

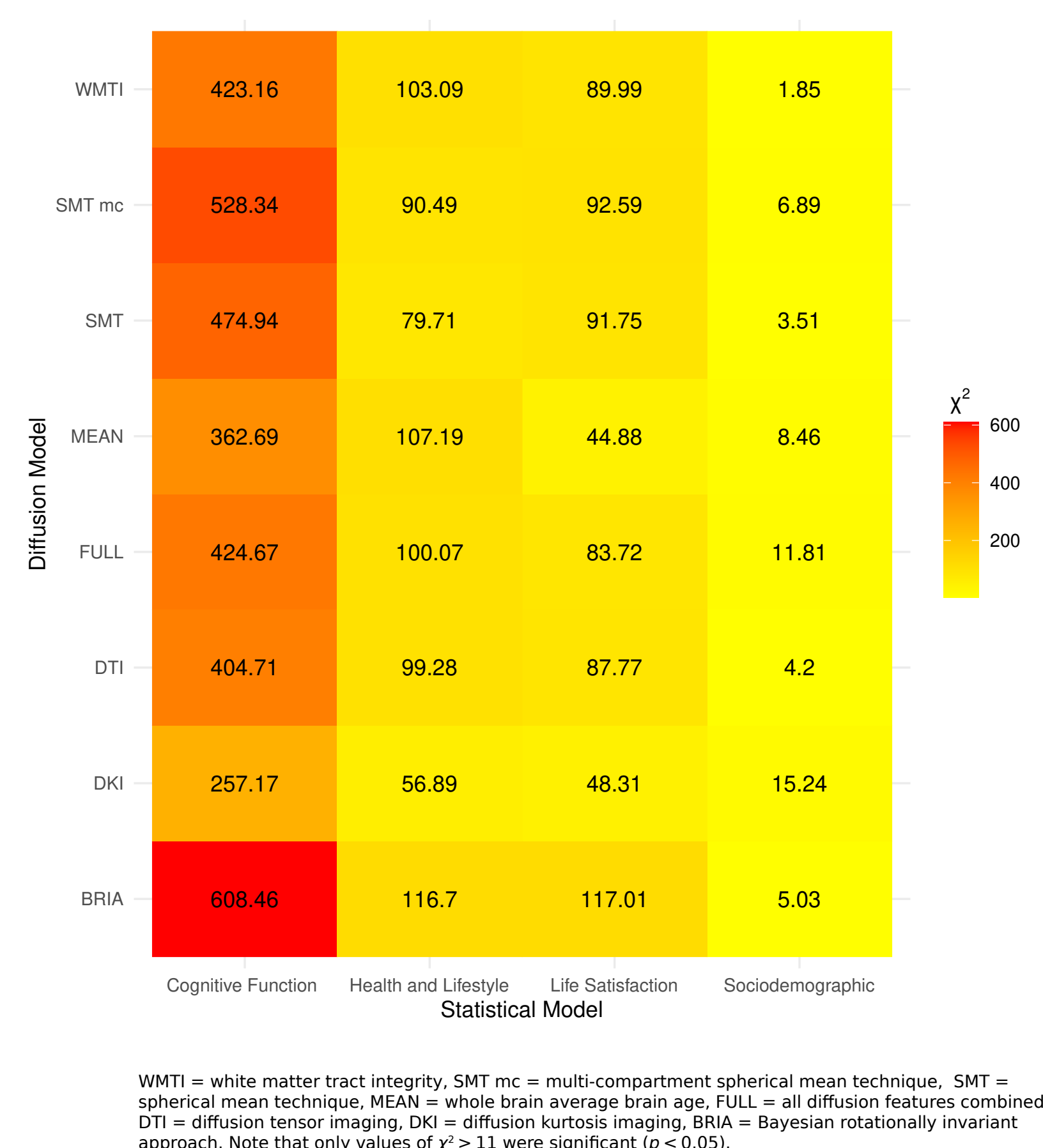
# Brain age estimates from different white matter microstructure features associate concordantly with bio-psycho-social factors.

## *Bio-psycho-social factors' associations with brain age: a large-scale UK Biobank diffusion study of 35,749 participants*

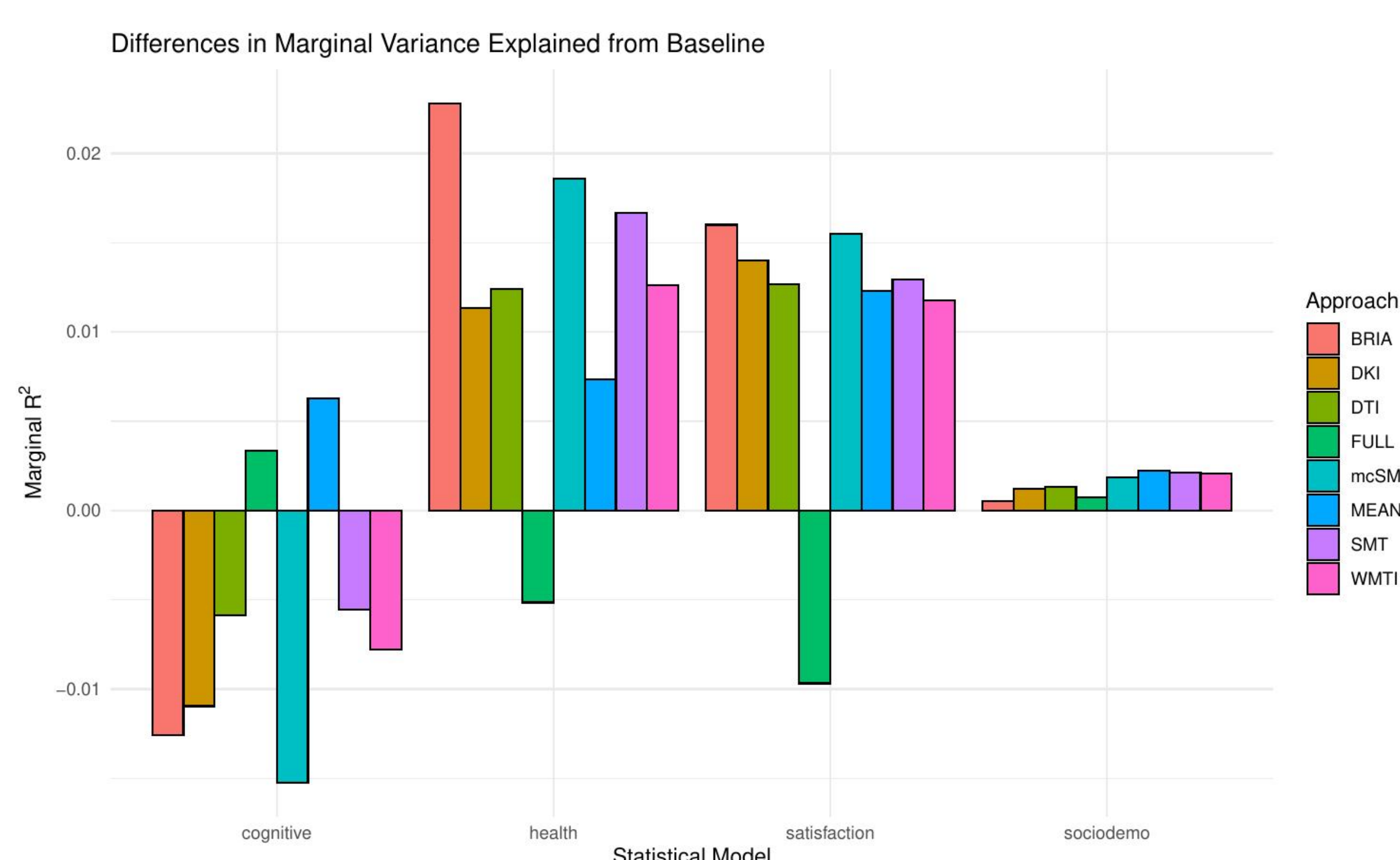
**Background:** Brain age (BA) has previously been described as a general health marker. Yet, BA's associations with various bio-psycho-social factors have not been laid out in a structured way.

**Method:** BAs of UK Biobank participants (N = 35,749, 44.6–82.8 years of age) estimated from white matter microstructure features were associated with bio-psycho-social variables within the domains of sociodemographic, cognitive, life-satisfaction, as well as health and lifestyle.

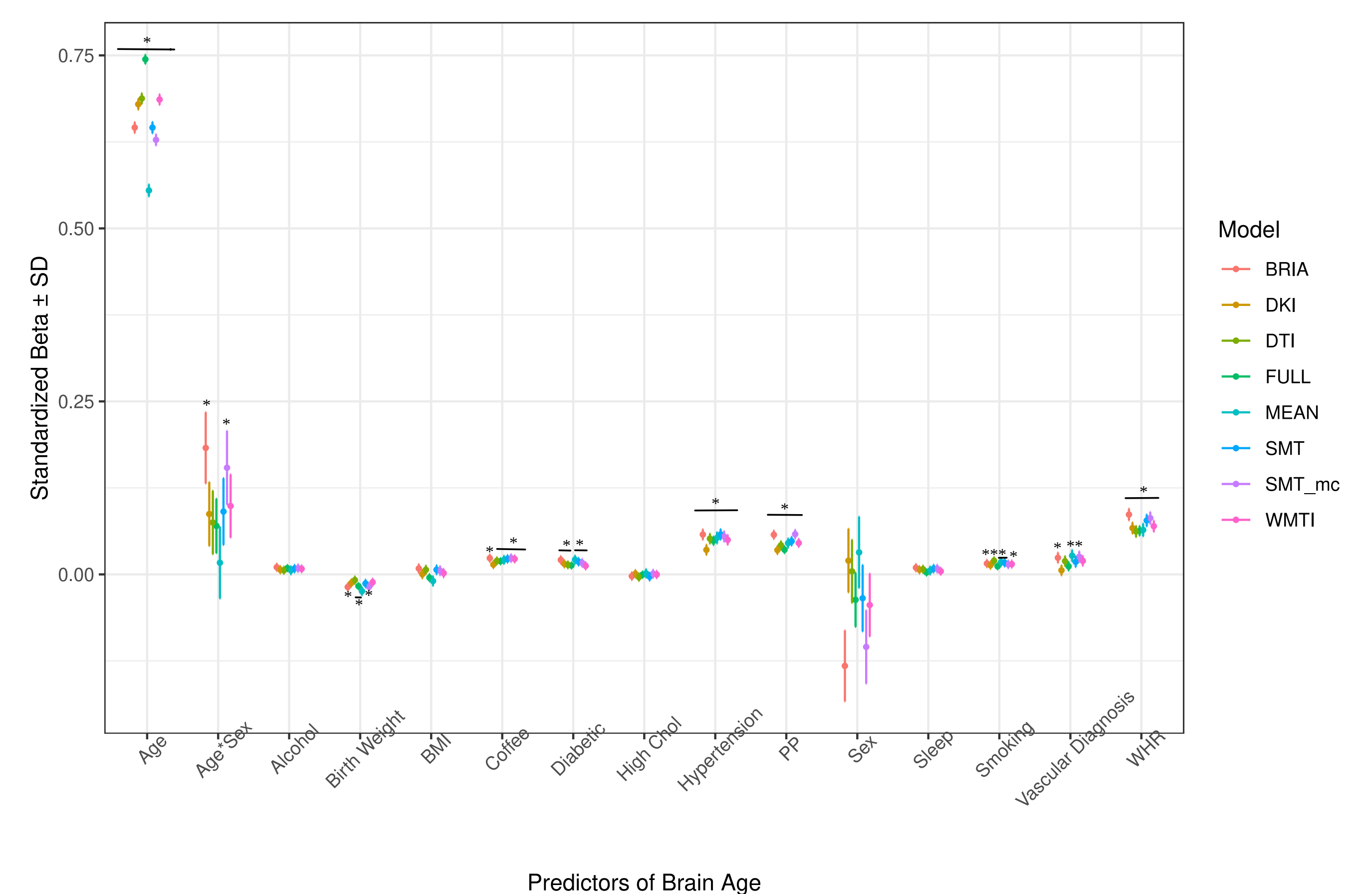
**Result 1a:** Adding blocks of bio-psycho-social variables to a baseline model (including sex, age, & site) changed explained BA variance significantly.



**Result 1b:** Yet, the changes in variance explained were relatively small:  $R^2 < 3\%$ .

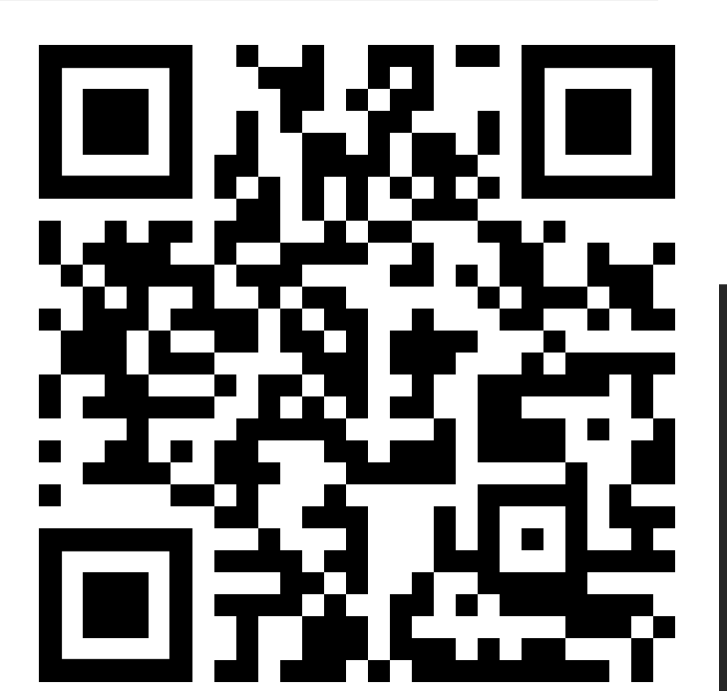


**Result 2:** We identified various concordantly significant predictors across diffusion approaches (with the exception of socio-demographics).



Single health and lifestyle factors were most predictive of BA, with waist-to-hip-ratio, diabetes, hypertension and related diagnoses, smoking status, coffee consumption being indicative of a higher BA. An inverse relationship was found between BA and birth weight. Finally, higher health satisfaction, self-rated health, and digit substitution scores were indicative of lower brain ages.

**Conclusion:** Our results indicate BA as a general marker of health. Moreover, associations of white matter BA with bio-psycho-social factors are robust to different WM diffusion modelling assumptions. A potentially fruitful guiding principal for future brain age associations research could be to focus on measures which are directly or indirectly related to or reflect pathology.



To the paper