UNIVERSITÀ
DEGLI STUDI DI TRIESTE
Department of Life Sciences
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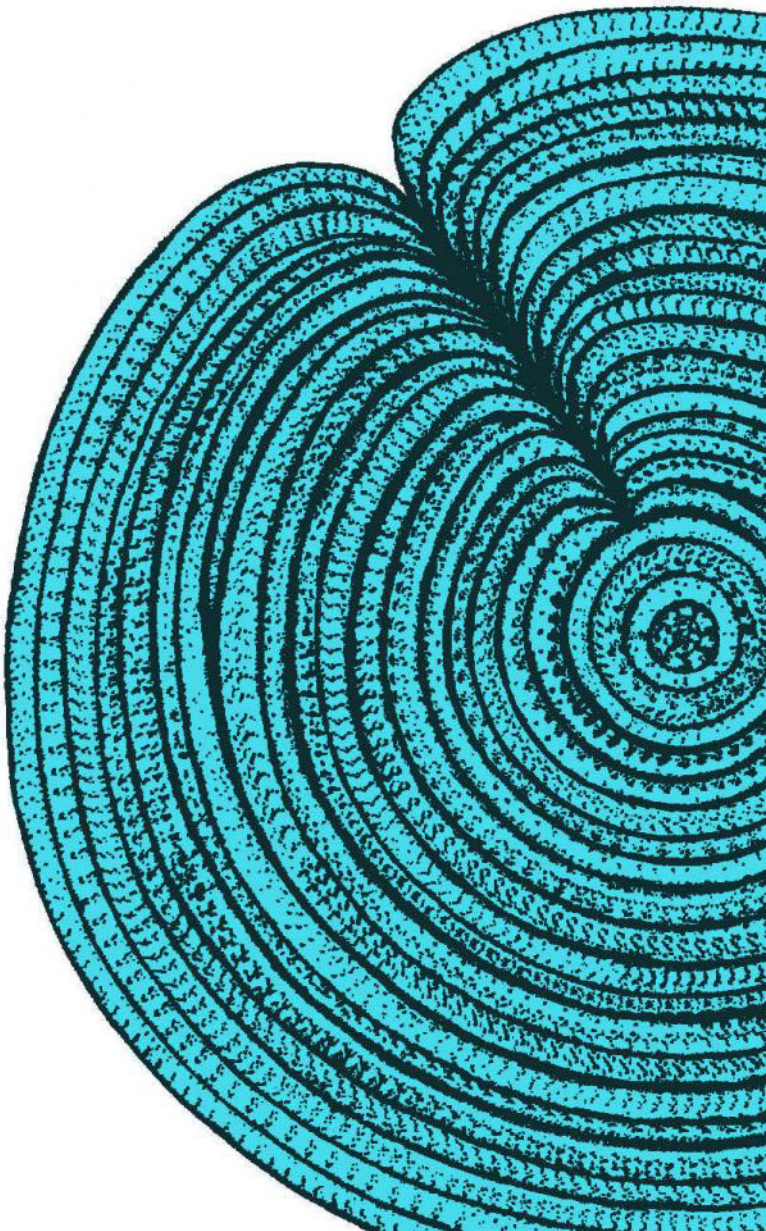
TSPC2016

Proceedings of the
Trieste Symposium on Perception and Cognition
November 4



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Context matters: Domestic chicks' short- and long-term habituation of freezing to a sudden acoustic stimulus

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Keywords: Habituation, Context, Associative models, Freezing, Imprinting

Habituation, a response decrement to an irrelevant stimulus across repeated presentations, is often described as the simplest form of non-associative learning, and it is often considered to be stimulus-specific [1]. However, associative models of habituation have been proposed, according to which a stimulus-context association is established in long-term memory when a stimulus is presented repeatedly [2]. If habituation is context-specific, the habituated response to the same stimulus should not transfer from one context to another [3-5].

We reared 51 chicks (*Gallus gallus*) in cages with an imprinting object as social companion for 2 days. On the next 2 days, all chicks underwent 2 daily sequences, 1 hour apart, of 5 sudden burst of white noise (250 ms), one every 30-60 seconds. Chicks could be administered the stimulation in the following conditions: a) always within a running wheel; b) one day in the home-cage and the next in the wheel; c) in a cage-replica placed in the same experimental room of the wheel and the next day in the wheel. Number and duration of stops of running in the wheel were the measures of chicks' freezing response.

When tested in the wheel, chicks stimulated in their home-cage froze significantly more than those stimulated always in the wheel, and those stimulated in the cage-replica before being moved in the wheel. Chicks stimulated in the same environment (the experimental room) but in different contexts (wheel *vs.* cage-replica), showed a comparable level of habituation overall. However, a higher proportion of stops revealed a modulation of context when chicks were moved from the cage-replica to the wheel as compared to those stimulated only in the wheel.

We documented in newborn chickens the presence of a sophisticated mechanism of associative learning that cannot be accounted for by classic non-associative models of habituation. Our data show that habituation relies both on local contextual and broader environmental information, which are not necessarily based on visual cues, and that probably involve other sensory information.

Acknowledgments: This work was partially supported by a UniTs-FRA2015 grant to CC. We thank Giorgio Vallortigara for providing us with the eggs and the Stabulario di Ateneo for chicks' maintenance.

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