Supplementary Table S1. Demographic characteristics, P50 sensory gating, cognitive and functional measures of healthy controls at baseline and follow up-12m

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Controls | Baseline | Follow up-12m | Statistic | *p* value |
| Mean ± SD | N | Mean ± SD | N |
| Ratio | 47.72±33.10 | 88 | 53.26±19.69 | 22 | -0.68 | 0.506 |
| S1-S2(μV) | 1.78±1.46 | 88 | 1.83±1.68 | 22 | -0.82 | 0.424 |
| MCCB |  |  |  |  |  |  |
| Processing  | 54.15±9.89 | 52 | 59.86±10.73 | 21 | -1.92 | 0.073 |
| Attention  | 48.62±8.13 | 52 | 50.86±8.62 | 21 | -0.39 | 0.702 |
| Memory  | 51.04±10.88 | 52 | 55.14±7.72 | 21 | 0.19 | 0.855 |
| Verbal  | 50.17±8.98 | 52 | 53.10±11.35 | 21 | -0.87 | 0.395 |
| Visual  | 47.48±7.63 | 52 | 52.29±6.06 | 21 | -0.08 | 0.940 |
| Solving  | 48.08±8.71 | 52 | 51.62±7.57 | 21 | -0.60 | 0.560 |
| Social  | 54.31±7.57 | 52 | 52.52±7.30 | 21 | 1.55 | 0.141 |
| Composite  | 50.73±8.12 | 52 | 55.76±7.78 | 21 | -0.87 | 0.399 |
| TASIT | 55.84±5.11 | 44 | 57.18±3.47 | 22 | -0.15 | 0.880 |
| GFS | 9.00±0.43 | 53 | 8.91±0.33 | 22 | 1.42 | 0.172 |
| GFR | 9.09±0.38 | 53 | 9.02±0.11 | 22 | 1.84 | 0.083 |
| MCAS | 54.77±0.59 | 48 | 54.82±0.50 | 22 | 1.14 | 0.269 |
| -Social | 19.88±0.44 | 48 | 19.95±0.22 | 21 | 0.00 | 1.000 |
| -IndeMoney | 9.94±0.24 | 48 | 9.90±0.30 | 21 | 1.00 | 0.332 |

Abbreviations: EP, early psychosis; SZ, schizophrenia; BP, bipolar disorder; MCCB, Measurement and Treatment Research to Improve Cognition in Schizophrenia (MATRICS) Consensus Cognitive Battery; TASIT, Awareness of Social Inference Test; GFS, the Global Functioning Scale-Social; GFR, the Global Functioning Scale-Role; MCAS, Multnomah Community Ability Scale, IndeMoney, independence-money.

Supplementary Table S2. Demographic characteristics and clinical feature of EP patients at baseline, 12-month and 24-month follow up

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| EP | Baseline | Follow up-12m | Follow up-24m | Statistic | *p value* |
| (N=71) | (N=33) | (N=20) |
| Age (years) | 22.77±3.19 | 23.42±2.91 | 25.25±4.28 | 4.36 | **0.015** |
| Sex (Male/Female) | 46/25 | 23/10 | 12/8 | 0.54 | 0.764 |
| Education (years) | 14.87±1.67 | 14.97±1.61 | 15.3±1.53 | 0.54 | 0.586 |
| Onset age (years) | 21.54±3.26 | 21.12±2.93 | 22.15±4.53 | 0.57 | 0.570 |
| CPZ equivalent (mg) | 139.98±174.74 | 133.98±162.68 | 168.91±193.99 | 0.27 | 0.761 |
| Baseline diagnosis |  |  |  | 11.24 | 0.508 |
|  BP (N, %) | 46 (64.8%) | 21 (63.6%) | 13 (65%) |  |  |
|  SZ (N, %) | 11 (15.5%) | 6 (18.2%) | 3 (15%) |  |  |
|  SZA (N, %) | 4 (5.6%) | 4 (12.1%) | 4 (20%) |  |  |
|  Psychosis NOS (N, %) | 10 (14.1%) | 2 (6.1%) | 0 (0%) |  |  |

Abbreviations: EP, early psychosis; CPZ, chlorpromazine; SZ, schizophrenia; BP, bipolar disorder; Psychosis NOS, psychotic disorder not otherwise specified.

Supplementary Table S3. Demographic characteristics and clinical feature between EP patients with and without 12-month and 24-month follow up data

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| EP | 12m Time point | Statistic (*p value*) | 24m Time point | Statistic (*p value*) |
| No follow- up (N=38) | With follow- up (N=33) | No follow- up (N=51) | With follow- up (N=20) |
| Age (years) | 22.66±3.22 | 22.94±3.05 | 0.39 (0.70) | 22.61±3.10 | 24.33±4.56 | 1.60(0.12) |
| Sex (Male/Female) | 23/15 | 23/10 | 0.65 (0.42) | 34/17 | 12/8 | 0.28 (0.60) |
| Education (years) | 14.75±1.66 | 15.03±1.62 | 0.73 (0.47) | 14.73±1.68 | 15.38±1.53 | 1.62(0.11) |
| Onset age (years) | 21.73±3.31 | 21.32±3.12 | -0.54 (0.59) | 21.42±3.13 | 22.43±4.60 | 0.93(0.36) |
| CPZ equivalent (mg) | 168.96±192.21 | 104.16±144.43 | -1.66 (0.10) | 157.73±184.03 | 109.12±130.76 | -1.29 (0.20) |
| Baseline diagnosis |  |  | 0.37 (0.83) |  |  | 0.01 (1.00) |
| BP (N, %) | 25 (65.8%) | 21 (63.6%) |  | 33 (64.7%) | 13 (65%) |  |
| SZ (N, %) | 5 (13.2%) | 6 (18.2%) |  | 8 (15.7%) | 3 (15%) |  |
| SZA (N, %) | 0 (0%) | 4 (12.1%) |  | 0 (0%) | 4 (20%) |  |
| Psychosis NOS (N, %) | 8 (21.1%) | 2 (6.1%) |  | 10 (19.6%) | 0 (0%) |  |

Abbreviations: EP, early psychosis; CPZ, chlorpromazine; SZ, schizophrenia; BP, bipolar disorder; Psychosis NOS, psychotic disorder not otherwise specified; NA not available.

Supplementary Table S4. Results of stepwise regression models of P50 indices at baseline, 12-month and 24-month follow-up time point

(A) Baseline

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Baseline | EP (N=45) | Controls (N=45) |
| Outcome |  | Predictors | *β\** | *t* | *p* | 95%CI | *β\** | *t* | *p* | 95%CI |
| P50 ratio |  | GFR | - | - | - | - | -30.46 | -2.29 | **0.027** | -57.33, -3.59 |
| S1-S2 (μV) |  | GFR | - | - | - | - | 1.25 | 2.56 | **0.014** | 0.27, 2.24 |
| S1 (μV) |  | GFS | 0.45 | 1.94 | 0.059 | -0.02, 0.92 | - | - | - | - |
|  |  | GFR | - | - | - | - | 0.95 | 2.15 | **0.038** | 0.06, 1.84 |
| S2 (μV) |  | GFS | 0.25 | 2.15 | **0.037** | 0.02, 0.49 | - | - | - | - |

(B) Follow up

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | 12-month | EP (N=25) |  | 24-month | EP (N=15) |
| Outcome |  | Predictors | *β\** | *t* | *p* | 95%CI |  | Predictors | *β\** | *t* | *p* | 95%CI |
| P50 ratio |  | MCAS | -3.96 | -2.13 | **0.046** | -7.84, -0.08 |  | - | - | - | - | - |
| S1 (μV) |  | - | - | - | - | - |  | MCAS | 0.10 | 2.37 | **0.034** | 0.01,0.19 |
| S2 (μV) |  | MCAS | -0.14 | -2.28 | **0.034** | -0.27, -0.01 |  | MCAS | 0.07 | 2.32 | **0.038** | 0.005,0.13 |

Abbreviations: EP, early psychosis; GFS, the Global Functioning Scale-Social; GFR, the Global Functioning Scale-Role; MCAS, Multnomah Community Ability Scale; CI, Confidence Intervals.

Supplementary Table S5. Relationships among neurocognition, functioning measures (MCAS), and social cognition (TASIT, MCCB-Social) at baseline (A), 12-m follow-up (B) and 24-m follow-up (C)

(A) Baseline

|  |  |
| --- | --- |
|  | All participants  |
| Variables | MCCB-Composite | TASIT | GFS | GFR |
| MCCB-Social | **0.28****0.003** | ns | ns | ns |
| MCCB-Composite | ns | **0.41****<0.001** | **0.38****<0.001** | **0.37****<0.001** |
| TASIT | ns | ns | **0.23****0.032** | ns |
| MCAS | **0.28****0.004** | ns | **0.79****<0.001** | **0.72****<0.001** |

(B) Follow up-12m

|  |  |
| --- | --- |
|  | EP  |
| Variables | MCCB-Social | GFS | GFR |
| MCCB-Composite | **0.412****0.011** | ns | ns |
| MCAS | **0.517****0.001** | **0.789****<0.001** | **0.754****<0.001** |

(C) Follow up-24m

|  |  |
| --- | --- |
|  | EP |
| Variables | MCCB-Visual | GFS | GFR |
| MCCB-Social | ns | **0.553****0.033** | **0.550****0.034** |
| MCAS | **-0.522****0.026** | **0.690****0.003** | **0.562****0.024** |

Abbreviations: EP, early psychosis; MCCB, Measurement and Treatment Research to Improve Cognition in Schizophrenia (MATRICS) Consensus Cognitive Battery; TASIT, Awareness of Social Inference Test; GFS, the Global Functioning Scale-Social; GFR, the Global Functioning Scale-Role; MCAS, Multnomah Community Ability Scale; ns, not significant.

Supplementary Table S6. Predictors of 12-month real-world functioning from baseline P50, cognition and symptoms (controlling for age, sex)

|  |  |  |
| --- | --- | --- |
| Follow up-12m | Baseline | EP (N=32) |
| Outcome | Predictors | *β\** | *t* | *p* | 95% CI |
| GFR | MCCB-Composite | -0.04 | -2.03 | 0.057 | -0.08, 0.001 |
|   | PANSS  | -0.04 | -3.14 | **0.006** | -0.06, -0.01 |
| GFS | PANSS  | -0.05 | -2.96 | **0.008** | -0.09, -0.01 |
|  | S1-S2 (μV) | 0.21 | 2.01 | 0.059 | -0.01, 0.42 |
| MCAS | S1-S2 (μV) | 0.70 | 1.93 | 0.063 | -0.04, 1.44 |

Abbreviations: EP, early psychosis; GFS, the Global Functioning Scale-Social; GFR, the Global Functioning Scale-Role; MCAS, Multnomah Community Ability Scale; MCCB, Measurement and Treatment Research to Improve Cognition in Schizophrenia (MATRICS) Consensus Cognitive Battery; PANSS, Positive and Negative Syndrome Scale.

Supplementary Table S7. Effect sizes of sensory gating changes of EP patients with 12m and 24m follow-up data and controls with 12m follow-up data.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | N | Baseline | Follow up-12m | Follow up-24m | Cohen's d |
| EP |  |  |  |  |  |
| Cz ratio | 33 | 45.07±31.55 | 48.71±31.62 |  | -0.12 |
| Cz S1-S2 diff (μV) | 33 | 2.12±2.06 | 1.53±1.17 |  | 0.35 |
| Cz ratio | 20 | 56.85±39.72 |  | 70.02±43.44 | -0.32 |
| Cz S1-S2 diff (μV) | 20 | 1.57±1.85 |  | 0.96±0.93 | 0.41 |
| Controls |  |  |  |  |  |
| Cz ratio | 22 | 49.70±32.59 | 53.26±19.69 | - | -0.24 |
| Cz S1-S2 diff (μV) | 22 | 1.58±0.26 | 1.83±1.68 | - | -0.21 |

Supplementary Figure S1. Typical ground P50 waveforms of S1 (blue) and S2 (red) for SZ at baseline (A), 12-m follow-up (B), 24-m follow-up (C), as well as BP at baseline (D), 12-m follow-up (E) and 24-m follow-up (F).

Abbreviations: EP, early psychosis; SZ, schizophrenia; BP, bipolar disorder; S1, the first stimulus; S2, the second stimulus.

 