

WITH THE MAMCAP R-PACKAGE

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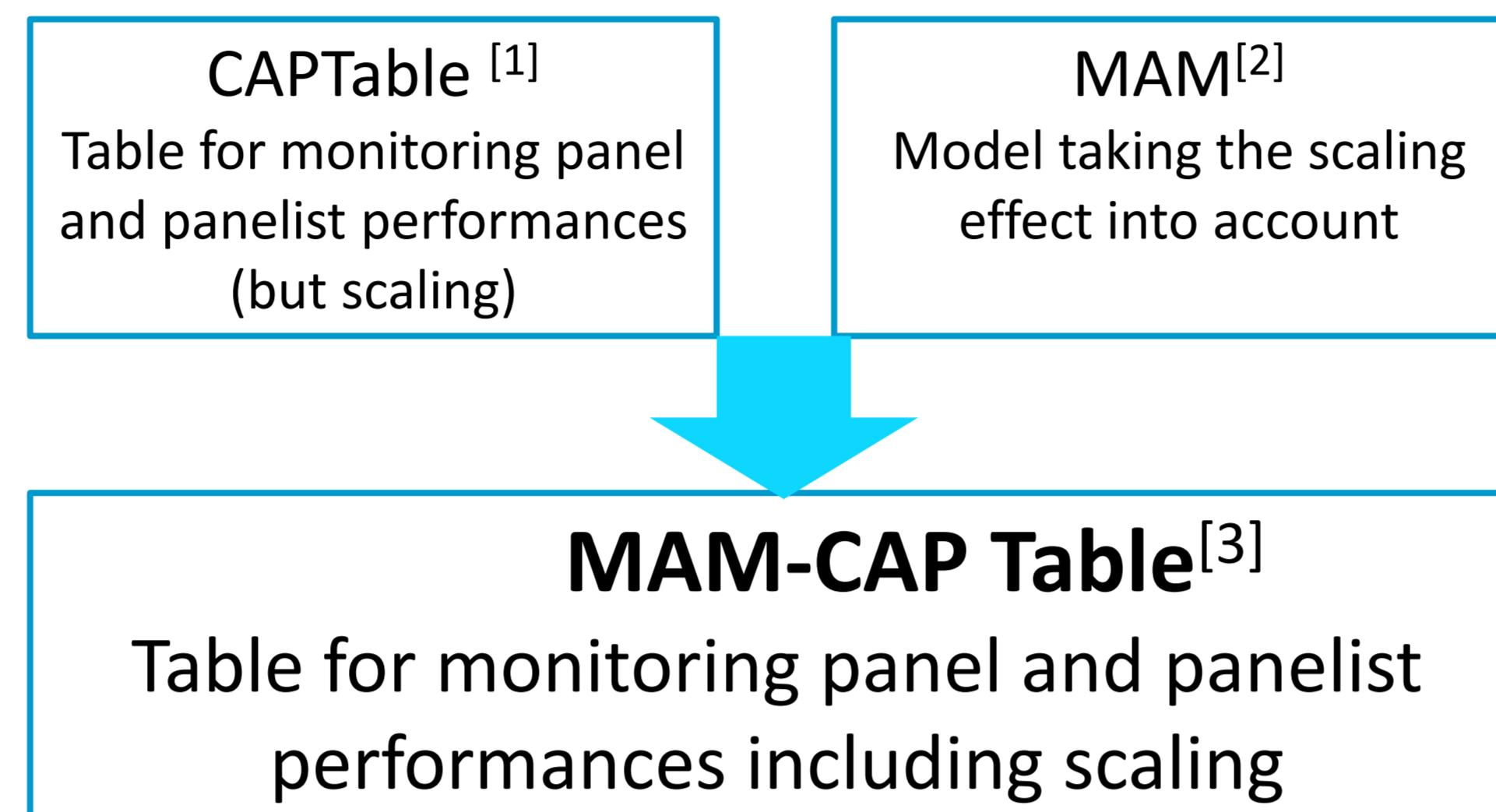
INTRODUCTION

Objective: Propose a tool for monitoring panel and panelist performances (including scaling)

PERFORMANCES

- ✓ **Discrimination:** finding product differences
- ✓ **Agreement:** agreeing with the panel on product differences
- ✓ **Repeatability:** giving the same scores to the same products
- ✓ **Scaling:** using a larger/smaller part of the scale than the panel

THE MAM-CAP TABLE



PERFORMANCE TESTS

	For panel	For panelist i
Discrimination (F-Prod)	$\frac{MS_{product}}{MS_{disag}}$	$\frac{SS_{product}^i / (J-1)}{SS_{error}^i / (K-1)}$
Scaling (F-Scal)	$\frac{MS_{scaling}}{MS_{disag}}$	$\frac{SS_{scaling}^i / 1}{SS_{disag}^i / (J-2)}$
Disagreement (F-Disag)	$\frac{MS_{disag}}{MS_{error}}$	$\frac{SS_{disag}^i / (J-2)}{SS_{error}^i / (K-1)}$
Repeatability	MS_{error}	$(1-1) \frac{MS_{error}^i}{\sum_{i \neq i'} MS_{error}^i}$

ⁱ number of subjects, ^J number of products, ^K number of replicates; MS_{effect} Mean Square of the related effect, MS_{effect}^i Mean Square of the related effect restricted to the panelist i

HOW TO USE THE MAMCAP R PACKAGE

GETTING THE MAMCAP PACKAGE

- ✓ Download the MAMCAP.zip package from www.timesens.com (account required)
- ✓ In R, get into "Packages/Install from zip file" and choose MAMCAP.zip
- ✓ Enter `library(MAMCAP)` in the R command lines

READING DATA

- ✓ Your dataset (data) has to be in this format:

product	subject	rep	attribute 1	...	attribute p
Product 1	Subject 1	1	2		2

- ✓ Read your data in R: `data=read.csv("Data.csv")`

GETTING THE MAM-CAP TABLE

- ✓ Enter in the R command prompt:
`CAPTable(data)`
- ✓ The MAM-CAP Table is built as an html file in your working directory

THE MAM-CAP TABLE ON A COFFEE EXAMPLE (16 PRODUCTS, 10 SUBJECTS, 3 REPLICATES, 6 ATTRIBUTES)

	PANEL PERFORMANCES					PANELIST PERFORMANCES							
	Mean	(a) F-Prod	(b) F-Scal	(c) F-Disag	(d) RMSE	S8	S2	S10	S3	S4	S7	S9	S6
BURN (Odor)	46.13	29.12	4.65	0.79	16.84	--	<-->	--	--	--	<-->	<-- r>	r
BURN (Flavor)	42.36	21.79	6.65	0.89	16.57	>--<	<-->	--	--	<-->	><	<-->	r
BITTER (Taste)	44.27	20.02	5.19	0.87	16.72	>--<	<-- r>	--	>--<	--	<-->	-- r	r
ACIDITY (Taste)	32.41	8.47	4.19	1.29	17.19	--	<-- r>	><	--	<-->	r		r
ACIDITY (Odor)	24.5	5.44	2.39	1.16	16.32		<-->	><	-	--		r	< r>
WOOD (Odor)	13.73	0.59	0.82	1.86	8.4	--	r		--		-- r	r	
F Rank	-	-	-	-	-	2.83	3.67	3.83	4.83	4.83	5.83	7	9.5

Attributes are sorted according to their discrimination (F-prod)

Subjects are sorted according to their F-Rank* (averaged rank of individual F-Prod over descriptors)

LEGEND

Panel performances

F-Prod	F-Scal	F-Disag
p>0.05	p<0.05	p<0.05
p<0.05	p>0.05	p>0.05

Panelist performances

Scaling
 < > : the panelist spreads more his scores than the panel
 | | : the panelist spreads his scores the same as the panel
 > < : the panelist spreads less his scores than the panel

Discrimination and agreement

---: panelist discriminative (p < 0.01)
 --: panelist discriminative (p < 0.05)
 -: panelist discriminative (p < 0.1)
 : : panelist not discriminative

When the panelist is discriminative, is he in agreement with the panel?
 YES NO

Repeatability:

The presence of "lr" in the cell indicates that the panelist is less repeatable than the panel

INTERPRETATION FOR THE ATTRIBUTE BURN (ODOR)

- (a) Is the panel discriminative? **YES**
- (b) Is there an heterogeneity of scaling in the panel? **YES**
- (c) Is the panel in agreement? **YES**
- (d) Is the panel repeatable? No test but magnitude with RMSE (Root Mean Square of Error)

INTERPRETATION FOR THE PANELIST S2

- ✓ Is the panelist in agreement and discriminant? (e) **YES**
- ✓ Does he use the scale like the panel? **NO**: The presence of < > in the cell indicates that he spreads more his scores than the panel
- ✓ Is he repeatable? **YES** (absence of the letters lr in the cell)

OPTIONS WITH MAMCAP

OBTAINING THE CLASSICAL CAP TABLE

- ✓ The classical CAPTable can be obtained by entering:
`CAPTable(data, option="CAP")`
- ✓ It can be relevant when MAM can not be used:
 - ✓ when the dataset is not balanced
 - ✓ when the dataset contains one or two products only

ALTERNATIVE TO THE DISAGREEMENT TEST OF THE MAMCAP TABLE

- ✓ The disagreement panelist test consists in comparing disagreement with no-repeatability. Thus a panelist highly repeatable would have greater chance to be in disagreement with the panel. To leverage this issue, the correlations tests are also proposed with the parameter `correlationTest`:
`CAPTable(data, correlationTest="Pearson")` or `"Kendall"`

CONCLUSION

The MAMCAP Package is a complete tool for monitoring his panel performances in one single table

References:

- [1] Schlich, P., (1997) CAP: une méthode et un outil de contrôle rapide et synthétique des performances des sujets en évaluation sensorielle descriptive (Agrostats)
- [2] Brockhoff, P. B., Schlich, P., Skovgaard, I. Taking individual scaling differences into account by analyzing profile data with the Mixed Assessor Model (2015) FQP 39 156-166
- [3] Peltier, C.; Brockhoff, P. B., Visalli, M., Schlich, P., (2014) The MAM-CAP Table: A new tool for monitoring panel performances. FQP 32A 24-27