

Research Article

Odour and Salt Taste Identification in Older Adults: Evidence from the Yakumo Study in August, 2016

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Abstract

We performed taste and olfactometry in Yakumo-cho inhabitants examination in 2015 and reported the result in *Advances in Sciences and Engineering* 2017. This study examined the relationship between olfactory function and taste function as same as last report. A personal function test was calculated from the Yakumo study database, and the odour stick identification test and salt taste identification test were administered to healthy elderly people. The participants were community dwellers who voluntarily participated in the Yakumo Study and had managed everyday life by themselves. We performed a questionnaire survey for each participant to evaluate the salivation condition, the sense of odour identification and favourite taste in their daily life as same as 2015. And we performed new questionnaire survey for each participant to the sense of taste recognition and intake frequency of the eating out. We compared the answers of female participants with that of male participants and found that recognition of salivation and odour identification were better in female participants than in male participants. The results showed that the performance score on odour identification test was better in female participants than male participants. The results of the salt

taste identification test showed that the recognition of salt density was lower in female participants than in male participants. These results were about the same with 2105. Because taste and olfactory cognitive abilities decline with age, the development of meals for the elderly requires a new approach. Particularly, sense of smell test and odour test results of 60-70s worsens in comparison with 40-50s. From the above-mentioned thing, meals for the elderly should be healthy, with a strong fragrance and a light taste of salt.

Keywords

Healthy Elderly People; Olfactory Function; Taste Function; Yakumo Study

Introduction

Japan is aged society. The Japanese Government uses a large amount of fund for the care of the elderly person. The elderly person is often cared for at home. It is expected in future that care service business for elderly people increases. Although, meals

are consumed everyday, the elderly have a low appetite, and the quantity of the meal may decrease as well. Therefore, the body composition state worsens. It is necessary to think about preparing meals that an elderly person will enjoy eating; hence, we need to check the salt taste and olfactory sensitivity of the elderly. Attention is necessary about the meal of the elderly person. The elderly person may have dysphagia. The elderly person may have a decline in taste and sense of smell. In addition, the elderly person may be infected with various diseases. Therefore, the elderly person takes much medicine. The elderly person may get an obstacle in taste and sense of smell by a side effect of medicine. There is a concern that with increasing age, individuals would soon be unable to identify through the sense of smell. Furthermore, nasal congestion and olfactory disorders occurring after inflammation that are caused by allergic rhinitis, modern-day hay fever, common colds and air pollution also inhibit the sense of smell [1,2,3]. The odour and taste of food are intimately related [4], where our appreciating palate is formed by a combination of olfaction (olfactory sense) and gustation (gustatory sense). Such a combination of smell and taste, constitute a part of the flavour and is an important element in the appreciation of food. Signals traveling from the olfactory bulb to other brain areas where signals are interpreted and odors recognized [5]. The medial aspect of the temporal lobe that remembers smells is also stimulated at this point, and the brain can identify the odour based on a memory of previously experienced smells. In other words, smell identification requires an already-accumulated set of experienced smells [6,7]. Both olfaction and gustation start to decline in humans around the age of 50-59 years, with 40% of the elderly experiencing a noticeable decline [8]. A person's first awareness of decline in olfaction as our primary dependence for identification of flavour occurs when one is unable to distinguish foods by flavor alone. Olfaction also performs an important and essential role in our ability to detect dangers, including the smell of leaking gas, the burning odour of fire, and the putrid smell of rotten food. Olfaction is also responsible for enrichment and psychological stimulation in our everyday lives, such as with the scents and smells of foods and flowers [9]. In an already aged society, healthy olfaction is a necessary part of creating a safe and fertile living environment and for improving an individual's quality of life.

Considering these circumstances, this study aims to understand the age-related decline in olfactory and taste function in participants aged 40-49 years, 50-59 years, 60-69 years, 70-79 years, and 80-89 years. We identified the odours and taste particularly difficult to distinguish for individuals of these age groups. This might help draw attention to issues faced by individuals in their daily lives and facilitate improvement in their quality of life.

Material and Methods

Participants

The participants were community dwellers who voluntarily participated in the Yakumo Study and had managed their everyday life themselves. The Yakumo Study has been conducted since 1981 as a joint project between the town of Yakumo in Hokkaido and the Nagoya University Graduate School of Medicine.

Professionals in the fields of epidemiology, internal medicine, orthopedics, neuropsychology, ophthalmology, otolaryngology, and urology have joined to the Yakumo Study. The analysed data here were based upon the database from 2016 from the neuropsychology and otolaryngology teams. The participants had been engaged in a variety of jobs, not only white collar but also in agriculture, fishery, and forestry. Therefore, this town can be regarded as representative of today's Japanese society. We participated in Yakumo-cho inhabitants examination carried out in August, 2016. This data was results carried out in August, 2016. The participant was 481 people (219 men, woman 262 participated). (Table 1)

Assessment of Daily Life

Before we conducted our examination of odour and taste, we performed the questionnaire survey. The questionnaire included the questions based on smell recognition, taste recognition, salivation, intake frequency of the eating out and favourite taste of daily life. Participant completed the questionnaire themselves. The participant also provided their height and weight for a questionnaire.

We performed questionnaire survey to know the daily life. The question content is as follows.

1. Can you recognize a smell? Please add a circle to an answer.
Good, Slightly good, Slightly bad, Bad
2. Can you recognize a taste? Please add a circle to an answer.
Good, Slightly good, Slightly bad, Bad
3. Does saliva secrete it well? Please add a circle to an answer.
Good, Slightly good, Slightly bad, Bad
4. Which applies to the preference of the everyday salty seasoning? Please add a circle to an answer.
Light, Slightly light, Slightly strong, Strong
5. How often do you eat out? Please add a circle to an answer.
Every day, 4-5 days a week, 2-3 days a week, one day a week, 2-3 days a month, hardly use

Assessment of Odour Identification

The Odour Stick Identification Test (OSIT-J) was used to assess odour perception. This test possesses high reliability and validity [10]. The OSIT-J includes 12 different odorants to be identified. As odour perception is not necessarily culture-free, the Japanese version was employed [11]. The basic procedure resembles that of the San Diego Odour Identification Test [12]. The aromas used in the OSIT-J includes curry, perfume, Japanese cypress, India ink, menthol, rose, wood, nattou/sweat socks, roasted garlic, condensed milk, gas for cooking, and Japanese mandarin aromas. Each fragrance was enclosed in microcapsules made of melamine resin. These microcapsules were mixed with an odourless

solid cream and then shaped to look like a lipstick. During the inspection test, the examiner applied each odorant to a piece of paraffin paper. After application, the examiner handed the paper to the participant, who would then sniff the paper and identify the odour. Participants selected each answer from a set of cards, each of which listed the name of an odorant, including the correct answer. Each correct answer was scored as one point, with the total performance score ranging from 0 to 12 points. We defined it as follows: normal range as more than 6 points, borderline as 3 - 5 points, and abnormal as less than 2 points.

Assessment of Salt Taste Identification

The gustatory test was performed using test paper SALSAVE (ADVANTEC Co. Ltd.), which include 7 different densities of NaCl on a test paper, as follows: 0.0 mg/cm², 0.6 mg/cm², 0.8 mg/cm², 1.0 mg/cm², 1.2 mg/cm², 1.4 mg/cm², and 1.6 mg/cm². The participant placed a test paper on the tongue and closed the mouth to feel the taste. We inspect it from the light taste. When the participant understood that there is taste is de-

tection. When participant might be said that it is saltiness is the recognition. Firstly, the participant rides 0.0% of test papers on the tongue and checks taste. The participant learns the taste of the test paper. Participant checks taste on a tongue from a test paper having a low density of NaCl sequentially afterward. There is the report that detection of salt taste is more important than recognition to salt taste [13]. We defined it as follows: normal range as 0.6% - 1.0%, border as 1.2% - 1.4%, and abnormal as 1.6% - more than 1.6%.

Ethical Review Board

This study was conducted with the approval of the Ethical Review Board (Nagoya women's university 'hito wo mochiita kennkyuu ni kansuru iinnkai'). The approval number is 27-11.

Results

Assessment of Daily Life

We obtained the height and weight data by a questionnaire from each participant (Table 2).

Participants	40 Generations	50 Generations	60 Generations	70 Generations	80 Generations
Total	58(12.1%)	89(18.5%)	58(21.6%)	58(20.6%)	58(5.6%)
Male	20(4.2%)	25(7.3%)	20(21.6%)	20(9.6%)	20(2.9%)
Female	38(7.9%)	54(11.2%)	38(21.6%)	38(11.0%)	38(2.7%)

Table 1: Yakumo study inhibit tents examination percipient 2016 (n=481)

Sex	Age	Height(cm)	Weight(kg)	BMI(kg/m/n)
Buth(n=481)	63±11	158±8	59±11	23±4
male(n=219)	65±10	164±12	66±10	24±3
female(n=262)	62±11	154±6	54±9	23±4

Table 2: Body Composition of the inhabitants' examination participant 2016 (yakumo study n=481)

Furthermore, we investigated this in detail according to the age range (Cf. Tables 2.1 and 2.2).

Generation distinction	Age	Height(cm)	Weight(kg)	BMI(kg/m/n)
The 40 years old level (Male n=20)	45±3	168±6	70±11	25±3
The 50 years old level (Male n=35)	55±3	168±6	71±12	25±4
The 60 years old level (Male n=104)	65±3	165±6	65±10	24±3
The 70 years old level (Male n=46)	74±3	163±5	64±9	24±3
The 80 years old level (Male n=14)	84±3	160±7	61±7	24±3

Table 2.1: Body composition of the inhabitant's examination participant: generation distinction of Male 2016 (Yakumo study n=219)

Generation distinction	Age	Height(cm)	Weight(kg)	BMI(kg/m/n)
The 40 years old level (Male n=38)	45±3	158±5	55±10	23±4
The 50 years old level (Male n=54)	55±3	157±6	55±8	22±3
The 60 years old level (Male n=104)	65±3	153±5	54±9	23±4
The 70 years old level (Male n=53)	74±3	150±5	52±9	23±4
The 80 years old level (Male n=13)	84±3	148±4	51±6	23±3

Table 2.2: Body composition of the inhabitant's examination participant: generation distinction of Female 2016 (Yakumo study n=262)

We obtained data on the conscious sense of smell, taste, saliva distribution, intake frequency of the eating out, and favourite salty taste by a questionnaire from each participant (Cf. Tables 3, 3.1, 3.2, 4, 4.1, 4.2, 5, 5.1, 5.2, 6, 6.1, 6.2, 7, 7.1 and 7.2). Female participants thought that their sense of smell was in a good state than male participants. But, both participants thought that their salivation was in a good state. Regarding saltiness, female participants answered that their favourite salty taste is right taste than male participants. In a questionnaire of conscious taste, there was not the person who did not understand taste. It became clear that inhabitants of Yakumo-cho had few ratios of person who ate out. From the result according to the generation, it was revealed that a woman had better sense of smell than a man consciously.

	The olfactory cognitive situation				
	Good	Slightly good	Slightly bad	Bad	No answer
Both(n=481)	252(52.4%)	189 (39.3%)	37 (7.7%)	0 (0.0%)	3 (0.6%)
male(n=219)	101 (46.1%)	91 (41.6%)	26 (11.9%)	0 (0.0%)	1 (0.5%)
femal(n=262)	151 (57.6%)	98 (37.4%)	11 (4.2%)	0 (0.0%)	2 (0.7%)

Table 3: The conscious sense of smell recognition situation 2016 (questionnaire answer)

	The olfactory cognitive situation				
	Good	Slightly good	Slightly bad	Bad	No answer
The 40s (Both n=20)	9(45.0%)	10(50.0%)	1(5.0%)	0 (0.0%)	0 (0.0%)
The 50s (Both n=35)	13(37.1%)	20(57.1%)	2(5.7%)	0 (0.0%)	0 (0.0%)
The 60s (Both n=104)	52(50.0%)	38(36.5%)	14(13.55)	0 (0.0%)	0 (0.0%)
The 70s (Both n=46)	21(45.7%)	18(39.1%)	7(15.2%)	0 (0.0%)	0 (0.0%)
The 80s (Both n=14)	6(42.9%)	5(35.7%)	2(14.3%)	0 (0.0%)	1(7.1%)

Table 3.1: The conscious sense of smell recognition situation of generation distinction 2016 (questionnaire answer: Male =219)

	The olfactory cognitive situation				
	Good	Slightly good	Slightly bad	Bad	No answer
The 40s (Both n=38)	23(60.5%)	14(36.8%)	1(1.7%)	0 (0.0%)	0 (0.0%)
The 50s (Both n=35)	31(57.0%)	21(38.9%)	2(3.7%)	0 (0.0%)	0 (0.0%)
The 60s (Both n=104)	61(58.7%)	40(38.5%)	2(1.9%)	0 (0.0%)	1(1.0%)
The 70s (Both n=46)	28(52.8%)	19(35.8%)	5(9.4%)	0 (0.0%)	1(1.9%)
The 80s (Both n=14)	8(61.5%)	4(30.8%)	1(7.7%)	0 (0.0%)	0 (0.0%)

Table 3.2: The conscious sense of smell re cognition situation of generation distinction 2016 (questionnaire answer: Female =262)

	The olfactory cognitive situation				
	Good	Slightly good	Slightly bad	Bad	No answer
Both (n=481)	158 (32.8%)	285 (59.3%)	29 (6.0%)	6 (1.2%)	3 (0.6%)
Male (n=219)	75 (34.2%)	135(61.6%)	7 (3.2%)	1 (0.5%)	1 (0.5%)
Female (n=262)	83 (31.7%)	150 (57.3%)	22 (8.4%)	5 (1.9%)	2 (0.7%)

Table 4: The conscious mark saliva distribution situation 2016 (questionnaire answer)

	The olfactory cognitive situation				
	Good	Slightly good	Slightly bad	Bad	No answer
The 40s (Both n=38)	10(26.3%)	24(63.2%)	3(7.9%)	1(2.6%)	0 (0.0%)
The 50s (Both n=35)	15(27.8%)	34(63.0%)	3(5.6%)	2(3.7%)	0 (0.0%)
The 60s (Both n=104)	35(33.7%)	56(53.8%)	11(10.6%)	1(1.0%)	1(1.0%)
The 70s (Both n=46)	22(41.5%)	27(50.9%)	3(5.7%)	0 (0.0%)	1(1.9%)
The 80s (Both n=14)	1(7.7%)	9(69.2%)	2(15.4%)	1(7.7%)	0 (0.0%)

Table 4.1: The conscious mark saliva distribution situation of generation distinction 2016 (questionnaire answer Male =219)

	The olfactory cognitive situation				
	Good	Slightly good	Slightly bad	Bad	No answer
The 40s (Both n=38)	5(25.0%)	14(70.0%)	1(5.0%)	0 (0.0%)	0 (0.0%)
The 50s (Both n=35)	14(40.0%)	21(60.0%)	0(0.0%)	0 (0.0%)	0 (0.0%)
The 60s (Both n=104)	38(36.5%)	64(59.3%)	1(1.0%)	1(1.0%)	0 (0.0%)
The 70s (Both n=46)	17(37.0%)	26(56.5%)	3(5.7%)	0 (0.0%)	0 (0.0%)
The 80s (Both n=14)	1(7.1%)	10(71.4%)	2(14.3%)	0 (0.0%)	1(7.1%)

Table 4.2: The conscious mark saliva distribution situation of generation distinction 2016 (questionnaire answer Female =262)

	The olfactory cognitive situation				
	Good	Slightly good	Slightly bad	Strong	No answer
Both (n=481)	90 (18.7%)	151 (31.4%)	178 (37.0%)	59 (12.3%)	3 (0.6%)
Male (n=219)	36 (16.4%)	54 (24.7%)	96 (43.8%)	31 (14.2%)	2 (0.9%)
Female (n=262)	54 (20.6%)	97 (37.0%)	82 (31.3%)	28 (10.7%)	1 (0.4%)

Table 5: The conscious sense of favorite salty taste 2016 (questionnaire answer)

	The olfactory cognitive situation				
	Good	Slightly good	Slightly bad	Bad	No answer
The 40s (Both n=20)	7(35.0%)	10(50.0%)	3(15.0%)	0(0.0%)	0 (0.0%)
The 50s (Both n=35)	6(17.1%)	18(51.4%)	8(22.9%)	3(8.6%)	0 (0.0%)
The 60s (Both n=104)	13(12.5%)	42(40.4%)	29(27.9%)	20(19.2%)	0 (0.0%)
The 70s (Both n=46)	5(10.9%)	21(45.7%)	10(21.7%)	10(21.7%)	0 (0.0%)
The 80s (Both n=14)	0(0.0%)	5(35.7%)	4(28.6%)	3(21.4%)	2(14.3%)

Table 5.1: The conscious sense of favorite salty taste of generation distinction2016 (questionnaire answer Male =219)

	The olfactory cognitive situation				
	Good	Slightly good	Slightly bad	Bad	No answer
The 40s (Both n=38)	4(10.55%)	17(44.7%)	11(28.9%)	6(15.8%)	0 (0.0%)
The 50s (Both n=54)	7(13.0%)	21(38.9%)	21(38.9%)	5(9.3%)	0 (0.0%)
The 60s (Both n=104)	14(13.5%)	27(26.0%)	42(40.4%)	21(20.2%)	0 (0.0%)
The 70s (Both n=53)	2(3.8%)	16(30.2%)	15(28.3%)	19(35.8%)	1(1.9%)
The 80s (Both n=13)	1(7.7%)	1(7.7%)	8(61.5%)	3(23.1%)	0 (0.0%)

Table 5.2: The conscious sense of favorite salty taste of generation distinction 2016 (questionnaire answer Female =262)

	The olfactory cognitive situation				
	Good	Slightly good	Slightly bad	Bad	No answer
Both (n=481)	257(53.5%)	194(40.4%)	29(6.0%)	0(0.0%)	0(0.0%)
Male (n=219)	99(45.4%)	98(45.0%)	21(9.6%)	0(0.0%)	0(0.0%)
Female (n=262)	158(60.3%)	96(36.6%)	8(3.1%)	0(0.0%)	0(0.0%)

Table 6: The conscious sense of taste recognition situation 2016 (questionnaire answer)

	The olfactory cognitive situation				
	Good	Slightly good	Slightly bad	Bad	No answer
The 40s (Both n=20)	8(40.0%)	12(60.0%)	0(0.0%)	0(0.0%)	0 (0.0%)
The 50s (Both n=35)	15(42.9%)	17(48.6%)	3(8.6%)	0(0.0%)	0 (0.0%)
The 60s (Both n=104)	52(50.0%)	40(38.5%)	12(11.5%)	0(0.0%)	0 (0.0%)
The 70s (Both n=46)	19(41.3%)	22(47.8%)	5(10.9%)	0(0.0%)	0(0.0%)
The 80s (Both n=13)	5(38.5%)	7(53.8%)	1(7.7%)	0(0.0%)	0 (0.0%)

Table 6.1: The conscious sense of taste recognition situation of generation distinction 2016 (questionnaire answer Male =218)

	The olfactory cognitive situation				
	Good	Slightly good	Slightly bad	Bad	No answer
The 40s (Both n=38)	24(63.2%)	14(36.8%)	0(0.0%)	0(0.0%)	0 (0.0%)
The 50s (Both n=54)	32(59.3%)	21(38.9%)	1(1.9%)	0(0.0%)	0 (0.0%)
The 60s (Both n=104)	66(63.5%)	33(31.7%)	5(4.8%)	0(0.0%)	0 (0.0%)
The 70s (Both n=53)	28(52.8%)	23(43.4%)	2(3.8%)	0(0.0%)	0(0.0%)
The 80s (Both n=13)	8(61.5%)	5(38.5%)	0(0.0%)	0(0.0%)	0 (0.0%)

Table 6.2: The conscious sense of taste recognition situation of generations distinction 2016 (questionnaire answer Female =262)

	The situation					
	every day	4-5 days a week	2-3 days a week	one day a week	2-3 days a month	hardly use
Both (n=481)	7(1.5%)	24(5%)	68(14.2%)	95(19.8%)	135(28.1%)	151(31.5%)
Male (n=219)	4(1.8%)	16(7.3%)	34(15.6%)	47(21.6%)	61(28.0%)	56(25.7%)
Female (n=262)	3(1.1%)	8(3.1%)	34(13.0%)	48(18.3%)	74(28.2%)	95(36.3%)

Table 7: The intake frequency of the eating out 2016 (questionnaire answer)

	The situation					
	every day	4-5 days a week	2-3 days a week	one day a week	2-3 days a month	hardly use
The 40s (Both n=20)	2(10.0%)	4(20.0%)	5(25.0%)	2(10.0%)	4(20.0%)	3(15.0%)
The 50s (Both n=35)	0(0.0%)	6(17.1%)	8(24.9%)	12(34.3%)	6(17.1%)	8(8.6%)
The 60s (Both n=104)	1(1.0%)	5(4.8%)	16(15.4%)	20(19.2%)	30(28.8%)	32(30.8%)
The 70s (Both n=46)	0(0.0%)	1(2.2%)	5(10.9%)	10(21.7%)	16(34.8%)	14(30.4%)
The 80s (Both n=13)	1(7.7%)	0(0.0%)	0(0.0%)	3(23.1%)	5(38.5%)	4(30.8%)

Table 7.1: The intake frequency of the eating out of generations distinction 2016 (questionnaire answer Male)

	The situation					
	every day	4-5 days a week	2-3 days a week	one day a week	2-3 days a month	hardly use
The 40s (Both n=38)	0(0.0%)	1(2.6%)	7(18.4%)	15(39.5%)	10(26.3%)	5(13.2%)
The 50s (Both n=54)	1(1.8%)	2(3.6%)	13(23.6%)	6(10.9%)	15(27.3%)	8(32.7%)
The 60s (Both n=104)	1(10. %)	2(1.9%)	9(8.7%)	18(17.3%)	36(34.6%)	38(36.5%)
The 70s (Both n=53)	1(1.9%)	2(3.8%)	5(9.4%)	6(11.3%)	9(17.0%)	30(56.6%)
The 80s (Both n=13)	0(0.0%)	1(7.7%)	0(0.0%)	3(23.9%)	5(38.5%)	4(30.4%)

Table 7.2: The intake frequency of the eating out of generations distinction 2016 (questionnaire answer Female =262)

Assessment of Odour Identification

Olfactometry was performed using odour stick (Diichi yakuhin Co. Ltd.). The results are shown in Table 8. The olfactory test result showed that approximately 75% of the participants were in the normal range. However, approximately 9% of the participants had an abnormality in the sense of smell. The sense of smell in male participants was 2.5 times worse than that in the female participants. The results of generation distinction are shown in Table 8.1 and 8.2. Sense of smell Tess result of 60-70s worsens in comparison with 40-50s. Particularly, the sense of smell test result of the 60-70 years old male worsens in comparison with 60-70s female.

Olfactory	Normal	Border	abnormal
Total	356(74.3%)	80(16.7%)	43(9.0%)
Male	144(66.1%)	45(20.6%)	29(13.3%)
Female	212(81.2%)	35(13.4%)	14(5.4%)

Table 8: Olfactory function tests 2016 (n=479)

Olfactory	Normal	Border	abnormal
The 40s (Male n=20)	18(90.0%)	2(10.0%)	0(0.0%)
The 50s (Male n= 34)	30(85.7%)	2(5.7%)	3(8.6%)
The 60s (Male n= 104)	67(64.4%)	24(23.1%)	13(12.5%)
The 70s (Male n=46)	23(50.0%)	13(28.3%)	10(21.7%)
The 80s (Male n= 13)	6(46.2%)	4(30.8%)	3(23.1%)

Table 8.1: Olfactory function tests generations distinction of generations distinction 2016 (Male n=218)

Olfactory	Normal	Border	abnormal
The 40s (Female n=38)	35(9.2%)	2(5.3%)	1(2.6%)
The 50s (Female n=53)	49(92.5%)	3(5.7%)	1(1.9%)
The 60s (Female n=103)	91(87.5%)	8(7.7%)	5(4.8%)
The 70s (Female n=53)	33(62.3%)	16(30.2%)	4(7.5%)
The 80s (Female n=13)	4(30.8%)	6(46.2%)	3(23.1%)

Table 8.2: Olfactory function tests generations distinction of generations distinction 2016 (Female n= 261)

Assessment of Salt Taste Identification

Gustation was performed by using test paper SALSAVE (ADVANTEC Co. Ltd.). The results are shown in Table 9. The salt taste test result showed that approximately 73% of the participants were in the normal range. However, approximately 14% of the participants had an abnormality in the sense of salt taste. Borderline and abnormal values were observed approximately as same times as between male and female participants. The results of generation distinction are shown in Table 9.1 and 9.2. Sense of salt taste test result of 60-70s worsens in comparison with 40-50s. Particularly about abnormality, the sense of salt taste test result of the 60-70 years old male worsens in comparison with 60-70s female.

Taste	Normal	Border	abnormal
Total	348(73.0%)	64(13.4%)	65(13.6%)
Male	154(71.0%)	32(14.7%)	31(14.3%)
Female	194(74.6%)	32(12.3%)	31(14.3%)

Table 9: Taste function tests 2016 (n=477)

Taste	Normal	Border	abnormal
The 40s (Both n=20)	16(80.0%)	2(10.0%)	2(10.0%)
The 50s (Both n= 35)	25(73.5%)	9(26.5%)	0(0.0%)
The 60s (Both n= 104)	69(66.3%)	13(12.5%)	22(21.2%)
The 70s (Both n=46)	35(76.1%)	5(10.9%)	1(7.7%)
The 80s (Both n=13)	9(69.2%)	3(23.1%)	1(7.7%)

Table 9.1: Taste function tests generations distinction of generations distinction 2016 (Male n=217)

Taste	Normal	Border	abnormal
The 40s (Both n= 38)	29(76.3%)	3(7.9%)	6(15.8%)
The 50s (Both n= 53)	39(73.6%)	9(17.0%)	5(9.4%)
The 60s (Both n= 104)	77(74.8%)	14(13.6%)	12(11.7%)
The 70s (Both n= 53)	39(73.6%)	5(9.4%)	9(17.0%)
The 80s (Both n=13)	10(76.9%)	1(7.7%)	2(15.4%)

Table 9.2: Taste function tests generations distinction of generations distinction 2016 (Female n= 260)

Assessment of odour and salt taste identification

We investigated the senses of smell and taste simultaneously. We found that approximately 60% of the participants had both senses of smell and taste in the normal range. Approximately 2% of the participants had abnormal values for both taste and olfactory senses. The results are shown in Table 10, 10.1, and 10.2.

Olfactometry Normal = 355 (74.4%)			
Total	Taste (Normal)	Taste (Border)	Taste (Abnormal)
	273 (57.2%)	38 (8.0%)	44 (9.2%)
Olfactometry Normal = 143 (30.0%)			
Male	Taste (Normal)	Taste (Border)	Taste (Abnormal)
	110 (23.1%)	16 (3.4%)	17 (3.6%)
Olfactometry Normal =212 (44.5%)			
Female	Taste (Normal)	Taste (Border)	Taste (Abnormal)
	163 (34.2%)	22 (4.6%)	27 (5.7%)

Table 10: The result of olfactometry with taste examination 2016 (n=477)

Olfactometry Normal = 79 (16.6%)			
Total	Taste (Normal)	Taste (Border)	Taste (Abnormal)
	50 (10.5%)	17 (3.6%)	44 (9.2%)
Olfactometry Normal = 45 (9.4%)			
Male	Taste (Normal)	Taste (Border)	Taste (Abnormal)
	28 (5.9%)	10 (2.1%)	7 (1.5%)
Olfactometry Normal =34 (7.1%)			
Female	Taste (Normal)	Taste (Border)	Taste (Abnormal)
	22 (4.6%)	7 (1.5%)	5 (1.0%)

Table 10.1: The result of olfactometry with taste examination 2016 (n=477)

Olfactometry Normal = 43 (9.0%)			
Total	Taste (Normal)	Taste (Border)	Taste (Abnormal)
	25 (5.2%)	25 (5.2%)	9 (1.9%)
Olfactometry Normal = 29 (6.1%)			
Male	Taste (Normal)	Taste (Border)	Taste (Abnormal)
	18 (3.8%)	0 (0%)	3 (0.6 %)
Olfactometry Normal =14 (2.9%)			
Female	Taste (Normal)	Taste (Border)	Taste (Abnormal)
	5 (1.0%)	0 (0%)	2 (0.4%)

Table 10.2: The result of olfactometry with taste examination 2016 (n=477)

Odour Identification Ratio of 12 Different Smells

The correct answer of odour ratio according to 12 types of smells is that individually (Cf. Tables 11, 11.1, and 11.2). More than 60% correct answers were observed for the odorants Indian ink, perfume, curry, rose, sweaty socks/bodily odour, condensed milk and fried garlic. The incomprehensible smells were Japanese cypress. A difference in the correct answer rate between male and female participants was observed in the odorants Indian ink, wood, perfume, menthol, mandarin orange, domestic gas, Japanese cypress, condensed milk and fried garlic. High correct answer ratio was observed in female participants than in male participants.

Identification ratio	Indian ink	wood	perfume	menthol	mandarin orange	curry
	65.10%	59.70%	61.30%	58.60%	53.80%	77.50%
Identification ratio	domestic gas	rose	Jap anise cypress	sweaty socks/bodily odor	condensed milk	fried garlic
	58.60%	62.40%	42.80%	68.60%	60.90%	71.10%

Table 11: Odor identification ratio of 12 different smell 2016 (Both n=481)

Identification ratio	Indian ink	wood	perfume	menthol	mandarin orange	curry
	71.8%	67.2%	67.2%	64.9%	60.9%	81.3%
Identification ratio	domestic gas	rose	Jap anise cypress	sweaty socks/bodily odor	condensed milk	fried garlic
	64.9%	70.2%	59.2%	72.9%	66.8%	77.1%

Table 11.1: Odor identification ratio of 12 different smell 2016 (Male n=219)

Identification ratio	Indian ink	wood	perfume	menthol	mandarin orange	curry
	50.1%	50.7%	50.7%	50.7%	50.7%	73.1%
Identification ratio	domestic gas	rose	Jap anise cy-press	sweaty socks/ bodily odor	condensed milk	fried garlic
	51.1%	53.0%	45.2%	63.5%	53.9%	63.9%

Table 11.2: Odor identification ratio of 12 different smell 2016 (Female n=262)

Discussion

As expected, the correct identification rate measured using the odour identification test decreased with an increase in age, showing that olfaction declines with an increase in age. This result was similar to that obtained by Ayabe-kanamura et al. (2005) [14], by Katayama et al. (2017) [15] and shows the validity of the test method used in this study. Examining the results by individual odours also showed that common odours closely associated with everyday life, i.e., Indian ink, Perfume, curry, rose, sweaty socks/ bodily odour, condensed milk, and fried garlic, were correctly identified by 60% of the participants. Furthermore, most of the subjects in all the age groups correctly identified the odours, indicating the importance of the day-to-day experience of odours. Identification of domestic gas declined significantly. However, domestic gas is an odour bound closely with quality of life. Although many remarked that the odour of domestic gas was 'a bad smell', and 'I do not know what the smell is'. 'Gas' is not an odour that individuals actively experience in their daily lives. Given the dangers posed by a gas leak, preventing explosion efforts are needed to ensure that individuals do not forget the odour, probably by periodically embellishing their experience to confirm their personal knowledge of the odour. Our level of sensory recognition of odours is created by the circumstances of our everyday lives [16]. The results showed that experiences with wood, Japanese cypress are on the decrease in modern life. Although such remarks as 'it smells nice' and 'it smells natural' were given for wood and Japanese cypress, subjects could not identify the specific odour. This results from the fact that people have a few opportunities to come in contact with natural wood in our modern life. The numbers of individuals who are unable to distinguish the smell of wood or Japanese cypress are now rising due to an increased presence of goods produced from chemically artificial resins and similar materials, such as bath tubs made of synthetic resins and not natural wood. For that reason, individuals are unable to experience the odour, and they were probably unable to recall it by name from their memory alone. The salt taste test result and odour test results of female participants showed better results than male results. Sense of smell test and odour test results of 60-70s worsens in comparison with 40-50s. Particularly, the sense of smell test result of the 60-70 years old male worsens in comparison with 60-70s female. Particularly about abnormality, the sense of salt taste test result of the 60-70 years old male worsens in comparison with 60-70s female. The results of odour test and salt test accorded with conscious taste. In the future, we need to provide individuals with as many opportunities as possi-

ble to experience a variety of odours, and in particular, direction should be provided to ensure individuals accumulate the experience of odours related to quality of life, such as domestic gas and sweaty socks/bodily odour connected with food poisoning. Furthermore, since ageing is likely to be accompanied by non-specific impairment of peripheral nerves, there exists the need to encourage active daily consumption of food containing vitamin B12, a compound that contributes to preventing peripheral neuropathy. Similarly, we need to consume food that includes copper (for example seaweed or fishery products) for maintaining our sense of taste. Because both the senses of taste and smell decline with age, incense needs the meal of the elderly. It is necessary to use much spice and spicy grass to prepare a meal with the right saltiness level. In addition, given the fundamental relationship between olfaction and gustation, a future investigation should be performed for olfactory testing and gustatory testing in tandem. This would contribute to an improvement in individuals' quality of dietary life through the enjoyment of flavour. This data provided this time were about the same with our last data which was accepted [17]. From this, we think that probably the data of taste and olfactory in each generation, follow our data.

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