



Syddansk Universitet

Reproducibility of Rate-all-that-apply (RATA) with semi-trained assessors

Giacalone, Davide ; Ingholt Hedelund, Pia

Publication date:
2016

Document version
Final published version

Citation for pulished version (APA):

Giacalone, D., & Ingholt Hedelund, P. (2016). Reproducibility of Rate-all-that-apply (RATA) with semi-trained assessors. Poster session presented at The 2nd Asian Sensory and Consumer Research Symposium, Shanghai, China.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal ?

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

REPRODUCIBILITY OF RATE-ALL-THAT-APPLY (RATA) WITH SEMI-TRAINED ASSESSORS

Davide Giacalone^{1,*}, Pia Ingholt Hedelund²

¹University of Southern Denmark, ²Danish Technological Institute

* Presenting author: dg@iti.sdu.dk

Background

Rate-all-that-apply (RATA) is a variant of check-all-that-apply (CATA) questions that allows assessor to rate the intensity of selected attributes. Compared to CATA, RATA has been reported to improve sample description and discrimination, and is more appropriate when only a small number of assessors are available. Before advocating its use with confidence, investigations on the method validity and reproducibility are necessary.

Method

This work examined the reproducibility of results obtained elicited by RATA within a test-retest paradigm, drawing on data from a relevant case study involving sensory assessment of common defects in chocolate production (Table 1) by a panel of semi-trained assessors (N=11) over four replicated evaluations. Criteria considered were 1) within-assessors reproducibility, 2) attribute stability, and 3) configurational agreement between perceptual spaces obtained across replicates. The former two criteria were evaluated by means of (univariate) reproducibility indices, while the latter by Multiple Factor Analysis (MFA).

Results

Within-assessors reproducibility was moderate, with reproducibility indices spanning a range between 0.66 and 0.45 (Table 2). The mean value was 0.55, indicating that on average 55% of the terms (36 out of 65) were used reliably across all four replicates. Stability indices for individual attributes spanned a large range of values, 38 out of 65 reproducible at or above 50% (data not shown). RATA showed a very good reproducibility at panel level indicated by the high configurational agreement between product maps obtained from individual replicates (Figure 1). RV coefficients between configurations obtained from individual replicates ranged from 0.81 to 0.97 (Mean=0.87) when considering two MFA dimensions, and between 0.79 and 0.91 (Mean=0.83) when considering four MFA dimensions, indicating a high degree of configurational similarities (Table 3).

Conclusion

In conclusion, these results indicate that RATA is a valid and reliable sensory profiling tool. Its inherent characteristics make it particularly advantageous in industrial contexts where small semi-trained panels (e.g. of co-workers) are most readily available, but where the time or the budget for sensory evaluation is often limited.

Table 1. Description of the chocolate samples used in the study. Samples "B-1" and "B-2" came from the same production batch and were used as blind duplicates. The same sample is also the standard to which the defects (samples D, E, F, G, H) relate.

Product codes	Cocoa content (%)	Description
A	57	Standard recipe
B-1	70	Standard recipe
B-2	70	Standard recipe
C	80	Standard recipe
D	70	Defect sample obtained by storing the chocolate under temperature fluctuation, resulting in so-called "bloomed" chocolate (Briones & Aguilera, 2005)
E	70	Defect sample obtained by addition of extra lecithin (4g per 100g chocolate mass)
F	70	Defect sample obtained by overly roasting the cocoa nibs
G	70	Defect sample obtained by skipping the "conching" process (Beckett, 2009)
H	70	Defect sample obtained by prolonged conching (twice the time as normal production for sample B)

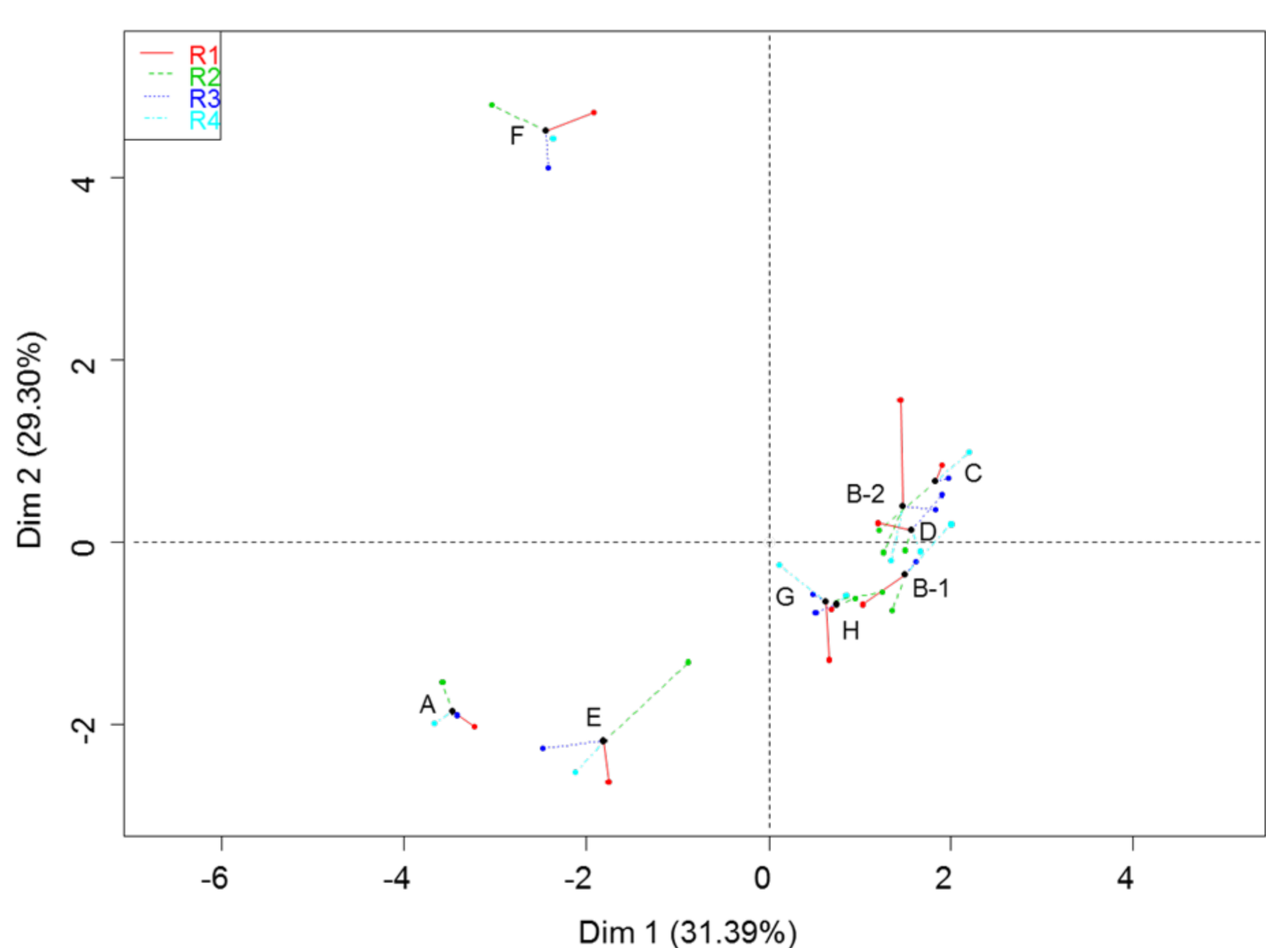
Table 2. Assessors' reproducibility index (range from 0 to 1, where 1= perfect reproducibility), global as well as by samples. †Denotes the mean of reproducibility indices computed separately for each couple of replicates.

	Global (4 reps.)	Global (Avg.)†	A	B-1	B-2	C	D	E	F	G	H
A1	0.66	0.81	0.68	0.72	0.70	0.68	0.63	0.55	0.66	0.68	0.68
A2	0.48	0.68	0.61	0.54	0.51	0.49	0.43	0.48	0.45	0.40	0.49
A3	0.64	0.79	0.61	0.60	0.68	0.66	0.58	0.63	0.71	0.63	0.64
A4	0.46	0.67	0.66	0.35	0.46	0.43	0.41	0.32	0.49	0.57	0.46
A5	0.63	0.76	0.69	0.61	0.71	0.57	0.60	0.62	0.57	0.68	0.65
A6	0.54	0.71	0.62	0.62	0.54	0.55	0.54	0.45	0.48	0.55	0.52
A7	0.45	0.66	0.48	0.45	0.38	0.46	0.38	0.40	0.74	0.46	0.37
A8	0.56	0.72	0.58	0.49	0.51	0.52	0.49	0.57	0.77	0.54	0.60
A9	0.47	0.67	0.57	0.49	0.32	0.43	0.49	0.46	0.60	0.46	0.40
A10	0.57	0.75	0.58	0.63	0.60	0.54	0.57	0.60	0.55	0.52	0.57
A11	0.63	0.78	0.65	0.62	0.71	0.62	0.66	0.57	0.72	0.55	0.65
Mean	0.55	0.72	0.61	0.56	0.56	0.54	0.52	0.51	0.61	0.55	0.55

Table 3. RV coefficients quantifying the similarities between sample configurations from individual replicates considering 2, 4 or all MFA dimensions.

	RV (2 MFA dims.)	RV (4 MFA dims.)	RV (All MFA dims)
R1 vs. R2	0.81	0.81	0.70
R1 vs. R3	0.90	0.86	0.76
R1 vs. R4	0.87	0.81	0.66
R2 vs. R3	0.85	0.80	0.81
R2 vs. R4	0.85	0.79	0.73
R3 vs. R4	0.97	0.91	0.85

Figure 1. First and second MFA dimensions showing consensus sample configuration with superimposed partial configurations from individual replicates.



Reference: Giacalone, D., & Hedelund, P. I. (2016). Rate-all-that-apply (RATA) with semi-trained assessors: An investigation of the method reproducibility at assessor-, attribute- and panel-level. *Food Quality and Preference*, 51, 65-71.

