Six tea-towels, one calendar and 1659 children's self-portraits: A developmental study of children drawing faces

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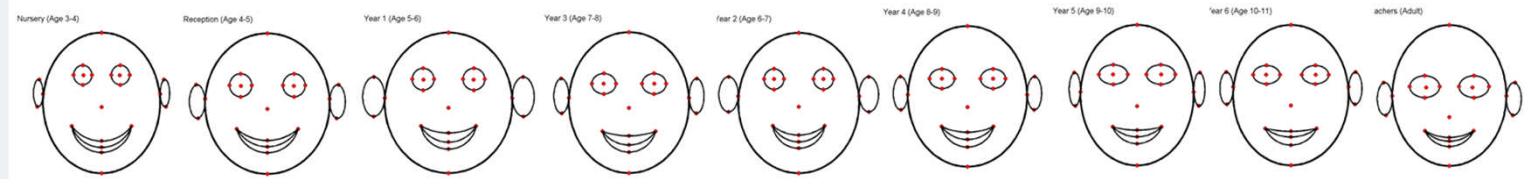Research Department of Clinical, Educational and Health Psychology, University College London, London WC1E 6BT, UK

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Figure 1: Mean location of landmarks from age 3-4 (Left) to Adult (right)

Almost all children draw, and almost all draw faces. Faces are, however, difficult to draw, and even adults typically get the internal proportions wrong, placing the eyes and ears too high, instead of in their correct position, which in adult faces is typically about halfway between chin and vertex, but somewhat lower in children's faces (**figure 4** shows the anthropometric norms of Farkas and Munro, 1987). Large-scale studies of children's self-portraits are rare, and this study used an unusual data set to examine the development of children's self-portraits.

Each year, as a fund-raising exercise at Christmas, a local state school attended by the first author's three children, printed a calendar or tea-towels with pictures of all the children in the Infant (3-7) and Junior (8-11) school. For the calendars Each child was given a standard 5 x 5 cms piece of paper by their teacher and asked to draw a self-portrait and to write their name. Many of the teachers also drew self-portraits. The images were then assembled by classes, photographed, and printed either as a calendar or as tea-towels.

Method

Images. Six tea-towels and one calendar were available, containing a total of 1659 recognisable, usable images of faces, almost all of which were full frontal. Most images had legible names, and the images were grouped by classes, so that the age group was easily recognised, and with the help of the first author's family, many of the children could be securely identified. Since most children progressed through the school, 467 pupils were identified on at least two occasions, with 127 on three occasions and 19 on four occasions.

Image measurement

The tea-towels and calendar were photographed digitally, and individual portraits extracted and numbered. Using a special-purpose Matlab program the locations of 24 landmarks were identified visually; as shown in the schematics above (figure 2), five for each eye, five for the mouth, one for the tip of the nose, two for the extrema of each ear, two for the lateral head extrema excluding the ears, and one each for vertex and chin. Not all features could be identified or were present in all images.
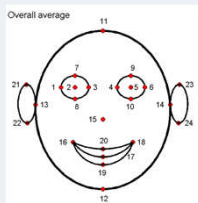

Figure 2: Location of landmarks on an average face

Summary

- Children's facial self-portraits develop from age 3 to 11
- The **eyes** become **lower** in the face, **wider** and **more oval**
- The **mouth** becomes **narrower** and **less 'smiley'**
- The **head** becomes **narrower** and the **ears lower set**
- Both **children and adults** set the **eyes too high** in the head
- If the **nose is absent** the **eyes are lower** and **mouth higher**
- The **nose** moves down **earlier** than either eyes or mouth
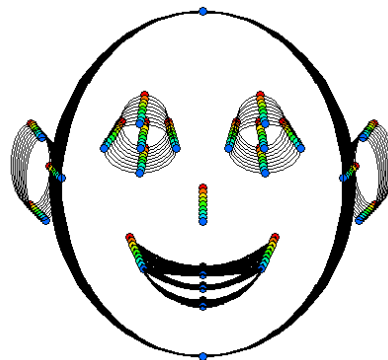- The **nose** may drive positioning of other face components

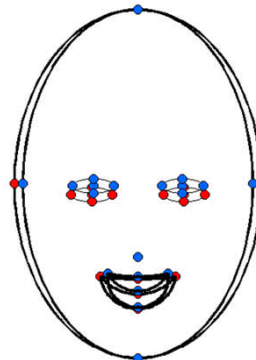**Figure 3**: Fitted location (linear trend) of landmarks from age 3-4 (Red) to Adult (Blue).

Figure 4: Veridical location of landmarks from Farkas & Munro 1987 at 6 (Red) and 18 (Blue).

Image registration. Images were rotated and stretched so that the chin and vertex were at co-ordinates (0,0) and (0,100), all other locations being measured relative to these two landmarks.

Statistical analysis. Conventional statistical analysis used SPSS 13.0.

Ethical permission. Ethical permission was not necessary as the tea-towels and calendar had been sold in public and were therefore in the public domain.

Results

Figure 1 shows landmark positions at each age. The highly significant trends with age (**figures 3 & 5**) show that in older children the:
- **Eyes**:
  - are lower in the head
  - are wider
  - are more elliptical
- **Nose:** is lower
- **Mouth**:
  - is less wide
  - smiles less
- **Head:** is more oval
- **Ears**: are lower on the head

Comparison with norms:
Figures 3 & 4 show that children and adults place features too high in the head compared with anthropometric norms.
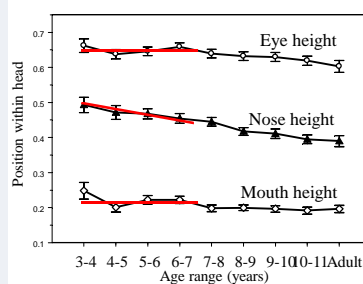

Figure 5: Eye, nose and mouth height (95% CI) by age. Only the nose shows a significant trend across ages 3 to 7.

The role of the nose: About 25% of self-portraits did not show a nose, rather more in younger children (~35%) than in older children and adults (~15%). For all ages, if the nose was drawn then the eyes were higher and the mouth lower.

Trends to age 7. Considering just the younger children (ages 3 – 7), neither eye height nor mouth height showed a significant linear trend with age (p=.377; .757), that conclusion being the same whether or not a nose was drawn. However the nose becomes lower across the first four age groups (p=.009). The implication is that the nose begins to move before the other facial components, and may be driving change in other components.

Discussion

Self-portraits of children show systematic errors in locating eyes, nose and mouth. The nose seems to play a previously unrecognised role in driving facial organisation, as when it is absent the eyes are lower and the mouth higher, presumably due to the need to pack in more components. The nose also moves down earlier than the eyes or mouth. Unclear is whether the *order* of drawing eyes, nose and mouth alters facial portrayal.

The tea-towels and the calendar

Tea-towels were available for Infant and Junior Schools for 2008/9, 2009/10 and 2010/11, and a Calendar was available for 2006/7.