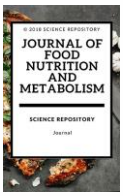

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Research Article

Perceived influences on episodes of (un)healthy eating

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ABSTRACT

The present work investigated episodic memories to identify influences on healthiness of everyday eating episodes carried out by members of the public. The sample included 128 healthy weight undergraduate students from an urban locality in midlands Mexico. Participants reported a recent episode when they ate either healthy or unhealthy food and what influenced them to eat that way. Reported influences were categorised and counted for testing differences in mentions between episodes of healthy and unhealthy eating. The most commonly reported influences on healthy eating episodes concerned wellbeing and weight control. The main reported influences on unhealthy eating episodes were food liking, hunger and convenience. The findings extend our understanding on the most prominent influences on eating choices, which could be useful for tailoring interventions to increase healthy eating and decrease unhealthy eating.

Introduction

A transition in modern societies from healthy to unhealthy eating patterns is largely linked to high prevalence of obesity and chronic diseases [1]. Evidence of influences on healthy and unhealthy eating could inform the design of interventions to promote healthier eating choices. Several studies have investigated the influences on eating, but little research has been done on eating episodes as they occur in normal life [2-5].

Individuals perceive with accuracy multiple aspects of their day to day experiences, so people are likely to be aware of influences on their eating occasions. From a psychology perspective, influences can involve internal and external stimuli that are cognitively integrated and filtrated under specific situations to motivate eating behaviour [6, 7]. For instance, stimulus from hunger sensations (somatic signals), food cues (sensory signals) and people present (social signals) could operate alone or combined to influence eating choices.

Qualitative studies report a wide variety of influences on healthy and unhealthy eating [8-11]. The most cited reasons for unhealthy eating involve food preference (i.e. taste) and convenience [2, 10-13]. Motives to eat healthy foods tend to concern the protection of well-being and body weight [3, 8, 9, 10, 12, 14, 15]. Such research has, however, focused on general perceptions of eating influences rather than on specific episodes and has tended to limit the findings to influences that are inquired in survey designs that have been deductively driven and pre-determined at the outset.

Some studies have investigated influences on eating by asking people to record their eating episodes as they occur in daily life [4, 5, 16-20]. Such studies have also been limited to a few factors such as hunger, food enjoyment or mood and could be biased due to reactivity from monitoring behaviour in real time [21].

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People can accurately remember the activities they carried out in the preceding week period [22, 23]. The salient representations in memory are manifested by the individuals' selection of words to describe any past autobiographical episode [24]. Hence recall of episodic memories could be useful for eliciting ecological valid descriptions on the motives underlying individuals' food choices at eating occasions.

Considering this, it is surprising that there is little research in which individuals have been asked for accounts of the reasons why they have eaten in a healthy or unhealthy way [25-27]. The present study will contribute to the literature by examining memories of the influences on recent episodes of healthy and unhealthy eating as voiced by undergraduate students in an urban locality of Mexico. The aim was to investigate participants' awareness of influences on their everyday eating episodes of healthy and unhealthy eating. The hypothesis was that a large number of diverse types of perceived influences would be reported. The most reported influences would indicate potentially relevant factors on healthiness of eating choices. On the basis of former research reviewed above, it was hypothesised that the main influences to eat unhealthily would include convenience and food liking, and to eat healthily would include intentions to improve health or control weight. Nevertheless, since no research has been conducted in Mexico, different findings may be expected in terms of culture and possible influences perceived on healthy and unhealthy eating episodes.

Method

I Participants and procedure

Volunteers were recruited among undergraduate students the School of Languages of the Autonomous University of the State of Mexico, Toluca city, México. They were informed that the study involved anonymous completion of a questionnaire that explored the characteristics of their eating practices, and signed consent to take part. The ethics committee of the Medical Sciences Research Centre approved the study protocol.

Research assistants visited the students in their classrooms, provided them the study information and invited them to take part. They gave alternately to the participants a questionnaire to report either a healthy or unhealthy eating episode. The questionnaire obtained written information of the respective eating episode as well as demographic and anthropometric data of the participant.

Out of the 129 questionnaires collected, three were excluded based on erroneous information. Therefore 126 questionnaires (57% women and 43% men, $p = 0.40$) were available for analysis, 61 of healthy eating and 65 of unhealthy eating with no differences in age or BMI between conditions (Table 1).

II Measures

Eating episode: The participant described an episode of eating from the previous seven days when she or he ate either healthy or unhealthily (as requested in the assigned questionnaire). The participant was prompted to report type of occasion, ingested food and/or drink, location, timing of the episode and people present. This cognitive technique facilitates mental reconstruction of the episode [22].

Episode healthiness: The participant rated how healthy the eating episode was using a 10-point scale with the anchors *not healthy at all* and *completely healthy* at both ends.

Eating influence: The participant wrote freely what influenced her or him to eat either healthy or unhealthily.

Behavior frequency: The participant reported how many times per week she or he ate in the reported healthy or unhealthy way.

Demographic and anthropometric information: The participants reported their gender, age, weight and height. Body mass index (BMI) was calculated dividing weight in kilograms by height in meters squared.

III Analyses of data

Participants' descriptions of foods and contextual features of eating episodes as well as perceived influences to eat were categorised by two health psychologists (ALC & SJH). The words describing an occasion were divided into the Episode type, Location, People present, Food intake and Influence type corresponding to the prompts to recall. The descriptions were categorised matching phrases or words conveying a similar meaning. Descriptions were allocated into a category by consensus between researchers. The most representative term was used as category name. Any discrepancy was consulted with a third research colleague. To find the most common categories of perceived contextual features, foods and influences for all participants these were counted and converted into percentages. Differences in the proportion of times that each category was counted across eating episodes between healthy and unhealthy conditions were tested using exact probability. Such quantitative analysis has been previously used for examining characteristics of eating episodes reported by people from a different culture [28].

Table 1: Mean [95% confidence interval] of quantitative variables in healthy (HE) and unhealthy (UE) eating episodes

		HE		UE	
		Women n = 36	Men n = 25	Women n = 36	Men n = 29
1	BMI (kg/m^2)	21.9 [21.2, 22.5]	22.4 [21.7, 23.1]	22.2 [21.6, 22.8]	22.3 [21.7, 22.9]
2	Age (years)	19.9 [19.1, 20.6]	21.7 [20.5, 22.9]	20.1 [19.3, 20.9]	21.2 [20.2, 22.3]
3	Episode healthiness (0-10 scale)	7.7 [7.2, 8.2]	7.6 [7.0, 8.1]	2.3 [1.5, 3.0]	3.6 [2.8, 4.3]
4	Episodic frequency (times per week)	4.5 [3.9, 5.0]	4.1 [3.3, 4.8]	2.7 [2.2, 3.2]	2.5 [1.9, 3.1]

Results

I Check of episodes recency

The mean time elapsed between the reported timing of the eating episode and the timing of the completion of the questionnaire was 2.9 [0.6, 5.2] days. Hence participants' reports were within the weekly time span of reliable recall.

II Characteristics of episodes of healthy and unhealthy eating

The eating healthiness ratings were on average higher for episodes of healthy eating than for episodes of unhealthy eating (Table 1). The mean frequency per week for healthy eating was also higher than for unhealthy eating. There were no reliably differences between women and men in contextual features or food types mentioned in episodes of healthy or unhealthy eating (Tables 2 and 3).

Breakfast was reported more frequently in healthy eating and eating between lunch and dinner and eating after dinner were reported more frequently in unhealthy eating (Table 2, lines 2, 5 & 7). Episodes of healthy eating occurred mostly at home and with family members. In contrast, the majority of episodes of unhealthy eating took place out of the home and with friends (Table 2, lines 9 & 21; 11, 14 & 29). Mentions of fruit, vegetables and water were higher in episodes of healthy eating than in episodes of unhealthy eating (Table 3, lines 1-3 & 26). Soft drinks, crisps, sweets, chocolate, biscuits, pizza, potato chips, nuggets and other fast food were mentioned more in episodes of unhealthy eating than in episodes of healthy eating (Table 3, lines 31-38). Other foods also mentioned but with less frequency in episodes of healthy eating were cereals, bread, chicken, egg, meat, milk and fruit drink; and in episodes of unhealthy eating were tacos, spicy food and tortas (Table 3, lines 7-27 & 39-46).

III Influences to eat healthy or unhealthy

Twenty-one categories of influences to eat either healthy or unhealthy were identified (Table 4). There was no evidence that counts of reported influences differed by gender. In men and women, the most commonly reported influences to eat healthy involved intentions to look after their wellbeing, controlling weight and exercising (Table 4, lines 46-77). The reported influences on unhealthy eating involved desire to eat, food liking, hunger and time to eat (Table 4, lines 39-41, 36-38, 32-35 & 19-22).

Table 2: Counts of contextual features in reported episodes of healthy (HE) and unhealthy (UE) eating (%)

	Feature of eating episode	HE		UE		*p*
		Women n = 36	Men n = 36	Women n = 25	Men n = 29	
1	Episode type					
2	*at breakfast*	28	52	6	10	0.0002
3	*between breakfast and lunch*	19	4	17	7	1.00
4	*at lunch*	47	32	39	31	0.65
5	*between lunch and dinner*	6	4	28	31	0.0002
6	*at dinner*	0	8	11	3	0.33
7	*after dinner*	0	0	0	17	0.007
8	Place					
9	*Home*	83	88	44	55	0.05
10	*Out of the home*					
11	*School*	17	12	36	21	0.10
12	*Cafeteria*	0	0	0	3	1.00
13	*Work*	0	0	3	3	0.24
14	*Street*	0	0	8	10	0.004
15	*Market*	0	0	3	0	0.50
16	*Restaurant*	0	0	3	7	0.06
17	*Cinema*	0	0	3	0	0.50
18	People present					
19	*Nobody*	14	40	31	41	0.33
20	*Family members*					
21	*Family*	31	28	14	7	0.02
22	*Parents, mother, father*	22	12	14	7	0.30
23	*Siblings, brother, sister*	11	0	8	0	0.74
24	*Female cousin, male cousin*	3	4	0	0	0.24
25	*Husband, wife*	6	0	0	3	0.36
26	*Aunt, mother in law, brother in law, nephew, niece*	14	0	0	0	0.007
27	*Non-family members*					
28	*Boyfriend, Girlfriend*	3	12	3	0	0.17
29	*Female friends, male friend, friends, classmates*	22	4	36	41	0.01
30	*Maid*	0	0	3	0	0.50
31	Crowd around them	33	24	56	25	0.28

Table 3: Reported foods in episodes of healthy (HE) or unhealthy (UE) eating (%)

	Categories of food	HE		UE		*p*
		Women n = 36	Men n = 25	Women n = 36	Men n = 29	
1	*Fruit, fruits, papaya*	44	32	3	3	0.0001
2	*Juice, natural juice, orange juice, vegetable juice*	8	16	0	0	0.001
3	*Salad, vegetables, cucumber, tomato, radish*	39	32	0	0	0.0001
4	*Vegetable soup*	3	4	0	0	0.24
5	*(vegetable dish) chiles rellenos; tortas de flor de calabaza*	3	0	0	3	1.00
6	*Avocado*	3	0	0	0	0.50
7	*Cereal, oats, muesli*	19	12	0	3	0.0004
8	*Bread, white bread*	17	8	3	3	0.03
9	*Tortilla, tortillas*	11	0	3	3	0.49
10	*Soup, pasta*	19	0	0	0	0.001
11	*Rice*	17	4	3	0	0.02
12	*Chicken soup*	3	0	0	0	0.50
13	*Chicken, chicken breast, chicken fillet, grilled breast chicken*	17	16	0	3	0.0004
14	*(chicken dish) breaded chicken, tinga*	3	4	0	0	0.24
15	*Egg*	3	16	0	0	0.007
16	*Omelette with manchego cheese*	0	4	0	0	0.50
17	*Meat, steak, pork meat, grilled meat*	19	8	0	0	0.0002
18	*(meat dish) milaneza, meat balls, meat in green sauce*	6	0	0	0	0.12
19	*Sandwich*	8	0	0	0	0.06
20	*Tuna, fish*	8	0	0	0	0.06
21	*Ham, sausage*	0	4	0	3	1.00
22	*Cheese*	0	4	0	3	1.00
23	*Milk, whole milk*	19	16	3	3	0.003
24	*Shake, fruit shake*	11	4	0	0	0.007
25	*Yogurt*	3	16	0	0	0.007
26	*Water*	25	12	0	0	0.0001
27	*Fruit water, lemon water, horchata water, Jamaica water*	22	0	6	0	0.03
28	*Jelly*	6	4	0	0	0.06
29	*Tea*	8	4	0	0	0.03
30	*Coffee*	0	0	8	7	0.007
31	*Soft drink, Coca Cola, Coca, Boing juice*	0	0	44	55	0.0001
32	*Crisps, Doritos, Sabritas, chicharrones, savoury snacks*	0	0	44	52	0.0001
33	*Sweets*	0	0	14	14	0.0002
34	*Chocolate, chocolates*	0	0	8	7	0.006
35	*Biscuits*	1	0	17	3	0.007
36	*Pizza*	0	0	14	0	0.006
37	*French fries, potato chips*	0	0	6	3	0.007
38	*Nuggets, KFC, McDonalds*	0	0	8	7	0.12
39	*Maruchan (instant soup)*	0	0	8	0	0.50
40	*Tacos, tacos filled with carnitas, garnachas*	0	0	0	21	0.004
41	*Chilaquiles, spicy food*	0	0	8	3	0.03
42	*Torta, torta filled with milaneza*	0	0	8	0	0.12
43	*Bread with sugar and butter, bread with caramel*	0	0	6	3	0.06
44	*Cake, lemon cake*	0	0	0	6	0.24
45	*Ice-cream*	0	0	3	3	0.24
46	*Popcorns*	0	0	3	7	0.06
47	*Nothing*	0	0	3	0	0.50

Table 4: Mentions of perceived influences to eat healthy (HE) or unhealthy (UE) (%)

	Categories of influence on eating	HE		UE		*p*
		Women n = 36	Men n = 25	Women n = 36	Men n = 29	
1	People	6	4	3	7	1.00
2	HE: *My family*					
3	UE: *I was with friends; my brother*					
4	Who cooks	0	8	3	0	1.00
5	HE: *My mum cooked; my aunt cooked*					
6	UE: *I do not have no one who cooks me*					
7	Place	8	4	8	7	0.78
8	HE: *place*					
9	UE: *I was not at home; out of home; I went to the cinema; I was in a shop*					
10	Accessibility	8	4	11	14	0.21
11	HE: *It was served in my house; there was only that to eat in my house; it was the*					
12	*meal of the day; it is what is cooked in my house*					
13	UE: *accessibility; there was nothing else; it was the only food that I found away*					
14	*from home; I can only eat fast food; there is what is available in my school; it was the*					
15	*most accessible; it was the only thing to eat*					
16	Easiness of preparation	3	0	6	3	0.44
17	HE: *it was the easiest thing to cook;*					
18	UE: *easy preparation, easiness*					
19	Time to eat	0	4	19	17	0.001
20	HE: *I had extra time; I had time to cook; I have time to prepare*					
21	UE: *Lack of time; there was no time; I do not have time to eat well; because of*					
22	*the time; I did not have much time; little time; time; because of other activities*					
23	Laziness	0	0	0	7	0.24
24	HE: -					
25	UE: *Laziness*					
26	Money	3	0	0	3	1.00
27	HE: *price*					
28	UE: *price; little money; the food in the school is expensive*					
29	Emotions	0	4	3	0	1.00
30	HE: *preoccupation, I felt tired*					
31	UE: *anxiety*					
32	Hunger	3	0	11	10	0.02
33	HE: *I was hungry*					
34	UE: *hungry, I was hungry; I hadn't eaten for a while; I did not have breakfast;*					
35	*when I finish eating sometimes I am still hungry*					
36	Food liking	3	4	11	17	0.02
37	HE: *I like it*					
38	UE: *it is very tasty; tastes good; I like Coca Cola; I do not like drinking water*					
39	Desire to eat	3	4	42	28	0.0001
40	HE: *I craved it, craving*					
41	UE: *craving, I craved it; I craved them; I felt like eating them*					
42	Habit	3	12	8	3	1.00
43	HE: *habit; my habits; routine; custom; it is normal…*					
44	UE: *I have bad habits; I do not have the habit; I usually do it when I watch*					
45	*television; I have the habit*					
46	Awareness	11	0	0	0	0.03
47	HE: *to help my family eat in the same manner; I have been always educated to*					
48	*eat in a balanced way; teaching in the school that there are diseases; it is important*					
49	UE: -					
50	Eating well	33	12	0	3	0.0001
51	HE: *I require good eating; good combination; eating healthily; I like eating well;*					
52	*eating should be abundant and balanced; I try to balance and vary my eating; try to*					

	improve my eating; breakfast is the most important meal of the day; there are proteins in the foods; because of the proteins; I need vitamins; not wanting to eat too much					
	UE: *lack of knowledge about what foods to combine*					
	Health	22	16	0	0	0.0001
	HE: *healthy; my health; health; to have good health; to feel myself healthy*					
	UE: -					
	Health issues	11	12	0	0	0.001
	HE: *to have good digestion; medical issues; I have gastritis; my digestive process is slow; I have renal stones; the fats have produced me pain and unwellness; my mum has fatty liver and my dad renal stones, so we have a healthy life*					
	UE: -					
	Exercise	11	12	0	0	0.001
	HE: *athlete; I train; I practice sport; I am doing exercise; I practice sport; better condition*					
	UE: -					
	Energy	6	4	0	0	0.06
	HE: *to start the day well; active the rest of the day; more energy*					
	UE: -					
	Body figure	8	4	0	0	0.03
	HE: *physical appearance; to have a good body; to feel myself lighter; better body*					
	UE: -					
	Weight control	11	0	0	0	0.03
	HE: *I am on a diet to reduce body fat; because I were formerly overweight; because I felt I am gaining weight; reduce weight*					

Discussion

As expected, undergraduate students wrote down a wide variety of influences on their recent episodes of healthy and unhealthy eating. The present study showed that intentions to protect wellbeing were perceived as the dominant influence on episodes of healthy eating. This finding agrees with survey and qualitative studies indicating that a common general reason for eating healthy concerns the perceived benefits for maintaining or improving health or weight [3, 8-10, 12, 14, 15]. It is also consistent with findings that health-related goals are the most prevalent influences on everyday eating occasions against tempting food [5]. The finding is also supported by conclusions from a review that forming intentions to eat healthy foods can be effective to increase intake of healthy food [29].

The most common influences on episodes of unhealthy eating perceived by participants were desire for tasty food, hunger and convenience, and these are consistent with previous research findings. In the present study the desire to eat tasty food was the most common influence on unhealthy eating and supports other findings that perceived taste is a dominant influence on unhealthy eating [2, 12, 13]. Field studies examining influences on eating behaviour have also found that sensory appeal of foods is influential in unhealthy eating episodes [25, 26]. This is consistent with the view of taste as a relevant sensory cue in food preference possibly through its association with a positive hedonic response [30].

Hunger sensation was another perceived influence on episodes of unhealthy eating that has also been frequently reported by people as a reason to eat unhealthy foods [25, 26]. The other reasons to eat unhealthy foods in the present study were related to convenience and have been also found across qualitative studies as primary factor to eat unhealthy food [2, 10, 11].

The presence of other people was only occasionally reported as an influence to eat either healthy or unhealthy foods. However, consistent with a previous study, eating with friends or with crowd around appeared to characterise more episodes of unhealthy eating and eating with family members characterised more episodes of healthy eating [28].

Emotions were not a frequently reported influence on eating episodes. A previous study found no evidence that negative emotions such as stress, anxiety and sadness predicted episodes of unhealthy eating [20]. It may indicate that young healthy weight individuals are less affected by emotions than overweight individuals in daily eating episodes as previous research has found [31].

The findings of the present study describe the environment of modern societies characterised by high availability of tempting unhealthy food that can influence individuals to eat unhealthy particularly when they are hungry and out of the home. The present study points also to the underlying cognitive conflict between healthy eating intentions and desires to eat tasty food [5]. Such connections between specific influences, self-control and eating episode healthiness can be fruitfully examined using the approach presented in the current study.

The present study cannot show that reported episodes really occurred. Reports of past personal experiences can be biased by suggestive questions [32]. Such biases were avoided in the present study by applying cognitive interview technique [22]. Reporting an actual event is also cognitively less demanding than confabulating a past event [33]. More evidence is however needed to substantiate the actual role of perceived influences on peoples eating choices. Recent episodic memory

is beginning to be applied to the study of different aspects of eating behaviour. For instance, using a similar approach a study found that different aspects of the recalled context of evening meals were associated with amount of consumed energy at that episode [27].

The current study extends a previous investigation on recent episodic memories that characterised foods, sort of episode, time of the day, location and people present of episodes of healthy and unhealthy eating [28]. The main contribution of the present study was the identification of perceived influences on choice of healthy and unhealthy foods that they ate. These influences on eating episodes for Mexican individuals have not been reported previously.

Knowledge of the most prominent influences on eating choices could be useful for tailoring interventions to increase healthy eating. There are many examples in the scientific literature of environmental and individual interventions to promote healthier food choices [34]. In the investigated student population, a tailored intervention could be to reduce the preference for tempting unhealthy foods, particularly out of home. Examples could include to increase availability of healthy enjoyable food or to prepare healthy food at home in advance to eat out [35, 36]. Another tailored intervention would be to raise healthy eating intentions across students. An example could be to share the information reported by students about what works the most for achieving healthy eating choices.

The findings are limited to a sample consisted of only healthy weight individuals derived from just one school at a single University. Future research would do well to explore the influences on eating in other groups and localities. In addition, the incidence of influences is likely to be in a dynamic state. So subsequent research could track the occurrence of influences over time.

Conclusion

This study explored people's memory of their recent eating episodes to gain insight into the realities of their eating. The findings extend the understanding towards the identification of potentially relevant influences on healthiness of eating as perceived by individuals. This innovative approach can be useful for developing strategies to facilitate healthy eating among members of the public.

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