



Fast Food Consumption and Its Relation with Attention Span and Memory Retention in School Children

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ABSTRACT To study the relationship of fast food consumption with attention span and memory retention, a total of 240 school children aged 13-15 years with frequent consumption of fast food were selected from three private and three government schools of Ludhiana city. The data on general information and demographic profile of the respondents and frequency of fast food consumption was collected. The subjects were asked to fill the questionnaire containing these details. D2 attention span test and memory retention test were conducted among the selected subjects in order to assess their cognitive development. The results revealed that there was frequent consumption of fast food among the school children, wherein comparison to the private school children, consumption of fast foods by government school children was slightly higher. Frequently consumed fast foods among both private and government school children were chips, biscuits, bread, cookies, *golgappe* (potato filled fried salty snack) and *samosa* (potato stuffed fried salty snack). A significant negative correlation was observed between the consumption of fast food and attention span and memory retention; while a significant positive correlation was observed between attention span and memory retention. Hence, it was concluded that private school children were having better attention span ($p \leq 0.05$) and memory retention scores than government school children.

INTRODUCTION

Convenience food, commonly known as junk food which is obtained in self-service or take-away eating joints is high in energy, has small amount of micronutrients, fibrous ingredients, and possesses a huge chunk of simple sugars and salt with a greater portion size than the traditional home-cooked or restaurant foods. Foods that can be served in the ready to eat mode are referred to as fast foods. Though fast foods cannot always be declared as junk foods, particularly when nutritional contents are used in their preparation; most of the junk foods are known as fast foods because they are designed to cope up with the fast-paced urban life (Pereira et al. 2005). Some common examples of such foods that can be found on a global scale are chips, cookies, munchies, etc., but the most processed are the meals like fried chicken, French fries, burgers, pizzas, ice-creams, etc.

Although this approach comes with some advantages like standardization of taste and optimum utilization of ingredients that may seem suitable for the rapid growth of the urban areas in the cities, but it is also accompanied with various disadvantages which somewhere outweigh the merits that is, they make people rely on them.

In South Korea, the consumption of western fast food and sugar-sweetened beverages has almost doubled over an 11-year period (1998-2009) (Lim et al. 2018). Consumption of fast food has become a common practice in the day to day lives of the 21st century generation. The main reasons due to which adolescents depend on fast food is the lack of time to eat a healthier cooked meal prepared at home. The taste, marketing strategies, low cost, ready availability and peer pressure make these more popular among children and adolescents (Mellinger 2006; Kaushik et al. 2011). According to Darkesh et al. (2018) there is a higher consumption of fast food than high nutritional value food (fruits and vegetables) among the adolescents in the state of Qatar. Also, obesity and overweight has a positive correlation with the frequency of consumption.

Apart from the effects that fast food has on physical health, consumption of fast foods also have an effect on mental health or cognitive development. The mental action or process of acquiring knowledge through thought, experience and senses is known as cognition. Attention, memory, executive functions, visual-spatial functions, comprehension, learning, motor speed and expressive speech are major components of cognition. Out of these, memory indicates the en-

coding, storage, and retrieval of information. It is very important from a developmental perspective because the capability to hold information and process it, supports various higher level accomplishments such as language, categorization and social cognition (Udani 1992).

The recollection of information held in the mind in response to an external stimuli is called 'Retrieval', and the capability to hold information is called 'Retention'. Memory 'Retention' and 'Retrieval' are considered as the prime memory processes (Amin and Malik 2013). The conventional concept of learning and retrieval is that learning takes place during the events of studying, while retrieval helps to assess the learned contents (Eichenbaum 2002; Parker et al. 2002; Karpicke and Roediger 2007).

A large number of interdisciplinary researches have analysed a direct link between the consumption of processed products and symptoms of depression or perceived stress. For example, Vidal et al. (2018) identified an association of greater levels of perceived stress with higher intake of fat, and a stronger association with males. High fat consumption was also reported in more than forty percent students. So, the results suggested that there is a need to execute policies that promote lower fat intake. One of the concerns is that a western style diet high in saturated fat and refined sugars can weaken certain types of memory in healthy subjects. For example, Francis and Stevenson (2011) presented that healthy undergraduate student participants with high self-reported fat and refined sugar intake were impaired on memory tasks that were sensitive to hippocampal function. Verbal paired associates and logical memory subsets of the Wechsler Memory Scale Revised were also utilized in these tasks. Additionally, in a laboratory-based test of food intake, the subjects were less accurate in recalling what they had eaten previously. Also, they had a reduced sensitivity to internal signals of hunger and satiety. The chosen tasks were also hippocampal-dependent because the hippocampus plays a significant role in episodic memory (that is, remembering what we have eaten) and our responsiveness to internal hunger and satiety clues.

There may be a connection between unhealthy eating and cognitive development. Consuming an unbalanced diet on a regular basis (for example, increased consumption of western

processed foods) promotes health related risks like depression and anxiety (Jacka et al. 2010; Sánchez-Villegas et al. 2012). Due to easy availability of fast foods in school canteens and a change in life pattern, signifies the growth in the rate of consumption of junk food among kids and teenagers. Through immense funds and advertising, the fast food industry adds to the challenge which parents are already facing, that is; to provide wholesome foods for their families. It is seen in a research that fast food consumption is fueled by lack of cooking confidence, time strains and the perceptions of fast food being easy and convenient to consume. Hence, practical strategies are needed to aid parents and children in selecting more healthy food options (Fulkerson 2018). Also, according to a study by Sapkota and Neupane (2018) adolescents were found to consume a greater amount of junk food which led to a bulk of ill effects later on. It was therefore recommended that awareness programmes on junk food consumption and its ill effects should be conducted and, subsequently, implemented by the school and community.

METHODOLOGY

The study was conducted in three private and three government schools in Ludhiana city. At least 40 students of eighth standard were taken from each school, thus making a total of 240 students. Stratified random sampling was used for selecting students in 13-15 years age group from co-educational schools of Ludhiana city. The demographic profile of the respondents pertaining to gender (male/female), annual family income, background (rural/urban), educational background of parents, occupation of mother, food habits, meal patterns and frequency of fast food consumption was collected. A fast food frequency questionnaire was used to collect data regarding fast food consumption pattern among the school children. The mean consumption of fast food was calculated. On a scale of 1-7, the respondents were asked to respond according to their frequency of consumption of fast foods which was rated as never with a score of 1 to daily with a score of 7.

The cognitive development was assessed through attention span and memory retention. Attention span was assessed with the help of D2 Attention Span test by Brickenkamp (1962). The purpose of this test was to assess constant

attention and visual scanning capability of the subjects. Memory retention was assessed with the help of Immediate Memory Test from Bhatia's Battery of Performance Tests of Intelligence (Bhatia 1955). Since, immediate memory has a close relation with mental development or general intelligence; it was selected for testing the memory retention in the children. Correlations were used to find out the relationship between different fast foods, memory and attention span variables.

RESULTS AND DISCUSSION

Fried Foods

The fast foods were categorized into 6 categories, that is, fried, baked, street food, instant, packed (ready to eat) and sweet dish. From the data of the present study, it was seen that among the fried foods, potato chips and *golgappe* (potato filled fried salty snack) were being consumed weekly in private schools with a mean score of 3.76 ± 1.72 and 3.39 ± 1.68 respectively (Table 1). While in government schools, potato chips, *golgappe* (potato filled fried salty snack) and *samosa* (potato stuffed fried salty snack) were consumed weekly and fortnightly with mean scores of 3.95 ± 1.98 , 3.78 ± 1.74 and 3.66 ± 1.83 respectively. Further, it was also seen that there was a significant difference in the consumption of fryums ($p \leq 0.05$), *pakore* (fried salty fritters made from potato, onion, cauliflower, etc. coated with Bengal gram flour), *samosa* (potato stuffed fried salty snack), bread *pakora* (salty fried bread fritters), bread roll and *kachori* (fried salty snack made from refined flour) ($p \leq 0.01$) among private and government schools. Pathak (2010) reported similar results, where, the girls of Chandigarh preferred to consume *samosa* (potato stuffed fried salty snack) and *pakora* (fried salty fritters), while 93.8 percent consumed burger and patties during their stress period. Yaméogo et al. (2018) carried out a study which reflected an excessive consumption of sweet drinks and fried food in 12.7 percent ($n = 253$) and 28.2 percent ($n = 561$) of secondary school pupils, respectively.

Baked Foods

Biscuits (5.76 ± 1.70 and 5.13 ± 2.07), bread (4.59 ± 1.68 and 4.08 ± 2.04), cookies (3.73 ± 2.03) and patties (3.35 ± 1.80) were the three most common-

ly consumed baked foods among private and government schools respectively. This showed that the consumption of these baked foods was ranging from thrice a week to fortnightly. The data displayed a significant difference in the consumption of bread, biscuits and cookies ($P \leq 0.05$) among the two groups. Similar results noted by Malhotra (2016) stated that for bakery food items such as cakes, pastries and muffins the frequency scores were higher, that is, 2.06, 2.64 and 1.68 for GI (government schools) than for GII (private schools) which showed the values of 1.82, 2.49 and 1.63 respectively. The outcomes of a study by Ishak et al. (2013) showed that the children usually consumed snacks such as white bread with spread or as a sandwich, local cakes, biscuits or cookies, tea, chocolate drink and instant noodles. Their choices of fast foods included pizza, burgers, French fries and fried chicken. Also, Chhabara (2016) stated that average consumption of biscuits was 5.82 and 5.16 among GII (private schools) boys and girls, respectively, and 3.86 and 4.66 among GI (government schools) boys and girls, respectively. In another study, it was seen that approximately half of the children (2 and 3 year old) were consuming bread, rolls, tortillas, bagels, or biscuits, with twenty percent children consuming whole grain-rich varieties (Welker et al. 2018).

Street Foods

The data revealed in the present study that almost all the foods like noodles, *pav-bhaji* (salty potato vegetable cooked in butter and served with buttered buns), burger, manchurian, *bhelpuri* (salted and spicy snack made from puffed rice), momos, *kulcha channa* (shallow fried buns stuffed with dried peas or chickpeas) and grilled sandwich were being consumed weekly or fortnightly in both groups. The mean consumption of burger (3.64 ± 1.88), noodles (3.62 ± 1.89) and *kulcha channa* (shallow fried buns stuffed with dried peas or chickpeas) (3.42 ± 1.89) was high among government school children. While consumption of street foods in private school children was not so frequent. A significant difference was observed in the consumption of noodles, burger and manchurian ($p \leq 0.01$) and *bhelpuri* (salted and spicy snack made from puffed rice), momos and *kulcha channa* (shallow fried buns stuffed with dried peas or chickpeas) ($p \leq 0.05$) among private and government

Table 1: Average frequency consumption of various fast foods

S. No.	Food item	Private (n=120)		Govt. (n=120)		t value	Total	
		Mean	SD	Mean	SD		Mean	SD
a) Fried								
1	Aloo tikki	2.48	1.21	2.66	1.43	1.02	2.57	1.32
2	Papri chaat	2.76	1.50	2.73	1.54	0.17	2.74	1.52
3	Golgappe	3.39	1.68	3.78	1.74	1.78	3.59	1.71
4	French fries	2.63	1.41	2.94	1.63	1.61	2.78	1.52
5	Fryums	2.23	1.21	2.73	1.72	2.60*	2.48	1.47
6	Hotdog	2.28	1.11	2.53	1.50	1.51	2.40	1.31
7	Pakore	2.59	1.27	3.34	1.78	3.76**	2.97	1.52
8	Samosa	2.90	1.47	3.66	1.83	3.54**	3.28	1.65
9	Spring rolls	2.68	1.53	2.93	1.73	1.19	2.80	1.63
10	Potato chips	3.76	1.72	3.95	1.98	0.80	3.85	1.85
11	Paneer pakora	2.67	1.38	2.85	1.62	0.94	2.76	1.50
12	Bread pakora	2.63	1.25	3.33	1.69	3.60**	2.98	1.47
13	Breadroll	2.37	1.14	2.91	1.73	2.86**	2.64	1.44
14	Cutlets	2.41	1.31	2.64	1.60	1.24	2.53	1.45
15	Veg bullets	2.70	1.51	2.77	1.78	0.31	2.73	1.65
16	Kachori	2.31	1.21	3.14	1.76	4.26**	2.73	1.49
b) Baked								
1	Bread	4.59	1.68	4.08	2.04	2.14*	4.33	1.86
2	Garlic bread	2.53	1.42	2.73	1.69	0.99	2.63	1.56
3	Biscuits	5.76	1.70	5.13	2.07	2.56*	5.45	1.88
4	Cakes	2.88	1.41	2.94	1.65	0.34	2.91	1.53
5	Muffins	2.53	1.41	2.58	1.53	0.26	2.55	1.47
6	Pastries	2.90	1.64	3.00	1.66	0.47	2.95	1.65
7	Cookies	3.73	2.03	3.19	1.86	2.15*	3.46	1.95
8	Patties	2.96	1.56	3.35	1.80	1.80	3.15	1.68
9	Pizza	2.73	1.56	2.61	1.56	0.58	2.67	1.56
10	Doughnut	2.28	1.19	2.28	1.40	0.05	2.28	1.29
c) Street Food								
1	Noodles	3.00	1.47	3.62	1.89	2.82**	3.31	1.68
2	Pav-bhaji	2.64	1.42	2.94	1.67	1.50	2.79	1.55
3	Burger	2.90	1.55	3.64	1.88	3.34**	3.27	1.71
4	Manchurian	2.63	1.42	3.34	1.81	3.41**	2.98	1.62
5	Bhelpuri	2.73	1.52	3.27	1.90	2.44*	3.00	1.71
6	Momos	2.54	1.35	3.11	1.98	2.59*	2.83	1.66
7	Kulcha channa	2.87	1.57	3.42	1.89	2.45*	3.14	1.73
8	Grilled sandwich	3.02	1.76	2.68	1.70	1.53	2.85	1.73
d) Instant								
1	Maggi	3.98	1.49	4.16	1.89	0.80	4.07	1.69
2	Pasta/Macaroni	3.52	1.57	3.34	1.76	0.81	3.43	1.66
3	Soups	2.87	1.66	3.15	1.92	1.22	3.01	1.79
4	Popcorns	3.09	1.59	3.71	1.95	2.68*	3.40	1.77
5	Idli	2.67	1.49	2.59	1.62	0.37	2.63	1.55
6	Dosa	2.70	1.42	2.78	1.75	0.40	2.74	1.59
7	Vada	2.38	1.15	2.36	1.44	0.10	2.37	1.29
8	Upma	2.37	1.22	2.19	1.35	1.05	2.28	1.29
9	Uttapam	2.43	1.26	2.11	1.16	2.03*	2.27	1.21
e) Packed (Ready to Eat)								
1	Chips	4.75	1.78	5.18	1.84	1.82	4.96	1.81
2	Kurkure	4.13	1.94	4.88	1.86	3.02**	4.50	1.90
3	Namkeen	4.35	2.04	4.93	1.91	2.29*	4.64	1.97
4	Fried peanuts	3.11	1.96	3.06	1.83	0.20	3.08	1.89
5	Namkeen peanuts	3.16	1.94	3.82	2.10	2.52*	3.49	2.02
f) Sweet Dish								
1	Pinni	2.69	1.81	3.02	2.07	1.29	2.85	1.94
2	Chocolate and toffees	4.80	1.82	4.68	2.07	0.46	4.74	1.95
3	Gajrela	3.03	1.74	3.15	1.81	0.55	3.09	1.78
4	Halwa	3.05	1.80	3.51	1.81	1.97*	3.28	1.80
5	Kheer	3.39	1.95	3.53	1.77	0.56	3.46	1.86
6	Pudding	2.94	1.74	3.15	1.99	0.86	3.05	1.86
7	Ice-cream	4.75	1.94	4.44	1.96	1.23	4.60	1.95

*Significant at 0.05 level

**Significant at 0.01 level

school children. A study by Haokip and Sharma (2016) also revealed that daily consumption of fast foods was higher among boys as compared to girls and burger, manchurian, noodles, pizza, patty and *samosa* (potato stuffed fried salty snack) have been the frequently consumed fast foods amongst college students. Mahajan (2011) reported that reduction in consumption of noodles was highly significant ($P \leq 0.01$), followed by manchurian, maggi ($P \leq 0.05$) and non-significant improvement was found in consumption of spring rolls. In a similar study by Sapkota and Neupane (2018) the concerning patterns of junk food consumption was that, all respondents (100%) consumed '*chat-pat*' (salty snack) and noodles, *panipuri* (another name for *golgappe*) (97.2%), doughnuts (93%), chocolates (92.3%), biscuits (95.8%), ice-cream (65.5%) and cold drinks (65.5%).

Instant Foods

Among the instant foods, maggi (3.98 ± 1.49 and 4.16 ± 1.89), pasta/macaroni (3.52 ± 1.57 and 3.34 ± 1.76), popcorns (3.09 ± 1.59 and 3.71 ± 1.95) were the most frequently consumed fast foods among private and government school children respectively, with frequency of weekly to fortnightly and also the consumption of popcorns and *uttapam* (ready to make salty pancake made from semolina) showed a significant difference ($p \leq 0.05$). Mahajan (2011) also observed that the frequency of consumption of fast food items like *aloo tikki* (fried salty potato snack), bread *pakora* (salty bread fritters), burger, macaroni, manchurian, maggi, noodles, and *samosa* (potato stuffed fried salty snack) significantly decreased after the nutrition intervention. Singla (2011) observed that fifty and 26.7 percent, 33.4 and 13.3 percent, fifty and twenty percent and twenty and zero percent of subjects consumed *dosa* (ready to make shallow fried potato, onion stuffed salty snack), *idli* (ready to make steamed snack made from semolina), vada (fried salty snack) and *uttapam* (ready to make salty pancake made from semolina) once a week in both experimental and control groups before nutrition counselling respectively.

Packed Foods (Ready to Eat)

It was perceived from the data, that chips, *kurkure* (RTE salty snacks) and *namkeen* (RTE

salty mixed snacks) were being consumed twice a week, weekly and fortnightly. The mean corresponding values of consumption of these foods were 4.75 ± 1.78 and 5.18 ± 1.84 , 4.13 ± 1.94 and 4.88 ± 1.86 and 4.35 ± 2.04 and 4.93 ± 1.91 for private and government school children while consumption of *namkeen* peanuts (salted and fried peanuts) was found to be 3.82 ± 2.10 in government school children. Further, a significant difference in the consumption of these foods was seen in *kurkure* (RTE salty snacks) ($p \leq 0.01$) and in *namkeen* (RTE salted mixed snacks) and *namkeen* peanuts (salty and fried peanuts) ($P \leq 0.05$). Gregori et al. (2014) revealed that overall, thirty-three percent (857) of the children were snacking potato chips at least once per day, whereas fifty-seven percent (1446) were not having access to these but rarely, varied from fifty-one percent in Brazil up to eighty percent in Argentina (p -value < 0.001). Singla et al. (2012) observed that majority of the subjects consumed fried foods like potato chips, *kurkure* (RTE salty snacks), *kulche/bhatura channe* (deep fried rolled refined flour dough balls served with salty/spicy chick-peas), *paneer pakora* (fried salty cottage cheese fritters), bread *pakora* (salty fried bread fritters), cutlets and *samosa* (potato stuffed fried salty snack) in group E (experimental) and C (control) before nutrition counselling respectively.

Sweet Dish

Most commonly eaten sweet dishes were chocolates and toffees (4.80 ± 1.82 and 4.68 ± 2.07), ice cream (4.75 ± 1.94 and 4.44 ± 1.96), *kheer* (rice cooked in milk with sugar) (3.39 ± 1.95 and 3.53 ± 1.77) and *halwa* (flour cooked in oil/ghee and sugar) (3.05 ± 1.80 and 3.51 ± 1.81) among both the groups, that is, private and government schools. While *gajrela* (carrots cooked with oil/ghee, *khoya* and sugar), *pinni* (gram flour cooked in oil/ghee with sugar and dry fruits) and pudding were not being frequently consumed, a significant difference was seen in the consumption of *halwa* (flour cooked in oil/ghee and sugar) ($p \leq 0.05$). Naveed et al. (2015) found that only 7.5 percent children did not take chocolate and chocolate containing foods. While other 92.5 percent children were taking chocolate and chocolate containing foods daily. In professional adults, ninety percent took chocolates on daily or weekly basis. Welker et al. (2018) found that nearly all (90%) 2-3 year old children were con-

suming a dessert, or sweet and forty-five percent children were consuming sugar sweetened beverages.

Characteristics Related to Fast Food Consumption

A survey was conducted among the school children to see which characteristics related to consumption of fast food were more preferred. The respondents were asked to rate on a rating scale of 1-5 on these different characteristics. Table 2 displayed that among private school children, highest rating was given to the "wide availability" of fast foods (4.22) followed by "taste" (4.18), "convenience" (3.50), "cost" (3.20), "regular consumption" (2.35), "nutritious" (2.21), "safety" (2.15) and "healthy" (2.07) being the lowest rating. Thus, they were aware of the fact that though fast foods were tasty and convenient, still those were not nutritious and also had a bad effect on their health. While among government school children, highest rating was given to "wide availability" (4.30), followed by "taste" (4.24), "cost" (3.66), "convenience" (3.53), "regular consumption" (2.38), "nutritious" (2.28), "safety" (2.10) and "healthy" (2.07). These ratings showed that even government school children thought that fast foods were tasty, convenient and widely available but not nutritious, safe and healthy.

Findings from the study conducted by Saghaian and Mohammadi (2018) indicated that entertainment was the main reason (first and second priority) for fifty-two percent of the respondents to consume fast food and shortage of time was also listed as the main reason by fifty percent of respondents. Abraham et al. (2018) in their study showed that the students had knowledge about the additives found in fast food, processed food and soda and that the con-

sumption of these foods was unhealthy. They strongly agreed on choosing fast foods due to the taste preference. Also, a significant number of students consumed processed foods like chips, cookies and cereal because of convenience.

Factor Analysis

Factor analysis was used for finding out the principal dimensions of the statements in context of patronizing the consumption of fast food. The following discussion deals with the results pertaining to factor analysis and factor definitions.

Evaluation of KMO, Bartlett's Test and Factor Extraction

Factor analysis was run using SPSS16.0 and the results have been discussed as follows. Table 3 shows the value of Kaiser-Meyer-Olkin (KMO), the measure of sampling adequacy came out to be 0.635. KMO value of more than 0.50 is an indication of adequate sample size (Field 2003).

Table 3: Values for KMO measure and Bartlett's test

Measure	Value
Kaiser-Meyer-Olkin measure of sampling adequacy	0.635
Bartlett's test of sphericity approx. Chi-square	181.474
Degrees of freedom	21
Significance	<0.000

The value of Chi-square for Bartlett's test of sphericity came out to be 181.474. This value was found to be significant with 21 degrees of freedom. The value of KMO and results of Bartlett's test of sphericity indicated factor analysis could be performed on the given data set.

Table 2: Characteristics related to fast food consumption as per the opinion of subjects

S. No.	Characteristics	Private (n=120)	Govt. (n=120)	Total (n=240)
		Mean scores	Mean scores	Mean scores
1	Cost	3.20±1.35	3.66±1.39	3.43±1.37
2	Healthy	2.07±1.42	1.74±1.29	1.91±1.35
3	Safety	2.15±1.35	2.10±1.41	2.13±1.38
4	Taste	4.18±1.19	4.24±1.29	4.21±1.24
5	Convenience	3.50±1.23	3.53±1.67	3.52±1.15
6	Wide availability	4.22±1.09	4.30±1.19	4.26±1.14
7	Nutritious	2.21±1.37	2.28±1.27	2.25±1.32
8	Regular consumption	2.35±1.35	2.38±1.28	2.37±1.31

Results from factor analysis have been presented in Table 4. While extracting factors, Principal Component Analysis was used and the rotation method used, was Varimax Rotation with Kaiser normalization. In all three, components were extracted and minimum factor loading used for the analysis was 0.40.

Table 4: Rotated component matrix

Statements	Component		
	1	2	3
Saves time			0.814
Convenient to cook			0.785
Convenient to consume		0.746	
For change and fun	0.814		
Variety of menu	0.725		
Availability of fast food joints		0.820	
Tastes great	0.711		

Factor Definitions

Three principal components were obtained from Principal Component Analysis. Factor loadings have been presented in Table 5. These three components on the reasons for patronizing fast food consumption were able to explain 63.14 percent variance in the data set. Factor definitions for the extracted factors have been provided as follows:

Fun and Taste

This factor deals with the fun and taste of the fast foods as favoured by the school children. Items under this factor include consumption of fast food for change and fun, for variety of menus and because it tastes great. This factor explained 25.194 percent variance in the data.

Availability

This factor deals with the reasons patronizing fast food consumption due to easy avail-

ability. Variables represented by this factor include convenience to consume fast food and availability of fast food joints. From the given Table 5, it can be shown that variance explained by this factor is 19.304 percent.

Time Saving

This component was analysed with concern to the time saving feature of the fast food consumption. Variables represented by this factor include that eating fast food saves time and these are convenient to cook. This factor explained 18.644 percent variance in the data.

From the results of factor analysis, it can be stated that fun and taste, availability and time saving were the main reasons for patronizing the consumption of fast food among the school children.

Sapkota and Neupane (2018) found in their study that the majority of respondents (90.1%) preferred junk food for taste, due to faster preparation (44.4%), as influenced by TV advertisements (15.5%), because of peer influences (31.7%) and some (29.6%) respondents favoured junk food because nothing else was available. Findings from another study by Nondzor and Tawiah (2015) indicated that those who patronized fast food perceived those to be time saving, convenient, good for fun and change, delicious and exposed them to likable environments while those who did not patronize fast food perceived them to be expensive, unhealthy and too foreign. To place an order for fast food, consumers preferred these in the form of both “take-away” and ‘eat in’ services. The most preferred menu happened to be the exotic ones (that is, pizza, burger, rice etc.). The findings proved to be more significant and revealing as they would help marketers to analyze the behavioral characteristics of consumers’ with respect to the consumption of fast foods.

Table 5: Extracted factors

Factor	Factor name	Eigen value	% of variance	Items	Item loading
1.	Fun and taste	1.764	25.194	For change and fun	0.814
				Variety of menu	0.725
				Tastes great	0.711
2.	Availability	1.351	19.304	Availability of fast food joints	0.820
				Convenient to consume	0.746
3.	Time saving	1.305	18.644	Saves time	0.814
				Convenient to cook	0.785

Correlation Analysis

Table 6 showed that out of all the correlations, a highly significant ($p \leq 0.05$) negative correlation was found in attention span and consumption of fast food, the value of 'r' being -0.144. Similarly, a significant ($p \leq 0.05$) negative correlation of memory retention and consumption of fast food was observed with the value of 'r' being -0.136 which depicts that with the increase in fast food consumption, the memory retention and attention span of the children were decreasing, whereas a significant ($p \leq 0.01$) positive correlation was seen in the attention span and memory retention with the 'r' value 0.217. Thus indicating that with an increase in attention span, the memory retention also increased. Ingwersen et al. (2008) showed no evidence, at any test time, for an effect of snack on cognitive performance. In another study by Liao et al. (2018) it was reported that women who consumed more High fat/High Sugar (HFHS) foods or fewer fruits and vegetables than others were seen to have a higher average sadness (both $P < 0.05$). While obese or overweight women who reported to have more frequent HFHS consumption than others had higher average stress than normal weight women ($P < 0.05$). The results of a study conducted by Khoshnoud et al. (2018) showed that Sodium Benzoate (SB), a commonly used food preservative, has significantly impaired the memory and motor coordination in mice. Furthermore, SB was also seen to reduce Glutathione (GSH) and enhance the Malondialdehyde (MDA) level in their brains significantly ($P < 0.001$).

Table 6 also highlighted a significant ($p \leq 0.05$) negative correlation between memory retention

and the perception of fast food as beneficial ('r' = -0.139). Thus indicating that, higher the fast food consumption, lower was the memory retention among children. From the data of the present study, more correlations were found which include a significant ($p \leq 0.01$) positive correlation of fast food consumption with fast food rated as healthy ('r' = 0.448), perception of fast food as beneficial ('r' = 0.172), perception of fast food consumption due to social pressure ('r' = 0.257) and intention of fast food consumption ('r' = 0.143). Thus indicating that, with the increase in subjects thinking of fast food to be healthy, perception of fast food being beneficial, social pressure to consume fast food and intention of the children to consume fast food, there was an increase in the consumption of fast food.

Perception of fast food as beneficial and perception of fast food consumption due to social pressure had a significant ($p \leq 0.01$) positive correlation ('r' = 0.285) and also another significant ($p \leq 0.01$) positive correlation was observed in the perception of fast food as beneficial and the intention of fast food consumption ('r' = 0.386). Perception of fast food consumption due to social pressure and intention of fast food consumption was also having a significant ($p \leq 0.01$) positive correlation. Thus, with increasing perceptions of fast food being beneficial, the perceptions of fast food consumption due to social pressure and intention of fast food consumption also increased. Moreover, intention of fast food consumption also increased with increase in perception of fast food consumption due to social pressure ('r' = 0.575). Shami and Fatima (2017) observed that according to statistical analysis through correlation, there was no association between perception of fast food being un-

Table 6: Coefficient correlation (r) between various factors

S. No.	Variable 1	Variable 2	Correlation coefficient (r)
1	Attention span	Fast food consumption	-0.144*
2	Memory retention	Fast food consumption	-0.136*
3	Attention span	Memory retention	0.217**
4	Memory retention	Perception of fast food as beneficial	-0.139*
5	Fast food consumption	Fast food rated as healthy	0.448**
6	Fast food consumption	Perception of fast food as beneficial	0.172**
7	Fast food consumption	Perception of fast food (social pressure)	0.257**
8	Fast food consumption	Intention of fast food consumption	0.143*
9	Perception of fast food as beneficial	Perception of fast food (social pressure)	0.285**
10	Perception of fast food as beneficial	Intention of fast food consumption	0.386**
11	Perception of fast food (social pressure)	Intention of fast food consumption	0.575**

**Correlation is significant at 0.01 level (2-tailed)

*Correlation is significant at 0.05 level (2-tailed)

healthy and frequency of fast food consumption among college girls ($p > 0.05$).

CONCLUSION

It can be concluded that the fast food consumption of government school children was slightly higher than private school children. Hence, private school children were having better attention span ($p \leq 0.05$) and memory retention scores than government school children. Also, fast food consumption showed a significant negative correlation with attention span and memory retention of the school children.

RECOMMENDATIONS

The consumption of fast food needs to be checked among the school children as it has an adverse effect on the attention span and memory retention. The time spent on screens (computer/mobiles/tabs and TV) among children needs to be reduced as it has shown a direct negative impact on attention span of school children. It has also shown an increase in fast food consumption pattern. Also, bringing of lunch boxes with a prescribed menu needs to be encouraged by the school authorities as it reduces the fast food consumption and also has a positive impact on the attention span and memory retention.

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