frontiers | Frontiers for Young Minds

NEUROSCIENCE AND PSYCHOLOGY
Published: 01 July 2024
doi: 10.3389/frym.2024.1229029

WONDER-FULL HEARTS: AWE TURNS CHILDREN INTO CARING CHAMPIONS

Eftychia Stamkou [1*] ***and Dacher Keltner*** [2]

[1] *Department of Social Psychology, University of Amsterdam, Amsterdam, Netherlands*

[2] *Department of Psychology, University of California, Berkeley, CA, United States*

YOUNG REVIEWERS:

ANARA
AGE: 8

ASHER BUSH
AGE: 12

Have you ever exclaimed "Wow!" when looking at the stars, fireworks, or rainbows? This is the magical feeling of awe. Awe makes us feel small in a big world full of mysteries. Awe makes us focus on things other than just ourselves. Could awe make children more caring and helpful to other people? We tested this idea in two experiments. We showed children movie clips that made them feel awe, happiness, or nothing special. We found that children who felt awe became more helpful and caring. They counted more food items for a food drive for refugees and were also more likely to give away their chocolate treats or museum tickets to refugees. They even had a special change in their heart rates and breathing patterns. This bodily change made them feel more relaxed and connected to others. Awe is an amazing force because it makes kids kinder!

SMALL ACTS OF KINDNESS MAKE A BIG DIFFERENCE

How can children become more kind, helpful, and caring toward other people? Even small acts of kindness, like saying a nice word to

someone who is sad or sharing a little treat with someone in need, can have a big impact. Being kind to others brings a smile to their faces, makes us feel good about ourselves, strengthens our relationships with others, and may even inspire more kindness. **Prosociality**—a term that describes all these acts of kindness—makes the world a friendlier place to live in [1]. Our research examined how **awe** (the wow emotion) can make children more prosocial.

PROSOCIALITY

Being kind and helpful to others, especially those who are different from you.

AWE

Feeling amazed and small in front of something so great that takes your breath away. When we are in awe, we often exclaim "Wow!".

PARASYMPATHETIC NERVOUS SYSTEM (PNS)

The branch of the nervous system that slows your heart rate, makes you feel relaxed and safe, and helps you connect with others.

VAGUS NERVE

A major nerve that acts like a highway running through your body and connecting your brain with lots of other organs, like your heart, lungs, and stomach.

HEART RATE

The number of times your heart beats in 1 min. It shows how fast or slow your heart is pumping blood through your body.

RESPIRATORY SINUS ARRHYTHMIA (RSA)

The "special dance" your heart does together with your breathing. Your heart beats a little faster when breathing in and a little slower when breathing out.

WHAT IS AWE AND HOW CAN IT MAKE PEOPLE MORE PROSOCIAL?

Imagine standing on top of a mountain and looking down at the vast landscape. Imagine seeing dazzling fireworks bursting into a pitch-black sky. Imagine watching a spectacular sunset turning the sky into a canvas of vibrant oranges, pinks, and purples. Imagine standing at the foothills of the Pyramids of Egypt. These events' extraordinary beauty fills us with awe, an emotion that takes our breath away and can even give us goosebumps [2].

Awe is fascinating, but how can it make people more prosocial? Experiences of awe make us feel small because they remind us how vast and amazing the world is. This feeling of "small self" makes us humbler and less focused on our own needs and concerns. Awe makes us less selfish. When we are less selfish, we are more likely to consider other people's needs and reach out to help them. This is one way in which amazing, awesome things make us care about others instead of just ourselves.

Another way that awe helps us connect with others is through the changes it produces in our bodies, specifically in the **parasympathetic nervous system** (PNS). The PNS creates a cozy, safe environment for your body and mind to relax. The **vagus nerve** is an important part of the PNS (Figure 1). It is like a superfast messenger that sends signals from the brain to the heart, lungs, and other organs. When you feel calm and relaxed, the vagus nerve sends signals to your heart that tell it to speed up a little bit when you breathe in (inhalation) and to slow down a little bit when you breathe out (exhalation). This special "dance" between the **heart rate** and breathing is called **respiratory sinus arrhythmia** (RSA). RSA is an indicator of good heart health that occurs naturally when people meditate, practice yoga, do light exercise, and do other relaxing activities, but also when we feel awe!

Past research showed that, when adults felt in awe, they showed all these changes: they felt "smaller", their hearts did the RSA "dance", and they generously helped complete strangers (they became more prosocial) [3]. Could awe bring about the same benefits in children?

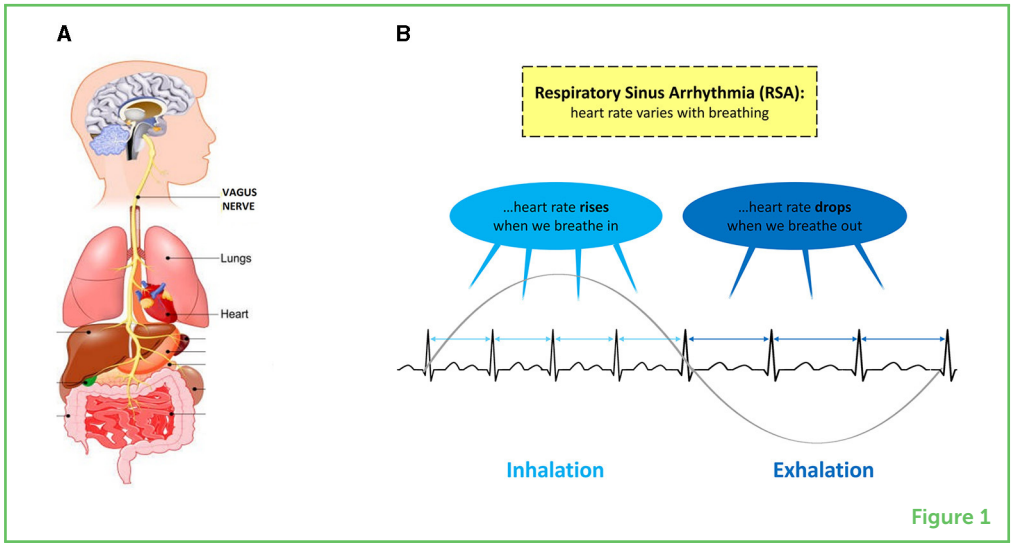

Figure 1

The vagus nerve and respiratory sinus arrhythmia. **(A)** The vagus nerve is the long nerve (yellow) that connects the brain to many other organs, such as the heart and lungs. It is an important part of the PNS, which helps us feel calm and relaxed. **(B)** Respiratory sinus arrhythmia, caused by a signal sent along the vagus nerve, is when the heart rate rises with inhalation and drops with exhalation. The spikes in the graph indicate each heartbeat. You can see that the time between beats (blue arrows) increases during exhalation.

EXPERIMENT 1: DOES AWE MAKE CHILDREN MORE PROSOCIAL?

Our research team was the first to test whether awe makes children more prosocial. We tested this idea in two experiments. The first experiment was online with 159 children. The children were between 8–13 years old. About a third of the children (55) watched a video clip that made them feel awe. This clip was from the movie "Song of the Sea", and it showed a girl becoming a seal, emerging out of the sea, and flying into the sky to transform the entire city. It was quite magical! Another third of the children (53) watched a clip that made them feel happy. This clip was from the movie "Fantasia" and showed the Greek god Dionysus throwing a big party with his friends. That was a lot of fun! The remaining children (51) watched a clip that was meant to make them feel nothing special or a neutral state. It showed a person painting a white wall while explaining how to do it well.

After the children watched their video clips, we tested how helpful or prosocial they were toward refugees, using two tasks that we called "prosociality tasks". The first prosociality task was to count food items in many long lists, to help figure out what had been donated to refugees through a food drive. We told the children that they could count as many or as few food items as they wanted and that the more they counted, the more helpful they would be to refugees. The lists were endless! We made this task boring on purpose, so the children would have to face the dilemma of spending their free time counting, to benefit refugees, or quitting, to do something more fun with their time.

After finishing this task, we gave the children a little gift to thank them for participating in our experiment. The gift was a ticket to an exciting children's museum. Here is where the second prosociality task came in. After we gave each child their ticket, we asked them whether they

wanted to donate it to a refugee family or keep it for themselves. You can imagine how hard it was to give away a gift like this!

RESULTS OF EXPERIMENT 1

We were happily surprised by the results of our first experiment (Figure 2). For the first prosociality task, we found that children who watched the awe video counted the most food items, whereas children who watched the neutral video counted the least items. Children who watched the happy video were somewhere in between. In other words, children who watched the awe video were the most helpful because they counted at least 50% more food items for the refugees' food drive than children who watched the happy or neutral videos.

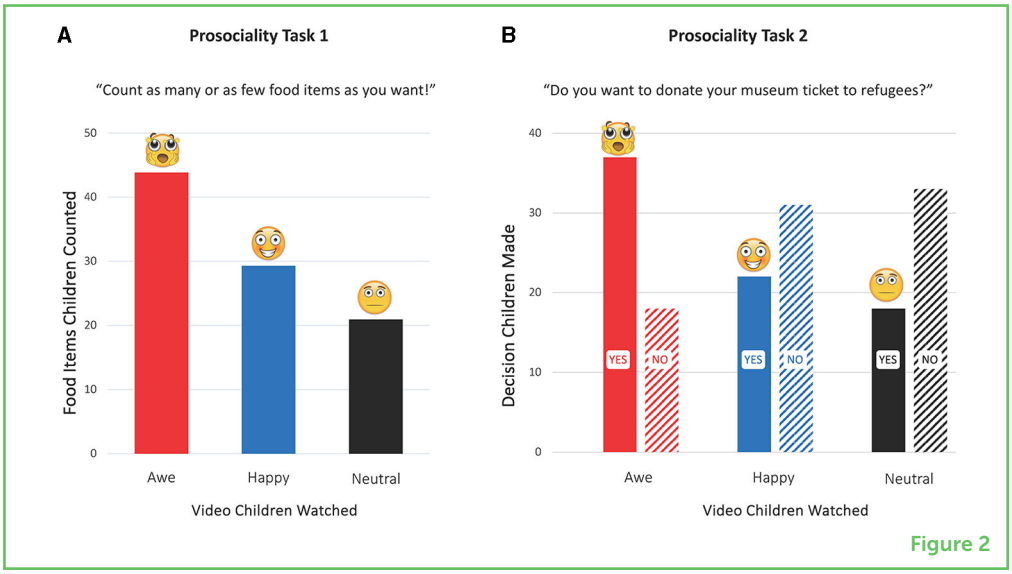

Figure 2

Figure 2

Findings from experiment 1. **(A)** In prosociality task 1, children who watched the awe video counted more food items than children who watched the happy or neutral videos. **(B)** In prosociality task 2, children who watched the awe video donated their museum tickets to refugees more often than children who watched the happy or neutral videos. Taken together, these data tell us awe made children more kind and caring toward strangers.

For the second prosociality task, we again found that children who watched the awe video made the most ticket donations to refugees, whereas children who watched the neutral video made the least donations and children who watched the happy video were somewhere in between. So, children who watched the awe video were at least twice as likely to donate their museum tickets to a refugee family than were children who watched the happy or neutral videos.

Compared to happiness or a neutral state, awe made children more prosocial toward refugees. How awesome is that?! Just watching an amazing video can help you become a caring champion!

EXPERIMENT 2: DOES AWE MAKE CHILDREN'S HEARTS BEAT DIFFERENTLY?

The results of the first experiment were encouraging, but we wanted to make sure that we could get the same results if we did the study

again. Also, we wanted to understand how awe influences children's bodily reactions. So, we did a second experiment that was live (rather than online), which allowed us to test how awe affects changes in RSA (the "special dance" of the heart rate and breathing). The setting was the NEMO Science Museum in Amsterdam, which invited us to do our second experiment as part of their *Science Live* program.

The second experiment included 384 children who were 8–13 years old. Again, the children watched one of three videos and then did the two prosociality tasks. For the second prosociality task, instead of gifting children a museum ticket, we gifted them their favorite chocolate snack. When the time came for them to decide whether they wanted to donate their chocolate snack or not, you can imagine how tough this decision was! In addition, we measured children's heart and breathing patterns while watching the video, by using sensors attached to their chests.

RESULTS OF EXPERIMENT 2

What did we find this time? For the first prosociality task (counting food items in endless lists), we found that children who watched the awe video *did not* differ from children who watched the happy or neutral videos. So, our results were not the same as in the first experiment. This probably happened because children were in a museum full of exciting things to do, so spending time counting food items on a screen was perhaps asking too much of them. Imagine being at an amusement park with lots of fun games all around. If someone asked you to sit down and do homework right there, you might find it hard to focus, right? We believe something similar happened in the museum, where the task of counting food items could not catch children's attention because exploring the museum instead was too tempting!

For the second prosociality task, however, we found very similar results to the first experiment—children who watched the awe video donated their chocolate snacks to refugees more often than children who watched the happy or neutral videos.

In terms of the bodily changes (Figure 3), we found that children who watched the awe video showed an increase in RSA by the time they finished watching the video, whereas children who watched the happy or neutral videos showed a decrease in RSA. RSA reflects the activation of the PNS. So, while watching the awe-inspiring video, children showed greater PNS activation, which made them feel more relaxed and connected to others.

CONCLUSION

Awe is everywhere: in spectacular natural scenes, the incredible abilities of animals, a virtuoso violin player, the technological

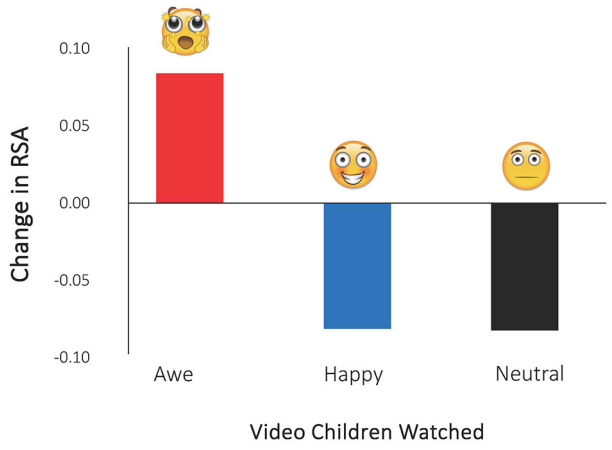

Figure 3

Findings from experiment 2. Children who watched the awe video showed an increase in RSA by the time they finished watching the video (positive value on the y-axis), whereas children who watched the happy or neutral videos showed a decrease in RSA (negative value on the y-axis). This tells us that awe made children feel more relaxed.

advancements that brought us to the moon, and the beauty of a kind, generous gesture. Awe makes us feel small in a big world full of mysteries. Awe reminds us that we are all part of a larger community. Embrace the experience of awe and let it fill your heart! Awe, in turn, can help you become a caring champion who can make this world a little better every day with small acts of kindness.

ACKNOWLEDGMENTS

This research was supported by funding by the Netherlands Organisation for Scientific Research (VI.Veni.201G.013) and the European Commission (Horizon 2020-ID 870827) awarded to ES.

ORIGINAL SOURCE ARTICLE

Stamkou, E., Brummelman, E., Dunham, R., Nikolic, M., and Keltner, D. 2023. Awe sparks prosociality in children. *Psychol. Sci.* 34:455–467. doi: 10.1177/09567976221150616

REFERENCES

1. Keltner, D., Kogan, A., Piff, P. K., and Saturn, S. R. 2014. The sociocultural appraisals, values, and emotions (SAVE) framework of prosociality: core processes from gene to meme. *Ann. Rev. Psychol.* 65:425–460. doi: 10.1146/annurev-psych-010213-115054
2. Keltner, D. 2023. *Awe: The New Science of Everyday Wonder and How It Can Transform Your Life*. London: Penguin.
3. Stellar, J. E., Gordon, A., Anderson, C. L., Piff, P. K., McNeil, G. D., and Keltner, D. 2018. Awe and humility. *J. Person. Soc. Psychol.* 114:258–269. doi: 10.1037/pspi0000109

SUBMITTED: 25 May 2023; **ACCEPTED:** 31 May 2024;
PUBLISHED ONLINE: 01 July 2024.

EDITOR: Jay Hegdé, Augusta University, United States

SCIENCE MENTORS: Mansi Shah and John Heslen

CITATION: Stamkou E and Keltner D (2024) Wonder-Full Hearts: Awe Turns Children Into Caring Champions. Front. Young Minds 12:1229029. doi: 10.3389/frym.2024.1229029

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

ANARA, AGE: 8

I live in the USA. I love reading books and drawing. My favorite books are Harry Potter, Wings of Fire, and Keeper of Lost Cities. I also love to imaginative play with my little brother. I like to learn about cultures and people around the world. My favorite subjects in school are art, STEM, and library. When I grow up, I want to be a scientist or an author.

ASHER BUSH, AGE: 12

My name is Asher Bush and I am 12 years old. I live in Peach Tree City, Georgia and am in middle school. I love the outdoors and playing video games. I have a brother and a sister and a dog. I play saxophone and love to perform in the middle school band.

AUTHORS

EFTYCHIA STAMKOU

Eftychia Stamkou is a hybrid artist-scientist: she studied music composition and psychology. As an assistant professor of psychology at the University of Amsterdam, she explores the interplay between art and society, trying to understand how art transforms our cultural worldviews. Eftychia founded the Amsterdam Arts and Social Sciences Lab (AARTSS; https://www.aartss-lab.com/) and co-founded the Art and Research on Transformation of Individuals and Societies project (ART*IS; https://artis-h2020.eu/). She often works together with artists, museums, and cultural

institutions, such as Google Arts & Culture, MovieLens, and NEMO Science Museum.
*e.stamkou@uva.nl

DACHER KELTNER

Dacher Keltner is a Professor of Psychology at UC Berkeley and faculty director of the Greater Good Science Center (greatergood.berkeley.edu). Dacher's research focuses on the biological and cultural evolution of compassion, awe, love, beauty, and humility, as well as power, social class, and inequality (dacherkeltner.com). Dacher is the author of many scientific articles and several books, including Born to Be Good: The Science of a Meaningful Life, The Power Paradox: How We Gain and Lose Influence, and AWE: The New Science of Everyday Wonder and How it Can Transform Your Life. Dacher has won many research, teaching, mentoring, and service awards, and is a member of the American Academy of Arts and Sciences. He has consulted for Apple, Pinterest, Google, the Sierra Club, and was a scientific consultant for Pixar's Inside Out and Soul and for the Center for Constitutional Rights in its work to outlaw solitary confinement.