**Supplementary Methods**

*EEG pre-processing and artefact rejection*

Prior to artefact rejection data were concatenated across the Solo Play and Joint Play conditions for each participant to ensure that all artefact rejection procedures were applied identically across conditions. First, a band-pass filter was applied to exclude activity below 1Hz and above 16Hz. Second, noisy channels were identified by calculating the power spectrum with Fast Fourier Transform (FFT) and summing the total power across the frequency spectrum. Channels for which the total power was greater than two inter-quartile ranges above the mean total power for all channels were excluded. The mean (st.err.) number of channels excluded in this way was 1.44 (0.22) for infants and 0.18 (0.10) for parents. In addition, the total power across the entire frequency spectrum was visually inspected for each channel at this stage, and data from a further 3 infants was excluded because the total power for all channels was markedly above the average total across all infants, and because visual inspection of the data confirmed that this was not due to factors such as sporadic noisy segments, or to ground noise that could be removed via ICA. (These 3 infants were already excluded prior to calculating the final participant numbers reported in the main Methods section.) Third, continuous data were segmented into two-second epochs, and the most egregious sections of noisy data were excluded prior to running the ICA. In order to ensure that comparable amounts of data were retained for infant and adult participants, this was done by calculating the max-min change on a per-channel, per-epoch basis, across all channels and epochs, and determining what level of this threshold would mean that 6% of data were excluded, separately for infants and parents. This threshold was set, for this coarse, initial rejection stage, at +/- 181μVfor adults, and **+/-**617 μV for infants, reflecting a naturally higher amplitude of EEG oscillations in infants (de Haan, 2008)

Fourth, an extended ICA algorithm was then run on the data using the runica algorithm implemented within EEGLAB in Matlab (Delorme, Sejnowski, & Makeig, 2007). The timecourses and spatial distributions of the ICs were visually inspected and the components accounting for ground noise, eye blinks, eye movements and other muscular and movement artifacts were then manually marked and removed (Jung et al., 2000). Fifth, channels that had been excluded at stage three were interpolated using the spherical interpolation function from EEGLAB (Delorme & Makeig, 2004). Sixth, a baseline correction was applied by calculating the average value for each epoch and for each channel, and subtracting every individual value within each epoch from that average. Seventh, a second max-min criterion was applied, identical to that applied at stage three but with more stringent criteria. For each epoch and for each channel, the max-min value was calculated. Epochs showing a difference >+/- 80μV were excluded from the adult data. The percentage of epochs excluded at this stage was calculated for the adult data, and the threshold determined such that an identical proportion of samples from the infant dataset were excluded. For the infant data, this threshold value was +/- 196 μV. Eighth, data from all channels other than C3 and C4 were excluded, because our analyses have shown that these are the channels that can be most confidently be said to be free of muscular and movement artefact on our semi-naturalistic tabletop play paradigm (Georgieva, Lester, Yilmaz, Wass, & Leong, 2017).

*EEG spectral power analysis*

To calculate EEG spectral power, a linear detrend was first applied, for each channel and for each epoch, and then an FFT was carried out using the built-in function in Matlab (Mathworks Inc). The FFT was performed on data in 2000 ms epochs, which were segmented with an 87.5 % (1750 ms) overlap between two adjacent epochs. The FFT was calculated in 1Hz frequency bins, examining frequencies between 1 and 16 Hz. For each epoch, that power at that bin was expressed as relative power – i.e. the total power at that frequency divided by the total power across all frequencies (1-16 Hz) at that epoch. Afterwards, results from the two channels analysed for each participant were averaged. Thus, power estimates of the EEG signal were obtained with a temporal resolution of 4 Hz and a frequency resolution of 1 Hz.