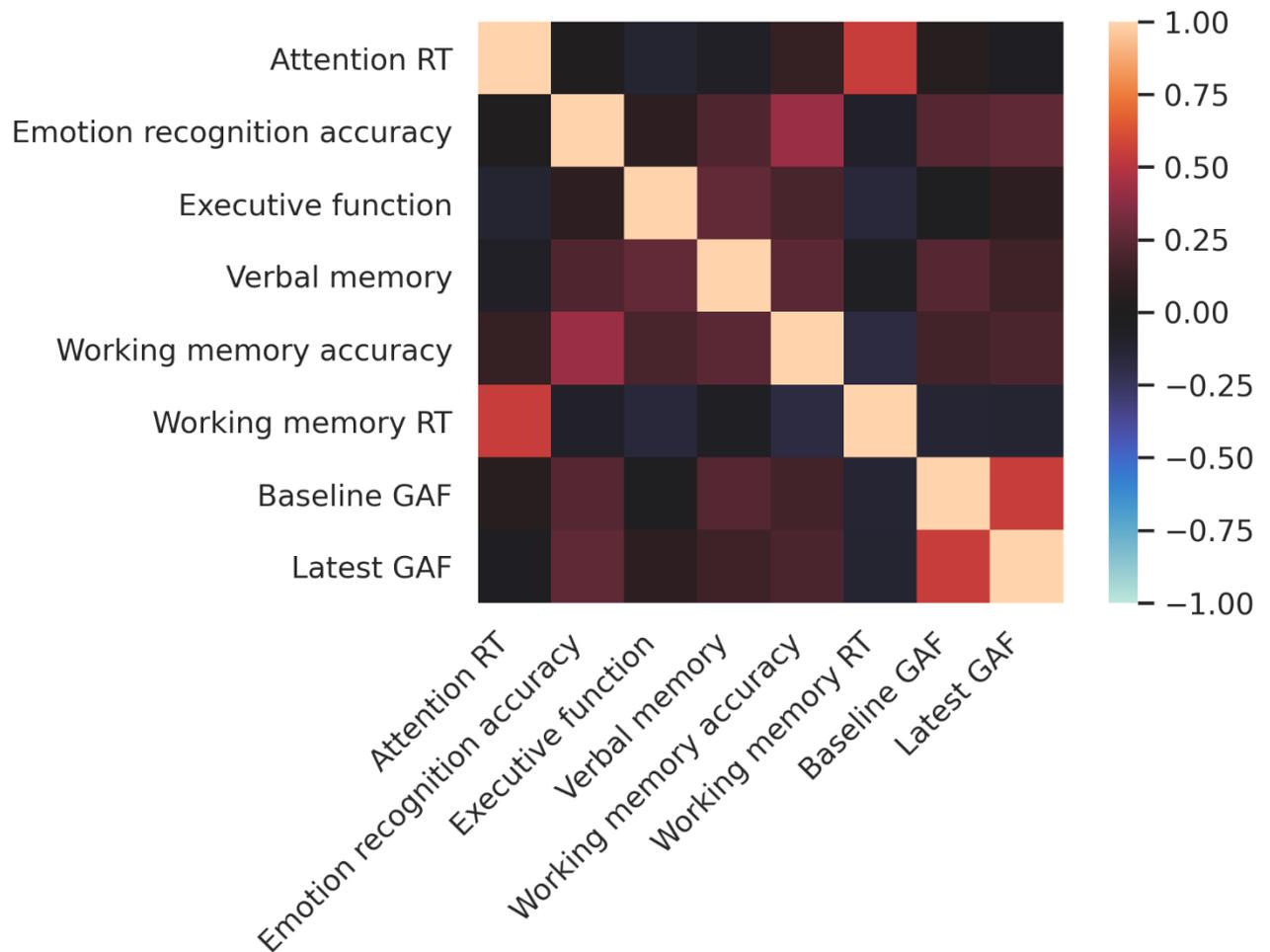
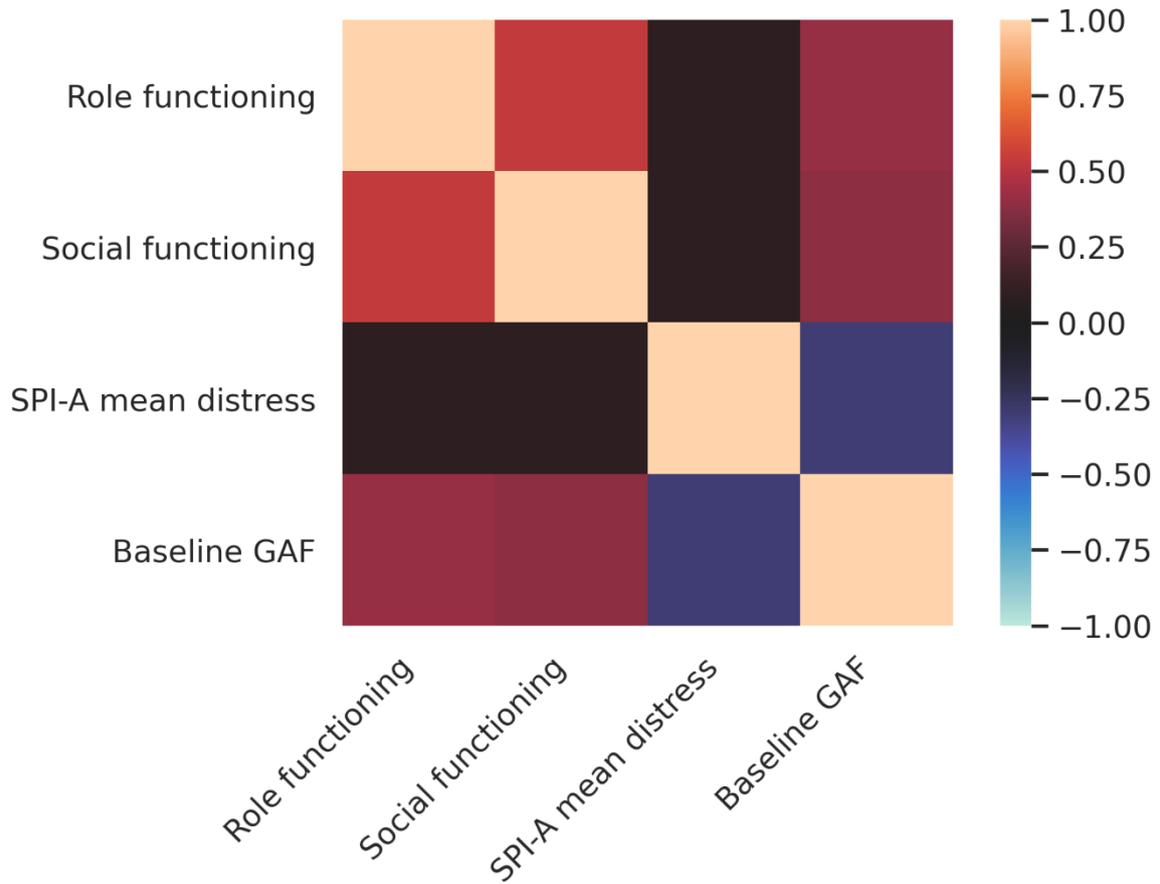


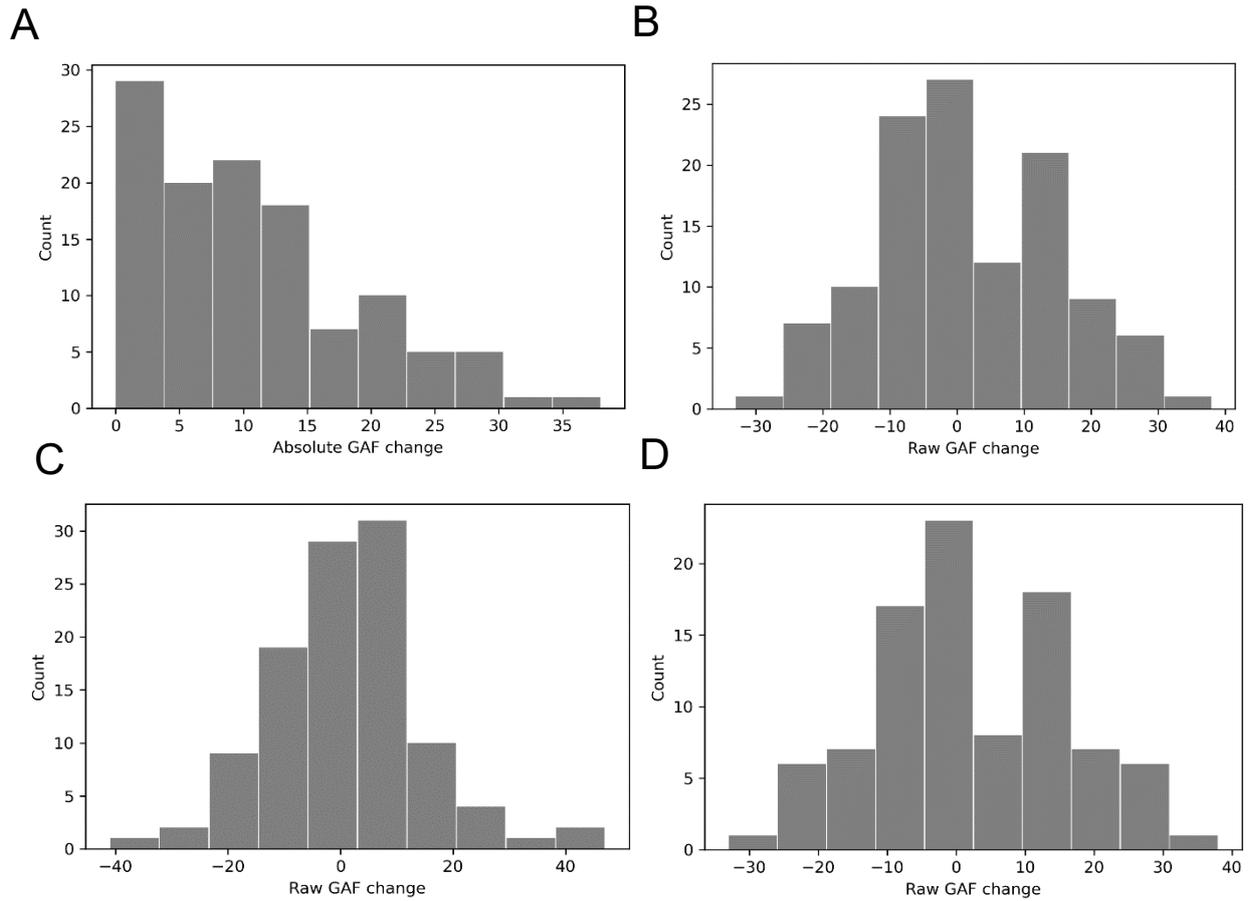
Supplementary Figure 1: Flowchart showing the sequence of analyses used. Data was first prepared for regression, variables associated with GAF scores at baseline were identified, and GAF outcomes were classified using those variables.



Supplementary Figure 2: Correlation matrix showing the relationship between nonzero predictors and baseline GAF scores for the cognitive LASSO-LARS regression model for the CHR-P group (N = 146). The latest GAF score is added to this figure for visualisation purposes only and has not been entered in the regression model.



Supplementary Figure 3: Correlation matrix showing the relationship between nonzero predictors and baseline GAF scores for the combined LASSO-LARS regression model for the CHR-N group (N = 47).



Supplementary Figure 4: GAF score changes in the CHR-P group: (A) absolute change in GAF scores between baseline and 6-12 month follow-up (N = 146); (B) raw change in GAF scores between baseline and 6-12 month follow-up (N = 146); (C) raw change in GAF scores between baseline and 6-month follow-up (N = 108); (D) raw change in GAF scores between baseline and 12-month follow-up (N = 94).

Supplementary Table 1. Demographic, clinical, functioning and cognitive characteristics across sites for CHR-P participants (N = 146)

Variable	Glasgow (N = 109)	Edinburgh (N = 37)	p-value
Age (years), mean (SD)	20.79 (3.95)	23.46 (4.39)	< .001
Gender, female n (%)	78 (71.6)	26 (70.3)	.881
Education (years), mean (SD)	14.51 (2.73)	16.95 (3.39)	< .001
CAARMS severity, median (range)	24 (0-74)	34 (12-72)	.006
CAARMS mean distress, median (range)	25 (0-86)	39 (0-85)	.005
SPI-A severity, median (range)	6 (0-74)	7 (0-39)	.987
SPI-A mean distress, median (range)	3 (0-28)	4 (0-12)	.339
CHR-P criteria subgroup, n (%)			
<i>CAARMS</i>	33 (30.3)	12 (32.4)	.806
<i>SPI-A</i>	33 (30.3)	4 (10.8)	.019
<i>CAARMS/SPI-A</i>	43 (39.4)	21 (56.8)	.067
ACES total, median (range)	2 (0-8)	2 (0-6)	.991
Comorbidity, n (%)			
<i>Anxiety disorder</i>	80 (73.4)	24 (64.9)	.322
<i>Mood disorder</i>	75 (68.8)	22 (59.5)	.298
<i>Alcohol abuse/dependence</i>	31 (28.4)	15 (40.5)	.171
<i>Drug abuse/dependence</i>	19 (17.4)	5 (13.5)	.579
<i>Eating disorder</i>	5 (4.6)	6 (16.2)	.021
Medication, n (%)			
<i>Antipsychotic</i>	3 (2.8)	1 (2.7)	.987
<i>Mood stabiliser</i>	2 (1.8)	2 (5.4)	.250
<i>Antidepressant</i>	32 (29.4)	21 (56.8)	.003
<i>Anti-anxiety</i>	4 (3.7)	6 (16.2)	.009
GAF, median (range)	58 (21-95)	58 (40-80)	.715
Poor baseline functioning, n (%)	79 (72.5)	27 (73.0)	.953
PFO, n (%)	51 (46.8)	19 (51.4)	.840
Social functioning, median (range)	8 (3-10)	8 (6-9)	.474
Role functioning, median (range)	8 (3-9)	8 (4-9)	.711
PAS average, median (range)	1.26 (0-3.43)	1.14 (0.29-2.50)	.984
BACS, mean (SD)			
<i>Verbal memory</i>	-0.47 (1.14)	0.50 (1.12)	< .001
<i>Motor speed</i>	-0.60 (1.22)	-1.05 (1.14)	.017
<i>Attention & processing speed</i>	-0.45 (1.12)	-0.57 (1.21)	.452
<i>Verbal fluency</i>	-0.15 (1.17)	0.09 (1.41)	.187
<i>Executive function</i>	-0.11 (1.38)	0.31 (1.16)	.093

<i>Working memory</i>	-0.29 (1.35)	0.53 (1.42)	.001
<i>Composite score</i>	-0.75 (1.61)	-0.10 (1.91)	.051
CNB, mean (SD)			
<i>Emotion recognition accuracy</i>	-0.16 (1.13)	-0.19 (1.12)	.763
<i>Emotion recognition RT</i>	0.12 (1.19)	1.97 (1.77)	< .001
<i>Attention accuracy</i>	-0.72 (2.58)	-0.69 (2.68)	.943
<i>Attention RT</i>	-0.05 (0.88)	-0.27 (0.84)	.142
<i>Working memory accuracy</i>	-0.33 (1.67)	-0.62 (1.76)	.298
<i>Working memory RT</i>	-0.04 (0.81)	-0.06 (0.86)	.941

Note. CHR-P, clinical high-risk for psychosis; CAARMS, Comprehensive Assessment of At-Risk Mental States; SPI-A, Schizophrenia Proneness Instrument, Adult version; ACES, Adverse Childhood Experience Scale; GAF, Global Assessment of Functioning; PFO, poor functional outcome; PAS, Premorbid Adjustment Scale; BACS, Brief Assessment of Cognition in Schizophrenia; CNB, Penn Computerized Neurocognitive Battery; RT, response time

Supplementary Table 2: Permutation feature importance scores for nonzero variables for the CHR-P (N= 146) and CHR-N (N = 47) LASSO-LARS baseline models

Variable	Permutation feature importance score		
	CHR-P combined model	CHR-P cognitive model	CHR-N combined model
Social functioning	0.18		0.04
PAS average	0.04		
Role functioning	0.04		0.10
Working memory RT	0.01	0.04	
SPI-A mean distress	0.01		0.05
ACES total	0.02		
Motor speed	< 0.01		
Verbal memory	< 0.01	0.08	
Emotion recognition accuracy	< 0.01	0.05	
Total CAARMS severity	0.05		
SPI-A severity	0.01		
CAARMS mean distress	0.01		
Attention RT		0.02	
Executive function		0.01	
Working memory RT		0.04	

Note. CHR-P, clinical high-risk for psychosis; CHR-N, clinical high-risk-negative; CAARMS, Comprehensive Assessment of At-Risk Mental States; SPI-A, Schizophrenia Proneness Instrument, Adult version; ACES, Adverse Childhood Experience Scale; GAF, Global Assessment of Functioning; PAS, Premorbid Adjustment Scale; RT, response time. Here, importance (i) for variable j is calculated using the R^2 score for the fitted model, and new R^2 scores ($S_{k,j}$) obtained after randomly shuffling variable column j for k iterations in the following manner:

$$i_j = s - \frac{1}{K} \sum_{k=1}^K S_{k,j}$$

Supplementary Table 3: Nonzero coefficients and variable significance for the combined LASSO-LARS model for the CHR-P group (N = 146).

Variable	Coefficient (cv.glmnet)	Coefficient (selectiveInference)	p-value (selectiveInference)
Verbal memory	0.20	0.57	.464
SPI-A mean distress	-0.18	-0.27	.370
Executive function	0	0	-
ACES total	-0.49	-0.76	.116
Motor speed	-0.15	1.18	.116
Verbal fluency	0	0	-
Attention & processing speed	0	0	-
BACS composite score	0	0	-
CAARMS mean distress	-0.02	-0.05	.416
Emotion recognition RT	0	0	-
Working memory accuracy	0	0	-
PAS average	-2.08	-2.79	.071
Emotion recognition accuracy	0.06	0.52	.539
Total CAARMS severity	-0.10	-0.09	.256
SPI-A severity	-0.05	-0.08	.493
Role functioning	1.22	1.42	.119
Social functioning	2.97	2.96	.002
Working memory	0	0	-
Working memory RT	-0.83	-2.19	.051
Attention RT	0	0	-

Note. CHR-P, clinical high-risk for psychosis; CHR-N, clinical high-risk-negative; CAARMS, Comprehensive Assessment of At-Risk Mental States; SPI-A, Schizophrenia Proneness Instrument, Adult version; ACES, Adverse Childhood Experience Scale; GAF, Global Assessment of Functioning; PAS, Premorbid Adjustment Scale; RT, response time. Coefficients were calculated using the R packages `glmnet` and `selectiveInference`, whereby the former is a different implementation of the algorithm used in the main text. The second set of coefficients and *p*-values were obtained using the package `selectiveInference`, which implements a procedure proposed by Lockhart et al. (2014). Due to implementation differences, the coefficients obtained through the two different functions differ slightly from each other; and both differ from those obtained using Python because random state settings do not transfer between platforms.