Supplemental Materials

Text S1	Illustration of Latent Profile Analysis.
Table S1	Pairwise comparisons of Positive Functioning scores across 7 person-level profiles
Fig. S1	Distributions of sensing features.

Text S1. Illustration of Latent Profile Analysis

For person $i = 1, \dots, N$, and indicators $k = 1, \dots, K$, a latent profile $Z_i \in \{1, \dots, J\}$, it is assumed:

$$Z_i \sim Categorical(\pi_1, \dots, \pi_J), \sum_{j=1}^{J} \pi_j = 1 \tag{1}$$

$$y_{ik} \mid Z_i = j \sim N(\mu_{jk}, \sigma_{jk}^2). \tag{2}$$

The marginal density of $y_i = (y_{i1}, \dots, y_{iK})$ is

$$p(y_i) = \sum_{j=1}^{J} \pi_j \prod_{k=1}^{K} N(y_{ik} \mid \mu_{jk}, \sigma_{jk}^2), \tag{3}$$

which means how plausible y_i would be if person i were in profile j. Parameters $(\pi_j, \mu_{jk}, \sigma_{jk}^2)$ are estimated by maximum likelihood with multiple random starts to mitigate local optima. Individuals are characterized by posterior class probabilities

$$\tau_{ij} = P(Z_i = j \mid y_i) = \frac{\pi_j \prod_{k=1}^{K} \mathcal{N}(y_{ik} | \mu_{jk}, \sigma_{jk}^2)}{\sum_{\ell=1}^{J} \pi_\ell \prod_{k=1}^{K} \mathcal{N}(y_{ik} | \mu_{\ell k}, \sigma_{\ell k}^2)}. \tag{4}$$

In the two-level setting, individuals $i = 1, \dots, N$ are nested within clusters $u = 1, \dots, U$, Level-1 latent profiles $Z_{iu} \in \{1, \dots, J\}$ capture within-cluster heterogeneity in the indicators y_{iku} , while Level-2 latent profiles $B_u \in \{1, \dots, B\}$ capture between-cluster heterogeneity in the relative frequencies of the Level-1 profiles. As fomular (2), it is assumed that:

$$y_{iku} \mid Z_{iu} = j \quad \sim N(\mu_{jk}, \sigma_{jk}^2), k = 1, \dots, K, \ j = 1, \dots, J, \tag{5}$$

The Level-2 classes have mixing proportions $B_u \sim Categorical(\rho_1, \dots, \rho_B), \sum_{b=1}^{B} \rho_b = 1$,

Conditional on $B_u = b$, the Level-1 class of person i in cluster u follows $Z_{iu} \mid B_u = b \sim Categorical(\pi_{1|b}, \dots, \pi_{J|b})$, parameterized by multinomial logits:

$$lo\,g \frac{\pi_{j|b}}{\pi_{J|b}} = \alpha_j + \beta_{jb}, j = 1, \dots, J-1, \ \ b = 1, \dots, B-1, \tag{6}$$

$$\pi_{j|b} = \frac{exp\,(\alpha_j + \beta_{jb})}{\sum_{\ell=1}^{J} exp\,(\alpha_\ell + \beta_{\ell b})} \tag{7}$$

Level-1 profile proportions are mixtures over Level-2 profiles: $\bar{\pi}_j = \sum_{b=1}^{B} \rho_b \, \pi_{j|b}, j = 1, \dots, J.$ Let $y_u = \{y_{iku}: i \in u,\ k = 1, \dots, K\}$, The marginal likelihood for class u is

$$p(y_u) = \sum_{b=1}^{B} \rho_b \prod_{i \in u} \{\sum_{j=1}^{J} \pi_{j|b} \prod_{k=1}^{K} N\,(y_{iku} \mid \mu_{jk}, \sigma_{jk}^2)\}, \tag{7}$$

Parameters $(\rho_b, \pi_{j|b}, \mu_{jk}, \sigma_{jk}^2)$ are estimated by maximum likelihood. Posterior probabilities at both levels follow by Bayes' rules,

$$P(\,B_u = b \mid y_u\,) \;\propto\; \rho_b \prod_{i \in u} \{\sum_{j=1}^{J} \pi_{j|b} \prod_{k=1}^{K} N\,(y_{iku} \mid \mu_{jk}, \sigma_{jk}^2)\} \tag{8}$$

$$P(Z_{iu} = j \mid B_u = b, y_u) \;\propto\; \pi_{j|b} \prod_{k=1}^{K} N\,(y_{iku} \mid \mu_{jk}, \sigma_{jk}^2). \tag{9}$$

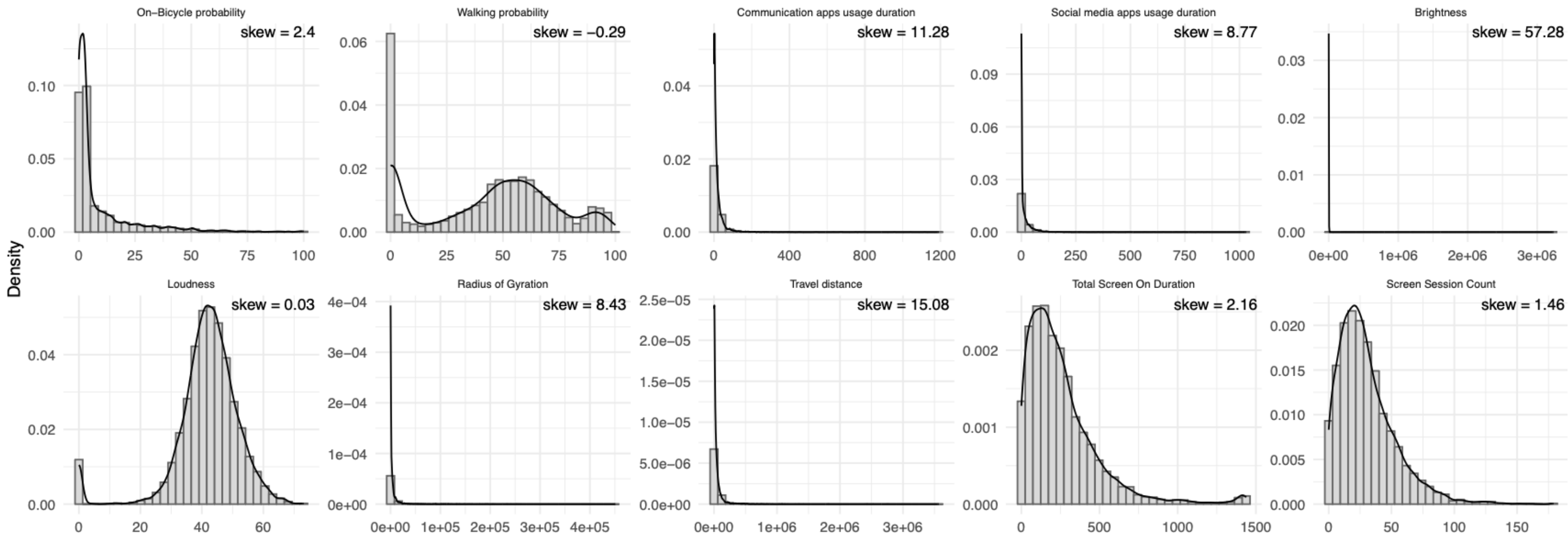
Table S1. Pairwise compositions of Positive Functioning scores across 7 personal profiles

	Estimate	SE	*Z*	*p*	p-adjusted
P1-P2	-0.06739	0.19142	-0.3521	0.7247856	1
P1-P3	-0.01776	0.13963	-0.1272	0.8988133	1
P1-P4	-0.09824	0.16579	-0.5926	0.5534606	1
P1-P5	-0.19437	0.1397	-1.3913	0.1641268	1
P1-P6	-0.04545	0.13559	-0.3352	0.7374755	1
P1-P7	0.13574	0.13594	0.9986	0.3179899	1
P2-P3	0.04964	0.16553	0.2999	0.7642845	1
P2-P4	-0.03085	0.18725	-0.1648	0.8691345	1
P2-P5	-0.12698	0.16302	-0.7789	0.4360134	1
P2-P6	0.02194	0.16186	0.1356	0.8921569	1
P2-P7	0.20314	0.16244	1.2506	0.2110937	1
P3-P4	-0.08049	0.13478	-0.5972	0.5503957	1
P3-P5	-0.17662	0.09739	-1.8135	0.0697577	1
P3-P6	-0.02769	0.09585	-0.2889	0.7726552	1
P3-P7	0.1535	0.09751	1.5742	0.1154401	1
P4-P5	-0.09613	0.13079	-0.735	0.4623384	1
P4-P6	0.0528	0.12933	0.4082	0.6831125	1
P4-P7	0.23399	0.13209	1.7714	0.0764927	1
P5-P6	0.14893	0.09193	1.6199	0.1052495	1
P5-P7	0.33012	0.09181	3.5955	0.0003238	0.006799
P6-P7	0.18119	0.08973	2.0192	0.0434659	0.869318

Note. P = Personal Profile. Multiple comparisons were controlled by adjusting *p* values with the Holm (sequential Bonferroni) procedure to control the family-wise error rate.

Fig. S1. Distributions of sensing features

A. Distributions before Box-Cox transformation



B. Distributions after Box-Cox transformation