

Optimizing audiovisual itch induction: the role of attention and expectancy

DOI: 10.1111/bjd.18596

Linked Article: Marzell et al. *Br J Dermatol* 2019; DOI:10.1111/bjd.18368

In this issue of the *BJD*, Marzell and colleagues¹ show for the first time that the level of itch induced by audiovisual itch stimuli is not inferior to histaminergic itch after dermal priming. New insights into the underlying mechanisms of audiovisual itch induction can further optimize its effectiveness.

The itch-inducing property of audiovisual material has been described previously.² Itch contagion may serve a nocifensive function (i.e. signalling potential bodily threat),³ and it probably involves activation of an affective mirror neuron system.^{1,4} Audiovisual itch contagion has been described for both humans and nonhuman primates, but it does not seem effective in rodents.⁵ This underlines the role of higher-order cognitive processes, of which attention and expectancies will be highlighted below.

Focusing attention on itch cues is evolutionarily advantageous because it enables a protective response, for example removing a mosquito from your skin. Marzell et al. showed that audiovisual effects on itch are particularly strong after dermal priming (i.e. showing a nonitch-inducing skin-related video). They plausibly state that dermal priming would lead to attention being shifted in a way that it 'potentiates mental processes'.¹ Priming prioritizes subsequent stimuli presented within the same modality,⁶ arguably resulting in facilitation of the audiovisual material (whether somatosensory priming would result in prioritization of somatosensory input remains to be investigated). This focusing was further enhanced because the participants were instructed to report their bodily sensations and emotions. At the same time, showing neutral audiovisual material during the histamine provocation may have distracted participants from the histaminergic itch, similarly to the approximately 50% reduction in itch we previously observed during a simple visual task.⁷

Negative expectancies are known powerful itch amplifiers.⁸ In the present study, it is not unlikely that placebo iontophoresis induced nocebo effects on itch, amplifying the itch-inducing effects of the audiovisual itch induction. Marzell and colleagues' statement that somatosensory provocations induce anxiety¹ – which plays a key role in nocebo effects⁹ – is consistent with this hypothesis.

From this perspective, it is not surprising that audiovisual stimuli are more effective in patients with chronic itch.² The persistent clinical itch of these patients may induce a tendency to be attentive to itch stimuli, to expect itch and to interpret stimuli in the context of itch.^{8,10}

To conclude, advantages of audiovisual itch induction over histamine iontophoresis are noninvasiveness, more widespread distribution of audiovisual itch (representative of patients' symptoms) and less contamination by painful sensations.¹ Limitations of

audiovisual itch include its inability to target specific body locations, and less control over induced scratching and the onset and duration of induced itch. The effectiveness of the method can be further enhanced by increasing the relevance (e.g. dermal priming) and inducing negative expectations (e.g. informing participants that the audiovisual stimuli induce quite some itch). Audiovisual itch stimuli may even be used as a short-lived human model of widespread chronic itch, for example by repetitively combining the presentation of the material together with a unique cue (i.e. conditioning), under ethical conditions. In summary, we agree with Marzell and colleagues¹ that audiovisual itch material can be very powerful.

A.I.M. van Laarhoven ^{1,2,3} and H. Holle ⁴

¹Health, Medical and Neuropsychology Unit, Faculty of Social and Behavioral Sciences, Leiden University, Leiden, the Netherlands; ²Leiden Institute for Brain and Cognition (LIBC), Leiden University, Leiden, the Netherlands; ³Department of Psychiatry, Leiden University Medical Centre, Leiden, the Netherlands; ⁴Department of Psychology, Faculty of Health Sciences, University of Hull, Hull, U.K.

E-mail: a.vanlaarhoven@fsw.leidenuniv.nl

Funding sources: this commentary was supported by an Innovation Scheme (Veni) grant (451-15-019) from the Netherlands Organization for Scientific Research, granted to A.v.L. The funder had no role in the preparation of the manuscript or the decision to publish.

Conflicts of interest: none to declare.

References

- 1 Marzell R, Reichwein G, Gieler U et al. Itch induction by audiovisual stimuli and histamine iontophoresis: a randomized, controlled noninferiority study. *Br J Dermatol* 2019; <https://doi.org/10.1111/bjd.18368> [Epub ahead of print].
- 2 Schut C, Grossman S, Gieler U et al. Contagious itch: what we know and what we would like to know. *Front Hum Neurosci* 2015; **9**:57.
- 3 Paus R, Schmelz M, Biro T et al. Frontiers in pruritus research: scratching the brain for more effective itch therapy. *J Clin Invest* 2006; **116**:1174–86.
- 4 Mueller SM, Hogg S, Mueller JM et al. Functional magnetic resonance imaging in dermatology: the skin, the brain and the invisible. *Exp Dermatol* 2017; **26**:845–53.
- 5 Lu J-S, Chen Q-Y, Zhou S-B et al. Contagious itch can be induced in humans but not in rodents. *Mol Brain* 2019; **12**:38.
- 6 Becker SI. The mechanism of priming: episodic retrieval or priming of pop-out? *Acta Psychol* 2008; **127**:324–39.
- 7 van Laarhoven AIM, van Damme S, Lavrijsen A et al. Do tonic itch and pain stimuli draw attention towards their location? *Biomed Res Int* 2017; **2017**:2031627.
- 8 Evers AWM, Peerdeman KJ, van Laarhoven AIM. What is new in the psychology of chronic itch? *Exp Dermatol* 2019; in press.
- 9 Blasini M, Corsi N, Klinger R et al. Nocebo and pain: an overview of the psychoneurobiological mechanisms. *Pain Rep* 2017; **2**:e585.
- 10 Van Beugen S, Maas J, van Laarhoven AI et al. Implicit stigmatization-related biases in individuals with skin conditions and their significant others. *Health Psychol* 2016; **35**:861–5.