

**APA citation of journal article:**

Kang, O., & Wheatley, T. (2017). Pupil dilation patterns spontaneously synchronize across individuals during shared attention. *Journal of Experimental Psychology: General*, 146(4), 569–576. <https://doi.org/10.1037/xge0000271>

**The Basics:**

1. What was the broad question being asked by this research project? What was the specific question being asked by this research project?
  - a. Summarize the background information on the research topic in three sentences.
  - b. What is the gap in the literature identified by the researchers? What question(s) are they trying to answer? What is their hypothesis and what should happen if the author's hypothesis is true?
  - c. What are alternative hypotheses?

Prior research suggests that people form connections by sharing emotions. Having shared physical responses and emotions can create a sense of group membership between people. However, little is known about how people act when they share attention. This research attempts to provide insight to this question by examining the relationship between shared empathy and synchronized pupil dilation patterns. The broad question asked how people demonstrate their shared attention. The specific research question asked whether shared attention between a speaker and a listener can be revealed by their synchronized pupil dilation patterns. The researchers hypothesized that synchronized pupil dilation should be predictive of levels of shared attention between the listener and the speaker. If the hypothesis is true, then the researchers should observe highly synchronized pupil dilation patterns when the listener is experiencing high levels of cognitive empathy for the speaker.

2. What experiments were done to test the hypothesis or investigate the research question?
  - a. Explain the task design – what are participants instructed to do and what is being measured? Think about the independent and dependent variables.

The researchers recruited college students and divided them into speakers, listeners, and raters. The speakers were videotaped while describing past events that are highly emotional, and the recordings were shown to the listeners and the raters. The listeners were asked to report their cognitive empathy for the speakers at the end of the recording, and the raters reported their levels of narrative salience continuously while watching the recording. Evaluations for each speaker and their levels of engagement were generated from the reported measures. Pupil dilation of the speakers and the listeners was measured throughout the course of the study. Their levels of pupil dilation were combined to generate synchronized pupil dilation patterns. The researchers believe that synchronized pupil dilation should be the strongest when the level of engagement is the highest between the speaker and the listener.

3. What evidence supports each of the conclusions?
  - a. Before you read the discussion, summarize the main findings and link each one back to the research question(s). How does each result inform the hypothesis? The result shows that highly synchronized pupil dilation patterns are observed when narrative salience is salient. This supports the hypothesis that synchronized pupil dilation serves as an indicator for shared attention. However, this pattern is only observed when the speaker is highly expressive. In addition, listener's trait cognitive empathy moderates this relationship.

4. What are the major conclusions?
  - a. What do the results add to the field? How do the researchers interpret their findings? Summarize any limitations identified by the researchers.

The results open up directions for future research. The researchers believe that there may exist factors that are unnecessary in their current study. For example, visual cues may not be needed to elicit synchronized pupil dilation.

### **The Critique:**

1. Is the paper well written? How do you know? For week 2 & later, use this space to practice headlines & summaries of the articles via tweets.

#### **###Eyes Are the Windows of the Mind: A New Study Suggests that Our Pupils Dilate in Accordance to Others When We Share Attention.**

We all know that we express emotions through our eyes as a way to form connections with others. A new study conducted by Olivia Kang and Thalia Wheatley from Harvard and Dartmouth suggests that our pupils dilate in synchronized patterns when we share attention. In their study, Kang and Wheatley recruited college students and divided them into speakers and listeners. The speakers were videotaped when talking about highly emotional past experiences. The listeners watched the recordings of the speakers, and were asked to rate the speaker at the end. Pupil dilation patterns of both groups were measured with eye trackers and were compared at the end to generate the level of synchronization. The researchers found that pupil dilation synchronization was the highest when both the speaker and the listener paid the most attention. This suggests that when we share attention with others, our pupil dilates in the same pattern as them. However, Kang and Wheatley point out that such result is only salient when the speaker is highly expressive, and is dependent on how empathetic the listener is in nature. In addition, they denote that visual cues may not be necessary to elicit synchronized pupil dilation patterns. Future research may look into how auditory cues alone affect pupil dilation.

2. Do the conclusions seem logical given the data processed? Why or why not? Another way of thinking about this: do the results adequately support the conclusions that are drawn? Are there alternative explanations for the findings? What inferences about the hypotheses and questions can be made based on these results?

While the experiment is well-designed, it is questionable whether narrative salience acts as an accurate measure of attention. In addition, the study fails to consider individual differences between the raters and the listeners, and it might be inaccurate to apply the scale the raters generated to the listeners.

3. Are the conclusions important? How do you think this relates to everyday behavior?

The conclusions highly relate to our everyday behavior because shared attention is one of the many ways we form connections with each other. This study elaborated on our physical responses to sharing attention, and opens up space for new studies to further examine issue.

4. What were the best aspects of the research presented, and how could the research be improved? Name at least one way to improve the experiment.

The study is well designed. It has high internal reliability. However, the study may be improved by asking the listeners to come up with their own ratings of narrative salience.

5. How would you follow-up this experiment or study?  
Keep up with the research of the two authors.

**Additional Resources:** What are the basic concepts that you need to know to understand the science presented in your paper? What other information or resources would help you better understand the paper? This is helpful to consider for your science communication pieces. This study is fairly easy to understand. Knowing the concepts of narrative salience and cognitive empathy would be conducive to understanding the article.

**Further Questions:**

Write at least five comments or questions about the article to discuss with the class.

1. How much is narrative salience related to attention?
2. Did the speakers rate themselves?
3. Did each listener watch only one recording, or did they watch all?
4. Why are all the speakers female? Were there a sexual difference between the listeners?
5. This is such an interesting study!