**Supplementary materials**

**Understanding sensory regulation in typical and atypical development:**

**the case of sensory seeking**

Elena Serena Piccardi1,2, Teodora Gliga3

[1] School of Psychology, Department of Psychological Sciences, University of East London, London (UK)

[2] Centre for Brain and Cognitive Development, Department of Psychological Sciences, Birkbeck, University of London (UK)

[3] School of Psychology, University of East Anglia, Norwich (UK)

Corresponding author: Elena Serena Piccardi

Address: Arthur Edwards Building, Water Lane, Stratford, London, E15 4LZ

E-mail address: E.S.Piccardi@uel.ac.uk

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**Materials and Methods**

***Sample characteristics, recruitment, and ethical approval***

The present analysis is based on data collected for the Predictive Learning study, carried out at Birkbeck, University of London between September 2017 and July 2021. Sixty-one participants contributed data at 10 months (mean age= 10 months and 6 days, SD= 14 days; n males=30, n females=31). Of these, n=28 contributed follow-up data (mean age=38 months and 19 days, SD=25 days; n males=10, n females=18). According to Cohen (1988) and Sawilowsky (2009) a medium effect size in psychological studies is r = .50 and, considering an estimate power of .80, we estimate a sample size of 23 participants to detect one-tailed correlational effects at an alpha-level of 0.05. All infants were born full term (gestational age 38–42 weeks), weighed >2,500 g at birth, and had no history of pre or perinatal medical complications. Infants were typically developing and, therefore, had no know developmental atypicality based on parental reports at recruitment. Infants were recruited from a volunteer database at the Centre for Brain and Cognitive Development (Birkbeck, University of London). The present study was conducted in accordance with guidelines laid down in the Declaration of Helsinki, with written informed consent obtained from a parent or guardian for each infant before any assessment or data collection. All procedures involving human subjects were approved by the Research Ethics Committee at Birkbeck, University of London (Protocols no. 171805 and 2021065).

***Measures***

***Infant-Toddler Sensory Profile (ITSP)***

Following participation in an EEG battery (details of which are reported in Piccardi et al., 2020), caregivers were asked to complete the parent-reported questionnaire ITSP (Dunn, 2002). The “7–36 months” version of the ITSP is a 48-item questionnaire which provides a measure of infants’ sensory processing in four quadrants (i.e., sensory seeking, low registration, sensation avoiding and sensory sensitivity) for each sensory domain. Visual sensory seeking is captured through four items asking whether the child enjoys looking at moving or spinning objects (Item 14); enjoys looking at shiny objects (Item 15); enjoys looking at own reflection in the mirror (Item 19); and prefers fast-paced, brightly colored TV shows (Item 20). Parents were asked to rate the frequency of occurrence of infant’s sensory behaviors on a 5-point scale (i.e., 1 = almost always; 5 = almost never). In a normative sample, the reliability of the domains and quadrants’ scores ranges from 0.69 to 0.85 (Dunn, 2002; Eeles et al., 2013), and good content and criterion validity are reported (Dunn & Daniels, 2002). To test the hypothesis that parent-reported individual visual sensory seeking profiles at 10 months predict parent-reported measures of epistemic curiosity at 3-4 years of age, infants’ average scores for the sensory seeking quadrant in the visual domain were extracted and included in the subsequent statistical analyses. In the current dataset, composite reliability for the visual sensory seeking items at 10 months was 0.73, indicating satisfactory internal consistency.

***Epistemic Curiosity Scales for Young Children***

Caregivers of infants who participated in the Predictive Learning study at 10 months were recontacted approximately 3 years later to complete an online survey (administered via Qualtrics, Provo, UT) including the Epistemic Curiosity Scales (ECS) (Piotrowski et al., 2014). The ECS is a 10-item questionnaire for children aged 3-8 years which provides a measure of curiosity within two dimensions: interest (I) and deprivation (D) types. I-type refers to the desire of obtaining new knowledge capable of producing positive experiences of intellectual interest, whereas D-type refers to the desire of reducing unpleasant experiences of information uncertainty. I-type is captured through five items asking whether the child has fun learning new topics of subjects (Item 1); is attracted to new things in his/her environment (Item 2); enjoys talking about topics that are new to him/her (Item 3); shows visible enjoyment when discovering something new (Item 4); while learning something new, he/she asks many questions about it (Item 5). D-type is captured through five items asking whether the child, when presented with a difficult topic, focuses all his/her attention on how to solve it (Item 6); devotes considerable attention trying to figure out things that are confusing or unclear (Item 7); is bothered when he/she does not understand something, and tries hard to make sense of it (Item 8); will work for a long time to solve a problem because he/she wants to know the answer (Item 9); carefully examines things by turning them around or looking at them from all sides (Item 10). In the original version of the instrument, parents are asked to rate the frequency of occurrence of children’s behaviors on a 4-point scale (i.e., 1=almost never; 4=almost always). Scores on the I-type and D-type dimensions are separately computed by averaging individual items. In a normative sample, the reliability of the I-type dimension is reported to be 0.85; of the D-type dimension is reported to be 0.80, and satisfactory construct validity is documented (Piotrowski et al., 2014). Due to a coding error, a 5-point scale was used in the current study (i.e., 1=never; 5=always). This error did not affect the reliability of the scale: composite reliability for the I-type dimension was 0.90; for the D-type dimension was 0.91, indicating excellent internal consistency.

**Results**

Statistical analyses were conducted in SPSS v27. Prior to performing any inferential statistical analyses, the variables were assessed for normality. ITSP visual sensory seeking scores at 10 months significantly violated normality assumptions (Shapiro-Wilk, *p*=.006; Skewness =.314, SE=.306; Kurtosis= -.492, SE=.604). Similarly, I-type scores significantly violated normality assumptions (Shapiro-Wilk, *p*=.011; Skewness = -.248, SE=.441; Kurtosis= -1.197, SE=.858). No significant violations of normality emerged for D-type scores (Shapiro-Wilk, *p*>.05). Thus, Spearman models were used. ITSP visual sensory seeking scores at 10 months significantly associated with I-type (rho (26) = -.691, *p*<.001) and D-type (rho (26) = -.606, *p*<.001) scores at 3-4 years. The negative direction of these associations indicates that the higher the parent-reported visual sensory seeking scores at 10 months, the higher the parent-reported curiosity scores (interest and deprivation) at 3-4 years of age (see Figure 2 main manuscript).

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