

Principal component analysis of sensory panel results for a reference and multiple prototypes



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Data set

Sensory panel results for **8 cheddar cheeses** (1 control/reference and 7 test products) on **12 sensory attributes**.

Goal

Summarize multivariate results to understand how test products ("T1", ..., "T7") differ from the control/reference ("C").

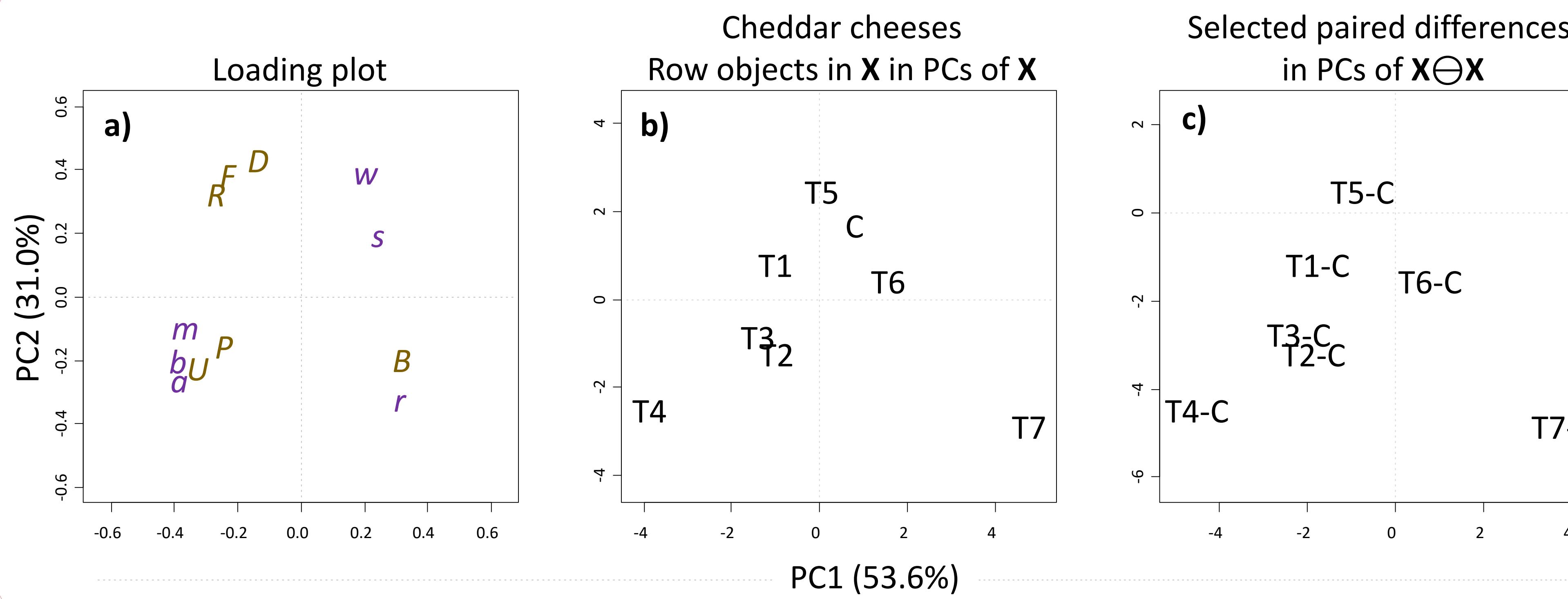
Conventional approach

Conduct PCA in the conventional way, then investigate the relevant paired comparisons (see Castura, Varela & Næs, 2023a). Results shown in **Fig. 1**.

Proposed approach

Conduct PCA of the relevant subset of paired comparisons (see Castura, Varela & Næs, 2023b). Results shown in **Fig. 2**.

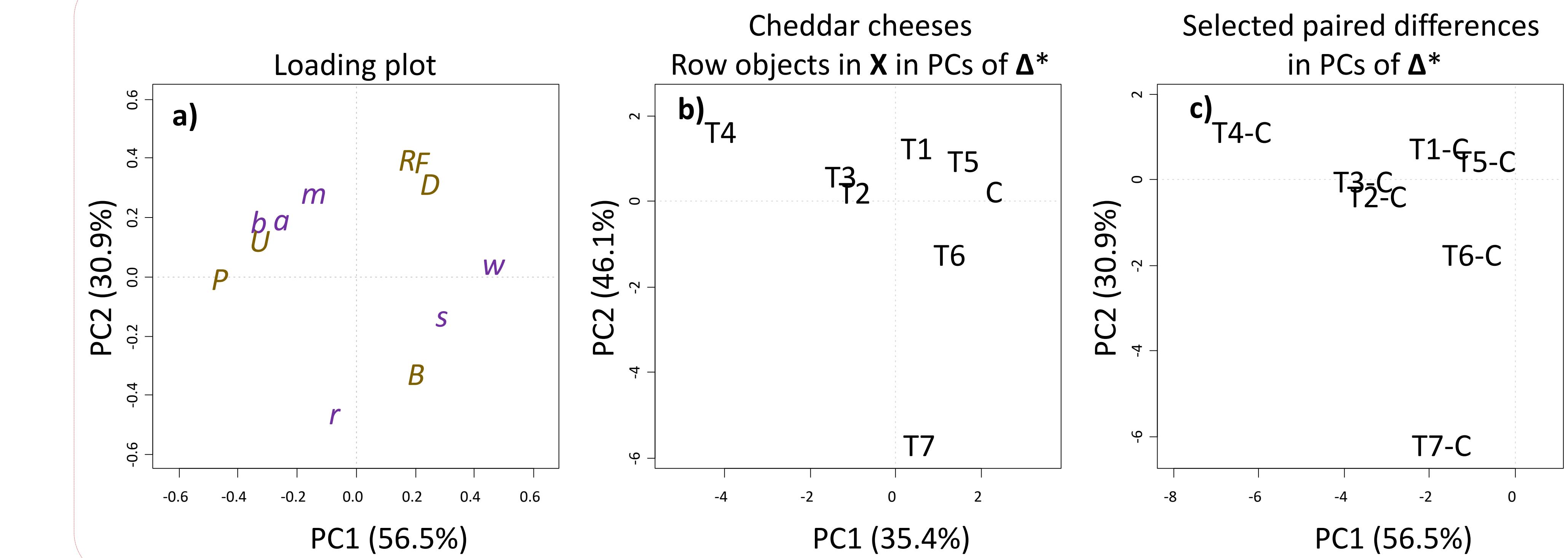
Fig. 1. PCA of all paired comparisons (PCA of $X \ominus X$)



Attribute codes

Flavour/taste: maturity [m] rindy [r] sweet [w] bitter [b] acidic [a] salty [s] Texture: first-bite firmness [F] rubbery [U] bitty breakdown [B] pasty [P] breakdown rate [R] dry [D]

Fig. 2. PCA of selected paired comparisons (PCA of Δ^*)



Key Findings

- Loadings in proposed PCA solution (Fig. 2a) were less clumped vs in conventional PCA solution (Fig. 1a)
 - Cheddar cheeses in proposed PCA solution (Fig. 2b) were less separated vs in conventional PCA solution (Fig. 1b)
 - Relevant pairs in proposed PCA solution (Fig. 2c) were better separated vs in conventional PCA solution (Fig. 1c)
- Benefit of proposed PCA solution is meaningfully large: 46.3% in one PC and 7.0% in two PCs vs the conventional PCA solution

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References

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