having observed their son's abilities, asked to see the test and discovered that the questions were color-based: "How many green crayons are in the picture? How many red?" But William is colorblind.

Though he was promptly reassigned to the appropriate classroom, Harding faced a series of challenges in school. When he colored with the wrong crayons, teachers thought he was being insubordinate. On St. Patrick's Day, he went home with bruises, having worn a brown shirt that looked perfectly green to his eyes.

"I can't tell the difference between green and brown and I often wonder if purple is a real thing," said Harding, 32, now a market researcher living in

Seattle. "To me, my colors are the only colors."

An estimated one in 12 boys and one in 200 girls in the United States have a red-green color vision deficiency (CVD). This comes from a hereditary gene mutation that disables or alters some of the light-sensitive cone cells in their eyes, making it difficult to distinguish certain greens, reds, browns, oranges and yellows. While this is only a minor obstacle for most affected children, it does put them at a disadvantage in certain contexts – especially at school. Despite the prevalence of colorblindness, however, there are few systems in place to minimize the confusion and frustration that these students may experience in the classroom.

"Everything is color-coded in kindergarten," said Karen Rae Levine, who raised a colorblind son and wrote a book called "All About Colorblindness" to increase awareness among kids, teachers and parents about situations that are problematic for colorblind students.

Grade school educators often use colors to communicate concepts and organize their classroom space. When Levine discovered her son Andrew's color vision deficiency, she worked with his teachers to make adjustments such as changing the color-based system for marking the tables in the classroom. Instead of colors, they used shapes.

"Children don't know that they're colorblind, so they can't say to somebody, 'I don't understand that because I can't see the colors,'" said Levine. "To a four or five year old, they assume everybody sees the way they do, and so they think that they must be stupid."

To avoid misunderstandings in the classroom, teachers need to know which of their students are colorblind. Often, however, even parents do not know their children have color vision problems unless they have them tested at the doctor's office. Most states require school children to undergo vision screenings, but they focus primarily on the sharpness of their eyesight.

The National Association of School Nurses says "screening for color vision anomalies is important to a child's educational success and quality of life," but only 12 states require such tests. Children would only need to be screened once for colorblindness, and if they're not tested at school, they probably won't get tested at all, said James Bailey of the Southern California College of Optometry. "To me, it's a problem that's largely been overlooked."

Jeff Klein, an optometrist who helped rewrite Nebraska's vision screening guidelines, said color vision testing is not required in his state because

colorblindness affects a small number of children and cannot be treated or corrected. The testing materials are also an added cost. Klein said Nebraska's new guidelines recommend but do not require color vision screening.

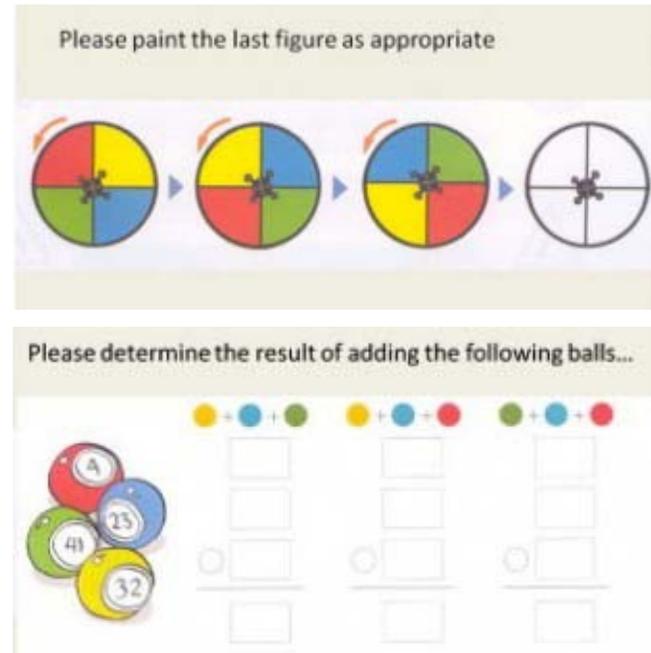
"There's always a significant pause before adopting anything that would be perceived as a mandate or an additional burden when it comes to something as specific as colorblindness screening," said Rachele Chiang, a health policy associate at the National Association of State Boards of Education, which does not take a position on color vision screening. She said there are inconsistencies between the states on just about any education policy because of varying levels of tolerance among lawmakers for detailed mandates. And unlike bullying, school food and concussions, this issue hasn't been a priority for the public or for prominent advocacy organizations, Chiang said.

But without screening, teachers may misinterpret the difficulties colorblind students have on certain tasks as learning disabilities or behavioral problems and start treating them with lowered expectations, warns T.J. Waggoner of TestingColorVision.com, a website that offers information and sells a color vision test. "The first thing kids are learning in school is your colors. If you have trouble on those activities, are the teachers going to treat you differently?" he asked. Waggoner, who is colorblind, recalls being disciplined for cheating in school when he had to consult another student to identify the color of a solution in chemistry class.

A 2005 study conducted in Spain found that teachers who did not know which of their students had color vision deficiencies rated the colorblind children as less competent even though they performed just as well on tasks that did not rely on color vision. The study, which involved testing 1,039 pre-school students for colorblindness, reported that "in most cases the response of both parents and teachers to the diagnosis of a child's colour vision anomaly was one of surprise, even disbelief."

Even if teachers know which of their students have a color vision deficiency, they likely use materials that were not designed to be accessible to colorblind children. Researchers at the Technical University of Catalonia, also in Spain, examined 24 of the most commonly used textbooks for five to seven year old children in the region and found that 10 percent of the tasks in the math books "would be very difficult or impossible to solve" for colorblind students. The authors found that "efforts to design CVD-friendly teaching materials and resources are scarce." A search of the ERIC education research database

indicates that this type of analysis has not been conducted for textbooks in the U.S.



Color-based tasks from textbooks in Spain  
[Image credit: Genís Cardona]

Some textbook companies responded to the Spanish study, published in 2011, by labeling the relevant pages "not suitable for children with color deficiencies," according to study author and optometrist Genís Cardona. Other companies opted to change the tasks altogether. Using patterns, labeling with text and carefully choosing high contrast colors can usually fix the problem.

The bottom line, according to advocates, is that students need to be tested for color vision problems very early on. Not only would universal screening improve the educational experience of colorblind children, but it could also help them avoid hardship later on in life.

"I can't tell you the thousands of males that I have run across in my career who all they have ever wanted to do is be a police officer or firefighter," said Bailey of the Southern California College of Optometry, "and they're physically well qualified, they passed all the written exams, mental tests, et cetera. But the medical requirements for the job don't allow any deficiency of color vision, and all of a sudden they find out that they're colorblind."