

Denying the lunar effect: astronomer dabbles in astrology and gets it wrong... again

By Peter Marko

“The Moon does not influence the timing of human births or hospital admissions” was the recent reported conclusion of Belgian-born astronomer Professor Jean-Luc Margot of the UCLA. Oh, really? Dare astrology challenge such ‘rationalist’ might? Scientist (and astrologer) Peter Marko closely examines the professor’s approach and discovers a great many flaws

Some astronomers feel it is their duty to educate the ‘gullible’ public on how much harm astrologers can do to them and how stupid those people are who believe in astrology. Needless to say, most of these ‘saviour’ astronomers have no background in astrology but still feel qualified to comment on it in no uncertain terms. After all, we all know that astrology is rubbish...right?

Enter Professor Jean-Luc Margot of the UCLA, who published an article in the May/June 2015 issue of the journal *Nursing Research* on the correlation between hospital admission rates and phases of the Moon (Margot, ‘No Evidence of Purported Lunar Effect on Hospital Admission Rates or Birth Rates’, 2015). His article is a review and supposed refutation of a 2004 paper by health professionals from Barcelona (Román, Soriano, Fuentes, Gálvez, & Fernández, 2004), examining the generally-held belief that activity in hospitals increases during a Full Moon. The Spanish researchers collected data for two years of admissions at their hospital due to gastrointestinal haemorrhage (bleeding of the digestive tract) and found that the number of patients on days of Full Moon was significantly higher than on other days.

Professor Margot’s interest in ‘erroneous beliefs’

How does a California astronomer, focusing on the characterization of asteroid dynamics and the investigation of planets’ interior properties (Research Interests, 2013), get interested in decade-old research on the Moon’s phases by Spanish healthcare professionals? Good question. By Margot’s own admission, he was struck at a high school reunion how a prior schoolmate of his (now a midwife)



could be “so disconnected from reality” by believing that the number of deliveries increased when there was a Full Moon. He then came across the paper by Román and others, which had been unchallenged in scientific literature at that point. “Something had to be done,” Margot thought, so he got to work on a rebuttal (Margot, *There was a Full Moon and Nothing Happened . . . Again*, 2015).

Fair enough. That’s how science is supposed to work. Someone publishes a finding, and then other scientists try to replicate those results. Some will hold up and some won’t. The findings of those that do in repeated attempts will eventually make it into the body of knowledge for a particular field of science. Scientists are supposed to be neutral and open-minded to new and foreign ideas, so the only question when it comes to publications should be scientific merit. In practice, no scientist is entirely unbiased, especially when their cherished ideas and hard-built careers are at stake. Intriguingly,

Margot’s background page starts with the following introduction under the heading, ‘What is this article about’:

“Some professionals who work in emergency rooms or maternity wards believe that the number of hospital admissions or human births is larger during the Full Moon than at other times. This belief is incorrect.”

Section headings that follow this intro read ‘Why should anyone care’, ‘Why worry about erroneous beliefs’, ‘How prevalent is this problem’ and ‘What can we do about it’ (Margot, *There was a Full Moon and Nothing Happened . . . Again*, 2015).

Evidently, Professor Margot is on a mission to cleanse people of this dangerous heresy. Unfortunately, an agenda of this sort doesn’t typically lead to unbiased research and good scholarship. Be that as it may, let us now

look at how good a job an astronomer was able to do in a field entirely outside of his area of expertise.

Cherry-picking the evidence

Margot makes claims about two different subjects (birth rates and hospital admissions with respect to lunar phases) but only reviews the latter in detail. His references to lunar effect research curiously focus on one name, that of Ivan Kelly, the infamous debunker of astrology we all know so well. The only citation that does not involve him (Foster & Roenneberg, 2008) is Margot's key reference for 'refuting' the hypothesis of lunar influence on human affairs.

In their article, Foster and Roenneberg place the emphasis on an examination of seasonal (solar) variations and devote barely over one page to review the vast literature on the Moon's rhythms and her possible effects. After a few elementary paragraphs serving as introduction, the authors state that the Moon has no effect on humans, and support this assertion by a summary table listing 36 references by subject area. These sources omit all research supporting the lunar effect. Following this one-sided dismissal, the authors exclude any possible lunar influence resulting from tidal or gravitational effects on humans and conclude that, as a consequence, no lunar effect can exist in any form. While describing the mechanism of tidal forces, they are incorrect in saying that the phases of the Moon are not involved. As is well known from early education, a number of factors affect the tidal pull and the interplay of the Sun and the Moon is an important one. The relative positions of these two luminaries to the Earth can be observed as the phases of the Moon.

The authors fail to consider that the observed correlation between the Moon's phases and human behaviour could be accounted for by another known or as yet unknown mechanism. By focusing on gravity, they set up a straw man argument. Moreover, the authors fall prey to rational fallacy by assuming that a mechanism needs to be known for accepting a demonstrated correlation between two phenomena. It is easy to see that Foster and Roenneberg did not do their homework when reviewing lunar effect research.

Just as his key reference, Margot doesn't cite research supporting the lunar effect either. Since Professor Margot started drafting his article in the summer of 2013, he would surely have been aware of research on how sleep is affected by the Moon, the most publicised finding on the lunar effect in recent years (Cajochen, et al., 2013). And if he had taken the trouble of typing "lunar effect on humans" into Google, he would have found on the first page the link to a highly relevant and thorough review of the subject titled 'The lunar cycle: effects on human and animal behavior and physiology' (Zimecki, 2006). This paper is also the third hit on Google Scholar, and consequently, even an astronomer not familiar with lunar effect research would have found plenty of references to publications with positive results. Professor Margot's approach reminds me of certain philosophers refusing to look through Galileo's telescope: it seems the author's strong bias against unconventional science doesn't admit the objective consideration of all evidence.

Failure to debunk lunar effect research

How about refuting the claims of Román and others of a lunar effect on hospital admissions? Surely an astronomy professor can do a decent job once he gets down to specifics, can he not? The answer unfortunately is a disappointing 'no'.

We have already dealt with the biased nature of Margot's review of literature, leading to his false conclusion. This inadequate treatment is followed by a condescending lecture on "basic standards of evidence". Following a long list of possible shortcomings with lunar effect research (which are coincidentally tailored to the study he attempts to discredit later), Margot gets to his main point by saying that "studies that have claimed the existence of a lunar effect universally fail to meet the reproducibility and predictability requirements". The two references given in support of this sweeping judgment are by (surprise) Kelly and Kelly, in collaboration with two other authors. The anticlimax comes when Professor Margot exhibits the research by Román and others as "an instructive example of these shortcomings".

Margot makes his specific criticism of this

research on data collection, methodology and interpretation. Many of these objections were answered by the Spanish authors in their response (Román, Gich, & Soriano, 2015). This response, which was published together with Margot's article, includes clarifications on how the Moon's phases and the number of hospital admissions were assigned to civil days, confirmation of the validity of the statistical test applied, additional information on the data, and clarification on what was originally claimed. These responses invalidate most of Margot's objections, which turn out to be based on false assumptions in hindsight.

Unfounded criticism of data, methodology and interpretation

Professor Margot starts his long series of attacks on the 2004 paper by casting doubt on the time zone in effect for the two years of data. He is ill-informed when supposing that the time zone or daylight saving rule for Barcelona was changing during this two-year period (1996-1998).

He is suggesting that "their data set is ill-suited to study the possibility of lunar effects and is better suited to study the possibility of cyclic effects modulated by the vagaries of legislated time zone changes", which is simply ludicrous when confronted with facts. The single objection in the entire article where he might have a case (concerning admissions falling on the 30th civil day of the Moon's cycle) will require a more detailed examination and is too fine a point for the current article.

Margot makes a number of unsubstantiated claims about methodology and statistical analysis (addressed by the response of Román and others). In this section he includes a slightly modified version of the specious argument that was made popular by Carl Sagan ("extraordinary claims require extraordinary evidence"), which itself is a rewording of Laplace's principle, "the weight of evidence for an extraordinary claim must be proportioned to its strangeness" (Gillispie, Gratton-Guinness, & Fox, 1999). There are many issues with this claim, namely: (1) the statement itself is extraordinary and would require extraordinary validation by its own claim; (2) there is no universally accepted criteria for a claim to qualify as extraordinary; (3) there is no

absolute criteria for qualifying evidence as extraordinary; and (4) everything in science needs to be held to the same level of standard. This argument is often used politically with the intention to silence or censor statements challenging the status quo. Seeing that Professor Margot has an axe to grind on this subject, it is not surprising that he would utilise this seemingly logical but in reality false and self-contradictory statement as ammunition.

Once Margot is through with his (unsound) criticism of methodology used by Román and others, he applies his own statistical analysis of the data. However, he makes the elementary mistake of choosing the wrong tool for this. Ironically, he then surprises himself with finding significant deviations from chance in the data, which would normally mean correlation with the Moon's phases. In Margot's world, however, this conclusion is not possible, so he looks for excuses why the results of his own analysis cannot

be true. He dismisses his own finding of a lunar effect because "there is no known plausible lunar-related mechanism that could explain such variations". In other words, Margot falls into the mechanistic fallacy of Foster and Roenneberg that rules out evidence unless the cause is known.

Professor Margot attacks the speculation by Román and others that tidal forces could be a contributing factor to an increase of bleeding in patients. Unfortunately, Margot makes a number of mistakes in his criticism. First of all, he claims that "ordinary objects in the vicinity of a potential patient exert tides that are orders of magnitude stronger than those exerted by the Moon". Really? We know that, despite the far greater gravitational pull of the Earth, the gravity of the Moon is still able to draw the water on the Earth's surface. Margot's line of reasoning ignores the fact that the tidal pull results not simply from a temporary gravitational force but is due to the

amplifying effects of resonance over a long period of time.

Secondly, he 'corrects' Román and others on an observation that the number of patients were not elevated on New Moon days, a point which they already made in their original article. In Margot's mind, this further invalidates the interpretation by the Spanish researchers.

Let us remind the astronomy professor here that the main finding of the 2004 study was that "the number of admissions for gastrointestinal haemorrhage [bleeding of the digestive tract] nearly doubled on Full Moon days as compared to non-Full Moon days". The lack of an increase in patients at New Moon does not in any way invalidate this finding. The speculation about tidal forces is mentioned as such and as an "interesting finding" by Román and others, following the main finding and the secondary one of gender difference in the data (the number of women patients did not increase during Full Moon days).

Culture and Cosmos

A journal of the History of Astrology and Cultural Astronomy

Editor Nicholas Campion



'To know the past is to understand the present'

The very best of historical writing on astrology, including Robert Zoller on Hermetic Science, Michael Molnar on the Star of Bethlehem, Robin Waterfield on Greek Astrology, Robin Heath on Solar Hero Myths, Nicholas Campion on Freud and Astrology and Demetra George on Astrology in Byzantium.

Plus reviews, book notices and details of upcoming events.

Published twice a year in Spring/Summer and Autumn/Winter

Subscriptions (for two issues)

AA Members: £13 for UK, EU, ISAR/AFAN members etc, £15 for other overseas

Send your subscriptions to: The Astrological Association, BCM 450, London WC1N 3XX

Tel: +44 (0)208 6250098 Fax: +44 (0)208 6250097

office@astrologicalassociation.com | www.astrologicalassociation.com

Back Issues: £6.50 UK and Europe, £7.50 overseas, including the USA and Canada.

See www.CultureAndCosmos.org for details of back issues.

Conclusion

Towards the end of his article, Margot also draws an analogy between the research by Román and others and the “persistent” and “inconsistent” belief of a lunar effect on birth rates, and then goes on to explain how cognitive biases can lead to an “emergence of questionable beliefs”. His conclusion in the article is that no correlation between hospital admission rates and phases of the Moon was found. While it is true that Margot didn’t find any correlation that he could believe in, this was only because he was wearing blinkers when looking. Ironically, he didn’t even believe his own (flawed) analysis.

In summary, we have seen how Professor Margot is on a mission to save the world from astrologers and other heretics. His strong bias against unconventional science, religion and non-materialistic belief systems prevents him from presenting a well-balanced literature review due to a refusal to look through the telescope to wider knowledge. His criticism of the research by Román and others is a series of logical fallacies and elementary mistakes that are based on false assumptions. Many of his errors have been pointed out by the Spanish researchers in their response, and it is regrettable that Professor Margot has not updated his online summary of the article to reflect an improved understanding of the issues. The article and online summary are certainly well below accepted standards of scientific publications, which beg the questions (1) why Professor Margot would write an unscientific article and maintain a fundamentalist webpage about a subject outside of his area of expertise; (2) how he was able to devote time, effort and resources to such research as a UCLA astronomy professor; and (3) whether his paper was properly peer-reviewed by *Nursing Research*.

Our intent in the present article was to address the most basic flaws with Margot’s article and not to respond in detail to every one of his claims or to consider the finer points and scientific minutia. A planned follow-up article in *Correlation* will do that. For now, we can be satisfied that there is nothing substantial or scientific about Professor

Margot’s paper on the relationship between the Moon’s phases and hospital admission rates, and the main finding of Román and others continues to stand.

Acknowledgements

I would like to thank especially Robert Currey for his continued interest in and substantial contributions to draft versions of this article. Victor Olliver’s helpful comments and kind accommodation of ever-increasing length are also highly appreciated.



Peter Marko, MSc, PMP, is an ICT project management consultant and independent research astrologist living in Ottawa, Canada. His education and experience include mathematics, physics, astronomy, competitive chess, probability theory and statistics, sports forecasting, electrical engineering, hardware design, computer programming, product development, project management, astrology, business analysis and finance.

Bibliography

- Best, S. (1981, Winter). Stressful Moon, Part I. *The Astrological Journal*, 23(1), 37-38.
- Best, S. (1981, Spring). Stressful Moon, Part II. *The Astrological Journal*, 23(2), 78-79, 92.
- Burns, J. T. (1997). *Cosmic Influences on Humans, Animals and Plants: An Annotated Bibliography*. Lanham, MD: Scarecrow Press.
- Cajochen, C., Altanay-Ekici, S., Münch, M., Frey, S., Knoblauch, V., & Wirz-Justice, A. (2013, August). Evidence that the Lunar Cycle Influences Human Sleep. *Current Biology*, 23(15), 1485-1488. Retrieved May 12, 2015, from <http://www.sciencedirect.com/science/article/pii/S0960982213007549>
- Foster, R., & Kreitzman, L. (2009). *Seasons of Life: The Biological Rhythms That Enable Living Things to Thrive and Survive*. New Haven, CT: Yale University Press.
- Foster, R., & Roenneberg, T. (2008). Human responses to the geophysical daily, annual and lunar cycles. *Current Biology*, 18, R784-R794. Retrieved May 12, 2015, from <http://www.sciencedirect.com/science/article/pii/S0960982208008658>
- Gillispie, C., Gratton-Guinness, I., & Fox, R. (1999). *Pierre Simon Laplace, A Life in Exact*

Science. Princeton, NJ: Princeton University Press.

Kollerstrom, N., & Steffert, B. (2003, December). Sex difference in response to stress by lunar month: a pilot study of four years’ crisis-call frequency. *BMC Psychiatry*, 3, 20. Retrieved May 12, 2015, from <http://www.biomedcentral.com/1471-244X/3/20>

Lieber, A., & Agel, J. (1996). *How the Moon Affects You*. New York, NY: Hastings House.

Margot, J.-L. (2015, May/June). No Evidence of Purported Lunar Effect on Hospital Admission Rates or Birth Rates. *Nursing Research*, 64(3), 168-175. Retrieved May 12, 2015, from http://journals.lww.com/nursingresearchonline/Fulltext/2015/05000/No_Evidence_of_Purported_Lunar_Effect_on_Hospital.3.aspx

Margot, J.-L. (2015, May/June). Rejoinder to Roman, Gich, and Soriano (2015). *Nursing Research*, 64(3), 175-176. Retrieved May 12, 2015, from http://journals.lww.com/nursingresearchonline/Fulltext/2015/05000/Rejoinder_to_Rom_n_Gich_and_Soriano_2015_5.aspx

Margot, J.-L. (2015, March 29). There was a Full Moon and Nothing Happened . . . Again. Retrieved May 12, 2015, from Jean-Luc Margot’s webpage at UCLA: <http://mel.epps.ucla.edu/jlm/epo/FullMoon.html>

McCrae, N. (2011). *The Moon and Madness*. Thorverton, UK: Imprint Academic.

Research Interests. (2013, May 12). Retrieved May 12, 2015, from Jean-Luc Margot’s webpage at UCLA: <http://mel.epps.ucla.edu/jlm/research.html>

Román, E., Gich, I., & Soriano, G. (2015, May/June). Full Moon and Gastrointestinal Bleeding: Response to Margot (2015). *Nursing Research*, 64(3), 173-175. Retrieved May 12, 2015, from http://journals.lww.com/nursingresearchonline/Fulltext/2015/05000/Full_Moon_and_Gastrointestinal_Bleeding_Response.4.aspx

Román, E., Soriano, G., Fuentes, M., Gálvez, M., & Fernández, C. (2004, December). The influence of the full moon on the number of admissions related to gastrointestinal bleeding. *International Journal of Nursing Practice*, 10(6), 292-296. Retrieved May 12, 2015, from <http://www.ncbi.nlm.nih.gov/pubmed/15544585>

Zimecki, M. (2006). The lunar cycle: effects on human and animal behavior and physiology. *Postępy Higieny i Medycyny Doświadczalnej (Advances in Hygiene and Experimental Medicine, Poland)*, 60, 1-7. Retrieved May 12, 2015, from <http://www.ncbi.nlm.nih.gov/pubmed/16407788>