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The Food Selections of Nursery School Children

Thomas F. Vance
Iowa State College

THE FOOD SELECTIONS OF NURSERY SCHOOL CHILDREN

THOMAS F. VANCE

The observations herewith reported were made during the Fall and Winter quarters of the school year 1929 and 1930 at the Nursey School of the Iowa State College. Twenty-seven children served as subjects during the first quarter and twenty-four for the second. Twenty-one were on the roll for both quarters.

The facilities of the Nursery School were not sufficient to make it possible to keep all of the children all day. Consequently they were divided into two squads. For the first half of the quarter the one squad stayed all day while the children in the other squad went to their homes at the close of the morning session. The order was reversed for the second quarter. There were two children who remained throughout the day for both halves of each quarter. A maximum of sixteen children might have been expected to be present during the noon meal which made the occasion for the study of their food selections. The attendance at any one meal was, however, dependent upon such factors as health, exposure to a contagious disease, convenience of parents, etc. At one meal during the winter quarter the attendance dropped to as low as five.

The food was brought to the service table on plates, each of which was tagged, bearing the name of the child. The children were seated at tables set for from three to six children with an adult at each table.

The typical meal had four foods on the plate: meat or eggs, two vegetables and a sandwich. In addition to the food on the plate milk was served in a glass cup. Reaction to milk, however, was not considered in this study. The dessert was served as a second course but was not included in these observations. It served the nutritional requirement of making a balanced meal and, supposedly, the psychological purpose of a reward for a clean plate, a rather dogmatic doctrine of the Nursery School creed. The dessert was ignored in this study since there was no opportunity for selection on the part of the child.

Time was recorded for each child when the first morsel reached

his mouth and again when he had cleaned his plate. Mimeographed forms were prepared on which was recorded the general conditions which obtained as well as the specific order in which the child tasted and finished each food.

There were never more than six children for one recorder. The recorders were a member of the staff and two graduate students who had had a quarter or more of previous experience in Nursery School procedure. Usually two recorders were available for any one meal but sometimes only one. In either case it was frequently impossible to secure records on all the children at a given noon hour. The occasional changes of places on the part of both children and recorders tended toward the elimination of the selective factor.

The record of the order of tasting does not represent one hundred per cent accuracy. On those few days when there was a full attendance and when the children were unusually hungry, some detail might escape the eye of the recorder. The record for finishing is much more reliable. There was some difficulty here, however, particularly when a child had the foods on his plate badly mixed.

The principal results are given in the tables which accompany. Table I, Column 1, gives the different foods which were served, arranged in the order in which the children finished them. The place of the food in the list is determined by the average of the rank it received in the meals in which it was served. If, for instance, four children were observed enjoying a menu where raw carrots were served and one child finished it first of the four foods on the plate another second, another third, and another, fourth, the average rank would be 2.50. These values are given in the second column of Table I. The third column contains the frequency of meals observed. The number of children who were observed at any one meal varied from five to twelve. The difference of two units on a scale of four between the food that is first on the list and the one that is last must be due to something other than mere chance. It may be legitimate to say that a difference of one unit may be due to causes more explicit than chance.

Table II contains a classification of foods on the basis of kind. Meats are at the head of the list in spite of the low rating of one or two food items in this group. Sandwiches and eggs, with the exception of two raw vegetables, came next while carrots, green beans and onions bring up the rear.

Table III is a classification according to methods of preparation.

Table I — Rank of Finishing of Individual Food Item

Food	Average Rank	Individual Meals	Days Served
Bacon	1.57	183	20
Meat Balls	1.83	71	9
Eggs and Spinach	2.00	14	2
Golden Rod Eggs	2.16	43	6
Peanut Butter Sandwiches	2.25	120	12
Raw Carrots	2.21	28	3
Celery Cabbage	2.22	23	4
Crisp Celery	2.24	101	12
Raw Turnips	2.25	20	2
Creamed Peas	2.29	38	5
Apple Sandwiches	2.31	126	16
Scrambled Eggs	2.32	184	22
Egg and Pea Souffle	2.35	36	4
Butter Sandwiches	2.35	293	36
Coddled Eggs	2.40	42	4
Stewed Tomatoes	2.41	62	8
Baked Eggs	2.44	14	6
Cabbage Sandwiches	2.44	52	6
Toast	2.48	219	22
Buttered Peas	2.51	43	5
Creamed Liver	2.55	22	3
Scalloped Potatoes	2.57	56	7
Cottage Cheese	2.57	56	5
Shirred Eggs	2.58	25	4
Creamed Cabbage	2.59	32	2
Lettuce Crisp	2.59	168	20
Cabbage and Carrot Salad	2.60	37	4
Buttered Beets	2.62	44	5
Buttered Spinach	2.71	69	8
Cabbage Salad	2.74	69	9
Baked Potato	2.77	81	10
Creamed Tomato Soup	2.79	44	5
Mashed Potatoes	2.80	64	8
Vegetable Soup	2.82	86	8
Fish (Haddock)	2.83	21	3
Buttered Carrots	2.90	20	3
Creamed Potatoes	2.91	70	9
Creamed Carrots	2.92	62	8
Peas and Carrots Creamed	2.97	22	2
Creamed Green Beans	3.01	23	4
Liver Casserole	3.14	47	6
Macaroni and Tomato	3.21	31	4
Creamed Celery	3.22	28	3
Celery Soup	3.23	34	2
Creamed Onions	3.43	32	3

The preference given the raw vegetables over the buttered and the creamed is probably the most interesting fact to be observed. It is further to be noted that in the class of raw foods the salads are the lowest in the list. Dressing up the raw food does not seem to give it added preference.

As far as the mechanics of eating are concerned, little seems to be gained by a combination of foods into one dish. Liver en casserole affords the best example in the list. It is largely a mixture of liver, carrots and celery. The rank of the mixture is 3.14,

Table II — Combined Ranks of Finishing According to Kinds of Food Fall and Winter

Kind	Rank of Each Food	Average Rank of Class	Frequency of Each Food	Class Frequency
Meat				
Bacon	1.57		20	
Meat Balls	1.83		9	
Creamed Liver	2.55		3	
Haddock	2.83		3	
Liver en Casserole	3.14		6	
Average		2.02		39
Celery Cabbage	2.22		4	4
Turnips (raw)	2.25	2.25	2	2
Sandwiches				
Peanut Butter	2.25		12	
Lettuce	2.29			
Apple	2.31		16	
Butter	2.35		36	
Cabbage	2.44		6	
Average		2.35		70
Eggs				
and Spinach	2.00		2	
Creamed	2.16		6	
Scrambled	2.32		22	
Coddled	2.40		4	
Baked	2.44		6	
Shirred	2.58		4	
Average		2.35		44
Peas				
Creamed	2.29		5	
and Egg Souffle	2.35		4	
Buttered	2.51		5	
and Carrots (Creamed)	2.97		2	
Average		2.46		16
Toast	2.48	2.48	22	22
Cottage Cheese	2.57	2.57	5	5
Spinach				
and Eggs	2.00		2	
Buttered	2.71		8	
Average		2.57		10
Lettuce Crisp	2.59	2.59	20	20
Cabbage				
Sandwiches	2.44		6	
Creamed	2.59		2	
and Carrot Salad	2.60		4	
Salad	2.74		9	
Average		2.61		21
Beets, Buttered	2.62	2.62	5	5
Celery				
Crisp	2.24		12	12
Creamed	3.22		3	
Soup	3.23		2	
Liver, Casserole	3.14		6	
Average		2.69		23
Tomatoes				
Stewed	2.14		8	
Creamed Soup	2.79		5	
and Macaroni	3.21		4	
Average		2.71		17

Table II — Continued

Kind	Rank of Each Food	Average Rank of Class	Frequency of Each Food	Class Frequency
Potatoes				
Scalloped	2.57		7	
Baked	2.77		10	
Mashed	2.80		8	
Creamed	2.91		9	
Average		2.77		34
Vegetable Soup	2.82	2.82	8	8
Carrots				
Raw	2.21		3	
and Cabbage Salad	2.60		4	
Buttered	2.90		3	
Creamed	2.92		8	
and Peas (Creamed)	2.97		2	
Liver, Casserole	3.14		6	
Average		2.84		26
Green Beans (Creamed)	3.01	3.01	4	4
Onions (Creamed)	3.43	3.43	3	3

while the ranks for creamed liver is 2.55, for carrots, 2.21 to 2.92, and for celery 2.24 to 3.22, depending on the preparation.

Similarly, mixing tomatoes with macaroni reduces the rank for tomatoes. Creamed eggs and creamed peas each go faster than egg and pea souffle. However, an egg and spinach combination seem to have some advantage over each served separately.

The order of selection for the second quarter tended to be the same as for the fall quarter as indicated by a correlation of .78. A marked correlation also appears between the order of tasting and the order of finishing. For the fall quarter this correlation was .76 and for the winter quarter .64. Some children showed a marked tendency to master the four foods seriatum.

There are doubtless several factors needed to explain why the children have finished the food in the order indicated in Table I. It is the writer's opinion that so-called taste preference is the biggest single factor which is to be understood to include smell, taste, tactual and temperature qualities, visual appeal, and conditioning as the result of previous emotional reactions in connection with the food.

But physical factors must also be taken into account. The mechanical difficulties of eating certain foods are greater than with others. As adults well know, it requires greater skill in getting some foods to the mouth than others and at least greater endurance in getting away with them once they have arrived. It may be possible to secure a rating of the foods on this basis from the

adult angle but there is no knowing to what degree such a rating would hold for children.

Imitation and suggestion also play a part. In this, both teachers and children may serve as stimuli. Once in a while a child is found who will leave the preferred food until the last, either to

Table III — Combined Ranks of Finishing According to Preparation of Food, Fall and Winter

	Rank of Each Food	Average Rank of Class	Frequency	Frequency of Class
Broiled Foods				
Bacon	1.57		20	
Meat Balls	1.83		9	
Average		1.65		29
Sandwiches				
Peanut Butter	2.20		12	
Lettuce	2.29		9	
Apple	2.31		16	
Bread and Butter	2.35		36	
Cabbage	2.44		6	
Average		2.32		79
Temperatures Below Boiling				
Scrambled Eggs	2.32		22	
Coddled Eggs	2.40		4	
Cottage Cheese	2.57		5	
Average		2.37		31
Raw Foods				
Carrots, Raw	2.21		3	
Celery Cabbage, Raw	2.22		2	
Celery, Crisp	2.24		12	
Turnips, Raw	2.25		2	
Lettuce, Crisp	2.59		20	
Cabbage and Carrot Salad	2.60		4	
Cabbage Salad	2.74		9	
Average		2.39		52
Cooked Combinations				
Eggs and Spinach	2.00		2	
Egg and Pea Souffle	2.35		4	
Liver Casserole	3.14		6	
Macaroni and Tomato	3.21		4	
Average		2.44		16
Toast	2.48	2.48	22	22
Boiled Foods				
Stewed Tomato	2.41		8	
Potato, Mashed	2.80		8	
Average		2.61		16
Baked Foods				
Eggs, Baked	2.44		2	
Eggs, Shirred	2.58		4	
Potato, Scalloped	2.57		7	
Potato, Baked	2.77		10	
Haddock, Baked	2.83		3	
Average		2.66		26
Buttered Foods				
Peas	2.51		5	
Beets	2.62		5	
Spinach	2.71		8	
Carrots	2.90		3	
Average		2.67		21

Table III — Continued

	Rank of Each Food	Average Rank of Class	Frequency	Frequency of Class
Creamed Foods				
Liver	2.55		3	
Peas	2.29		5	
Carrots	2.92		8	
Peas and Carrots	2.97		2	
Green Beans	3.01		4	
Potato	2.91		9	
Celery	3.22		3	
Onions	3.43		3	
Cabbage	2.59		2	
Goldenrod Eggs	2.16		6	
Average		2.77		45
Soups				
Tomato, Creamed	2.79		5	
Vegetable	2.82		8	
Celery, Creamed	3.23		2	
Average		2.86		15

make a good thing last as long as possible or to gloat over others who have none of this choice treasure left. There is a slight tendency for the foods served the most frequently to be eaten first. The correlation between order of finishing and frequency is .34 with the results of both quarters combined.

From the data given in Table IV, some correlations have been derived which may be suggestive. There is a low correlation of .11 for the fall quarter and a somewhat better one of .44 for the winter quarter between the child's age and the time it takes him to eat. It should be kept in mind in this connection that the older children usually had larger helpings. There was a practical attempt to adjust the quantity of food put on the plate to the child's expected appetite.

Intelligence appears not to be much of a determing factor as indicated by the low correlation of — .25 between the I.Q. as determined by the Palmer test and the time it takes a child to eat.

The appetites of the children as measured by the time that it took them to finish the first course seemed to be about the same for both fall and winter. The average time for the fall was 21.6 minutes and for the winter 22.2. There happens to be a range of about 10 minutes between the averages by months. The average for February was 17.6 minutes and for December 27.4 minutes.

Generalizations and conclusions on the limited data would be premature. A summary of the data collected during the year 1928-1929 is not as yet complete. This data will add to the number of cases and will doubtless make some changes in the average re-

Table IV — I. Q. Age and Finishing Time for Both Fall and Winter

Name of Child	Palmer Test	Age in Month	Average Time for Winter and Fall	Frequency of Observation
1. T. G.	136	54	10.6	25
2. M. D.	119	45	11.1	35
3. T. M.	128	56	15.3	23
4. P. V.	130	57	15.6	63
5. B. R.	113	54	16.5	53
6. J. B.	117	36	16.4	43
7. H. C.	94	41	27.3	25
8. J. B.	104		19.0	19
9. H. B.	138	44	17.4	23
10. J. H.	109	48	19.6	33
11. I. B.	112	46	21.8	38
12. K. B.	97	41	26.6	34
13. D. G.	100	30	16.7	33
14. D. H.	113	54	20.9	37
15. J. B.	124	37	28.9	40
16. L. D.	105	24	23.8	18
17. J. G.	120	32	24.1	31
18. M. J. S.	111	27	25.6	31
19. A. W.	124	48	25.4	33
20. B. A. V.	121	43	24.2	35
21. R. L.	116	49	27.0	19
22. E. H.	112	40	27.6	53
23. B. A. F.	112	54	28.2	38
24. B. C.	115	58	10.8	6
25. J. P.	146	56	26.8	14
26. B. L.	93	38	27.6	16

sults. With another year of observation with an improved technique on the basis of the present experience we may be able to draw some rather definite conclusions. The results so far are considered merely suggestive.

Iowa State College,
Ames, Iowa.