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, Vol. 146*, 569-576. doi: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?

Humans are social beings that rely on interpersonal interactions to function properly in the modern world. One way in which that interconnectedness can be displayed is through patterns of pupil dilations between pairs of people. Pupil dilations reflect consciousness, attention, and connection within human social interactions.

There is a gap in knowledge about whether or not pupillary synchrony indexes shared attention between two or more minds.

The broad research question of this project would be whether or not people in pairs experience pupillary synchrony when they share attention. More specifically, the researchers want to measure the cognitive empathy of people in pairs based on their pupillary synchrony.

Researchers predicted that collective synchrony emerged as a function of narrative content. Also, they hypothesized that temporal dynamics across two populations of listeners would be consistent.

2) What experiments were done to test the hypothesis or investigate the research question?

Participants with normal or corrected-to-normal vision and audition were recruited to serve as either Speakers, LIsteners, or Raters (raters were not eye-tracked). Researchers use eye-trackers to measure pupillary dilation. The Berkeley Expressivity Questionnaire was used to access the expressivity of Speakers. Listener's cognitive empathy was measured using perspective-taking scale of the Interpersonal Reactivity Index. The experiment was split into Speaker and Listener phrases- Speaker phase yielded video stimuli used in Listener phase. Speaker was seated 30 inches away from eye-tracker. Each Speaker was given 5 minutes to write our their memory of any event. Before videoing, each Speaker spent about a minute assessing their mindset during the event. 8 videos were chosen for Listeners to watch. Listeners, also 30 inches away from the eye-tracker during their phase, rated how engaging each speaker was. During the rater phase, raters listened to the audio tracks of the 8 narratives and made 1-9 salience value association on the continuous ratings.

3) What evidence supports each of the conclusions?

There was a significant interaction effect of Speaker expressivity and Listener empathy on synchrony of pupil dilations. The model that had pupillary synchrony as a fixed effect was not a statistically significant more variable, meaning that shared attention on its own may not be a significant

predictor of interpersonal liking. Listeners synchronized their pupil dilations with those of speakers during engaging portions of the narrative. Participants showed less pupillary synchrony during less-engaging portions.

4) What are the major conclusions?

Pupillary synchrony was the most apparent in pairs where there were expressive speakers and empathetic listeners. Listener's cognitive empathy could predict the degree of which their pupils synchronized with those of the speakers. Less expressive speakers displayed a diminishing effect on listeners' empathy. Moments of collective synchrony positively correlated with independent ratings of emotional salience. Spontaneous synchronization of pupil dilation occurs when people share attention.

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.

The paper is well written to the extent that it has a good abstract and does a good job providing explanations behind what it is they are looking for specifically. The paper does lack some basic information that would be needed to reach audiences less familiar with cognitive psychology terms. The paper also lacks some headings found in the basic structure of most scientific papers.

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?

Based on the process data, the conclusions seem somewhat logical. I would assume that pupillary synchrony is more likely to occur between two people who may have shared experiences or emotions. The results support the conclusions drawn in a basic sense.

Inference: pupil synchrony and empathy are directly correlated. You should be familiar with basic methods of conducting statistical analysis. It would be helpful to know about reverse correlation and different types of empathy.

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

I would say that the conclusions are important because it points to a specific behavior that is an indicator of empathetic attitudes, which could be a useful tool in the future with other similar studies. This study illustrates pupillometry utility for observing how minds couple in ways that support communication.

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 best aspects of the research presented were the purpose of the study and background research. This study could be improved with more clear definitions of the two types of empathy they talk about as well as better headings in the paper as a whole.

5) How would you follow-up this experiment or study?

It would be useful to follow up this study with looking what else beside emotional salience is a good indicator of the presence of pupillary synchrony.

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.

-Association of cognitive empathy with accurate social understanding and effective communication -- you should be familiar with empathy as a concept and know the different types.

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

1. Is there a graph/figure that shows the correlation between emotional salience and pupil dilation?
2. How can empathy be assessed on a numerical scale?
3. What was the specific role of the Raters in the experiment?
4. What implications do mental coupling and shared attention have?
5. How much more likely would pupillary synchrony occur in couples/dyads that have a previously established emotional connection or relationship?