**Supplementary Information for Lynne Murray et al. commentary on Keven and Akins**

**1. Structure of infant behavior**

We coded infant behaviors (‘Non-Communicative’ Mouth Movements (e.g., chewing), Tongue Protrusions, Mouth Openings, Smiles, Cooing Vocalizations, Biological Events (e.g., sneezes, hiccoughs), Negative Mouth Movements (e.g., pouts), Negative Expressions (e.g., frowns), and Negative Vocalizations (e.g., cry, fret)), as discrete events, on a one-second basis, during naturalistic mother-infant face-to-face interactions, from video-recordings of 20 dyads, between 1 and 9 weeks of life. Infant events were then investigated through Principal Components Analysis (PCA), using Parallel Analysis, to determine the number of components to extract, and Simplimax rotation. Three components emerged (only behaviors with absolute value loadings >.5 are reported), explaining 61.01% of the variance (*KMO* = 0.673; Bartlett's Test of Sphericity *Χ2*(36) = 194.401, *P* < 0.001): the first one, infant social expressiveness, included Mouth Openings (.781), Smiles (0.753), Tongue Protrusions (0.712), and Cooing vocalizations (0.689), all positively loaded, and, with negative loading, ‘Non-Communicative’ Mouth Movements (- 0.561). Behaviors in the second component were Negative Mouth Movements (0.529), Negative Expressions (0.708), and Negative Vocalizations (0.803), that is, infant negative affect; while the third component was Biological Events (0.873).

**2. Maternal comments following infant Tongue Protrusion**

Using the video-recordings described above, we coded all maternal verbal comments following infant Tongue Protrusions. All but one infant made some tongue protrusion during face-to-face interaction: 52.63% of mothers directly responded to their infant’s tongue protrusions with verbal comments (the others responded only with facial movements, such as imitations). Of their verbal comments, none was related to feeding or to an interpretation of their infant’s tongue protrusions as indicating hunger. Twenty-five percent showed a social interpretation (“What are you trying to say?”, “Are you telling me that you had a lovely day?”); 58.33% showed a playful interpretation (“Oooh! I saw your tongue! There it is! Is it hiding!”), while 16.67% of comments where used to simply acknowledge the behavior (“Sticking your tongue out”). A Chi Square test of Goodness of Fit was used to test whether the mothers’ comments were equally distributed among these four categories (attributing tongue protrusion to their infant being hungry, social, playful, or whether the comments were simply used to acknowledge the infant’s behavior). The distribution of frequencies was found to differ significantly from what would be expected in the case of a truly independent distribution (X2(3)= 17.333, p<0.001), with standardized residuals showing that the kinds of comment showing the greatest discrepancies were hunger interpretations (Standardised Residual= -2.828) being the least represented, and playfulness interpretation (Standardised Residual=3.771) being the most frequent.