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# Testing young children's olfactory discrimination skills using a paradigm based on odorant-object congruence.

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## Introduction

Olfaction remains scarcely studied in humans (McGann, 2017). However, it is one of the first senses to develop in utero (Schaal, 1988). This sense participates in danger detection, feeding, emotional regulation but also in social interactions (Macfarlane, 1975; Mennella & Beauchamp, 1991; Nicklaus & Rigal, 2010; Delaunay-El Allam et al., 2010) as well as in cognitive development (Schaal, 1997). Olfactory discrimination skills have been demonstrated in young children (Macfarlane, 1975; Doty, 1991). However, no one has ever explored the development of a response to a change in congruence between object and odorant in infants and children between 6 months and 3 years of age. The aim of this study is to **construct a behavioral observation situation** that can account for the olfactory discrimination skills of young preschoolers from 6 months to 3 years of age.

Young preschoolers may exhibit differential behaviors demonstrating discriminatory skills in a paradigm comparing an object with a congruent odorant and another object differing only on olfactory characteristics and with an incongruity.

## Method & Material

**Participants:** 6 young preschoolers from 11 to 38 months

**Materiel:** congruent odorant-object (banana scent on an object banana), incongruent odorant-object (leek scent on an object banana)

**Procedure:**

- (1) **Familiarization** 24H before with **odorant-object congruent** during 5 min
- (2) We observe the child in **two successive situations of presentation of odorous object** with the introduction of an **odorant-object incongruent** → Recording behaviors

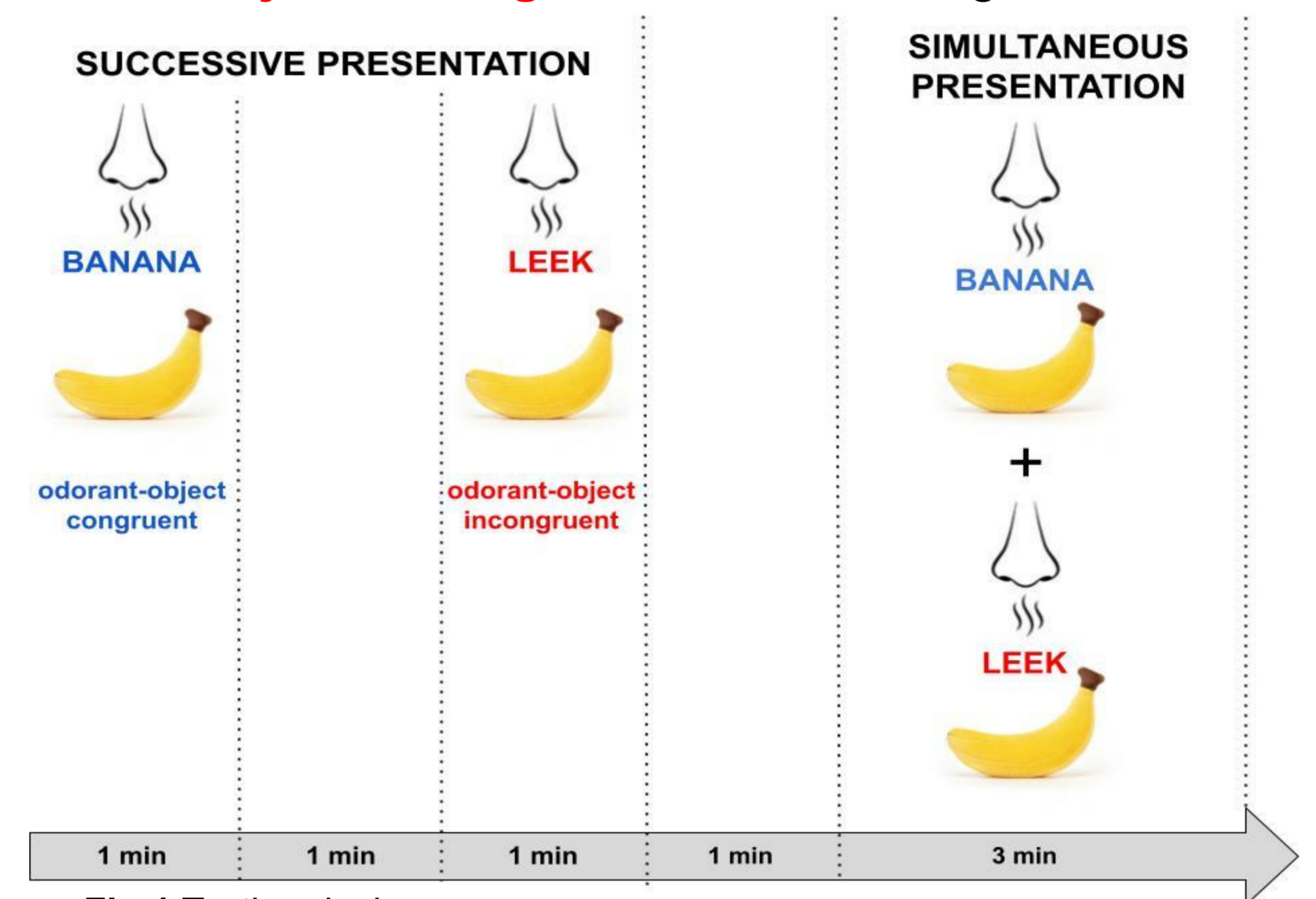


Fig.1 Testing design

## Results

### SUCCESSIVE PRESENTATION

→ Does the **odorant-object incongruent** cause more exploration than the other?

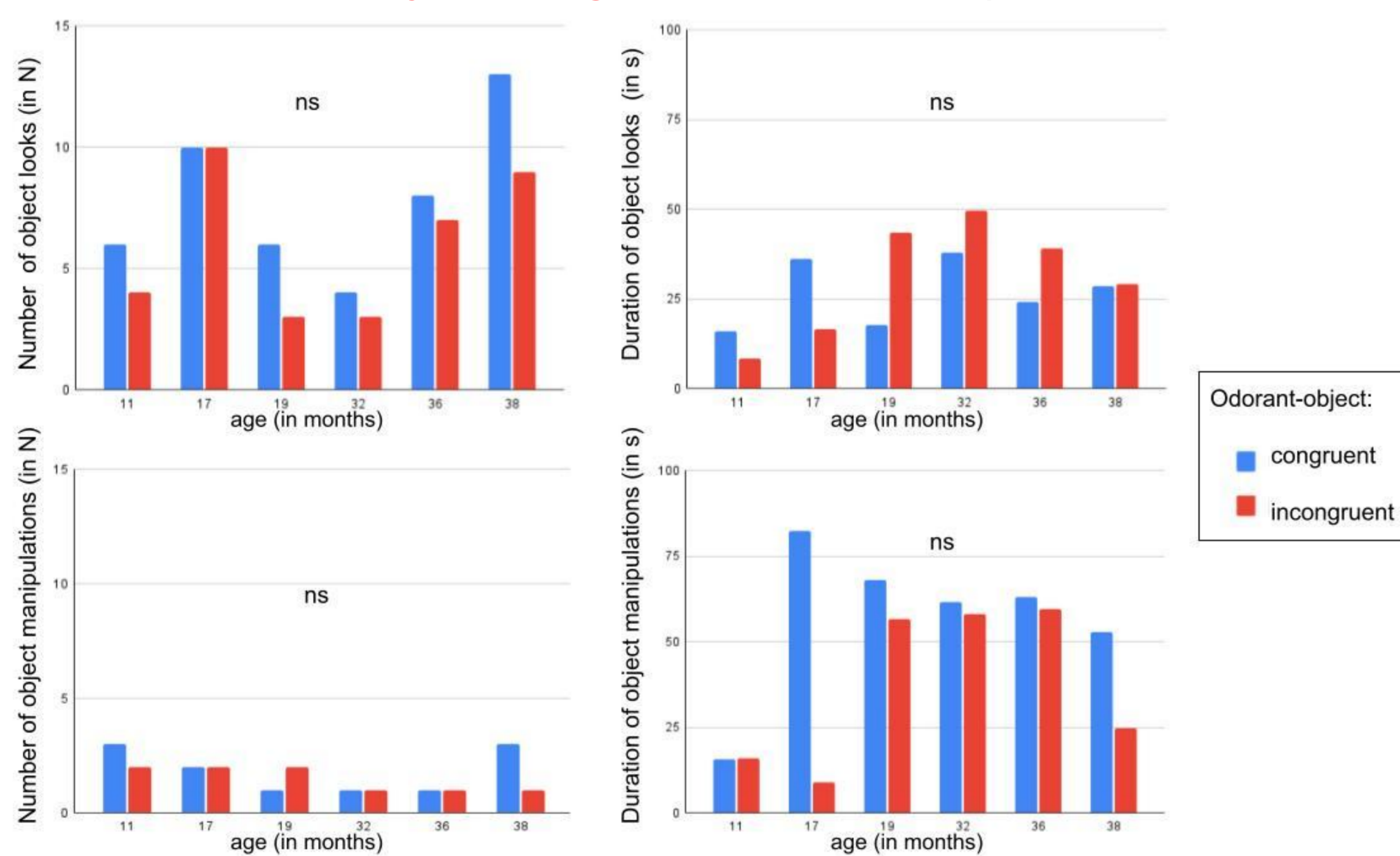


Fig.2 Number and duration of expressed behaviors (Object manipulations; Object looks) for each individual according to their age and the odorant-object explored (Congruent / Incongruent) during the successive presentation.

### SIMULTANEOUS PRESENTATION

→ Which object is preferred?

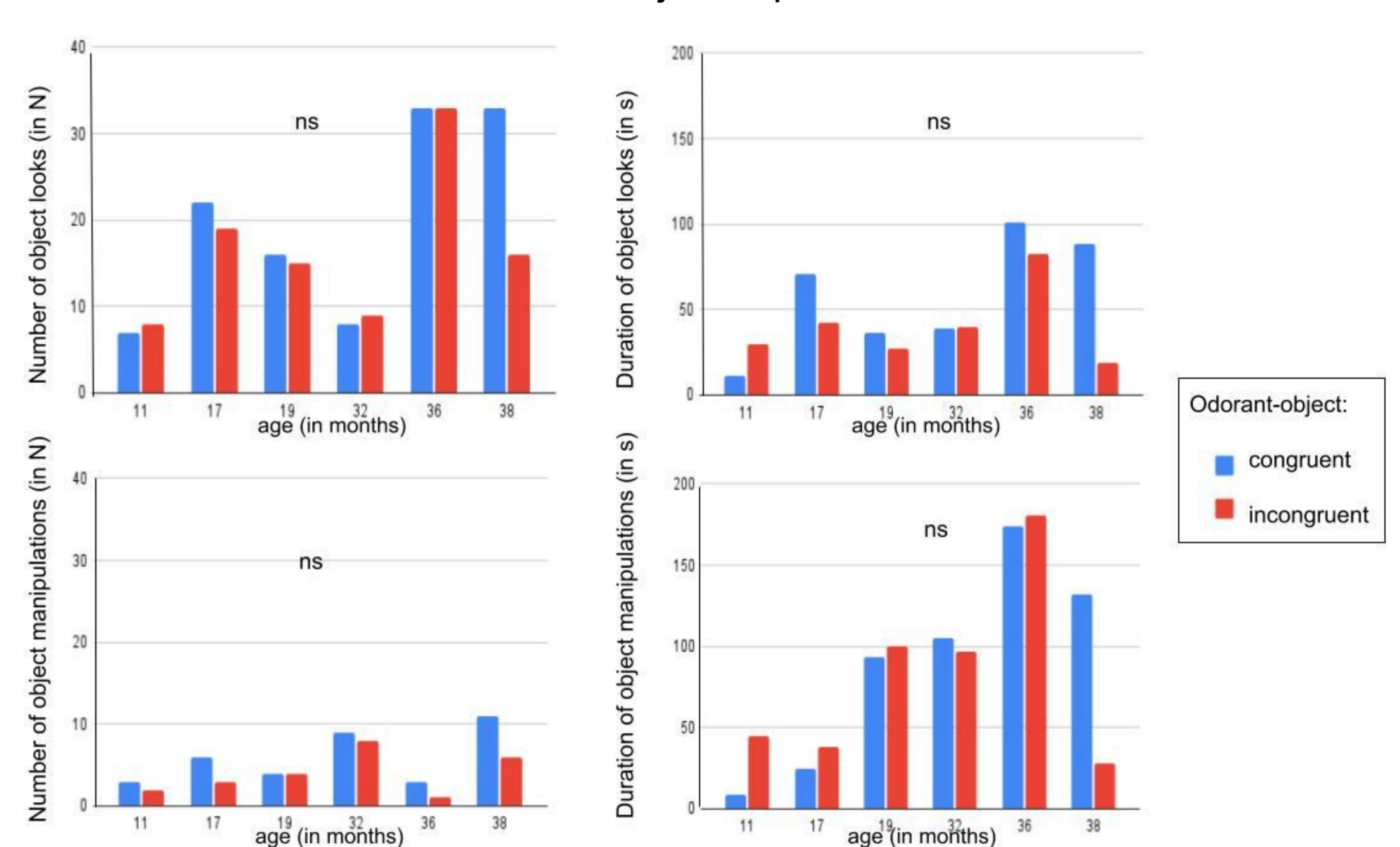


Fig.3 Number and duration of expressed behaviors (Object manipulations; Object looks) for each individual according to their age and the odorant-object explored (Congruent / Incongruent) during the simultaneous presentation.

## Discussion & Conclusion

- Inter-individual differences were found in the orientation of exploratory behaviours between congruent and incongruent object.
- Development of an ecological method and its improvement, preliminary and exploratory work.
- Limit of the heterogenous and small sample size.
- Other pairs of odorant objects considered.
- Importance in terms of fundamental research (build a normal developmental trajectory of discrimination skills) and applications (sensory awakening for prevention, diagnostic assistance, management of pathological behaviors) (Nicklaus & Rigal, 2010; Raudenbush et al., 1998)

### Bibliographic references

- Delaunay-ElAllam, M., Soussignan, R., Patris, B., Marlier, L., & Schaal, B. (2010). Long-lasting memory for an odor acquired at the mother's breast. *Developmental Science*, 13(6), 849–863.
- Doty, R. L. (1991). Olfactory function in neonates. In *The human sense of smell* (pp. 155–165). Springer.
- McGann, J. P. (2017). Poor Human Olfaction is a Nineteenth Century Myth. *Science (New York, N.Y.)*, 356(6338). <https://doi.org/10.1126/science.aam7263>
- Macfarlane, A. (1975). Olfaction in the development of social preferences in the human neonate. *Ciba Found Symp*, 33, 103–117.
- Mennella, J. A., & Beauchamp, G. K. (1991). The transfer of alcohol to human milk: Effects on flavor and the infant's behavior. *New England Journal of Medicine*, 325(14), 981–985.
- Nicklaus, S., & Rigal, N. (2010). Evolution des comportements alimentaires du jeune enfant: Implication des parents. *Médecine et Enfance*, 30, 80–91.
- Raudenbush, B., Schroth, F., Reilly, S., & Frank, R. A. (1998). Food neophobia, odor evaluation and exploratory sniffing behavior. *Appetite*, 31(2), 171–183.
- Schaal, B. (1988). Olfaction in infants and children: Developmental and functional perspectives. *Chemical Senses*, 13(2), 145–190.
- Schaal, B. (1997). L'olfaction: Développement de la fonction et fonctions au cours du développement. *Enfance*, 50(1), 5–20.