

BACKGROUND

- Accurate prediction of cognitive decline in preclinical Alzheimer’s disease (AD) using an accessible approach is currently a clinical priority for screening and/or cognitive monitoring purposes [1].
- Both digital biomarkers and blood-based biomarkers, notably plasma p-tau217, have shown promise for this regard [2, 3].
- In this context, The Speech Biomarker for Cognition (SB-C) is a remote, low-burden speech-based tool, based on a phone call, and designed to monitor cognitive change in real-world settings [4].

AIM

Explore the ability of the remote SB-C tool and plasma p-tau217 to predict a one-year cognitive outcome, measured by the modified Preclinical Alzheimer’s Cognitive Composite (mPACC), in individuals with Subjective Cognitive Decline (SCD).

METHODS

- 61 SCD participants from the PROSPECT-AD study [4], with plasma p-tau217 and speech data available, were included.
- SB-C recordings were collected remotely via automated administration of structured tasks (semantic verbal fluency and verbal memory). Then, processed using an AI-driven pipeline (ki:elements), yielding a global cognition score and domain scores (memory, executive function, processing speed). mPACC (z-scored) was administered in-clinic at baseline and after 12 months.
- Plasma p-tau217 was measured at baseline with Lumipulse immunoassays (Fujirebio) and dichotomized using a validated cut-off [5].
- Independent and combined linear models were employed to predict 12-month mPACC, adjusting for age, sex, education, and baseline mPACC. Model performance was compared using model metrics (AIC, ΔAIC, adjusted R² and ANOVA).



Structured cognitive tasks



Automatic SB-C scores

Sample for the study

- 61 participants with **SCD**
- Mean **age**: 66.55
- Sex (**women**): 39 (63,9%)
- Mean **education** (years): 15.49
- Plasma **p-tau217** positive: 11 (18%)

RESULTS

1 Baseline SB-C and plasma p-tau217 independently predict mPACC scores after 12-months

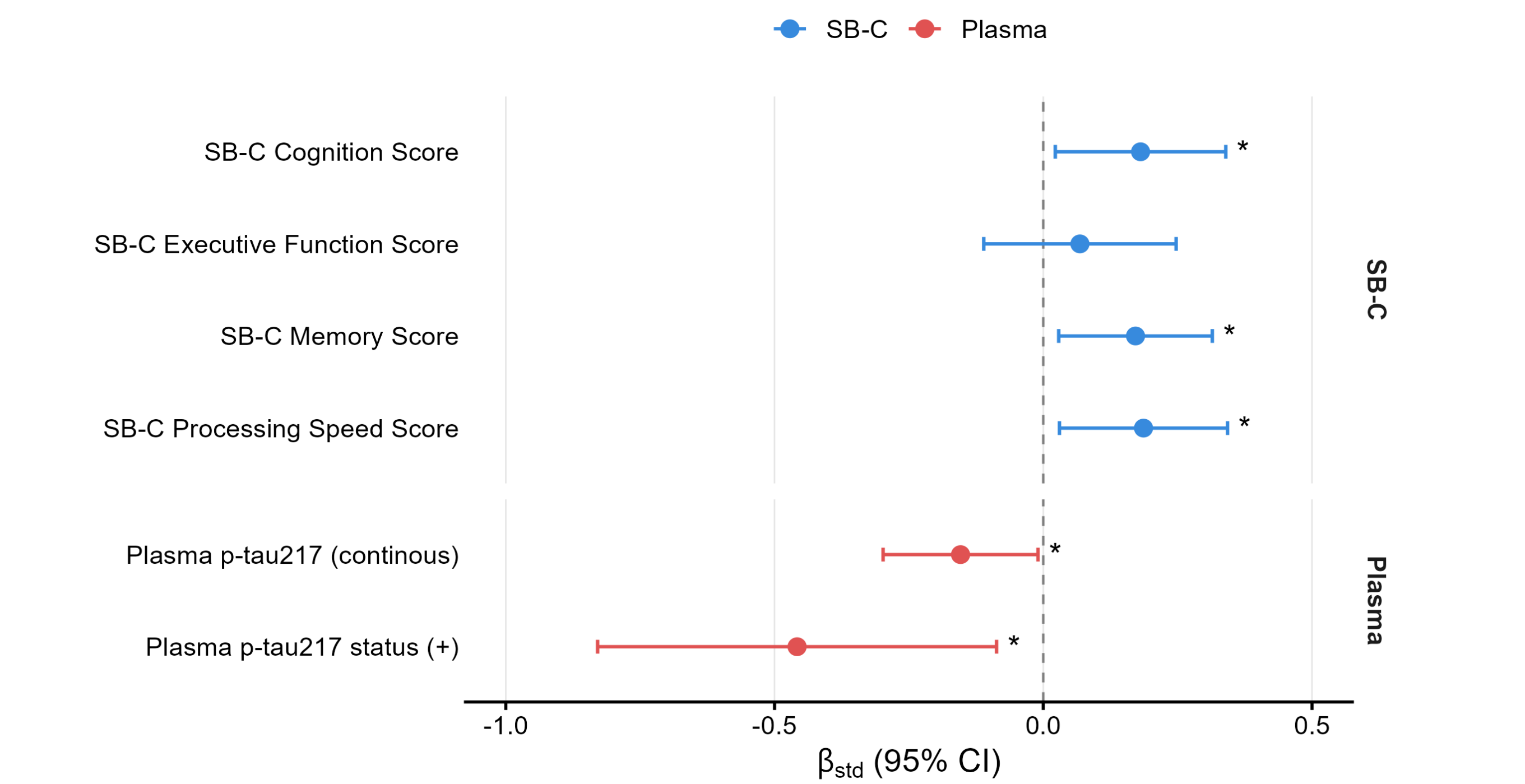


Figure 1. Standardized regression estimates (β) with 95% confidence intervals for baseline SB-C scores and plasma p-tau217 as independent predictors of 12-month mPACC score.

2 SB-C adds incremental predictive value beyond plasma p-tau217

Model	Model fit metrics			vs. plasma only	
	AIC	Adj. R ²	ΔAIC	F	p-value
Plasma p-tau217 status only (reference)	70.96	0.73	–	–	–
+ SB-C Cognition Score	68.00	0.74	-2.96	4.57	0.03
+ SB-C Executive Function Score	72.47	0.72	1.51	0.43	0.51
+ SB-C Memory Score	66.94	0.75	-4.02	5.59	0.02
+ SB-C Processing Speed Score	67.99	0.74	-2.97	4.58	0.03

Table 1. Model fit metrics for plasma p-tau217 status only and combined plasma + SB-C models predicting 12-month mPACC score. AIC: Akaike Information Criterion (lower = better fit); Adj. R²: adjusted coefficient of determination (higher = better fit); ΔAIC: change in AIC relative to the plasma-only reference model; F: F-statistic from ANOVA comparison of the models.

Predictor (combined models)	β (std)	95% CI	p-value
Model 1			
SB-C Cognition Score	0.16	[0.01, 0.31]	0.03
Plasma p-tau217 (status)	-0.42	[-0.78, -0.06]	0.02
Model 2			
SB-C Executive Function Score	0.06	[-0.11, 0.23]	0.51
Plasma p-tau217 (status)	-0.45	[-0.82, -0.08]	0.01
Model 3			
SB-C Memory Score	0.16	[0.02, 0.3]	0.02
Plasma p-tau217 (status)	-0.43	[-0.79, -0.08]	0.01
Model 4			
SB-C Processing Speed Score	0.16	[0.01, 0.32]	0.03
Plasma p-tau217 (status)	-0.40	[-0.77, -0.04]	0.03

Table 2. Standardized estimates of combined models including baseline SB-C scores and plasma p-tau217 to predict 12-month mPACC.