

## Arthritis and the Weather

Skepticism is more than simply doubting - it is the willingness to set aside one's preconceived notions, carefully examine all the evidence, and see where it leads. This month we look at something a bit more complicated: the link between arthritis and weather.

Unlike their western counterparts, many diseases in China are named by their symptoms or causes, which can be rather unflattering. For example, Alzheimer's becomes "stupid old person disease", diabetes becomes "sugary urine disease", and autism becomes "shut inside self disease". A common type of arthritis is called "风湿性关节炎", literally, "wind damp joint inflammation".

The belief that arthritis pain is linked to the weather is rather common, although probably far more prevalent in China. Hippocrates discussed the effect of weather on various ailments in 400 BCE, and the common saying "under the weather" had to originate somewhere. Everyone probably has a relative who swears he can "predict the weather with his bones". But is it real? Let's take a closer look.

### **Expert opinion**

*WebMD* [notes](#) that a change in weather may affect joint pain, however there is no scientific consensus, and one should not move to a warmer, dryer climate specifically for arthritis. In fact, they pointed out that patients in San Diego, the mildest of climates, reported the greatest sensitivity to weather, over Nashville and cities in Massachusetts. *MedicineNet.com* [notes](#) that although the author believes that there is a link to change in weather for some people, there hasn't been much research. Arthritis Foundation [believes](#) there is a link, going so far as to provide a "[joint pain prediction](#)" based on your location. *About.com* is [neutral](#) on the subject, noting that 72% of people polled believe it does in their polls.

### **The evidence**

Based on how strongly people over the world feel about it, one would think that would be overwhelming scientific evidence for it. And yet one would be very wrong. What we have are countless anecdotes; but according to the dictionary, the plural of anecdote, is *anecdotes*, not *evidence*. For evidence, we need to go to the primary source - the actual studies.

There are surprisingly few actual studies, many of which only track patients for a short duration of time (1-3 months), and published in small journals. Of the larger and better studies, two published in *Pain* ([1999](#), [2014](#)) found the effect to be clinically irrelevant. A [double-blind study](#) from Spain found an association with temperature, humidity, and barometric pressure. A [study from Argentina](#) found different associations for different types of arthritis. A [study](#) published in *Rheumatology (Oxford)* found no meaningful association. And a [review of the literature](#) published in Brazil found a "trend to confirm the influence of weather in pain intensity", concluding with the usual "more studies are needed".

### **Why is it so difficult?**

Pain is a very difficult thing to study, mainly because it is subjective. The studies rely on self-reporting by the patients, who presumably know about the current climate conditions and weather forecast, which could influence their reporting. [Studies](#) that looked at objective measures, such as degree of inflammation, found no actual difference, which means that people claim to perceive more pain, even though physically, there is nothing different. Only one very small study done 50 years ago controlled for

variables by placing the patients in an artificial environment and found an association, but only when multiple factors were combined (rising humidity and falling barometric pressure).

### **An alternative view**

Dr. Amos Tversky (1937-1996) was a world renowned cognitive and mathematical psychologist, and his work with Dr. Kahneman won the Nobel Prize in Economics (Kahneman only, since Nobels are not awarded posthumously). He specializes in “debugging human intuition”; in fact, he showed conclusively that a “[hot hand](#)” in basketball was a myth, an unwelcomed conclusion promptly ignored by most coaches. He explains, “It is easy for humans to guess that an association exists. But testing, and if necessary, rejecting such associations tends to go against all our intuitions.”

Dr. Tversky teamed up with Dr. Redelmeier to test the association. They followed patients for 15 months, assessing pain as reported by the patients, joint tenderness as determined by a doctor, and their ability to navigate daily life as measured by a standard test. They found no correlation at all between the symptoms and the weather. The [study](#), “*On the belief that arthritis pain is related to the weather*”, was published in the prestigious journal *Proceedings of the National Academy of Sciences*.

He concludes, “The desire to have an explanation for a worsening of pain may encourage patients to search for confirming evidence and neglect contrary instances.” “...Selective memory may further enhance the belief that arthritis pain is related to the weather if coincidences are more memorable than mismatches.” It could be simply because of motivated reasoning, confirmation bias, and selective memory – in short, he thinks it’s all in the head.

### ***Final thoughts***

No one is completely immune from cognitive biases. We inadvertently remember the hits and forget the misses. We tend to accept shaky arguments that align with our worldview, and dismiss solid arguments that don’t. And when faced with disconfirming evidence that challenges our beliefs – the no-better-than-average lucky shirt, the times when the folk remedy didn’t work, the noble acts of sworn enemies, the glaringly inaccurate psychic predictions, the everyday unanswered prayers, the annoying outliers in experiment data, the inconvenient facts that don’t fit our preconceived notions - we do what world leaders, Popes, philosophers, scientists, and so many of the greatest minds before us have often done.

We ignore it.

The goal of skepticism, is to ignore it less. It’s about actively seeking out all the evidence, not just what we agree with. Evidence should be used like lampposts – not individually to support a wobbly position, but collectively to illuminate the path ahead. In this case I tried to find the all the evidence available to me. Although the evidence is mixed and conflicting, one thing is clear: the effect weather has on arthritic pain, if any, is significantly smaller than what many people fervently believe.

So what is my conclusion? Occam’s Razor states, “When faced with competing hypotheses, select the one that makes the fewest assumptions”. Dr. Tversky’s explanation requires no assumptions. If I had to choose today, I’d put my dime down and say that most of the time, it’s in our heads. That is, until better evidence indicates otherwise.

References:

1. WebMD: [Does Weather Affect Joint Pain?](#)
2. MedicineNet: [Whether Weather Affects Arthritis](#)
3. Arthritis Foundation: [Weather and Arthritis Pain](#)
4. Arthritis Foundation [Joint Pain Prediction Tool](#)
5. About.com: [Weather - Do You Feel the Storm Approaching?](#)
6. Pain (1999): [Rheumatoid arthritis patients show weather sensitivity in daily life, but the relationship is not clinically significant](#)
7. Pain (2014): [Associations between weather conditions and clinical symptoms in patients with hip osteoarthritis: a 2-year cohort study](#)
8. Proceedings of the Western Pharmacological Society (2004): [Weather conditions can influence rheumatic diseases](#)
9. The Journal of Rheumatology (2002): [Influence of weather conditions on rheumatic pain](#)
10. Rheumatology (Oxford, England, 2003): [Osteoarthritis pain and weather](#)
11. Revista Brasileira de Reumatologia (2011): [Influence of meteorological elements on osteoarthritis pain: a review of the literature](#)
12. The Journal of Rheumatology (1981): [Annual fluctuations in rheumatoid arthritis](#)
13. The New York Times (1996): [Could It Be? Weather Has Nothing To Do With Your Arthritis Pain?](#)
14. [The Hot Hand in Basketball: On the Misperception of Random Sequences](#)
15. Proceedings of the National Academy of Sciences (1995): [On the belief that arthritis pain is related to the weather](#)