FDE443 SENSORY ANALYSIS

Lesson-11

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Difference Tests- Duo-Trio Test

- ✓The Duo-trio test is statistically inefficient compared with the Triangle test
  - ✓the chance of obtaining a correct result by guessing is 1 in 2 in Duo-Trio test.
- ✓On the other hand, the test is simple and easily understood.
- ✓ It has the advantage that a reference sample is presented which avoids confusion with respect to what constitutes a difference.

Difference Tests- Duo-Trio Test

✓This method is particularly useful in situations:

1. To determine whether product differences result from a change in ingredients, processing, packaging, or storage

2. To determine whether an overall difference exists, where no specific attributes can be identified

Difference Tests- Duo-Trio Test

- ✓Present to each subject an identified reference sample, followed by two coded samples, one of which matches the reference sample.

- ✓Ask subjects to indicate which coded sample matches the reference. Count the number of correct replies and refer to statistics Table for interpretation.

TEST SUBJECTS

- ✓Select, train, and instruct the subjects

- ✓As a general rule, the minimum is 16 subjects. Discrimination is much improved if 32, 40, or a larger number can be employed.

Critical Number of Correct Responses in a Duo-Trio Test

- Entries are the minimum number of correct responses required for significance at the stated α-level (i.e., column) for the corresponding number of respondents, *n* (i.e., row).
- Reject the assumption of "no difference" if the number of correct responses is greater than or equal to the tabled value.

	a						
n	0.40	0.30	0.20	0.10	0.05	0.01	0.001
2	2	2	—	—	—	—	—
3	3	3	3	—	—	—	—
4	3	4	4	4	—	—	—
5	4	4	4	5	5	—	—
6	4	5	5	6	6	—	—
7	5	5	6	6	7	7	—
8	5	6	6	7	7	8	—
9	6	6	7	7	8	9	—
10	6	7	7	8	9	10	10
11	7	7	8	9	9	10	11
12	7	8	8	9	10	11	12
13	8	8	9	10	10	12	13
14	8	9	10	10	11	12	13
15	9	10	10	11	12	13	14
16	10	10	11	12	12	14	15
17	10	11	11	12	13	14	16
18	11	11	12	13	13	15	16
19	11	12	12	13	14	15	17
20	12	12	13	14	15	16	18
21	12	13	13	14	15	17	18
22	13	13	14	15	16	17	19
23	13	14	15	16	16	18	20
24	14	14	15	16	17	19	20
25	14	15	16	17	18	19	21
26	15	15	16	17	18	20	22
27	15	16	17	18	19	20	22
28	16	16	17	18	19	21	23
29	16	17	18	19	20	22	24
30	17	17	18	20	20	22	24

	a						
n	0.40	0.30	0.20	0.10	0.05	0.01	0.001
31	17	18	19	20	21	23	25
32	18	18	19	21	22	24	26
33	18	19	20	21	22	24	26
34	19	20	20	22	23	25	27
35	19	20	21	22	23	25	27
36	20	21	22	23	24	26	28
40	22	23	24	25	26	28	31
44	24	25	26	27	28	31	33
48	26	27	28	29	31	33	36
52	28	29	30	32	33	35	38
56	30	31	32	34	35	38	40
60	32	33	34	36	37	40	43
64	34	35	36	38	40	42	45
68	36	37	38	40	42	45	48
72	38	39	41	42	44	47	50
76	40	41	43	45	46	49	52
80	42	43	45	47	48	51	55
84	44	45	47	49	51	54	57
88	46	47	49	51	53	56	59
92	48	50	51	53	55	58	62
96	50	52	53	55	57	60	64
100	52	54	55	57	59	63	66
104	54	56	57	60	61	65	69
108	56	58	59	62	64	67	71
112	58	60	61	64	66	69	73
116	60	62	64	66	68	71	76
122	63	65	67	69	71	75	79
128	66	68	70	72	74	78	82
134	69	71	73	75	78	81	86
140	72	74	76	79	81	85	89

Difference Tests- Two-out-of-Five Test

SCOPE AND APPLICATION

- ✓ Statistically very efficient
  - ✓ the chances of correctly guessing two out of five samples are 1 in 10, as compared with 1 in 3 for the Triangle test.

- ✓ Use this method when the test objective is to determine whether a sensory difference exists between two samples, and particularly when only a small number of subjects is available (e.g., ten).

Difference Tests- Two-out-of-Five Test

PRINCIPLE OF THE TEST

- ✓Present to each subject five coded samples.
- ✓ Instruct subjects that two samples belong to one type and three to another.
- ✓Ask the subjects to taste (feel, view, examine) each product from left to right and select the two samples that are different from the other three.
- ✓Count the number of correct replies and refer to statistics Table for interpretation.

TEST SUBJECTS

- ✓Select, train, and instruct the subjects. Generally 10 to 20 subjects are used.
- ✓As few as five to six may be used when differences are large and easy to spot. Use only trained subjects.

Difference Tests- Two-out-of-Five Test

TEST PROCEDURE

- ✓If the number of subjects is other than 20, select the combinations at random from the following, taking equal numbers of combinations with 3 A's and 3 B's:

AAABB ABABA BBBAA BABAB
AABAB BAABA BBABA ABBAB
ABAAB ABBAA BABBA BAABB
BAAAB BABAA ABBBA ABABB
AABBA BBAAA BBAAB AABBB

Difference Tests- “A” – “not A” Test

SCOPE AND APPLICATION

- ✓Use this method
  - ✓when the test objective is to determine whether a sensory difference exists between two products
  - ✓particularly when these are unsuitable for dual or triple presentation, i.e., when the Duo-trio and Triangle tests cannot be used
- ✓Examples of such situations;
  - ✓comparisons of products with a strong and/or lingering flavor, samples which need to be applied to the skin in half-face tests, products which differ slightly in appearance, and samples which are very complex stimuli and are mentally confusing to the panelists.

Difference Tests- “A” – “not A” Test

SCOPE AND APPLICATION

- ✓ Use the “A” – “Not A” test when one of the two products has importance as a standard or reference product, is familiar to the subjects, or is essential to the project as the current sample against which all others are measured.

- ✓ As with other overall difference tests, the “A” – “Not A” test is effective in situations:

1. To determine whether product differences result from a change in ingredients, processing, packaging, or storage

2. To determine whether an overall difference exists, where no specific attribute(s) can be identified as having been affected

Difference Tests- “A” – “not A” Test

PRINCIPLE OF THE TEST

- ✓Familiarize the panelists with samples “A” and “not A.”
- ✓Present each panelist with samples, some of which are product “A” while others are product “not A” for each sample the subject judges whether it is “A” or “not A.”
- ✓Determine the subjects’ ability to discriminate by comparing the correct identifications with the incorrect ones using the χ^2 test.

Difference Tests- “A” – “not A” Test

TEST SUBJECTS

- ✓ Train 10 to 50 subjects to recognize the “A” and the “not A” samples.

- ✓ Use 20 to 50 presentations of each sample in the study.

  - ➢ Each subject may receive only one sample (“A” or “not A”), two samples (one “A” and one “not A”), or
  - ➢ Each subject may test up to ten samples in a series.

Difference Tests- “A” – “not A” Test

TEST PROCEDURE

- ✓Present samples with scoresheet one at a time.
- ✓Code all samples with random numbers and present them in random order so that the subjects do not detect a pattern of “A” vs. “not A” samples in any series.

Difference Tests- Directional Difference Test: Comparing Two Samples

- ✓Use this method when the test objective is to determine in which way a particular sensory characteristic differs between two samples
- ✓The Paired Comparison test or the 2-AFC (2-Alternative Forced Choice) test
- ✓One of the simplest and most used sensory tests
  - ✓the chance of guessing is 50%

Difference Tests- Directional Difference Test: Comparing Two Samples

- ✓Present to each subject two coded samples.
- ✓Prepare equal numbers of the combinations A/B and B/A
- ✓Ask the subject to taste the products from left to right and fill in the scoresheet.
- ✓Because of the simplicity of the test, it can be conducted with subjects who have received a minimum of training.

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Paired Comparison Test