

# Confabulation, card tricks and confirming your migraine triggers



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## Part 1: How good are people at determining cause, effect and migraine triggers? (Not very good.)

Consider the fascinating, but disturbing results of a psychology experiment<sup>1</sup> Jay Olson recently conducted at McGill University in Montreal, Canada.

Olson asked test participants to select a random card while he flicked through a deck of playing cards. Unbeknownst to participants, the 10 of hearts had been slightly altered<sup>2</sup> which caused it to be visually exposed for a few milliseconds longer than any of the other cards. As a result, 98% of participants chose the 10 of hearts – not such a random choice after all!

What happened next is the unsettling part. Olson then asked participants what prompted them to choose 10 of hearts? A large portion, 90% of participants were absolutely convinced they knew. According to Olson, one person said, “I chose the 10 of hearts because 10 is a high number and I was thinking of hearts before the experiment started.” Another said, “because the card was nice and bright” and a third commented, “because hearts are a common symbol.”



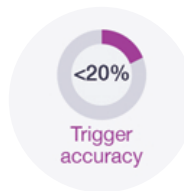
Our inability in distinguishing certain types of cause and effect is especially relevant for people with migraine because physicians commonly advise their patients to figure out triggers associated with their attacks and develop avoidance strategies. A problem with this approach is what psychologists term “confabulation” namely, when misinterpreted memories lead humans to be convinced they know the answer but in fact don't.

In an on-going Curelator Headache study, we are in the process of building the largest database of factors and symptoms scientifically associated with increasing (triggers) and decreasing (protectors) an individual's chance of getting a migraine attack. Consequently, we are now in a unique position to answer a simple question: How good are

people at determining their own migraine triggers<sup>3</sup>? Our answer is based on comparing the data of hundreds of migraineurs who believed they knew their triggers before using Curelator Headache with the trigger associations found after using Curelator Headache (i.e. applying a statistical analysis based on three months of daily data that tracks symptoms and exposure of commonly believed migraine factors).

The average accuracy was surprisingly low. On average, people correctly determined less than 20% of their triggers. Some factors were accurately identified as triggers more frequently than others: stress and sleep quality (and fatigue) being the leading ones. The accuracy of others, especially dietary factors fared poorly. Generally, people correctly identify a few of their triggers, are not aware of others and are needlessly avoiding other

factors. These results are supported by other research studies. Dana Turner of Wake Forest Baptist Medical Center and co-author of a scientific paper<sup>4</sup> titled “Natural experimentation is a challenging method for identifying headache triggers” is quoted as saying: “People who try to figure out their own triggers probably don't have enough information to truly know what causes their headaches.”



Considering that many people have had migraine for decades and firmly believe they know their triggers, less than 20% accuracy is an eyebrow-raising result. Are we really all that bad? Well not everyone is; from the hundreds of individuals we analyzed there were two individuals with above a 70% accuracy. We interviewed both of them: highly self-aware females who had migraine for decades and had meticulously

kept diaries for more than five years. One of them, Sharron Murray, is a registered nurse and well-known US-based migraineur and author whom we have [interviewed here previously](#). The second person was based in Northern Europe, although not a health care professional had a several decade long occupation of tracking inventory at hotels and restaurants – something that may have prepared her to also be good at tracking her triggers.



**Apart from our faulty ability in distinguishing cause and effect there are a number of issues that can help migraineurs' efforts to track their own triggers – and this is the subject of the second part of this article.**

### References:

- <sup>1</sup> Olson *et al.* Influencing choice without awareness. *Consciousness and Cognition* (2015) 37: 225
- <sup>2</sup> Out of allegiance to all magicians, Olson would not actually reveal the nature of the alteration!
- <sup>3</sup> Details of this analysis to be presented at [American Headache Society Scientific Meeting June 2016](#).
- <sup>4</sup> Turner *et al.* Natural experimentation is a challenging method for identifying headache triggers. *Headache*. (2013) 53: 628

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## Part 2: Why is it so hard to identify your migraine triggers?

In the first part of this article, we reviewed data from an ongoing Curelator Headache study. It includes hundreds of migraineurs who believed they knew their triggers before they used Curelator



Headache. After our analytical engine applied a statistical analysis (based on three months of their daily data), we concluded that the accuracy of these users' trigger identification was less than 20%. In this second part of the article, we offer some insight into the difficulty of self-determining migraine triggers.



Other than stress and sleep quality (fatigue), it can be exceedingly difficult to self-identify triggers. The first point is to consider the 'dose' or 'potency' of a trigger. Many factors would trigger headaches in virtually anyone if the 'dose' was extreme enough, for example, noise that was extremely loud and went on for a long time, or stress experienced at a high level again over a significant period.

The easiest triggers to identify are those that on their own and even at low 'doses' are always associated with headaches. There are other triggers, however, that may require a higher 'dose' to trigger a headache, or they need to occur in the presence of additional triggers so that the headache occurs in response to an aggregation of two or more triggers. And some triggers may only precipitate headaches in certain situations, such as when you are tired. Triggers such as these are more difficult to identify.

Even when clear associations are observed between factors considered to be triggers and ensuing headaches, it does not necessarily mean that the 'trigger' precipitated the headache. For example, someone experiences a headache and ruminates about what caused the headache. She notes that she ate chocolate just before the headache and assumes that chocolate was the trigger. But there is good evidence<sup>1</sup> that low blood sugar levels can give rise to headaches, and when blood sugar levels get low people feel hungry and might eat a bar of chocolate. Hence, it was not the chocolate that precipitated the headache, it was low blood sugar levels that triggered the headache and coincidentally resulted in eating chocolate just before the headache.

Another factor that makes identification of triggers difficult is that several behaviours may frequently co-vary and therefore it is easy to attribute the headache to one behaviour when it is really a correlated behaviour that is precipitating the headache on its own or in combination with other triggers. For example, headaches are often associated with a particular time of the month in females which is typically attributed to hormonal changes associated with the menstrual period. This might well be a factor but other deviations will be associated with that time of the month and hence might play a role. For example, research has shown that women react differently to situations that can be stressful at a certain time in the month, so it may be a combination of time of the month and stress levels.

Migraineurs are confronted by the exceedingly complex tasks of (1) avoiding confabulation and determining true cause and effect, (2) sorting out premonitory symptoms of migraine (like possibly developing a craving for chocolate) from actual triggers, (3) defining at which dose a factor might act as a trigger or as a protector against their migraine, (4) understanding how a trigger may act only in combination with other factors and not alone, (5) dissecting which associations are true triggers when multiple behaviors are occurring at the same time (e.g. exercise and dehydration – which is the true trigger?).

We developed Curelator Headache to provide a scientific tool to people with migraine that would help them discover their personal triggers and protectors.

Individual Protector Map™



Individual Trigger Map™



Individual No Association Map™



### 6 reasons why people have a hard time determining their own triggers:

- Faulty memories:** We preferentially remember positive associations over negative ones and construct rationales based on false memories (i.e., confabulation!). For example, after getting a headache while eating food with tyramine (e.g., cheese, citrus, chocolate), we may make a link implicating tyramine while forgetting all the times we ingested tyramine-containing foods that did NOT result in a migraine.
- Distinguishing between headaches and true migraines.** Many things are known to trigger headaches but not necessarily migraine. The first thing to understand about migraine triggers is whether a factor is triggering a headache or a true migraine – this involves an analysis of symptoms.
- Complexity and dose of exposure.** Some factors seem to act as triggers in some cases and protectors in other cases. Coffee can be a trigger or protector depending on dose and exposure. Richard Lipton, MD, one of the world's leading migraine neurologists says, "Caffeine withdrawal is a trigger, but coffee taken with NSAID or aspirin is a protector and long term exposure to caffeine can be a trigger as well."
- Distinguishing between warning signs (premonitory symptoms) and true migraine triggers.** Chocolate craving may simply be an early sign of an impending migraine. Similarly, anxiety, irritability, restless sleep, sensitivity to noise, smell and lights may all be premonitory symptoms instead of true triggers.
- Combination effects.** It is very difficult to determine when a factor is a trigger if it only acts in combination with other triggers. For example, many women with migraine suffer from menstruation migraine – but nevertheless do not get migraines every month. In this case it is possible that menstruation raises the risk of a migraine but does not by itself cause one. Instead, another factor, or factors need to be present to reach a critical mass necessary to trigger a migraine.
- Misleading associations.** Dissecting simultaneously occurring factors to identify the true triggers. Salty foods are occasionally associated as a trigger – but is it salty food or actually dehydration that is the true trigger? For an interesting and misleading association where neck pain turned up as a protector in some people see our [neck pain](#) article.

#### References:

<sup>1</sup> Martin & Seneviratne. Effects of food deprivation and a stressor on head pain. *Health Psychology* (1997) 16: 310