**Supplementary**

**Models of Mild Cognitive Deficits in Risk Assessment in Early Psychosis**

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# Table s1. Baseline cognitive performances (original score) in the HC, CHR and FEP groups.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Variables | HC | CHR | FEP | Three groups  *F(p)* | HC vs CHR  *MD(p)* | HC vs FEP  *MD(p)* | CHR vs FEP  *MD(p)* |
| Cases [*n*] | 774 | 794 | 1059 | - | - | - | - |
| Trail Making A | 28.92  (10.54) | 33.93  (14.11) | 47.67  (28.54) | 208.825  (<0.001) | -5.017  (<0.001) | -18.752  (<0.001) | -13.734  (<0.001) |
| BACS symbol coding | 64.81  (10.19) | 56.82  (10.53) | 47.36  (12.50) | 544.699  (<0.001) | 7.990  (<0.001) | 17.449  (<0.001) | 9.459  (<0.001) |
| Category Fluency | 23.61  (5.70) | 20.19  (5.74) | 18.07  (5.76) | 208.047  (<0.001) | 3.424  (<0.001) | 5.541  (<0.001) | 2.117  (<0.001) |
| CPT-IP | 2.90  (0.66) | 2.45  (0.80) | 1.93  (0.86) | 342.877  (<0.001) | 0.457  (<0.001) | 0.978  (<0.001) | 0.521  (<0.001) |
| WMS-3 spatial span | 16.71  (2.99) | 15.33  (3.19) | 14.43  (3.58) | 106.512  (<0.001) | 1.377  (<0.001) | 2.277  (<0.001) | 0.900  (<0.001) |
| HVLT-R | 26.58  (4.18) | 24.21  (5.16) | 20.92  (6.16) | 258.867  (<0.001) | 2.377  (<0.001) | 5.664  (<0.001) | 3.287  (<0.001) |
| BVMT-R | 28.36  (5.33) | 26.12  (6.50) | 21.33  (8.17) | 248.305  (<0.001) | 2.240  (<0.001) | 7.032  (<0.001) | 4.792  (<0.001) |
| NAB mazes | 19.38  (4.90) | 17.28  (6.04) | 12.78  (7.06) | 275.584  (<0.001) | 2.103  (<0.001) | 6.596  (<0.001) | 4.494  (<0.001) |

Note: Abbreviations: BACS, Brief Assessment of Cognition in Schizophrenia symbol coding; BVMT-R, Brief Visuospatial Memory Test–Revised; CHR-NC/C, Clinical high risk for psychosis nonconverters(C) / converters(NC) to psychosis; CPT-IP, Continuous Performance Test–Identical Pairs; HC, Healthy Control; HVLT-R, Hopkins Verbal Learning Test–Revised; MD, mean difference; NAB, Neuropsychological Assessment Battery mazes; WMS-3, Wechsler Memory Scale–Third Edition spatial span. Significance was tested using a one-way ANOVA with the Bonferroni correction. P values of < 0.05 are considered significant.

# Table s2. Baseline cognitive performances (original score) in the HC, CHR-NC and CHR-C groups.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Variables | HC | CHR-NC | CHR-C | Three groups  *F(p)* | HC vs CHR-NC  *MD(p)* | HC vs CHR-C  *MD(p)* | CHR-NC vs C  *MD(p)* |
| Cases [*n*] | 774 | 447 | 114 | - | - | - | - |
| Trail Making A | 28.92  (10.54) | 33.17  (14.29) | 34.90  (13.57) | 24.160  (<0.001) | -4.254  (<0.001) | -5.987  (<0.001) | -1.733  (0.526) |
| BACS symbol coding | 64.81  (10.19) | 57.25  (10.78) | 54.33  (10.18) | 103.778  (<0.001) | 7.564  (<0.001) | 10.479  (<0.001) | 2.915  (0.023) |
| Category Fluency | 23.61  (5.70) | 19.74  (5.57) | 19.32  (5.38) | 80.154  (<0.001) | 3.868  (<0.001) | 4.296  (<0.001) | 0.428  (1.000) |
| CPT-IP | 2.90  (0.66) | 2.42  (0.80) | 2.31  (0.80) | 80.451  (<0.001) | 0.486  (<0.001) | 0.593  (<0.001) | 0.108  (0.073) |
| WMS-3 spatial span | 16.71  (2.99) | 15.47  (3.38) | 15.49  (2.77) | 25.513  (<0.001) | 1.236  (<0.001) | 1.219  (<0.001) | -0.017  (1.000) |
| HVLT-R | 26.58  (4.18) | 23.87  (5.2) | 23.11  (5.55) | 62.468  (<0.001) | 2.716  (<0.001) | 3.468  (<0.001) | 0.752  (0.376) |
| BVMT-R | 28.36  (5.33) | 26.19  (6.53) | 23.73  (6.72) | 41.361  (<0.001) | 2.170  (<0.001) | 4.633  (<0.001) | 2.463  (<0.001) |
| NAB mazes | 19.38  (4.90) | 17.31  (6.05) | 15.50  (6.70) | 37.131  (<0.001) | 2.070  (<0.001) | 3.879  (<0.001) | 1.809  (0.005) |

Note: Abbreviations: BACS, Brief Assessment of Cognition in Schizophrenia symbol coding; BVMT-R, Brief Visuospatial Memory Test–Revised; CHR-NC/C, Clinical high risk for psychosis nonconverters(C) / converters(NC) to psychosis; CPT-IP, Continuous Performance Test–Identical Pairs; HC, Healthy Control; HVLT-R, Hopkins Verbal Learning Test–Revised; MD, mean difference; NAB, Neuropsychological Assessment Battery mazes; WMS-3, Wechsler Memory Scale–Third Edition spatial span. Significance was tested using a one-way ANOVA with the Bonferroni correction. P values of < 0.05 are considered significant.

# Table s3. Logistic regression (method: enter) for discriminating FEP from HC, of 8 individual cognitive variable adjusted by age and sex.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| FEP vs. HC | Beta | S.E. | *β* | 95％CI for *β* | *χ2* | *P* value |
| Trail Making A | 0.076 | 0.005 | 1.079 | 1.069-1.089 | 258.735 | <0.001 |
| ln(P/(1-P))= Age×(-0.01568)+Sex×0.145441+TMA×0.075652+(-2.072951)  *P: Probabilities; Age: years; Sex: 1=male, 0=female; TMA: Raw score of Trail Making A test.* | | | | | | |
| BACS symbol coding | -0.145 | 0.007 | 0.865 | 0.853-0.877 | 436.314 | <0.001 |
| ln(P/(1-P))= Age×(-0.024515)+Sex×(-0.166084)+BACS×(-0.144864)+(9.160140)  *P: Probabilities; Age: years; Sex: 1=male, 0=female; BACS: Raw score of BACS symbol coding test.* | | | | | | |
| Category Fluency | -0.169 | 0.010 | 0.845 | 0.828-0.862 | 280.432 | <0.001 |
| ln(P/(1-P))= Age×(0.012920)+Sex×(0.136257)+CF×(-0.168655)+(3.460653)  *P: Probabilities; Age: years; Sex: 1=male, 0=female; CF: Raw score of Category Fluency test.* | | | | | | |
| CPT-IP | -1.653 | 0.085 | 0.191 | 0.162-0.226 | 379.068 | <0.001 |
| ln(P/(1-P))= Age×(0.026905)+Sex×(0.219684)+CPT×(-1.653230)+(3.610362)  *P: Probabilities; Age: years; Sex: 1=male, 0=female; CPT: Raw score of CPT-IP test.* | | | | | | |
| WMS-3 spatial span | -0.216 | 0.016 | 0.806 | 0.780-0.832 | 173.191 | <0.001 |
| ln(P/(1-P))= Age×(-0.010264)+Sex×(0.264293)+WMS×(-0.216104)+(3.791231)  *P: Probabilities; Age: years; Sex: 1=male, 0=female; WMS: Raw score of WMS-3 spatial span test.* | | | | | | |
| HVLT-R | -0.205 | 0.012 | 0.815 | 0.797-0.834 | 310.200 | <0.001 |
| ln(P/(1-P))= Age×(-0.012814)+Sex×(-0.082956)+HVLT×(-0.204508)+(5.552554)  *P: Probabilities; Age: years; Sex: 1=male, 0=female; HVLT: Raw score of HVLT-R test.* | | | | | | |
| BVMT-R | -0.155 | 0.009 | 0.856 | 0.841-0.872 | 284.425 | <0.001 |
| ln(P/(1-P))= Age×(-0.021796)+Sex×(-0.118418)+BVMT×(-0.155162)+(4.796289)  *P: Probabilities; Age: years; Sex: 1=male, 0=female; BVMT Raw score of BVMT-R test.* | | | | | | |
| NAB mazes | -0.178 | 0.010 | 0.837 | 0.821-0.853 | 339.300 | <0.001 |
| ln(P/(1-P))= Age×(-0.036855)+Sex×(0.477561)+NAB×(-0.177916)+(3.810596)  *P: Probabilities; Age: years; Sex: 1=male, 0=female; NAB: Raw score of NAB mazes test.* | | | | | | |

Notes: Bate is the regression coefficient. SE is the standard error. 95% CI is the estimated 95% confidence interval for the corresponding parameter. β is the standardized regression coefficient. Abbreviations: BACS, Brief Assessment of Cognition in Schizophrenia symbol coding; BVMT-R, Brief Visuospatial Memory Test–Revised; CPT-IP, Continuous Performance Test–Identical Pairs; FEP, First Episode Psychosis; HC, Healthy Control; HVLT-R, Hopkins Verbal Learning Test–Revised; NAB, Neuropsychological Assessment Battery mazes; WMS-3, Wechsler Memory Scale–Third Edition spatial span.

# Table s4. Logistic regression (method: enter) for discriminating FEP from HC of overall cognitive variables adjusted by age and sex.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| FEP vs. HC | Beta | S.E. | *β* | 95％CI for *β* | *χ2* | *P* value |
| Trail Making A | 0.016 | 0.006 | 1.016 | 1.005-1.027 | 8.501 | 0.004 |
| BACS symbol coding | -0.088 | 0.008 | 0.916 | 0.901-0.931 | 111.944 | <0.001 |
| Category Fluency | -0.038 | 0.013 | 0.963 | 0.938-0.988 | 8.122 | 0.004 |
| CPT-IP | -0.664 | 0.105 | 0.525 | 0.428-0.644 | 38.030 | <0.001 |
| WMS-3 spatial span | 0.020 | 0.024 | 1.021 | 0.974-1.070 | 0.714 | 0.398 |
| HVLT-R | -0.054 | 0.016 | 0.947 | 0.919-0.976 | 12.271 | <0.001 |
| BVMT-R | -0.016 | 0.013 | 0.984 | 0.960-1.009 | 1.619 | 0.203 |
| NAB mazes | -0.036 | 0.014 | 0.965 | 0.940-0.991 | 6.850 | 0.009 |
| *ln(P/(1-P)) = Age × (-0.021239) + Sex × (-0.078751) + TMA × (0.016069) + BACS × (-0.087571) + CF × (-0.037886) + CPT × (-0.644491) + WMS × (0.020311) + HVLT × (-0.054450) + BVMT × (-0.015903) + NAB × (-0.035603) + (9.647129)*  *P: Probabilities; Age: years; Sex: 1=male, 0=female.*  *TMA: Raw score of Trail Making A test.*  *BACS: Raw score of BACS symbol coding test.*  *CF: Raw score of Category Fluency test.*  *CPT: Raw score of CPT-IP test.*  *WMS: Raw score of WMS-3 spatial span test.*  *HVLT: Raw score of HVLT-R test.*  *BVMT Raw score of BVMT-R test.*  *NAB: Raw score of NAB mazes test.* | | | | | | |

Notes: Bate is the regression coefficient. SE is the standard error. 95% CI is the estimated 95% confidence interval for the corresponding parameter. β is the standardized regression coefficient. Abbreviations: BACS, Brief Assessment of Cognition in Schizophrenia symbol coding; BVMT-R, Brief Visuospatial Memory Test–Revised; CPT-IP, Continuous Performance Test–Identical Pairs; FEP, First Episode Psychosis; HC, Healthy Control; HVLT-R, Hopkins Verbal Learning Test–Revised; NAB, Neuropsychological Assessment Battery mazes; WMS-3, Wechsler Memory Scale–Third Edition spatial span.

# Table s5. Performance of receiver operating characteristic curve for discriminating FEP from HC, of 8 cognitive variables and overall cognitive model adjusted by age and sex.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Optimal Cutoff for Probabilities | AUC | 95% CI | *p* | Probabilities | Se% | Sp% | YI | LR | |
| Individual cognitive test | | | | | | | | |
| Trail Making A | 0.772 | 0.750-0.793 | <0.001 | 0.628 | 86.2 | 56.9 | 0.431 | 2.001 | |
| BACS symbol coding | 0.873 | 0.857-0.889 | <0.001 | 0.612 | 85.8 | 76.0 | 0.618 | 3.570 | |
| Category Fluency | 0.757 | 0.735-0.779 | <0.001 | 0.567 | 68.0 | 72.0 | 0.400 | 2.428 | |
| CPT-IP | 0.819 | 0.800-0.839 | <0.001 | 0.502 | 71.1 | 78.7 | 0.498 | 3.334 | |
| WMS-3 spatial span | 0.691 | 0.667-0.715 | <0.001 | 0.542 | 59.3 | 68.9 | 0.283 | 1.910 | |
| HVLT-R | 0.771 | 0.750-0.792 | <0.001 | 0.640 | 83.8 | 59.0 | 0.429 | 2.046 | |
| BVMT-R | 0.763 | 0.742-0.785 | <0.001 | 0.577 | 76.9 | 63.1 | 0.400 | 2.083 | |
| NAB mazes | 0.777 | 0.757-0.798 | <0.001 | 0.651 | 83.5 | 59.66 | 0.431 | 2.069 | |
| Overall cognitive variables | | | | | | | | | |
| Overall model | 0.895 | 0.880-0.909 | <0.001 | 0.509 | 80.7 | 83.7 | 0.644 | 4.949 | |

Notes: AUC is the area under the receiver operating characteristic curve. 95% CI is the estimated 95% confidence interval for the corresponding parameter. Se is the sensitivity. Sp is the specificity. YI is Youden’s index. LR is likelihood ratio. Abbreviations: BACS, Brief Assessment of Cognition in Schizophrenia symbol coding; BVMT-R, Brief Visuospatial Memory Test–Revised; CPT-IP, Continuous Performance Test–Identical Pairs; FEP, First Episode Psychosis; HC, Healthy Control; HVLT-R, Hopkins Verbal Learning Test–Revised; NAB, Neuropsychological Assessment Battery mazes; WMS-3, Wechsler Memory Scale–Third Edition spatial span.

# Table s6. Discrimination statistics of Trail Making A for FEP across various levels of model-calculated probabilities

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Cutoff for Probabilities | Se% | 95% CI | Sp% | 95% CI | YI | LR |
| <0.201 | 0.78 | 0.29-1.68 | 99.81 | 99.32-99.98 | 0.006 | 4.105 |
| <0.300 | 17.31 | 14.71-20.17 | 96.03 | 94.68-97.13 | 0.133 | 4.365 |
| <0.400 | 44.7 | 41.16-48.28 | 84.80 | 82.49-86.91 | 0.295 | 2.940 |
| <0.500 | 67.96 | 64.54-71.24 | 71.29 | 68.47-74.00 | 0.393 | 2.367 |
| <0.602 | 82.95 | 80.11-85.53 | 59.21 | 56.18-62.18 | 0.422 | 2.033 |
| <0.700 | 90.18 | 87.86-92.19 | 46.27 | 43.23-49.33 | 0.365 | 1.678 |
| <0.800 | 94.83 | 93.03-96.28 | 35.51 | 32.62-38.47 | 0.303 | 1.470 |

Notes: Se is the sensitivity. Sp is the specificity. 95% CI is the estimated 95% confidence interval for the corresponding parameter. YI is Youden’s index. LR is likelihood ratio.

# Table s7. Discrimination statistics of BACS symbol coding for FEP across various levels of model-calculated probabilities

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Cutoff for Probabilities | Se% | 95% CI | Sp% | 95% CI | YI | LR |
| <0.201 | 34.24 | 30.9-37.7 | 96.03 | 94.67-97.12 | 0.303 | 8.616 |
| <0.300 | 51.16 | 47.58-54.74 | 93.66 | 92.02-95.05 | 0.448 | 8.072 |
| <0.400 | 64.99 | 61.51-68.35 | 88.74 | 86.68-90.58 | 0.537 | 5.772 |
| <0.500 | 75.58 | 72.40-78.57 | 82.88 | 80.47-85.10 | 0.585 | 4.414 |
| <0.601 | 84.50 | 81.75-86.98 | 76.16 | 73.47-78.70 | 0.607 | 3.544 |
| <0.700 | 90.18 | 87.86-92.19 | 68.31 | 65.41-71.10 | 0.585 | 2.845 |
| <0.801 | 94.44 | 92.59-95.95 | 54.49 | 51.44-57.53 | 0.489 | 2.075 |

Notes: Se is the sensitivity. Sp is the specificity. 95% CI is the estimated 95% confidence interval for the corresponding parameter. YI is Youden’s index. LR is likelihood ratio.

# Table s8. Discrimination statistics of Category Fluency for FEP across various levels of model-calculated probabilities

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Cutoff for Probabilities | Se% | 95% CI | Sp% | 95% CI | YI | LR |
| <0.201 | 10.77 | 8.67-13.17 | 98.39 | 97.43-99.07 | 0.092 | 6.674 |
| <0.301 | 22.57 | 19.66-25.69 | 93.93 | 92.31-95.29 | 0.165 | 3.717 |
| <0.402 | 38.39 | 34.94-41.93 | 88.33 | 86.24-90.21 | 0.267 | 3.290 |
| <0.501 | 55.51 | 51.92-59.06 | 79.60 | 77.04-82.00 | 0.351 | 2.721 |
| <0.601 | 72.89 | 69.61-76.00 | 66.70 | 63.76-69.54 | 0.396 | 2.189 |
| <0.700 | 85.86 | 83.20-88.25 | 48.48 | 45.43-51.55 | 0.343 | 1.667 |
| <0.800 | 95.59 | 93.89-96.93 | 26.57 | 23.92-29.34 | 0.222 | 1.302 |

Notes: Se is the sensitivity. Sp is the specificity. 95% CI is the estimated 95% confidence interval for the corresponding parameter. YI is Youden’s index. LR is likelihood ratio.

# Table s9. Discrimination statistics of CPT-IP for FEP across various levels of model-calculated probabilities

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Cutoff for Probabilities | Se% | 95% CI | Sp% | 95% CI | YI | LR |
| <0.201 | 19.90 | 17.13-22.90 | 96.11 | 94.72-97.22 | 0.160 | 5.117 |
| <0.300 | 40.57 | 37.08-44.14 | 91.92 | 90.06-93.54 | 0.325 | 5.024 |
| <0.400 | 57.87 | 54.29-61.39 | 85.74 | 83.42-87.85 | 0.436 | 4.059 |
| <0.501 | 70.74 | 67.39-73.94 | 78.76 | 76.10-81.26 | 0.495 | 3.331 |
| <0.600 | 79.71 | 76.70-82.50 | 69.39 | 66.44-72.23 | 0.491 | 2.604 |
| <0.700 | 88.95 | 86.51-91.08 | 57.63 | 54.50-60.71 | 0.466 | 2.099 |
| <0.800 | 95.06 | 93.28-96.48 | 42.47 | 39.39-45.60 | 0.375 | 1.652 |

Notes: Se is the sensitivity. Sp is the specificity. 95% CI is the estimated 95% confidence interval for the corresponding parameter. YI is Youden’s index. LR is likelihood ratio.

# Table s10. Discrimination statistics of WMS-3 spatial span for FEP across various levels of model-calculated probabilities

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Cutoff for Probabilities | Se% | 95% CI | Sp% | 95% CI | YI | LR |
| <0.200 | 0.78 | 0.29-1.68 | 100 | 99.65-100 | 0.008 | - |
| <0.303 | 5.18 | 3.73-6.99 | 97.92 | 96.86-98.69 | 0.031 | 2.487 |
| <0.401 | 23.32 | 20.38-26.46 | 90.15 | 88.19-91.88 | 0.135 | 2.367 |
| <0.501 | 49.09 | 45.51-52.68 | 75.57 | 72.86-78.13 | 0.247 | 2.009 |
| <0.601 | 71.50 | 68.18-74.66 | 55.49 | 52.44-58.52 | 0.270 | 1.607 |
| <0.701 | 88.21 | 85.73-90.40 | 33.71 | 30.86-36.65 | 0.219 | 1.331 |
| <0.800 | 96.89 | 95.41-98.00 | 15.44 | 13.31-17.76 | 0.123 | 1.146 |

Notes: Se is the sensitivity. Sp is the specificity. 95% CI is the estimated 95% confidence interval for the corresponding parameter. YI is Youden’s index. LR is likelihood ratio.

# Table s11. Discrimination statistics of HVLT-R for FEP across various levels of model-calculated probabilities

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Cutoff for Probabilities | Se% | 95% CI | Sp% | 95% CI | YI | LR |
| <0.200 | 6.86 | 5.18-8.87 | 97.73 | 96.64-98.54 | 0.046 | 3.020 |
| <0.301 | 24.58 | 21.58-27.77 | 92.24 | 90.46-93.78 | 0.168 | 3.168 |
| <0.400 | 41.14 | 37.64-44.70 | 85.62 | 83.36-87.68 | 0.268 | 2.861 |
| <0.500 | 62.74 | 59.23-66.16 | 75.78 | 73.08-78.34 | 0.385 | 2.591 |
| <0.601 | 76.97 | 73.84-79.90 | 64.14 | 61.17-67.04 | 0.411 | 2.147 |
| <0.700 | 88.62 | 86.16-90.77 | 49.76 | 46.71-52.82 | 0.384 | 1.764 |
| <0.800 | 97.02 | 95.57-98.10 | 35.19 | 32.31-38.16 | 0.322 | 1.497 |

Notes: Se is the sensitivity. Sp is the specificity. 95% CI is the estimated 95% confidence interval for the corresponding parameter. YI is Youden’s index. LR is likelihood ratio.

# Table s12. Discrimination statistics of BVMT-R for FEP across various levels of model-calculated probabilities

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Cutoff for Probabilities | Se% | 95% CI | Sp% | 95% CI | YI | LR |
| <0.202 | 0.65 | 0.21-1.51 | 99.91 | 99.47-100 | 0.006 | 6.848 |
| <0.300 | 20.23 | 17.45-23.25 | 95.45 | 94.02-96.63 | 0.157 | 4.451 |
| <0.400 | 43.71 | 40.17-47.29 | 85.61 | 83.34-87.67 | 0.293 | 3.037 |
| <0.501 | 66.02 | 62.55-69.36 | 72.54 | 69.74-75.21 | 0.386 | 2.404 |
| <0.601 | 78.60 | 75.53-81.45 | 60.51 | 57.49-63.47 | 0.391 | 1.990 |
| <0.701 | 87.29 | 84.73-89.56 | 47.16 | 44.11-50.22 | 0.345 | 1.652 |
| <0.800 | 94.94 | 93.15-96.38 | 33.33 | 30.49-36.27 | 0.283 | 1.424 |

Notes: Se is the sensitivity. Sp is the specificity. 95% CI is the estimated 95% confidence interval for the corresponding parameter. YI is Youden’s index. LR is likelihood ratio.

# Table s13. Discrimination statistics of NAB mazes for FEP across various levels of model-calculated probabilities

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Cutoff for Probabilities | Se% | 95% CI | Sp% | 95% CI | YI | LR |
| <0.200 | 6.33 | 4.72-8.28 | 98.77 | 97.90-99.34 | 0.051 | 5.143 |
| <0.300 | 26.87 | 23.78-30.15 | 91.95 | 90.14-93.52 | 0.188 | 3.339 |
| <0.401 | 50.13 | 46.55-53.71 | 83.90 | 81.54-86.07 | 0.340 | 3.114 |
| <0.501 | 64.86 | 61.38-68.22 | 73.67 | 70.91-76.31 | 0.385 | 2.464 |
| <0.601 | 77.13 | 74.01-80.05 | 64.11 | 61.13-67.01 | 0.412 | 2.149 |
| <0.700 | 87.73 | 85.21-89.96 | 54.36 | 51.30-57.39 | 0.421 | 1.922 |
| <0.800 | 94.70 | 92.88-96.17 | 38.16 | 35.22-41.17 | 0.329 | 1.531 |

Notes: Se is the sensitivity. Sp is the specificity. 95% CI is the estimated 95% confidence interval for the corresponding parameter. YI is Youden’s index. LR is likelihood ratio.

# Table s14. Discrimination statistics of overall cognitive model for FEP across various levels of model-calculated probabilities

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Cutoff for Probabilities | Se% | 95% CI | Sp% | 95% CI | YI | LR |
| <0.200 | 46.00 | 42.42-49.61 | 95.37 | 93.87-96.59 | 0.414 | 9.931 |
| <0.301 | 61.07 | 57.51-64.55 | 92.25 | 90.40-93.83 | 0.533 | 7.876 |
| <0.402 | 71.30 | 67.94-74.49 | 88.92 | 86.80-90.81 | 0.602 | 6.436 |
| <0.503 | 80.21 | 77.20-82.98 | 83.99 | 81.56-86.22 | 0.642 | 5.009 |
| <0.600 | 85.98 | 83.31-88.36 | 76.54 | 73.77-79.14 | 0.625 | 3.664 |
| <0.702 | 91.35 | 89.13-93.25 | 68.48 | 65.49-71.36 | 0.598 | 2.898 |
| <0.802 | 95.41 | 93.68-96.78 | 60.73 | 57.61-63.78 | 0.561 | 2.429 |

Notes: Se is the sensitivity. Sp is the specificity. 95% CI is the estimated 95% confidence interval for the corresponding parameter. YI is Youden’s index. LR is likelihood ratio.

# Table s15. Logistic regression for discriminating CHR-C from CHR-NC, of 8 individual cognitive variable adjusted by age and sex.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| CHR-C vs. CHR-NC | Beta | S.E. | *β* | 95％CI for *β* | *χ2* | *P* value |
| Individual cognitive test | | | | | | |
| Trail Making A | -0.011 | 0.007 | 0.989 | 0.975-1.003 | 2.277 | 0.131 |
| BACS symbol coding | 0.024 | 0.010 | 1.025 | 1.005-1.045 | 6.243 | 0.012 |
| Category Fluency | 0.017 | 0.019 | 1.018 | 0.980-1.057 | 0.804 | 0.370 |
| CPT-IP | 0.204 | 0.133 | 1.226 | 0.945-1.592 | 2.347 | 0.126 |
| WMS-3 spatial span | 0.011 | 0.033 | 1.011 | 0.948-1.079 | 0.117 | 0.732 |
| HVLT-R | 0.023 | 0.020 | 1.023 | 0.984-1.064 | 1.286 | 0.257 |
| BVMT-R | 0.052 | 0.016 | 1.054 | 1.022-1.087 | 11.192 | 0.001 |
| NAB mazes | 0.060 | 0.018 | 1.062 | 1.026-1.100 | 11.479 | 0.001 |

Notes: Bate is the regression coefficient. SE is the standard error. 95% CI is the estimated 95% confidence interval for the corresponding parameter. β is the standardized regression coefficient. Abbreviations: BACS, Brief Assessment of Cognition in Schizophrenia symbol coding; BVMT-R, Brief Visuospatial Memory Test–Revised; CPT-IP, Continuous Performance Test–Identical Pairs; CHR-C/NC, Clinical high risk for psychosis converters(C) / nonconverters(NC) to psychosis; HC, Healthy Control; HVLT-R, Hopkins Verbal Learning Test–Revised; NAB, Neuropsychological Assessment Battery mazes; WMS-3, Wechsler Memory Scale–Third Edition spatial span.

# Table s16. Logistic regression for discriminating CHR-C from CHR-NC of overall cognitive variables adjusted by age and sex.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| CHR-C vs. CHR-NC | Beta | S.E. | *β* | 95％CI for *β* | *χ2* | *P* value |
| Trail Making A | 0.002 | 0.009 | 1.002 | 0.985-1.021 | 0.069 | 0.793 |
| BACS symbol coding | 0.009 | 0.013 | 1.009 | 0.984-1.035 | 0.511 | 0.475 |
| Category Fluency | -0.018 | 0.023 | 0.982 | 0.938-1.028 | 0.622 | 0.430 |
| CPT-IP | 0.052 | 0.168 | 1.054 | 0.759-1.463 | 0.098 | 0.755 |
| WMS-3 spatial span | -0.064 | 0.040 | 0.938 | 0.867-1.015 | 2.513 | 0.113 |
| HVLT-R | -0.013 | 0.025 | 0.987 | 0.939-1.037 | 0.269 | 0.604 |
| BVMT-R | 0.056 | 0.020 | 1.057 | 1.016-1.100 | 7.556 | 0.006 |
| NAB mazes | 0.055 | 0.022 | 1.057 | 1.012-1.104 | 6.150 | 0.013 |

Notes: Bate is the regression coefficient. SE is the standard error. 95% CI is the estimated 95% confidence interval for the corresponding parameter. β is the standardized regression coefficient. Abbreviations: BACS, Brief Assessment of Cognition in Schizophrenia symbol coding; BVMT-R, Brief Visuospatial Memory Test–Revised; CPT-IP, Continuous Performance Test–Identical Pairs; CHR-C/NC, Clinical high risk for psychosis converters(C) / nonconverters(NC) to psychosis; HC, Healthy Control; HVLT-R, Hopkins Verbal Learning Test–Revised; NAB, Neuropsychological Assessment Battery mazes; WMS-3, Wechsler Memory Scale–Third Edition spatial span.

# Table s17. Performance of receiver operating characteristic curve for discriminating CHR-C from CHR-NC, of 8 cognitive variables and overall cognitive model adjusted by age and sex.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Optimal Cutoff for Probabilities | AUC | 95% CI | *p* | Probabilities | Se% | Sp% | YI | LR | |
| Individual cognitive test | | | | | | | | |
| Trail Making A | 0.556 | 0.500-0.612 | 0.065 | 0.420 | 79.0 | 36.9 | 0.159 | 1.251 | |
| BACS symbol coding | 0.577 | 0.519-0.636 | 0.011 | 0.573 | 61.4 | 51.5 | 0.129 | 1.265 | |
| Category Fluency | 0.540 | 0.480-0.601 | 0.183 | 0.664 | 49.1 | 62.5 | 0.116 | 1.309 | |
| CPT-IP | 0.554 | 0.494-0.614 | 0.079 | 0.728 | 34.8 | 76.6 | 0.114 | 1.485 | |
| WMS-3 spatial span | 0.534 | 0.477-0.590 | 0.269 | 0.649 | 43.86 | 67.56 | 0.114 | 1.352 | |
| HVLT-R | 0.539 | 0.478-0.600 | 0.196 | 0.671 | 46.49 | 65.55 | 0.120 | 1.349 | |
| BVMT-R | 0.607 | 0.550-0.664 | <0.001 | 0.694 | 43.86 | 73.54 | 0.174 | 1.658 | |
| NAB mazes | 0.594 | 0.536-0.653 | 0.002 | 0.384 | 86.84 | 30.20 | 0.170 | 1.244 | |
| Overall model | 0.581 | 0.521-0.641 | 0.008 | 0.745 | 44.64 | 70.60 | 0.152 | 1.519 | |

Notes: AUC is the area under the receiver operating characteristic curve. 95% CI is the estimated 95% confidence interval for the corresponding parameter. Se is the sensitivity. Sp is the specificity. YI is Youden’s index. LR is likelihood ratio. Abbreviations: BACS, Brief Assessment of Cognition in Schizophrenia symbol coding; BVMT-R, Brief Visuospatial Memory Test–Revised; CPT-IP, Continuous Performance Test–Identical Pairs; CHR-C/NC, Clinical high risk for psychosis converters(C) / nonconverters(NC) to psychosis; HC, Healthy Control; HVLT-R, Hopkins Verbal Learning Test–Revised; NAB, Neuropsychological Assessment Battery mazes; WMS-3, Wechsler Memory Scale–Third Edition spatial span.

# Table s18. Discrimination statistics for discriminating CHR from HC across various levels of MCD-L model-calculated probabilities

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Cutoff for PMCD-L | Se% | 95% CI | Sp% | 95% CI | YI | LR |
| <0.200 | 25.58 | 22.54-28.82 | 95.69 | 94.03-97.00 | 0.213 | 5.937 |
| <0.300 | 46.10 | 42.54-49.70 | 89.23 | 86.85-91.30 | 0.353 | 4.280 |
| <0.401 | 62.47 | 58.94-65.90 | 82.89 | 80.08-85.45 | 0.454 | 3.651 |
| <0.500 | 73.51 | 70.24-76.59 | 73.26 | 70.02-76.32 | 0.468 | 2.749 |
| <0.600 | 82.86 | 80.01-85.45 | 61.85 | 58.36-65.25 | 0.447 | 2.172 |
| <0.700 | 90.00 | 87.66-92.03 | 46.13 | 42.61-49.69 | 0.361 | 1.671 |
| <0.800 | 96.36 | 94.79-97.57 | 29.53 | 26.37-32.85 | 0.259 | 1.367 |

Notes: CHR, Clinical High Risk for psychosis; HC, Healthy Control; The MCD-L model is the logistic regression model for discriminating CHR from HC; The PMCD-L refer to probabilities generated from the MCD-L model. Se is the sensitivity. Sp is the specificity. 95% CI is the estimated 95% confidence interval for the corresponding parameter. YI is Youden’s index. LR is likelihood ratio.

# Table s19. Discrimination statistics for discriminating CHR-C from CHR-NC across various levels of MCD-M model-calculated probabilities

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Cutoff for PMCD-L | Se% | 95% CI | Sp% | 95% CI | YI | LR |
| <0.101 | 11.21 | 8.44-14.51 | 96.49 | 91.26-99.04 | 0.077 | 3.195 |
| <0.150 | 32.74 | 28.40-37.31 | 84.21 | 76.20-90.37 | 0.170 | 2.073 |
| <0.200 | 58.52 | 53.79-63.13 | 62.28 | 52.72-71.19 | 0.208 | 1.551 |
| <0.251 | 76.68 | 72.48-80.53 | 48.25 | 38.79-57.80 | 0.249 | 1.482 |
| <0.300 | 87.89 | 84.50-90.77 | 24.56 | 16.98-33.51 | 0.125 | 1.165 |
| <0.351 | 93.50 | 90.79-95.60 | 12.28 | 6.88-19.75 | 0.058 | 1.066 |
| <0.402 | 95.96 | 93.70-97.59 | 6.14 | 2.50-12.24 | 0.021 | 1.022 |

Notes: CHR-C, clinical high Risk converters to psychosis; CHR-NC, clinical high Risk nonconverters; FEP, First Episode Psychosis; The MCD-M model is the logistic regression model for discriminating CHR-C from CHR-NC; The PMCD-M refer to probabilities generated from the MCD-M model. Se is the sensitivity. Sp is the specificity. 95% CI is the estimated 95% confidence interval for the corresponding parameter. YI is Youden’s index. LR is likelihood ratio.

# Table s20. Discrimination statistics for discriminating FEP from HC across various levels of MCD-H model-calculated probabilities

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Cutoff for PMCD-L | Se% | 95% CI | Sp% | 95% CI | YI | LR |
| <0.201 | 44.52 | 40.96-48.12 | 95.58 | 94.11-96.77 | 0.401 | 10.07 |
| <0.300 | 60.31 | 56.75-63.80 | 92.46 | 90.64-94.03 | 0.528 | 8.002 |
| <0.400 | 71.02 | 67.66-74.21 | 88.64 | 86.51-90.55 | 0.597 | 6.253 |
| <0.501 | 80.16 | 77.15-82.93 | 83.92 | 81.49-86.15 | 0.641 | 4.985 |
| <0.600 | 86.29 | 83.65-88.65 | 75.78 | 72.99-78.41 | 0.621 | 3.563 |
| <0.700 | 91.25 | 89.02-93.16 | 68.84 | 65.86-71.71 | 0.601 | 2.929 |
| <0.801 | 95.30 | 93.55-96.69 | 61.01 | 57.90-64.05 | 0.563 | 2.444 |

Notes: FEP, First Episode Psychosis; HC, Healthy Control; The MCD-H model is the logistic regression model for discriminating FEP from HC; The PMCD-H refer to probabilities generated from the MCD-H model. Se is the sensitivity. Sp is the specificity. 95% CI is the estimated 95% confidence interval for the corresponding parameter. YI is Youden’s index. LR is likelihood ratio.