Novelty preference: A new eye tracking implementation and a comparison with the Fagan test of infant intelligence

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Morgan and Hayne (2006a; 2006b; 2011) developed a new paradigm for measuring visual recognition memory based on novelty preference (NP). This new brief procedure has been validated for 1 to 4 year old children. We adapted their paradigm for use with an eye tracker enabling us to measure the looking pattern automatically and to examine the paradigm for 9-month-old children. The videos contain animated geometric shapes (moving eyes and mouths) that are shown pairwise to the child for 30 seconds.

Our study had two goals: (1) To move Morgan and Hayne’s paradigm to an eye tracker platform, and (2) to compare the results with an established measure: the Fagan Test of Infant Intelligence (FTII; Fagan & Detterman, 1992).

(1) Does the new paradigm work on an eye tracker platform with 9 month-olds?

Study 1 examined NP in twelve (six girls) 9 months old infants (M = 9.4 months; SD = 0.4). All infants were tested with a Tobii T120 eye tracker system (a sampling rate of 120 Hz). Infants sat in their parents’ lap about 60 cm from the screen, and a 5-point calibration was used.

Tobii studio was used for analyses. Each figure defined an area of interest (AOI) equal to 38.7 % of the screen.

NP calculation: new stimuli / (new stimuli + old stimuli). Values > 0.5 indicate NP.

Two infants did not provide any data and were excluded from analysis. Mean NP was 0.69 (SD = 0.16) which was significantly higher than 0.5 (t(9) = 3.6, p = .006). Infants also fixated more on the new stimuli (M = 13.1, SD = 3.1) compared to the old stimuli (M= 9.0, SD = 3.9; t(9) = 4.3, p = .002).

❖ A significant novelty preference was observed.
❖ An eye tracker version of Morgan and Hayne’s new paradigm does work with 9-month-old children.

(2) Does the observed novelty preference correlate with the Fagan Test of Infant Intelligence?

Ten infants (3 girls) with a mean age of 9.4 months (SD = 0.41) were tested twice on two different days (1 or 5 days apart) with the NP paradigm and the FTII. One infant did not provide any data for NP on the first visit.

Table 1: Novelty preference as measured with Morgan and Hayne’s paradigm

<table>
<thead>
<tr>
<th>Novelty preference</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>at 1st visit</td>
<td>9</td>
<td>0.71</td>
<td>0.16</td>
<td>4.16</td>
<td>.003</td>
</tr>
<tr>
<td>at 2nd visit</td>
<td>10</td>
<td>0.64</td>
<td>0.12</td>
<td>3.57</td>
<td>.006</td>
</tr>
<tr>
<td>average</td>
<td>9</td>
<td>0.67</td>
<td>0.12</td>
<td>4.32</td>
<td>.003</td>
</tr>
</tbody>
</table>

* One-sample t-test for differences from 0.5.

Table 2: Pearson correlations between Morgan and Hayne’s paradigm and Fagan test of infant intelligence (FTII).

<table>
<thead>
<tr>
<th></th>
<th>at 1st visit</th>
<th>at 2nd visit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Novelty preference</td>
<td>.02</td>
<td>.87**</td>
</tr>
<tr>
<td>at 1st visit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>at 2nd visit</td>
<td>-.03</td>
<td>.28</td>
</tr>
</tbody>
</table>

❖ A significant novelty preference was observed at retest.
❖ The highest correlation was found between NP measured at the first visit and FTII measured at the second visit.

Conclusion
(a) Novelty preference in the Morgan and Hayne paradigm was observed in two samples of 9-month-old infants.
(b) NP as measured with Morgan and Hayne’s paradigm did not correlate with NP measured concurrently with FTII.
(c) Future studies should further explore individual differences using the new eye tracker based version of Morgan and Hayne’s procedure.

References

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