

AVIAN HATCHING AS A STRATEGY TO TEST CONTEXT-SPECIFIC HABITUATION

Andrea Dissegna¹, Massimo Turatto², Cinzia Chiandetti¹

¹.Department of Life Sciences, University of Trieste, Trieste, Trieste, Italy

².CIMeC - Center for Mind/Brain Sciences, University of Trento, Trento, Italy

INTRODUCTION

Prenatal habituation is a simple form of prenatal learning, consisting in the decrement of the response to a reiterated stimulus presented in the prenatal environment¹. Responses learnt prenatally are maintained after birth, even though the environment is different and the same response can be suboptimal.

In contrast with non-associative theories of habituation², previous findings have demonstrated that newborn chicks can show context-specific habituation of the freezing response to a sudden acoustic stimulation³, namely that habituation can be associative in nature⁴. In the present experiment we addressed whether this associative form of habituation is present even prenatally.

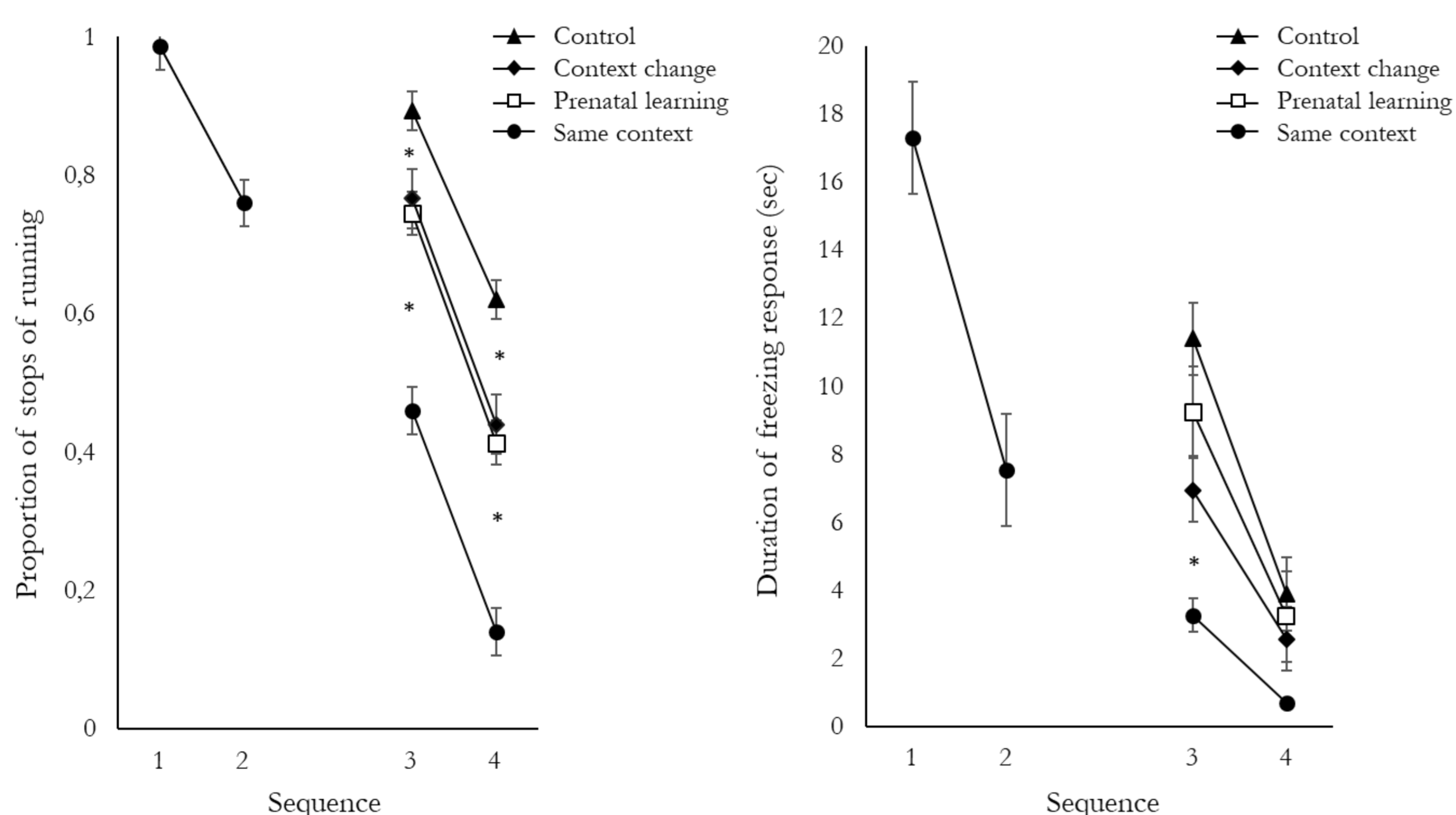
RESULTS

Same context group: chicks exposed to the noise within the same running-wheel the day before (session 1), showed a residual freezing response (long-term habituation) on session 2.

Context change group: chicks exposed to the noise within the incubator during session 1, exhibited a more intense freezing response on session 2, thus showing that habituation was at least partially context specific.

Prenatal learning group: chicks exposed to the noise before hatching, showed the same pattern of habituation of chicks in the Context change group.

Control group: chicks that were never exposed to the noise, showed the strongest freezing response on session 2. However, their response decreased within the same day (short-term habituation).



MEANING

Newborn chicks' habituation does not rely exclusively on the perception of stimulus similarity, i.e. it is not merely non-associative, but also depends on the memory of the context where the stimulus was originally encountered. A similar associative mechanism prevents maladaptive recovery of a prenatal learned response when a change of the context is perceived, promoting adaptive shift in response strategy during the first hours of life.

METHODS

A hundred and twenty chicks (*Gallus gallus*) (M=58) were tested in two different days (session 1 and session 2) and the stimulation consisted of 2 acoustic sequences of five bursts of white noise (250ms, 90dB), 1 hour apart, each day. Before hatching, eggs were randomized between the following 4 groups: Same context group (n=30), included chicks always stimulated within the running wheel; Context change group (n=30), consisted of chicks stimulated within the incubator during session 1 and within the running wheel during session 2; Prenatal learning group (n=30), included chicks stimulated in eggs during session 1 and within the running wheel during session 2; Control group (n=30), comprised chicks only tested within the running wheel in session 2.

Stops of the wheel-running behavior were scored as measure of chicks habituation in the first session for the Same context group (Day 1) and in the second session for all other groups (Day 2).

Group	Session 1		Session 2
	Hatching Day Stimulation time: 9 a.m.	Day 1 Stimulation time: 9 a.m.	Day 2 Stimulation time: 9 a.m.
Same Context (n=30)			
Context Change (n=30)			
Prenatal Learning (n=30)			
Control (n=30)			

REFERENCES

- Vince & Toosey (1980). Behaviour.
- Thompson (2009). Neurobiology of Learning and Memory.
- Chiandetti & Turatto (2017). Behavioral Neuroscience.
- Wagner, A. R. (1976). Priming in STM: An information-processing mechanism for self-generated or retrieval-generated depression in performance.

ACKNOWLEDGEMENTS

The research was supported by a UniTs-FRA2015 grant to Barbara Penolazzi and Cinzia Chiandetti. We thank the Stabulario di Ateneo of the University of Trieste for help with the animals and Giorgio Vallortigara for providing the eggs.

Contacts: andrea.dissegna@phd.units.it;
<https://sites.google.com/site/laboratoryanimalcognition/>