

## ABSTRACT

The widely accepted view nowadays is that experiencing odours as rather pleasant or unpleasant is, to a certain degree, shaped on a daily basis through individual experience within one's culture via evaluative conditioning or, rather marginally so, via mere exposure to that certain odour. In other words, humans are not born with any fixed set of olfactory likes or dislikes but rather, they acquire them throughout their lifetime. However, olfactory sensation is not a "pure" percept, as odorant stimuli generally elicit a qualitative percept of an odorant — generated mainly by the olfactory nerve — as well as some degree of chemesthesis — a tactile confound of the odour generated mainly by the trigeminal nerve. The olfactory and trigeminal system exhibit complex interactions at both the peripheral and central level of chemosensory processing, which is also reflected in perceptual characteristics of the final percept, including perceived pleasantness (hedonics).

If the olfactory contribution alone does not easily predict neonatal odour hedonics, due to newborns' limited previous exposure to chemosensory inputs, one may hypothesize that together with the strength of the trigeminal contribution they may form a significant factor affecting neonatal appetitive/aversive responses to odours. In the present study, odour hedonics has been operationalized in terms of autonomic responsiveness, namely heart rate variation. In adult studies, heart rate has been shown to correlate with perceived pleasantness, with unpleasant odours eliciting greater heart rate acceleration. In particular, one may expect that an intense, relative to a mild, trigeminal input will trigger a stronger defensive response (heart rate acceleration) in newborns, with no previous experience needed. To test this, we explored whether unfamiliar odours with contrasted trigeminal intensity (strong vs. mild) differentially elicit heart rate variations indicative of arousal magnitude.

Fifty 2- to 3-day-old newborns (26 F) were presented birhinally with three stimuli each — 1 relatively strong and 1 relatively mild trigeminal odorant in randomized order together with one blank stimulus. Thus, each presentation entailed three consecutive trials. For each trial a general linear model was run with continuous heart rate measurement averaged into 8 repeated measures over 10 seconds each as within-subject variables, odorant (mild/strong trigeminal stimulant/blank stimulus) and newborn sex as between-subject factors, and the averaged 80 s baseline heart rate as a covariate. The analyses revealed a significant interaction of the odorant with the course of heart rate variation in the first trial.

Further, repeated planned contrasts showed a significant difference between odorants across repeated measures circa half a minute after presentation. Such significant results were not found in the consequent trials.

The findings of this study might suggest an asymmetric processing of odours in the newborns at the heart rate level depending on the contrasting trigeminal component of the odorants. This asymmetric processing of odours might play a role in the formation of olfactory hedonics. However, our findings do not support the hypothesis that odours stimulating the trigeminal nerve more will elicit heart rate acceleration indicative of arousal magnitude.

### **Key words:**

Chemoreception, Chemesthesis, Olfaction, Olfactory nerve, Trigeminal nerve, Heart rate response, Newborns, Hedonics