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INFECTION DETECTION: CHILDREN AVOID SICK FACES

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YOUNG REVIEWERS:

ISAAC
AGE: 15

LOUIS
AGE: 11

MARK
AGE: 10

MAYUR
AGE: 8

Staying away from germs helps humans stay healthy and avoid dangerous sicknesses. People avoid other people who look or act like they might be feeling sick. For example, adults know when someone is sick just by looking at their face, and they can avoid going near sick people. We wanted to know whether children recognize sick faces. In our study, we asked 4–5-year-olds, 8–9-year-olds, and adults to look at photos of people and decide who was feeling sick and who they wanted to sit next to. Just by looking at the faces, 8–9-year-olds and adults could tell who was feeling sick and said they wanted to sit next to healthy people more than sick people. This study helps us understand that children can recognize and avoid sick faces just like grown-ups can, and that they get better at these skills as they get older.

HUMANS AVOID GERMS THAT MAKE THEM SICK

GERMS

Tiny organisms we can only see with a microscope. Germs can live on surfaces and float in the air. They can make us feel sick when they enter our bodies.

SICKNESS AVOIDANCE

Staying away from someone who is sick or something that can make us sick, like vomit or used tissues.

Do you ever get grossed out when you see someone coughing without covering their mouth? When you feel yourself react, there is a good reason. Over human history, **germs** have shaped how we interact with other people. Humans naturally want to be around other people, but interacting with everyone we see could be dangerous. Think of how many people you see each day. If one of those people was feeling sick, their germs could spread and make you sick too, if you get too close to them.

As children get older, they learn to keep away from sick people, which is called **sickness avoidance**. These actions can help stop germs from getting inside our bodies. One study found that 5–9-year-olds would prefer to be near someone who is wearing a clean shirt rather than someone who is wearing a shirt with vomit on it [1]. Another study pretended that there was one healthy person and one sick person that children could play with [2]. In this study, younger children (4–5 years old) spent an equal amount of time playing with both people. Younger children may not know that they can get sick from going near a sick person. They may need more help understanding how to stay away from germs. The older children (6–7 years old) spent more time playing with the healthy person compared to the sick person. Older kids seem to understand that playing with a sick person can get them sick. However, in all these previous studies, the people were not actually sick. So, we wanted to know: what happens when children look at *actual* sick people?

RECOGNIZING SICKNESS

SICKNESS RECOGNITION

The ability to tell that someone is feeling sick.

Sometimes, people can tell that others are feeling sick by the way they sound, smell, or move, which is called **sickness recognition**. Adults can also tell if someone is feeling sick just by looking at their face [3, 4]. Faces may help us to know when someone is sick with a disease that can be spread through germs. In our study, we wanted to know whether children can recognize and avoid sick people just by looking at pictures of their faces.

DO KIDS RECOGNIZE SICK FACES?

First, we asked 22 people to take one picture of their face when they had a sickness that could be spread to other people through the air, like a cold, flu, or COVID-19. We also asked them to take another picture of their face when they were feeling better (Figure 1). Then, we showed these faces to 4–5-year-olds, 8–9-year-olds, and adults. We included children who were 4–5 years old (we will call them the younger kids) and children who were 8–9 years old (we will call them the older kids)

because we wanted to know when the skill to recognize and avoid sick faces first appears and whether it improves with age.

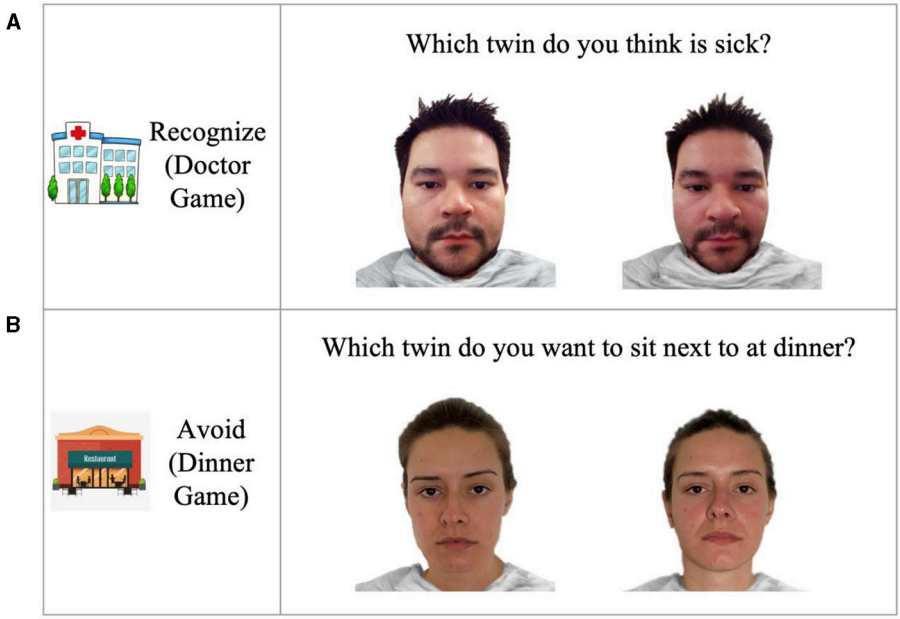

Figure 1

Examples of sick and healthy faces. **(A)** In the doctor game, we wanted to know about kids' ability to recognize sick faces. **(B)** In the dinner game, we wanted to know whether kids want to avoid sick faces. Can you tell which photos were taken when the people were sick? If you picked the right face in **(A)** and the left face in **(B)**, you are correct! Notice that the backgrounds are blank, and we gave everyone the same shirts, so there were no distractions from the faces.

In the doctor game (Figure 1A), we showed the kids pictures of a sick person next to a healthy person. We explained that these two faces were from twins. We did not tell the participants that the faces were actually pictures of the same person. We wanted to make sure that the participants were looking at the faces instead of other parts of the pictures, so we gave everyone the same shirts and erased the background. Then, we asked the participants, "Which twin do you think is sick?". This helped us test whether participants could pick the sick person.

Figure 2A shows that, on average, most of the 8- to 9-year-olds and all the adults could correctly choose the sick person the majority of the time. On average, older kids (8–9 years old) were 63% accurate and adults were 75% accurate over the 22 sets of pictures they looked at, which is more than if they guessed randomly (50% accurate). You can think of these scores like the scores on a test that you take in school: the scores for each person in each game are shown by the dots. If a person got 100% of the questions correct (a perfect score), that would mean that they always recognized and avoided the sick faces and their dot would be at the very top (at the 1.00 line). Impressive! On the other hand, if a person got 0% of the questions correct (all questions wrong), that would mean that they never recognized or avoided the sick faces and their dot would be at the very bottom (at the 0.00 line). Uh oh! These results tell us that older kids and grown-ups can tell when someone is feeling sick just by looking at a picture of their face.

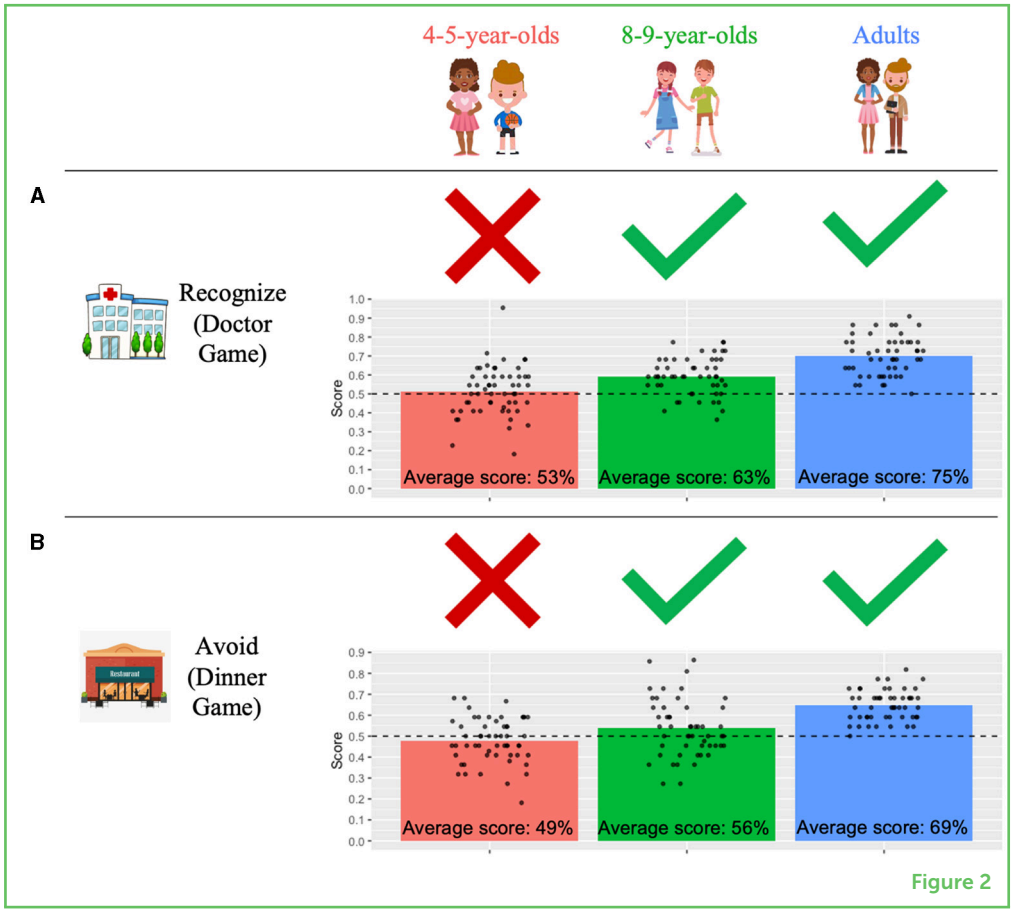

Figure 2

Scores in **(A)** the doctor game and **(B)** the dinner game. Each bar shows the average score of everyone in that age group, with each person represented by a dot. Dotted lines at 0.50 show the score from randomly guessing. Scores above the dotted line mean people were good at recognizing or avoiding sick faces. Scores below the line mean that people were not so good at it. Overall, younger kids did not recognize and avoid sick faces, but older kids and adults did. This means that people get better at recognizing and avoiding sick faces as they get older.

Some younger kids (4–5 years old) could tell when a person was feeling sick, which means that some younger kids may have a harder time telling when someone is sick, and other younger kids may have an easier time. You can see in the graph that one younger kid's score was better than all of the adults' scores. This kid is really good at spotting sick people, maybe because they know a lot about what sick people look like, or maybe they are really good at telling faces apart. Overall, the younger kids were only 53% accurate.

In the dinner game (Figure 1B), we showed our participants the same pictures of the sick and healthy people and asked them, "Which twin do you want to sit next to at dinner?". This helped us to see if participants wanted to go near or stay away from the sick people. We found that older kids and adults wanted to sit next to healthy people and avoid sick people. But younger kids were equally likely to sit by sick and healthy people (Figure 2B). On average, older kids were 56% accurate and adults were 69% accurate, but younger kids were only 49% accurate.

We discovered that, in general, younger kids did not identify the sick people in the doctor game or prefer to sit next to the healthy people in the dinner game. However, there were some younger kids who were really good at these games. In fact, we found that younger kids who

were good at recognizing sick faces were also good at avoiding them. These abilities may start at around 4–5 years old for some kids. Other kids may need more time and learning to get better at recognizing and avoiding sick faces. So, if you have a younger sibling, they might need your help!

We also found that adults were better at the games than older children, and older children were better at it than younger children. So, people get better at recognizing and avoiding sick faces as they get older. This improvement might be because people become more socially mature as they get older, or they learn more about germs and the people around them as they grow up.

WAYS TO STAY HEALTHY

No one likes to be sick. Everyone gets sick sometimes, but if you want to stay as healthy as possible there are several things you can do. First, you can look at people's faces to see if they are sick. Do they have tired eyes? A red or runny nose? A frown? Sometimes, people may have an illness that can be hard to see, so you can also ask them if they feel OK. The next step is to stay away from sick people. You can still talk to them on the phone or wave to them, but do not touch them.

Other ways to stay healthy include washing your hands after you go to the bathroom and before you eat, to keep germs at bay. Also, do not share drinks or food with others because that can spread germs. Finally, listen to your "gut". If you feel grossed out by something or do not feel well, pay attention to what your body is telling you!

DO YOU WANT TO TEST YOUR OWN SICKNESS RECOGNITION?

Try to see if you can figure out if the sick faces in Figure 3 are the ones in the top row or the ones in the bottom row. The answer is in the figure legend, so do not read it until you have made your guess! Hint: When people are sick, they usually have eyes that are a little bit closed and they might be frowning, like they are sad.

CHILDREN RECOGNIZE AND AVOID SICK FACES!

Our study told us that children recognize when people are feeling sick just by looking at photos of their faces. We also learned that kids know to stay away from sick people. Our research also taught us that as children get older, they get better at using people's faces to tell when someone is sick and whether they should stay away from them. So, the next time you see someone who is feeling sick, think about waving or

Figure 3

Examples of other faces in the study. The **top** row shows healthy faces, and the **bottom** row shows sick faces.

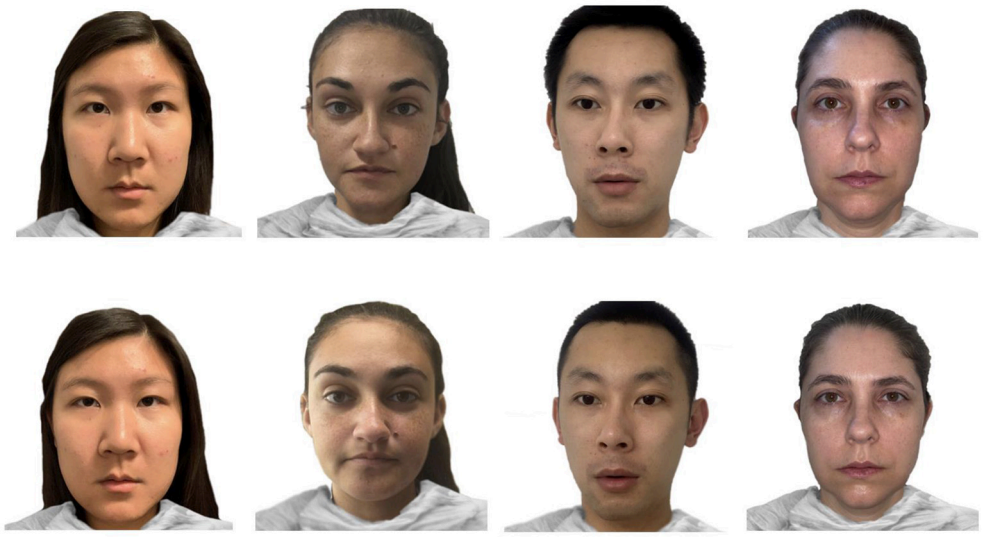

Figure 3

saying hello from a little farther away instead of going near them. That will help you stay healthy while the sick person gets better!

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CONFLICT OF INTEREST: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

YOUNG REVIEWERS

ISAAC, AGE: 15
Isaac is a 15-year-old boy. When he is not in school, you can find him playing basketball, running, reading or listening to music.

LOUIS, AGE: 11
Louis is an 11-year-old boy who likes to read, travel, and write down his dreams in his dream journal.

MARK, AGE: 10
Mark is a 10-year-old German-Indian, crazy about football and reverent about his favorite club, Borussia Dortmund. If he is not on the football pitch, he is to be found hanging out (playing football) with his friends, writing stories, and playing football on his Switch.

MAYUR, AGE: 8

Mayur is an 8-year-old German Indian, who is rarely to be found without a football in his hand. He is also crazy about crafting and spends hours putting together "inventions" from bits and bobs that he finds round the house.

AUTHORS

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Tiffany is a graduate student at the University of Miami. She is working toward a Ph.D. in psychology, and she is hoping to become a professor one day. Her research focuses on how babies and kids learn about people, especially by looking at faces. She enjoys writing about science, visiting the beach, and teaching her bunny new tricks. *tiffany6390@gmail.com

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Shantalle graduated from the University of Miami in psychology and English in 2022. She is currently working toward medical school and hopes to become a doctor to continue working with children. When she is not writing papers, Shantalle likes to go to concerts, watch TV shows, and cook up delicious meals.

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Dr. Krisztina is a professor of psychology at James Madison University. As a developmental scientist, she is particularly interested in how infants, children, and adults perceive faces. Krisztina likes to spend time with her family, watch her kids play baseball, and is a total bookworm.

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Dr. Liz is a professor of psychology at the University of Miami. She directs the developmental psychology Ph.D. program. As a developmental scientist, she studies how infants and children grow and learn. She has also worked with infant monkeys, making faces for them to imitate! She loves playing with her dogs, gardening, and watching reality TV shows.