Ig® & Beyond: Bees, Fish, Music and Whiskey

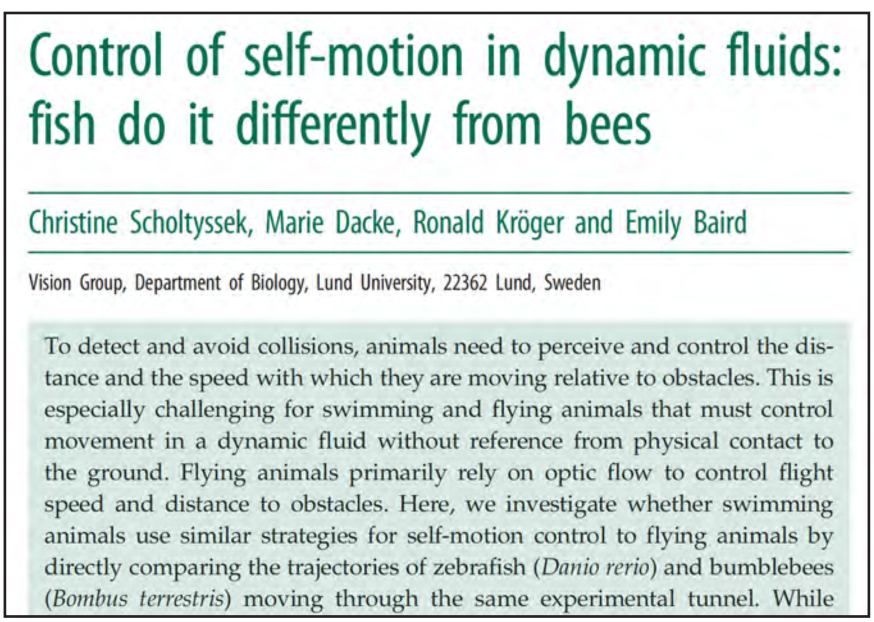
Some further research adventures of Ig Nobel Prize winners

compiled by Nan Swift, Improbable Research staff

Dacke and Baird: Collision Detection in Bees versus Fish

"Control of Self-Motion in Dynamic Fluids: Fish Do It Differently From Bees," Christine Scholtyssek, Marie Dacke, Ronald Kröger, and Emily Baird, *Biology Letters*, vol. 10, no. 5, 2014, 20140279. *(Thanks to Tony Tweedale for bringing this to our attention.)* Marie Dacke and Emily Baird, and other colleagues, shared the 2013 Ig Nobel Prize awarded jointly in the fields of biology and astronomy, for discovering that when dung beetles get lost, they can navigate their way home by looking at the Milky Way. [REFERENCE: "Dung Beetles Use the Milky Way for Orientation," Marie Dacke, Emily Baird, Marcus Byrne, Clarke H. Scholtz, and Eric J. Warrant, *Current Biology*, vol. 23, no. 4, February 18, 2013, pp. 298–300.] In this fish/birds paper, Dacke and Baird and two other colleagues at Lund University, Sweden, report:

> To detect and avoid collisions, animals need to perceive and control the distance and the speed with which they are moving relative to obstacles. This is especially challenging for swimming and flying animals... Flying animals primarily rely on optic flow to control flight speed and distance to obstacles. Here, we investigate whether swimming animals use similar strategies for self-motion control to flying animals by directly comparing the trajectories of zebrafish (*Danio rerio*) and bumblebees (*Bombus terrestris*) moving through the same experimental tunnel. While moving through the tunnel, black and white patterns produced (i) strong horizontal optic flow cues on both walls, (ii) weak horizontal optic flow cues on both walls and (iii) strong optic flow cues on one wall and weak optic flow cues on the other. We find that the mean speed of zebrafish does not depend on the amount of optic flow perceived from the walls. We further show that zebrafish, unlike bumblebees, move closer to the wall that provides the strongest visual feedback.


Control of self-motion in dynamic fluids: fish do it differently from bees

Christine Scholtyssek, Marie Dacke, Ronald Kröger and Emily Baird

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To detect and avoid collisions, animals need to perceive and control the distance and the speed with which they are moving relative to obstacles. This is especially challenging for swimming and flying animals that must control movement in a dynamic fluid without reference from physical contact to the ground. Flying animals primarily rely on optic flow to control flight speed and distance to obstacles. Here, we investigate whether swimming animals use similar strategies for self-motion control to flying animals by directly comparing the trajectories of zebrafish (*Danio rerio*) and bumblebees (*Bombus terrestris*) moving through the same experimental tunnel. While

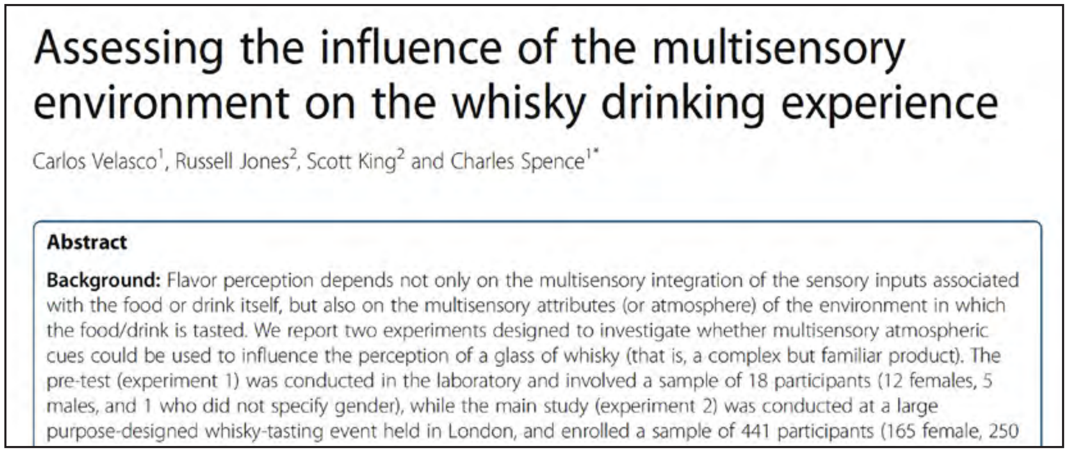
Watanabe: Fishes' Take on Musical Composers

"Reinforcing and Discriminative Stimulus Properties of Music in Goldfish," Kazutaka Shinozuka, Haruka Ono, and Shigeru Watanabe, *Behavioural Processes*, vol. 99, October 2013, pp. 26–33. *(Thanks to Scott Langill for bringing this to our attention.)* Shigeru Watanabe shared the 1995 Ig Nobel Prize for psychology, for success in training pigeons to discriminate between the paintings of Picasso and those of Monet. [REFERENCE: "Pigeons' Discrimination of Paintings by Monet and Picasso," Shigeru Watanabe, Junko Sakamoto, and Masumi Wakita, *Journal of the Experimental Analysis of Behavior*, vol. 63, 1995, pp. 165-174.] In this new study, Watanabe and two other colleagues at Keio University explain:

> Experiment 1 examined the discriminative stimulus properties of music. The subjects were successfully trained to discriminate between two pieces of music—*Toccata and Fugue in D minor* (BWV 565) by J. S. Bach and *The Rite of Spring* by I. Stravinsky. Experiment 2 examined the reinforcing properties of sounds, including BWV 565 and *The Rite of Spring*. We developed an apparatus for measuring spontaneous sound preference in goldfish. Music or noise stimuli were presented depending on the subject's position in the aquarium, and the time spent in each area was measured. The results indicated that the goldfish did not show consistent preferences for music.

Spence: Whisky in a Room

“Assessing the Influence of the Multisensory Environment on the Whisky Drinking Experience,” Carlos Velasco, Russell Jones, Scott King, and Charles Spence, *Flavour*, vol. 2, no. 1, 2013, pp. 1–11. Charles Spence shared the 2008 Ig Nobel Prize for nutrition for electronically modifying the sound of a potato chip to make the person chewing the chip believe it to be crisper and fresher than it really is. [REFERENCE: “The Role of Auditory Cues in Modulating the Perceived Crispness and Staleness of Potato Chips,” Massimiliano Zampini and Charles Spence, *Journal of Sensory Studies*, vol. 19, October 2004, pp. 347–63.] In this new study, Spence and colleagues at Oxford University and Condiment Junkie, London, U.K., explain:



Assessing the influence of the multisensory environment on the whisky drinking experience

Carlos Velasco[1], Russell Jones[2], Scott King[2] and Charles Spence[1*]

Abstract

Background: Flavor perception depends not only on the multisensory integration of the sensory inputs associated with the food or drink itself, but also on the multisensory attributes (or atmosphere) of the environment in which the food/drink is tasted. We report two experiments designed to investigate whether multisensory atmospheric cues could be used to influence the perception of a glass of whisky (that is, a complex but familiar product). The pre-test (experiment 1) was conducted in the laboratory and involved a sample of 18 participants (12 females, 5 males, and 1 who did not specify gender), while the main study (experiment 2) was conducted at a large purpose-designed whisky-tasting event held in London, and enrolled a sample of 441 participants (165 female, 250

> participants were exposed to three different multisensory atmospheres/rooms, and rated various attributes of the whisky (specifically the nose, the taste/flavor, and the aftertaste) in each room.
>
> RESULTS. Analysis of the data showed that each multisensory atmosphere/room exerted a significant effect on participants’ ratings of the attributes that the atmosphere/room had been designed to emphasize (namely grassiness, sweetness, and woodiness). Specifically, the whisky was rated as being significantly grassier in the Nose (‘grassy’) room, as being significantly sweeter in the Taste (‘sweet’) room, and as having a significantly woodier aftertaste in the Finish (‘woody’) room. Overall, the participants preferred the whisky when they tasted it in the Finish room.

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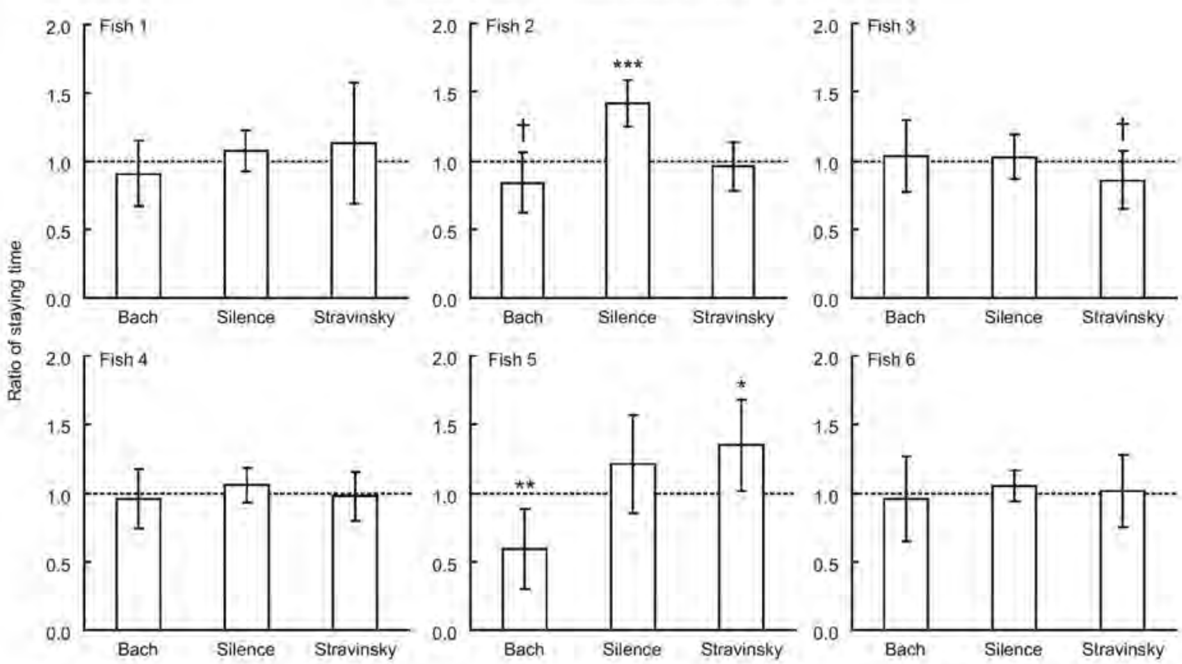

Fig. 7. The results of Experiment 2A. The vertical axis indicates the ratio of staying time in the test sessions to that during the baseline sessions. Values above 1.0 imply that the subject preferred that area more strongly during the test sessions than during the baseline sessions. Three of the six subjects (Fish 1, 4, and 6) did not show any preferences. Fish 2 preferred the silent area but tended to avoid the Bach area. Fish 3 tended to avoid the Stravinsky area. Fish 5 preferred the Stravinsky area and avoided the Bach area. Bars represent mean (SD).

Detail from the study “Reinforcing and Discriminative Stimulus Properties of Music in Goldfish.”