|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Supplementary Table S1.** *Results of neuroimaging studies investigating emotion recognition* | | | | | | | | | |
| **Disorder** | **Study** | **Study n**  **Behavioural**  **results** | **N (number female), Age, Sample, IQ** | **Task**  **Analysis** | **Contrast** | **Brain activation** | **Coordinates (MNI)** | | |
| **SZ** |  |  |  |  |  |  |  |  |  |
| Meta-analyses | |  |  |  |  |  |  |  |  |
|  | Taylor et al. | 17 | SZ = 450 (124F) | Implicit | Emotion > Neutral | **SZ < HC:** |  |  |  |
|  | 2012 |  | HC = 422 (119F) | Explicit | Emotion > Baseline | L Parahippocampal Gyrus/Amygdala | -22 | -6 | -20 |
|  |  |  | Mean age | Meta | Emotion > Shapes/ Scrambled | L Parahippocampal Gyrus/Amygdala | -24 | -12 | -18 |
|  |  |  | SZ: 32.5 | Kernel Density | face | R Anterior Cingulate Gyrus | 16 | 32 | 14 |
|  |  |  | HC: 32.1 | of whole brain analyses | Valence > Age | R Superior Frontal Gyrus( Medial FG) | 4 | 22 | 52 |
|  |  |  | Inpatients |  | Positive > Negative Emotion | R Insula (Dorsolateral Prefrontal Cortex) | 48 | 12 | 12 |
|  |  |  | Outpatients |  |  | R Inferior Frontal Gyrus (Anterior TP) | 34 | 12 | -24 |
|  |  |  | IQ: NR |  |  | R Thalamus (Caudate Body) | 16 | -4 | 12 |
|  |  |  |  |  |  | R Superior Temporal Gyrus | 50 | -20 | 4 |
|  |  |  |  |  |  | Midbrain | 0 | -22 | -6 |
|  |  |  |  |  |  | R Midbrain | 4 | -28 | -12 |
|  |  |  |  |  |  | R Thalamus | 10 | -10 | 12 |
|  |  |  |  |  |  | R Parahippocampal Gyrus (Temp Fusiform Gyrus) | 28 | -36 | -18 |
|  |  |  |  |  |  | R Temporal Fusiform Gyrus | 38 | -44 | -18 |
|  |  |  |  |  |  | L Occipital Fusiform Gyrus | -34 | -76 | -12 |
|  |  |  |  |  |  | R Occipital Fusiform Gyrus (Occipital Pole) | 32 | -86 | -10 |
|  |  |  |  |  |  | L Occipital Lingual Gyrus (Occipital Pole) | -10 | -100 | -6 |
|  |  |  |  |  |  | L Cerebellum Culmen | -16 | -32 | -22 |
|  |  |  |  |  |  | **SZ > HC** |  |  |  |
|  |  |  |  |  |  | L Superior Temporal Gyrus | -44 | 4 | -18 |
|  |  |  |  |  |  | R Precentral Gyrus | 50 | 0 | 28 |
|  |  |  |  |  |  | L Inferior Parietal Lobule | -36 | -44 | 54 |
|  |  |  |  |  |  | L Cuneus | -4 | -88 | 32 |
|  |  |  |  |  |  |  |  |  |  |
|  | Li et al. | 12 | SZ = 257 (NR) | Implicit | NR | **SZ < HC:** |  |  |  |
|  | 2009 | 6 | HC = 241 | Explicit |  | R Parahippocampal Gyrus/Amygdala | 29 | -8 | -18 |
|  |  |  | Mean age = 32.5 | Meta ALE |  | L Parahippocampal Gyrus/Amygdala | -27 | -11 | -18 |
|  |  |  | Inpatients | ROI |  | R Superior Frontal Gyrus | 11 | 30 | 49 |
|  |  |  | Outpatients | Whole brain studies |  | R Middle Occipital Gyrus | 53 | -75 | 6 |
|  |  |  | IQ: NR |  |  | **SZ > HC:** none |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  | Sugranyes | 12 | SZ = 203 (NR) | Implicit | Negative Emotion | **SZ < HC:** |  |  |  |
|  | et al. 2011 |  | HC = 211 | Explicit | (Anger, Fear, Sadness) | R Inferior Frontal Gyrus | 40 | 19 | -27 |
|  |  |  | Mean age = 30.6 | Meta ALE | > Neutral | R Posterior Cingulate Gyrus | 6 | -24 | 25 |
|  |  |  | Inpatients | ROI |  | L Parahippocampal Gyrus/Amygdala | -23 | -2 | -17 |
|  |  |  | Outpatients | Whole brain studies |  | R Fusiform Gyrus | 31 | -78 | -9 |
|  |  |  | IQ: NR |  |  | L Dorsomedial Thalamus | 1 | -10 | 10 |
|  |  |  |  |  |  | **SZ > HC:** none |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  | [Anticevic et](#_ENREF_12) | 35 | SZ = NR (79% male) | Implicit | Negative Emotion | **SZ < HC:** |  |  |  |
|  | al. 2012 |  | HC = NR (76% male) | Explicit | > Neutral | L Amygdala | NR | NR | NR |
|  |  |  | Mean age: NR | Meta-analysis |  | R Amygdala |  |  |  |
|  |  |  | Inpatients | of effect sizes |  | **SZ > HC:** none |  |  |  |
|  |  |  | Outpatients | (BC bootstrap) |  |  |  |  |  |
|  |  |  | IQ: SZ < HC | ROI |  |  |  |  |  |
|  |  |  |  | Whole brain studies |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| Studies comparing emotion faces > control faces | | |  |  |  |  |  |  |  |
|  | Lepage et |  | SZ = 26 (11F) | Implicit | Sadness + Happiness | **SZ < HC:** |  |  |  |
|  | al. 2011 | SZ = HC | HC = 26 (14F) | Whole brain | > Neutral | R Superior Frontal Gyrus | 14 | 14 | 66 |
|  |  | Flat affect (but no other | Mean age |  |  | L Anterior Cingulate | -6 | 26 | 14 |
|  |  | neg symptoms) neg | SZ: 31.8 (7.7) |  |  | L Thalamus | -6 | -20 | 6 |
|  |  | related to L ACC, R | HC: 28.3 (5.6) |  |  | R Lingual Gyrus (Cuneus) | 16 | -94 | 0 |
|  |  | Supramarginal | Outpatients |  |  | R Cerebellum, Cerebellar Tonsil | 14 | -36 | -38 |
|  |  | & Precentral Gyrus | IQ: NR |  |  | R Insula (Superior Temporal Gyrus) | 48 | 10 | -8 |
|  |  |  |  |  |  | R Thalamus | 4 | -10 | 12 |
|  |  |  |  |  |  | R Parahippocampal Gyrus | 14 | -38 | 2 |
|  |  |  |  |  |  | L Cuneus | -6 | -82 | 30 |
|  |  |  |  |  |  | L Lingual Gyrus | -10 | -88 | -2 |
|  |  |  |  |  |  | **SZ > HC: none** |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  | Derntl et al. |  | SZ = 15 (5F) | Explicit | Emotion (Happiness, | **SZ <HC** |  |  |  |
|  | 2012 |  | HC = 15 (5F) | Whole brain | Sadness, Anger, Fear, | R Thalamus | 2 | -8 | 8 |
|  |  |  | Mean age |  | Disgust) > Control | R Parahippocampal Gyrus (Fusiform Gyrus) | 40 | -22 | -20 |
|  |  |  | SZ: 34.2 (9.1) |  | (Age discrimination) | R Inferior Frontal Gyrus (Fusiform Gyrus) | 52 | 30 | 8 |
|  |  |  | HC: 30.4 (8.9) |  |  | L Insula (Inferior Frontal Gyrus) | -36 | 32 | 8 |
|  |  |  | Inpatients |  |  | L Precuneus (Inferior Frontal Gyrus) | -4 | -74 | 52 |
|  |  |  | Outpatients |  |  | R Postcentral Gyrus (Precuneus) | 8 | -46 | 74 |
|  |  |  | IQ: No difference |  |  | R Middle Cingulate | 4 | -30 | 44 |
|  |  |  |  |  |  | Cerebellum | 0 | -50 | -12 |
|  |  |  |  |  |  | R Anterior Cingulate | 8 | 42 | 8 |
|  |  |  |  |  |  | L Middle Occipital Gyrus (Middle Temporal Gyrus) | -44 | -82 | 20 |
|  |  |  |  |  |  | **SZ > HC: none** |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| Studies comparing emotion faces > baseline/shapes | | |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  | Mothersill et al. |  | SZ = 25 (5F) | Implicit | Emotion (Angry + Neutral) | **SZ < HC:** |  |  |  |
|  | 2014 |  | HC = 21 (5F) | Whole brain | > Shapes | L Cerebellum | -39 | -70 | -23 |
|  |  |  | Mean age |  |  | L Cerebellum | -18 | -76 | -35 |
|  |  |  | SZ: 42.8 (10.9) |  |  | L Cerebellum | -24 | -79 | -23 |
|  |  |  | HC: 38.2 (8.6) |  |  | **SZ > HC:** |  |  |  |
|  |  |  | IQ: NR |  |  | R Anterior Cingulate | 6 | 32 | 4 |
|  |  |  |  |  |  | R Anterior Cingulate | 9 | 38 | -11 |
|  |  |  |  |  |  | **L** Medial Frontal Gyrus | -9 | 56 | 4 |
|  |  |  |  |  | Angry > Baseline | **SZ < HC:** none |  |  |  |
|  |  |  |  |  |  | **SZ > HC:** |  |  |  |
|  |  |  |  |  |  | R Anterior Cingulate | -3 | 41 | 1 |
|  |  |  |  |  |  | R Anterior Cingulate | 12 | 38 | 1 |
|  |  |  |  |  |  | L Medial Frontal Gyrus | -9 | 56 | 4 |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  | Mier et al. | SZ = HC except | SZ = 12 (4F) | Explicit | Emotion | **SZ < HC:** |  |  |  |
|  | 2014 | SZ > HC: ER (Neutral) & RT | HC = 16 (5F) | Whole Brain | (Happiness, Anger, Fear | R Inferior Parietal Lobule | 45 | -55 | 58 |
|  |  | Positive symptoms: | Mean age |  | Disgust, Neutral) | R Cerebellum | 27 | -88 | -29 |
|  |  | pos related to | SZ: 32.5 (7.6) |  | > Baseline | L Insula | -39 | 17 | -5 |
|  |  | Amygdala activation | HC: 34.5 (6.5) |  |  | L Fusiform Gyrus | -45 | -25 | -17 |
|  |  | During anger > neutral | Outpatients |  |  | L Inferior Frontal Gyrus | -54 | 29 | 16 |
|  |  | Disgust > neutral | IQ: no difference |  |  | R Inferior Frontal Gyrus | 45 | 20 | -14 |
|  |  | neg related during happy |  |  |  | L Inferior Parietal Lobule | -48 | -49 | 52 |
|  |  | >neutral |  |  |  | R Middle Temporal Gyrus | 60 | -25 | -17 |
|  |  | Negative symptoms neg |  |  |  | L Transverse Temporal Gyrus | -51 | -19 | 10 |
|  |  | Related to amygdala |  |  |  | L Uncus, Cerebellum | -36 | -7- | -32 |
|  |  | Activation during anger |  |  |  | R Anterior Cingulate | 21 | 23 | 22 |
|  |  | > neutral |  |  |  | L Cerebellum | -18 | -49 | -26 |
|  |  |  |  |  |  | L Postcentral Gyrus | -21 | -46 | 70 |
|  |  |  |  |  |  | **SZ > HC:** |  |  |  |
|  |  |  |  |  |  | L Cuneus | -3 | -100 | 7 |
|  |  |  |  | ROI |  | **SZ < HC:** |  |  |  |
|  |  |  |  |  |  | L Amygdala: | -27 | -4 | -17 |
|  |  |  |  |  |  | **SZ > HC: none** |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| **ASD** |  |  |  |  |  |  |  |  |  |
| Meta-analyses | |  |  |  |  |  |  |  |  |
|  | Sugranyes | 5 | ASD = 55 | Implicit | Negative Emotion | **ASD < HC:** |  |  |  |
|  | et al. 2011 |  | HC = 55 | Explicit | > Neutral | L Postcentral Gyrus | -41 | -15 | 54 |
|  |  |  | Mean age = 29.8 | Meta ALE |  | **ASD > HC:** |  |  |  |
|  |  |  | IQ: NR | ROI |  | L Superior Temporal Sulcus | -59 | -24 | 5 |
|  |  |  |  | Whole brain studies |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| Studies comparing emotion faces > control faces | | |  |  |  |  |  |  |  |
|  | Weng et al. | ASD = HC | ASD = 22 (5F) | Implicit | Sadness > Happiness | **ASD < HC:** |  |  |  |
|  | 2011 |  | HC = 20 (1F) | ROI | Sadness > Neutral | R Amygdala | 24 | -8 | -20 |
|  |  |  | Mean age |  | (no other comparison | R Amygdala | 24 | -10 | -12 |
|  |  |  | ASD: 14.4 (1.7) |  | reached significance) | L Putamen (Striatum) | -28 | -22 | 0 |
|  |  |  | HC: 15 (2) |  |  | **ASD > HC: none** |  |  |  |
|  |  |  | Adolescents |  |  |  |  |  |  |
|  |  |  | IQ: Verbal no difference |  |  |  |  |  |  |
|  |  |  | Non-verbal ASD < HC |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  | Wicker et | ASD = HC | ASD = 12 (1F) | Explicit | Emotion (Anger , Happiness) | **ASD < HC** |  |  |  |
|  | al. 2008 |  | HC = 14 (0F) | Whole Brain | > Control (Age Judgement) | R Inferior Parietal Lobule (TPJ) | 74 | -32 | 23 |
|  |  |  | Mean age |  |  | R Inferior Frontal Gyrus | 58 | 25 | 1 |
|  |  |  | ASD: 27 (11) |  |  | R Superior Frontal Gyrus | 14 | 64 | 20 |
|  |  |  | HC: 23.4 (10) |  |  | **ASD > HC: none** |  |  |  |
|  |  |  | Adults |  |  |  |  |  |  |
|  |  |  | IQ: NR |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  | Piggot et al. | Emotion matching (EM) | ASD = 14 (male only) | Explicit | Emotion | **ASD < HC:** |  |  |  |
|  | 2003 | & labelling (EL): ASD =HC | HC = 10 | ROI | (Fear, Surprise Anger) > | Fusiform Gyrus | NR | NR | NR |
|  |  | No RT difference in EM | Mean age |  | Control (Shapes) | **ASD > HC:** none |  |  |  |
|  |  | EL: ASD < HC | ASD: 13.1 (2.5) |  |  |  |  |  |  |
|  |  |  | HC: 14.1 (3.3) |  |  |  |  |  |  |
|  |  |  | Children & |  | Emotion > Control | **ASD < HC:** none |  |  |  |
|  |  |  | Adolescents |  |  | **ASD > HC:** none |  |  |  |
|  |  |  | IQ: NR, both groups |  |  |  |  |  |  |
|  |  |  | Above average |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| Studies comparing emotion faces > other control | | | |  |  |  |  |  |  |
|  | Kleinhans |  | ASD = 28 | Implicit | Fear > Scrambled Image | **ASD < HC** |  |  |  |
|  | et al. 2011 |  | HC = 25 | ROI |  | L Amygdala | -22 | -4 | -16 |
|  |  |  | Mean age |  |  | L Parahippocampal Gyrus (Fusiform Gyrus) | -28 | -36 | -20 |
|  |  |  | ASD: 23.6 (6.6) |  |  | R Culmen (Fusiform Gyrus) | 34 | -46 | -24 |
|  |  |  | HC: 23.3 (5.2) |  |  | R Thalamus, Pulvinar | 20 | -34 | 4 |
|  |  |  | Adults |  |  | R Brainstem, Superior Colliculus | 6 | -38 | -6 |
|  |  |  | IQ: no difference |  |  | L Superior Colliculus |  |  |  |
|  |  |  |  |  |  | **ASD > HC:**  none |  |  |  |
|  |  |  |  |  |  | **ASD < HC** |  |  |  |
|  |  |  |  | Whole brain | Fear > Scrambled Image | R Culmen ( Fusiform Gyrus) | 34 | -46 | -24 |
|  |  |  |  |  |  | R Postcentral Gyrus (Superior Parietal Cortex) | 50 | -24 | 50 |
|  |  |  |  |  |  | **ASD > HC**: none |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  | Corbett et | ER: ASD < HC | ASD = 12 | Explicit | Emotion (Happiness, Sadness | **ASD < HC**: |  |  |  |
|  | al. 2009 | RT: ASD = HC | HC = 15 | Whole Brain | Anger, Fear, Neutral) > | R Culmen (Fusiform Gyrus) | 27 | -40 | -17 |
|  |  |  | Mean age |  | Shapes | **ASD > HC**: |  |  |  |
|  |  |  | ASD: 9.01 (1.6) |  |  | L Middle Temporal Gyrus (Superior Parietal lobe) | -66 | -30 | 2 |
|  |  |  | HC: 9.17 (1.44) |  |  | L Precentral Gyrus (Middle Frontal/ Parahippocampal) | -34 | -5 | 64 |
|  |  |  | Children |  |  | L Postcentral gyrus (Parahippocampal Gyrus) | -64 | -12 | 32 |
|  |  |  | IQ: ASD < HC |  |  | L Superior Parietal Lobe | -36 | -62 | 57 |
|  |  |  |  |  |  | L Middle Frontal Gyrus | -52 | 14 | 38 |
|  |  |  |  |  |  | L Cerebellar Tonsil | -58 | -57 | -34 |
|  |  |  |  | ROI |  | **ASD < HC:** none |  |  |  |
|  |  |  |  |  |  | **ASD > HC:**  none |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| Studies comparing emotion faces > baseline | | |  |  |  |  |  |  |  |
|  | Tottenham | ASD = HC | ASD = 31 (3F) | Implicit | Anger + Neutral > | **ASD < HC**: none |  |  |  |
|  | et al. 2013 | except ASD < HC | HC = 45 (18F) | ROI | Baseline | **ASD > HC**: |  |  |  |
|  |  | for neutral expressions | Mean age = 15.5 |  |  | L Amygdala | -26 | -5 | -23 |
|  |  | (Separate Task) | ASD: 15 (6) |  |  | R Amygdala | 28 | 0 | -25 |
|  |  |  | HC: 16 (8) |  |  |  |  |  |  |
|  |  |  | Children & |  |  |  |  |  |  |
|  |  |  | Adolescents |  |  |  |  |  |  |
|  |  |  | IQ: no difference |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  | Weng et al. | ASD = HC | ASD = 22 (5F) | Implicit | Sadness > Baseline | **ASD < HC:** none |  |  |  |
|  | 2011 |  | HC = 20 (1F) | Whole Brain |  | **ASD > HC:** |  |  |  |
|  |  |  | Mean age |  |  | R Insula | 42 | -32 | 20 |
|  |  |  | ASD: 14.4 (1.7) |  |  | L Putamen (Striatum) | -18 | 8 | 0 |
|  |  |  | HC: 15 (2) |  |  | L Middle Frontal Gyrus (Inferior Frontal Gyrus) | -54 | 10 | 38 |
|  |  |  | Adolescents |  |  | L Middle Temporal Gyrus | -56 | -40 | -4 |
|  |  |  | IQ: Verbal no difference |  | Happiness > Baseline | **ASD < HC:** none |  |  |  |
|  |  |  | Non-verbal ASD < HC |  |  | **ASD > HC:** |  |  |  |
|  |  |  |  |  |  | L Caudate (Striatum) | -10 | 16 | -4 |
|  |  |  |  |  | Neutral > Baseline | **ASD < HC:** none |  |  |  |
|  |  |  |  |  |  | **ASD > HC:** |  |  |  |
|  |  |  |  |  |  | R Medial Frontal Gyrus | 8 | 40 | 24 |
|  |  |  |  |  |  | **ASD < HC:** none |  |  |  |
|  |  |  |  | ROI | Sadness > Baseline | **ASD > HC:** |  |  |  |
|  |  |  |  |  |  | L Amygdala | -20 | -2 | -14 |
|  |  |  |  |  |  | R Amygdala | 24 | -10 | -12 |
|  |  |  |  |  |  | L Medial Frontal Gyrus (VPFC) | -44 | 40 | -10 |
|  |  |  |  |  |  | R Medial Frontal Gyrus (VPFC) | 28 | 40 | -18 |
|  |  |  |  |  |  | R Anterior Cingulate (VPFC) | 4 | 34 | -18 |
|  |  |  |  |  |  | L Putamen (Striatum) | -18 | 8 | 0 |
|  |  |  |  |  | Happiness > Baseline | **ASD < HC:** none |  |  |  |
|  |  |  |  |  |  | **ASD > HC:** |  |  |  |
|  |  |  |  |  |  | L Caudate ( Striatum) | -10 | 16 | -4 |
|  |  |  |  |  |  | R Caudate (Striatum) | 10 | 10 | -2 |
|  |  |  |  |  |  | **ASD > HC: none** |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  | Doyle -Thomas | ASD = HC | ASD = 18 (male only) | Explicit | Emotion (Happiness, | **ASD < HC** |  |  |  |
|  | et al. 2013 |  | HC = 16 | (Audio & | Sadness, Anger, Neutral) | R Superior Frontal Gyrus | 17 | 69 | -22 |
|  |  |  | Mean age | Visual ER) | > Baseline | L Middle Frontal Gyrus | -42 | 58 | 1 |
|  |  |  | ASD: 14.9 (1.6) | Whole Brain |  | L Middle Frontal Gyrus | -32 | 69 | 3 |
|  |  |  | HC: 14.7 (1.7) |  |  | R Middle Frontal Gyrus | 36 | 66 | 13 |
|  |  |  | Adolescents |  |  | L Middle Frontal Gyrus | -55 | 47 | 19 |
|  |  |  | Non-verbal |  |  | R Medial Frontal Gyrus | 4 | 8 | 52 |
|  |  |  | IQ: ASD < HC |  |  | R Inferior Frontal Gyrus | 26 | 21 | -20 |
|  |  |  |  |  |  | R Inferior Frontal Gyrus | 45 | 24 | -21 |
|  |  |  |  |  |  | R Anterior Cingulate | 10 | 34 | 19 |
|  |  |  |  |  |  | R Insula | 46 | 8 | 14 |
|  |  |  |  |  |  | L Precentral Gyrus | -45 | 28 | 34 |
|  |  |  |  |  |  | L Precentral Gyrus | -35 | -4 | 30 |
|  |  |  |  |  |  | L Cingulate Gyrus | 0 | -34 | 21 |
|  |  |  |  |  |  | R Cingulate Gyrus | 10 | -14 | 28 |
|  |  |  |  |  |  | R Superior Temporal Gyrus | 55 | -20 | -10 |
|  |  |  |  |  |  | L Middle Temporal Gyrus | -65 | 2 | -14 |
|  |  |  |  |  |  | L Parahippocampal Gyrus | -19 | -38 | 6 |
|  |  |  |  |  |  | R Parahippocampal Gyrus | 42 | -28 | -23 |
|  |  |  |  |  |  | L Inferior Occipital Gyrus | -39 | -92 | -8 |
|  |  |  |  |  |  | R Parahippocampal Gyrus | 39 | -8 | -21 |
|  |  |  |  |  |  | **ASD > HC:** |  |  |  |
|  |  |  |  |  |  | L Medial Frontal Gyrus | 0 | 56 | 20 |
|  |  |  |  |  |  | L Middle Frontal Gyrus | -38 | 36 | 16 |
|  |  |  |  |  |  | L Middle Frontal Gyrus | -30 | 39 | -25 |
|  |  |  |  |  |  | L Middle Temporal Gyrus | -48 | -69 | 23 |
|  |  |  |  |  |  | L Precuneus | -9 | -48 | 41 |
|  |  |  |  |  |  | L Middle Temporal Gyrus | -71 | -33 | -7 |
|  |  |  |  |  |  | R Middle Temporal Gyrus | 58 | -6 | -29 |
|  |  |  |  |  |  |  |  |  |  |
|  | Pelphrey et |  | ASD = 8 (2F) | Implicit | Anger + Fear > Baseline | **ASD < HC**: |  |  |  |
|  | al. 2007 |  | HC = 8 (2F) | Dynamic |  | R Lentiform Nucleus (Amygdala) | 20 | -5 | -9 |
|  |  |  | Mean age | Faces |  | L Medial Frontal Gyrus | -10 | -8 | 62 |
|  |  |  | ASD: 24.4 (11.5) | ROI |  | R Medial Frontal Gyrus (Superior Frontal Gyrus) | 11 | -1 | 65 |
|  |  |  | HC: 24.1 (5.6) |  |  | L Fusiform Gyrus | -25 | -64 | -8 |
|  |  |  | Adults |  |  | L Inferior Temporal Gyrus (Middle Temporal Gyrus) | -53 | -62 | 0 |
|  |  |  | IQ: no difference |  |  | R Middle Temporal Gyrus | 57 | -62 | 5 |
|  |  |  |  |  |  |  |  |  |  |
|  | Ogai et al. | ASD = HC | ASD = 5 (NR) | Implicit | Happiness > Baseline | **ASD < HC:** none | NR | NR | NR |
|  | 2003 | (Separate Task) | HC = 9 | Whole Brain |  | **ASD > HC:** none |  |  |  |
|  |  |  | Mean age |  | Disgust > Baseline | **ASD < HC:** |  |  |  |
|  |  |  | ASD: 21.8 (5.9) |  |  | L Insula |  |  |  |
|  |  |  | HC: 23 (5.2) |  |  | L Inferior Frontal Gyrus |  |  |  |
|  |  |  | Children, adolescents & |  |  | L Putamen |  |  |  |
|  |  |  | Adults |  |  | **ASD > HC:** none |  |  |  |
|  |  |  | IQ: no difference |  | Fear > Baseline | **ASD < HC:** |  |  |  |
|  |  |  |  |  |  | L Middle Frontal Gyrus |  |  |  |
|  |  |  |  |  |  | **ASD > HC:** none |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| **SZ vs. ASD** | |  |  |  |  |  |  |  |  |
| Meta-analysis | |  |  |  |  |  |  |  |  |
|  | Sugranyes | ASD = 5 | ASD = 55 | Implicit | Negative Emotion | **ASD > SZ** |  |  |  |
|  | et al. 2011 | SZ = 12 | SZ = 203 | Explicit | > Neutral | R Anterior Cingulate | 1 | 31 | 15 |
|  |  |  | Mean age = 31.7 | Meta ALE |  | L Anterior Cingulate | 12 | 40 | 14 |
|  |  |  | Inpatients | ROI |  | L Posterior Cingulate | -20 | -64 | 7 |
|  |  |  | Outpatients | Whole brain studies |  | R Superior Temporal Gyrus | -59 | -24 | 5 |
|  |  |  | IQ: NR |  |  | L Superior Temporal Gyrus | 45 | -48 | 15 |
|  |  |  |  |  |  | **SZ > ASD** |  |  |  |
|  |  |  |  |  |  | L Inferior Frontal Gyrus | -38 | 31 | -5 |
|  |  |  |  |  |  | L Parahippocampus | -23 | -23 | -13 |
|  |  |  |  |  |  | L Inferior Parietal Lobe | -53 | -50 | -44 |
|  |  |  |  |  |  | R Inferior Occipital Cortex | 36 | -88 | -1 |
|  |  |  |  |  |  | L Culmen | -31 | -50 | -22 |
|  |  |  |  |  |  | R Culmen | 36 | -47 | -21 |
|  |  |  |  |  |  | L Declive | -31 | -82 | -18 |
|  |  |  |  |  |  | R Declive | 29 | 72 | -28 |
|  |  |  |  |  |  |  |  |  |  |
| **PP** |  |  |  |  |  |  |  |  |  |
| Studies comparing emotion faces > other control | | | |  |  |  |  |  |  |
|  | Decety et al. | *Happy > scrambled* | PP = 27 (male only) | Implicit | Happy > Scrambled Image | **PP < HC** |  |  |  |
|  | 2013c | PCL-r 1 neg related to | PCL-r ≥ 30 | ROI |  | R Fusiform Gyrus | 48 | -35 | -28 |
|  |  | Fusiform gyrus | HC = 28 | Whole Brain |  | L Culmen (Fusiform Gyrus) | -35 | -42 | -22 |
|  |  | IFG, OFC, dmPFC, | PCL-r = ≤ 20 |  |  | R Middle Occipital Gyrus | 38 | -78 | 8 |
|  |  | Inferior temporal pole | Mean age = NR |  |  | R Precentral Gyrus (Inferior Frontal Gyrus) | 58 | 5 | 12 |
|  |  | Middle frontal gyrus | Range: 18-50 |  |  | L Precentral Gyrus (Inferior Frontal Gyrus) | -58 | 0 | 12 |
|  |  | PCL-r 2 neg related to | Incarcerated |  |  | R Postcentral Gyrus (Supramarginal Gyrus) | 68 | -22 | 40 |
|  |  | Supramarginal gyrus, | IQ: NR |  |  | R Medial Frontal Gyrus (Ventromedial Prefrontal) | 8 | 65 | -10 |
|  |  | SMA |  |  |  | R Subcallosal Gyrus (Medial Orbitofrontal Cortex) | 18 | 20 | -18 |
|  |  | *Fear > scrambled* |  |  |  | L Inferior Frontal Gyrus (Medial Orbitofrontal Cortex) | -15 | 32 | -22 |
|  |  | PCL-r 1 & 2 neg related |  |  |  | R Medial Frontal Gyrus (Dorsomedial Prefrontal) | 0 | 58 | 35 |
|  |  | To middle occipital gyrus |  |  |  | L Medial Frontal Gyrus (Dorsomedial Prefrontal) | -12 | 45 | 28 |
|  |  | IFG, supramarginal gyrus |  |  |  | R Superior Temporal Pole (Inferior Temporal Pole) | 28 | 5 | -48 |
|  |  | PCL-r 1 neg related to |  |  |  | L Middle Temporal Pole (Inferior Temporal Pole) | -42 | 8 | -48 |
|  |  | L Insula, vmPFC, OFC, |  |  |  | R Cingulate Gyrus (Middle Frontal Gyrus) | 25 | 15 | 45 |
|  |  | SMA, pos related to |  |  |  | L Middle frontal gyrus | -35 | 18 | 50 |
|  |  | R insula |  |  |  | R Medial Frontal Gyrus (Supplementary Motor Area) | 0 | -5 | 55 |
|  |  | PCL-r 2 neg related to |  |  |  | L Medial Frontal Gyrus (Supplementary Motor Area) | -10 | -12 | 55 |
|  |  | R Insula, IFG, middle FG |  |  |  | **PP >HC** |  |  |  |
|  |  | SMA |  |  |  | R Uncus (Amygdala) | 32 | 2 | -28 |
|  |  | *Sadness > scrambled* |  |  |  | R Temporal Lobe sub-gyral (Superior Temporal Pole) | 52 | -2 | -22 |
|  |  | PCL-r 1 & 2 neg related |  |  |  | L Middle Temporal Gyrus (Superior Temporal Pole) | -62 | -2 | -25 |
|  |  | Psts, r ifg, dmpfc, sma |  |  | Fear > Scrambled Image | **PP < HC** |  |  |  |
|  |  | PCL-r 1 neg related to |  |  |  | R Declive (Fusiform Gyrus) | 25 | -70 | -10 |
|  |  | L IFG, r middle FG |  |  |  | L Culmen (Fusiform Gyrus) | -40 | -40 | -25 |
|  |  | Pos related to: |  |  |  | R Middle Occipital Gyrus | 42 | -82 | 32 |
|  |  | aINS, middle cingulate |  |  |  | L Superior (Middle) Occipital gyrus | -42 | -80 | 22 |
|  |  | Gyrus |  |  |  | R Superior Temporal Gyrus (Insula) | 40 | 5 | -18 |
|  |  | PCL-r 2 neg related to |  |  |  | L Insula | -40 | 5 | -2 |
|  |  | Fusiform gyrus, L IFG, |  |  |  | R Inferior Frontal Gyrus | 65 | 10 | 12 |
|  |  | Inferior temporal pole |  |  |  | L Inferior Frontal Gyrus | -52 | 12 | 10 |
|  |  | *Pain > scrambled* |  |  |  | R Supramarginal gyrus | 55 | -42 | 37 |
|  |  | PCL-r 1 & 2 neg. related |  |  |  | R Medial Frontal Gyrus (Ventromedial Prefrontal) | 10 | 18 | -22 |
|  |  | Middle cingulate, IFG |  |  |  | L White matter (Orbitofrontal Cortex) | -22 | 25 | -12 |
|  |  | dmPFC, L angular gyrus |  |  |  | R Medial Frontal Cortex (Dorsomedial Prefrontal) | 0 | 50 | 18 |
|  |  | Pos related to aINS |  |  |  | L Superior Temporal Gyrus (Inferior Temporal Pole) | -42 | 10 | -42 |
|  |  | PCL-r 1 neg. related |  |  |  | R Middle Frontal Gyrus | 32 | 45 | 8 |
|  |  | R Angular gyrus, pSTS |  |  |  | L Middle Frontal Gyrus | -28 | 42 | 18 |
|  |  | Pos related to post and |  |  |  | R Medial Frontal Gyrus (Supplementary Motor Area) | 17 | 12 | 67 |
|  |  | Precentral gyrus |  |  |  | L Medial Frontal Gyrus (Supplementary Motor Area) | -2 | -8 | 58 |
|  |  | PCL-r 2 neg. related |  |  |  | **PP > HC** |  |  |  |
|  |  | STS, dACC, striatum |  |  |  | R Claustrum (Insula) | 40 | -5 | 2 |
|  |  |  |  |  |  | L Insula | -42 | -10 | 8 |
|  |  |  |  |  |  | L Superior Temporal Gyrus (Pole) | -50 | 20 | -30 |
|  |  |  |  |  | Sadness > Scrambled Image | **PP <HC** |  |  |  |
|  |  |  |  |  |  | L Culmen (Fusiform Gyrus) | -40 | -40 | -25 |
|  |  |  |  |  |  | L Middle Temporal Gyrus ( Posterior/superior) | -55 | -68 | 12 |
|  |  |  |  |  |  | R Middle Frontal gyrus (Inferior Frontal Gyrus) | 50 | 35 | 15 |
|  |  |  |  |  |  | L Medial Frontal Gyrus (Supplementary Motor Area) | -55 | 28 | 18 |
|  |  |  |  |  |  | R Medial Frontal Gyrus (Ventromedial Prefrontal) | 10 | 68 | -15 |
|  |  |  |  |  |  | R Medial Frontal Gyrus (Dorsomedial Prefrontal) | 12 | 50 | 25 |
|  |  |  |  |  |  | L Superior Frontal Gyrus (Dorsomedial Prefrontal) | -15 | 45 | 30 |
|  |  |  |  |  |  | L Superior Temporal Gyrus (Inferior Temporal Pole) | -32 | 10 | -45 |
|  |  |  |  |  |  | R Superior (Middle) Frontal Gyrus | 28 | 52 | 18 |
|  |  |  |  |  |  | R Medial Frontal Gyrus (Supplementary Motor Area) | 5 | -18 | 65 |
|  |  |  |  |  |  | **PP > HC** |  |  |  |
|  |  |  |  |  |  | R Anterior insula | 42 | 20 | 2 |
|  |  |  |  |  |  | L No grey matter found (Anterior insula) | -25 | 32 | 2 |
|  |  |  |  |  |  | L Middle Cingulate Gyrus | -2 | 0 | 28 |
|  |  |  |  |  |  | R Superior Temporal Gyrus (Pole) | 55 | 8 | -15 |
|  |  |  |  |  |  | L Superior Temporal Gyrus (Pole) | -52 | 20 | -30 |
|  |  |  |  |  | Pain > Scrambled Image | **PP < HC** |  |  |  |
|  |  |  |  |  |  | R Caudate (Posterior/Superior Temporal Sulcus) | 42 | -40 | 2 |
|  |  |  |  |  |  | L Middle Temporal Gyrus (Posterior/Superior Temporal Sulcus | -52 | -72 | 20 |
|  |  |  |  |  |  | R Middle Occipital Gyrus | 40 | -82 | 25 |
|  |  |  |  |  |  | R Inferior Frontal Gyrus | 50 | 5 | 15 |
|  |  |  |  |  |  | L Precentral Gyrus (Inferior Frontal Gyrus) | -38 | 5 | 25 |
|  |  |  |  |  |  | R Anterior Cingulate (Ventromedial Prefrontal) | 8 | 30 | -10 |
|  |  |  |  |  |  | R Anterior Cingulate (Medial Orbitofrontal) | 10 | 38 | -8 |
|  |  |  |  |  |  | L Anterior Cingulate (Medial Orbitofrontal) | -12 | 42 | -10 |
|  |  |  |  |  |  | R Medial Frontal Gyrus (Dorsomedial Prefrontal) | 8 | 58 | 35 |
|  |  |  |  |  |  | L Superior Frontal Gyrus (Dorsomedial Prefrontal) | -10 | 40 | 45 |
|  |  |  |  |  |  | R Middle Frontal Gyrus | 32 | 22 | 32 |
|  |  |  |  |  |  | L Middle Frontal Gyrus | -32 | 20 | 52 |
|  |  |  |  |  |  | R Superior Frontal Gyrus (Supplementary Motor Area) | 15 | 8 | 68 |
|  |  |  |  |  |  | **PP > HC** |  |  |  |
|  |  |  |  |  |  | R Claustrum (Anterior Insula) | 28 | 28 | 0 |
|  |  |  |  |  |  | L Inferior Frontal Gyrus ( Anterior Insula) | -32 | 30 | 0 |
|  |  |  |  |  |  |  |  |  |  |
|  | Contreras- | PP = HC | PP = 22 (male only) | Explicit | Emotion > Shapes | **PP < HC:** none |  |  |  |
|  | Rodríguez | ER or RT | PCL-r > 20, mean: 27.8 | Whole Brain |  | **PP > HC:** |  |  |  |
|  | et al., 2013 | PCL-r 1 (personal | HC = 22 |  |  | R Posterior Cingulate (Visual Cortex) | 24 | -64 | 12 |
|  |  | Affective deficits) pos. | Mean age |  |  | L No grey matter found (Fusiform Gyrus) | -18 | 88 | 12 |
|  |  | related to frontal | PP: 39.8 (9.2) |  |  | L Precentral Gyrus (Lateral Frontal Gyrus) | -32 | 2 | 46 |
|  |  | cortex activation | HC: 40.6 (9.5) |  |  | L Inferior Frontal Gyrus (Lateral Frontal Gyrus) | -52 | 20 | 14 |
|  |  |  | IQ: no difference |  |  | L Superior Frontal Gyrus (Medial Frontal Gyrus) | -2 | 24 | 44 |
|  |  |  |  |  | Happiness > Shapes | **PP < HC:** none |  |  |  |
|  |  |  |  |  |  | **PP > HC:** |  |  |  |
|  |  |  |  |  |  | R Lingual Gyrus (Visual Cortex) | 8 | -88 | 14 |
|  |  |  |  |  |  | L Precentral Gyrus (Lateral Frontal) | -28 | -2 | 50 |
|  |  |  |  |  | Fear > Shapes | **PP < HC:** none |  |  |  |
|  |  |  |  |  |  | **PP > HC:** |  |  |  |
|  |  |  |  |  |  | R Lingual Gyrus (Visual Cortex) | 12 | -64 | 8 |
|  |  |  |  |  |  | L Precentral Gyrus (Lateral Frontal) | -32 | 2 | 46 |
|  |  |  |  |  |  |  |  |  |  |
| Studies comparing emotion faces > baseline | | |  |  |  |  |  |  |  |
|  | Mier et al. | PP = HC | PP = 11 (male only) | Explicit | Emotion > Baseline | **PP < HC:** none |  |  |  |
|  | 2014 | In ER and RT | PCL-r ≥ 25, mean: 26.7 | Whole brain |  | **PP > HC:** none |  |  |  |
|  |  |  | HC = 18 |  |  |  |  |  |  |
|  |  |  | Mean age |  |  |  |  |  |  |
|  |  |  | PP: 44.6 (9) |  |  |  |  |  |  |
|  |  |  | HC: 44 (10.4) |  |  |  |  |  |  |
|  |  |  | Incarcerated |  |  |  |  |  |  |
|  |  |  | IQ: no difference |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  | Deeley et |  | PP = 6 (male only) | Implicit | Fear > Baseline | **PP < HC** |  |  |  |
|  | al. 2006 |  | PCL-r = 29.3 | Whole Brain |  | R Cerebellum | 36 | -68 | -25 |
|  |  |  | HC = 9 |  |  | L Cerebellum | -42 | -72 | -24 |
|  |  |  | Mean age |  |  | R Declive (including Fusiform Gyrus) | 32 | -86 | -17 |
|  |  |  | PP: 36 (9) |  |  | L Declive (including Fusiform Gyrus) | -33 | -83 | -16 |
|  |  |  | HC: 27 (5) |  |  | L Postcentral Gyrus | -42 | -18 | 45 |
|  |  |  | IQ: PP < HC |  |  | **PP > HC:** none |  |  |  |
|  |  |  |  |  | Happiness > Baseline | **PP < HC** |  |  |  |
|  |  |  |  |  |  | R Fusiform Gyrus | 36 | -86 | -11 |
|  |  |  |  |  |  | L Declive ( including Lingual Gyrus) | -6 | -95 | -15 |
|  |  |  |  |  |  | L Cerebellum | -30 | -68 | -24 |
|  |  |  |  |  |  | L Precentral Gyrus | -34 | -22 | 49 |
|  |  |  |  |  |  | **PP > HC:** none |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |