**Table S6. Association and interaction analyses of PRS with obesity**

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| **Study** | **Polygenic Risk Score** | **TEST** | | **obesity** | |
| **OR (95% CI)** | ***P*** |
| **KARE** | **PRS** | **genetic effect (G)** | | 1.0081 (1.0060-1.0103) | **4.71E-14** |
| **interaction effect (GxE)** | calorie intake (1-SD) | 0.9996 (0.9975-1.0018) | 0.729 |
| protein (1-SD) | 1.0009 (0.9987-1.0031) | 0.448 |
| fat (1-SD) | 1.0010 (0.9989-1.0031) | 0.362 |
| carbohydrate (1-SD) | 0.9989 (0.9968-1.0011) | 0.323 |
| **PRSunweighted** | **genetic effect (G)** | | 1.0264 (1.0213-1.0315) | **1.14E-24** |
| **interaction effect (GxE)** | calorie intake (1-SD) | 0.9990 (0.9941-1.0039) | 0.678 |
| protein (1-SD) | 1.0009 (0.9960-1.0058) | 0.726 |
| fat (1-SD) | 1.0001 (0.9953-1.0049) | 0.973 |
| carbohydrate (1-SD) | 0.9981 (0.9932-1.0030) | 0.447 |
| **CAVAS** | **PRS** | **genetic effect (G)** | | 1.0064 (1.0041-1.0088) | **4.99E-08** |
| **interaction effect (GxE)** | calorie intake (1-SD) | 0.9993 (0.9970-1.0016) | 0.553 |
| protein (1-SD) | 0.9989 (0.9966-1.0012) | 0.351 |
| fat (1-SD) | 1.0000 (0.9977-1.0023) | 0.988 |
| carbohydrate (1-SD) | 0.9991 (0.9968-1.0015) | 0.460 |
| **PRSunweighted** | **genetic effect (G)** | | 1.0231 (1.0175-1.0287) | **2.91E-16** |
| **interaction effect (GxE)** | calorie intake (1-SD) | 0.9979 (0.9924-1.0034) | 0.446 |
| protein (1-SD) | 0.9975 (0.9920-1.0030) | 0.375 |
| fat (1-SD) | 1.0001 (0.9947-1.0055) | 0.971 |
| carbohydrate (1-SD) | 0.9973 (0.9918-1.0028) | 0.336 |
| **HEXA** | **PRS** | **genetic effect (G)** | | 1.0081 (1.0065-1.0098) | **1.15E-22** |
| **interaction effect (GxE)** | calorie intake (1-SD) | 1.0013 (0.9997-1.0030) | 0.108 |
| protein (1-SD) | 1.0013 (0.9997-1.0029) | 0.109 |
| fat (1-SD) | 1.0015 (0.9999-1.0032) | 0.069 |
| carbohydrate (1-SD) | 1.0010 (0.9994-1.0027) | 0.218 |
| **PRSunweighted** | **genetic effect (G)** | | 1.0242 (1.0203-1.0281) | **1.28E-34** |
| **interaction effect (GxE)** | calorie intake (1-SD) | 0.9992 (0.9953-1.0030) | 0.678 |
| protein (1-SD) | 0.9995 (0.9956-1.0034) | 0.788 |
| fat (1-SD) | 1.0004 (0.9966-1.0043) | 0.825 |
| carbohydrate (1-SD) | 0.9989 (0.9950-1.0027) | 0.565 |

The association between PRS and phenotype, and PRS-calorie intakes interaction were analyzed by logistic regression model for obesity, adjusted for age, sex, recruitment area and 10 principal components for KARE and adjusted for sex, age and 10 PCs for CAVAS and HEXA.; The significance threshold P < 4.17E-04 (0.05 / 120 through multiple correction)

OR: odds ratio; CI: confidence interval.