

Panel and panelist agreement in studies of TDS

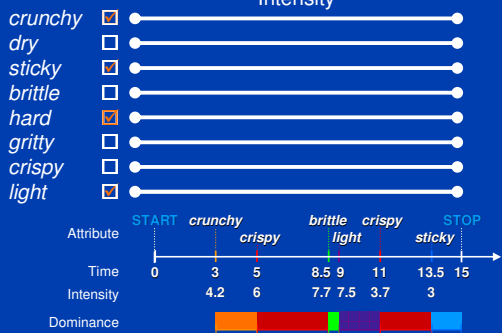
Michael Meyners



Introduction to TDS and prework

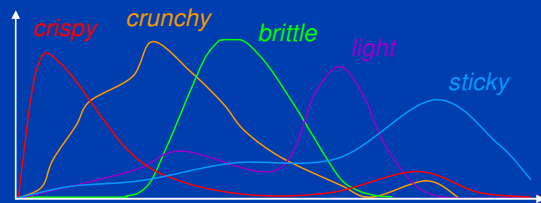


Temporal Dominance of Sensations

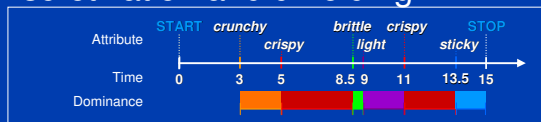


TDS curves

- one product
- all attributes



Discretization and unfolding



time	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
brittle	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
crispy	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0
crunchy	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0
dry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
gritty	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
hard	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
light	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
sticky	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1

Statistical inference

time	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
brittle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
crispy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
crunchy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
dry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
gritty	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
hard	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
light	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
sticky	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

- averages over replications
- (Euclidean) distance between matrices
- (Euclidean) distance between vectors
- difference between real numbers

Tests for panel performance

Panel performance

- panel disagreement:
assessor * product interaction
- randomization test:
permute sessions between assessors
- test statistic:
squared mean difference by pairs
of products, summed over assessors
- required: replications

judge	replicate	x_1	x_2	$x_1 - x_2$	Z_j	Z_j^2
1	1	1	0	1	2	4
	2	1	0	1	2	4
2	1	1	1	0	0	0
	2	0	0	0	0	0
3	1	1	0	1	2	4
	2	1	0	1	2	4
4	1	0	1	-1	-1	1
	2	0	0	0	-1	1
5	1	0	1	-1	-2	4
	2	0	1	-1	-2	4

$Z = 13$

judge	replicate	x_1	x_2	$x_1 - x_2$	Z_j	Z_j^2
1	1	1	0	1	2	4
	2	1	0	1	2	4
2	1	1	1	0	0	0
	2	0	0	0	0	0
3	1	1	0	1	2	4
	2	1	0	1	2	4
4	1	0	1	-1	-1	1
	2	0	0	0	-1	1
5	1	0	1	-1	-2	4
	2	0	1	-1	-2	4

$Z = 13$

judge	replicate	x_1	x_2	$x_1 - x_2$	Z_j	Z_j^2
1	1	0	1	-1	0	0
	2	1	0	1	0	0
2	1	1	1	0	0	0
	2	0	0	0	0	0
3	1	1	0	1	2	4
	2	1	0	1	2	4
4	1	0	1	-1	-1	1
	2	0	0	0	-1	1
5	1	1	0	1	0	0
	2	0	1	-1	0	0

$Z = 5$

Randomization test

- under H_0 :
only random differences between panelists
- re-assignment of sessions to assessors:
interaction (Z) fluctuates randomly
- observed interaction not “suspiciously”
large
- important: proper randomization

Randomization test Individual performance

- same concept
- keep one panelist separate
- consider all others as “the same”

13

judge	replicate	x_1	x_2	$x_1 - x_2$	Z_j	Z_j^2
1	1	1	0	1	2	4
	2	1	0	1		
2	1	1	1	0		
	2	0	0	0		
3	1	1	0	1		
	2	1	0	1		
4	1	0	1	-1	-1	1
	2	0	0	0		
5	1	0	1	-1		
	2	0	1	-1		

Z = 5

14

Randomization test Panel performance on TDS data

- use
 - distances between matrices
 - averages of matrices
- apply same concepts

15

Example

Example

- 6 wheat flakes (WF)
- 8 attributes
- 24 panelists evaluated in duplicate
- 2 panelists evaluated once
- 101 time points

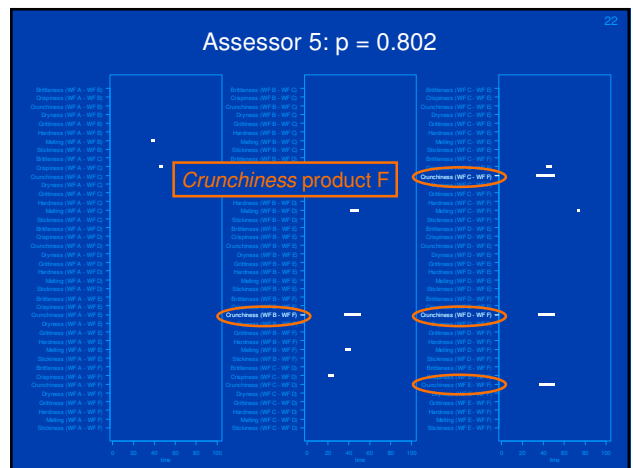
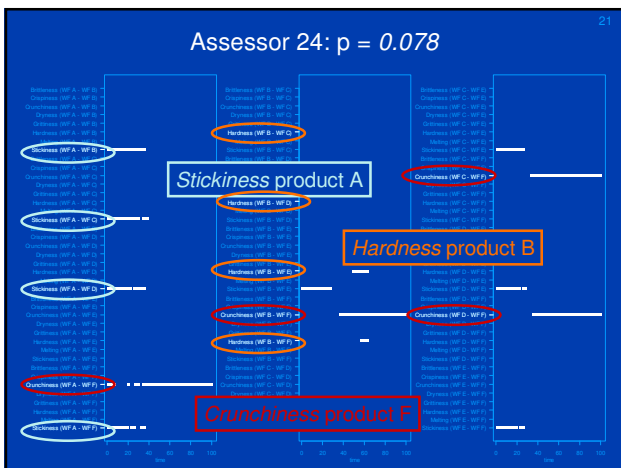
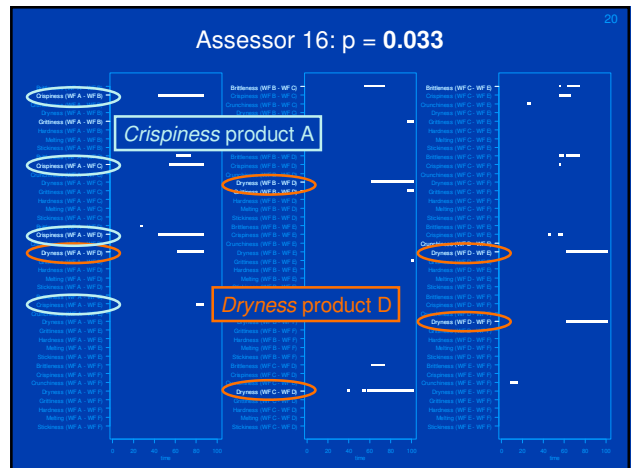
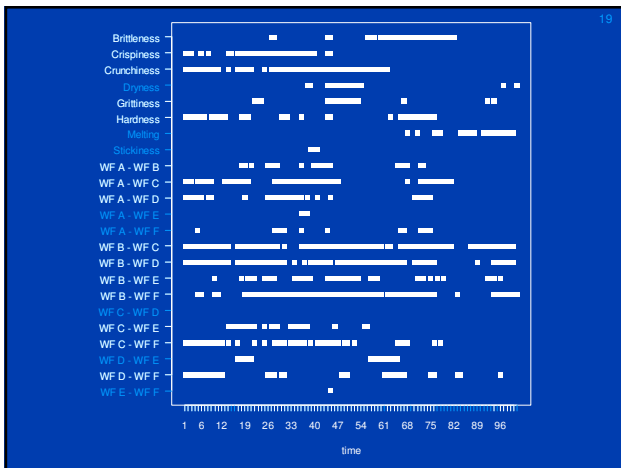
17

Individual performances

	p value		p value		p value
Ass 1	0.214	Ass 10	0.051	Ass 19	0.047
Ass 2	0.262	Ass 11	0.355	Ass 20	0.393
Ass 3	0.113	Ass 12	0.165	Ass 21	0.043
Ass 4	0.444	Ass 13	0.093	Ass 22	0.485
Ass 5	0.802	Ass 14	0.320	Ass 23	0.980
Ass 6	0.181	Ass 15	0.123	Ass 24	0.078
Ass 7	0.642	Ass 16	0.033	Ass 25	0.680
Ass 8	0.362	Ass 17	0.042	Ass 26	0.218
Ass 9	0.257	Ass 18	0.011		

overall p value: 0.001

18



- 23
- ## References
- Meyners M (2010). Panel and panelist agreement in studies of Temporal Dominance of Sensations. *Food Quality and Preference*, submitted.
 - Meyners M & Pineau N (2010). Statistical inference for Temporal Dominance of Sensations data using randomization tests. *Food Quality and Preference*, in press.

