

## Artikel Asli/Original Articles

# Social and Multimedia Influence on Endurance Athletes' Preferred Snack Choices (Pengaruh Sosial dan Multimedia terhadap Pilihan Snek Kegemaran Atlet Ketahanan)

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### ABSTRACT

*Snacks are required for athletes to fuel their higher demand of energy. Meanwhile, social influences and multimedia can affect the athletes' choices of snacks. Social influences are divided into three categories: Compliance (sports dietitian/nutritionist & medical officer), Conformity (friend) and Obedience (parent & coach), while multimedia refers to internet, magazines and newspaper. The objective of this study was to investigate the different sources of social influence and multimedia on athletes' preferred snacks. Out of 26 snack choices, 3 most preferred snacks were chosen by 69 endurance athletes from the National Sports Institute (NSI) through a questionnaire. They are Popiah & Mixed Fruit Jelly, Chicken Salad and Egg & Cheese Sandwich. Out of the 6 choices of beverages, the top 3 preferred beverages were sports drinks, orange smoothie and apple smoothie. Social influence from parent ( $p = 0.041$ ) has significant effect on the athlete's most preferred snack choice, followed by influence from dietitian ( $p = 0.02$ ) on their second preferred snack choice and lastly internet ( $p = 0.024$ ), has its effect on the third preferred snack. Other social influences such as friends, medical officer and coach show no significance effect on the preferred snack choices. The parent factor also has significant effect on the most preferred beverage choices with  $p = 0.043$ . To conclude, parent influence is strongly related to both snack and beverage choices of the athletes, followed by dietitian and internet on the athlete's preferred snack choices.*

*Keywords: Snack; social influence; endurance athletes; nutrition; multimedia*

### ABSTRAK

*Pengambilan snek adalah penting untuk memenuhi keperluan teenage atlet yang lebih tinggi, dan ia boleh dipengaruhi oleh sosial & multimedia. Pengaruh sosial dibahagikan kepada tiga kategori: Pematuhan (ahli diet sukan/pemakanan & pegawai perubatan), Conformity (kawan) dan Kepatuhan (ibu bapa & jurulatih), manakala multimedia merujuk kepada internet, majalah dan surat khabar. Objektif kajian ini adalah untuk mengenal pasti pengaruh sosial dan multimedia terhadap pengambilan snek atlet. Daripada 26 pilihan snek, 3 snek paling digemari telah dipilih oleh 69 atlet ketahanan daripada Institut Sukan Negara (ISN) melalui borang soal selidik. 3 snek ini adalah, Popiah Basah/Jeli Buah-buahan, Salad Ayam and Sandwic Telur dan Keju. Daripada 6 pilihan minuman, tiga pilihan utama adalah minuman sukan, smoothie oren dan epal smoothie. Pengaruh sosial daripada ibu bapa ( $p = 0.041$ ) mempunyai kesan yang signifikan pada pilihan snek paling digemari atlet, diikuti oleh pengaruh dari ahli diet ( $p = 0.02$ ) pada pilihan snek pilihan kedua atlet dan akhirnya pengaruh dari internet ( $p = 0.024$ ) ke atas snek pilihan ketiga. Pengaruh sosial lain seperti rakan, pegawai perubatan dan jurulatih tidak menunjukkan kesan signifikan pada pilihan snek atlet. Pengaruh dari ibu bapa juga mempunyai kesan yang signifikan ke atas pilihan minuman paling digemari dengan  $p = 0.043$ . Kesimpulannya, pengaruh ibu bapa berkait rapat dengan kedua-dua snek dan minuman pilihan atlet, diikuti oleh ahli diet dan internet pada pilihan snek pilihan atlet.*

*Kata kunci: Snek; pengaruh sosial; atlet ketahanan; pemakanan; multimedia*

### INTRODUCTION

Unlike normal individual, endurance athlete has higher energy demand due to their increased level of activity for training and competition. High carbohydrate (CHO) foods are recommended to ensure the availability of the glucose for continuous fuel consumption for the athletes (Burke 2011). Apart from their main meal, one of the many ways to meet their higher energy demand is by snacking. Some of the guidelines on CHO intake are 10-12 g/kg<sup>1</sup> taken 24 hr

before competition (also known as carbohydrate loading), 30-60 g.h<sup>-1</sup> of CHO intake during endurance exercise (1-2.5 hr) or up to 90 g.g.h<sup>-1</sup> of CHO intake during ultra-endurance exercise (>2.5-3.0 hr), 1.5 g/kg of CHO intake within 30 min after the competition (Burke et al. 2011; Jeukendrup 2011; Cermak & van Loon 2013; Potgieter 2013; Spriet 2014). However, recent studies have showed that the athletes are not eating enough (Joy et al. 2016; Martinsen & Sundgot-Borgen 2013; Sundgot-Borgen & Torstveit 2010). Therefore, nutritional education or advice

is essential to improve the athletes' eating habit through proper snacking.

While it is common to seek for nutritional advice from sports dietitian/nutritionist, nutritional advice can also be taken from varying social influence around the athletes. Gibson & Smart (2013) reported that social psychologist has categorised social influence into 3 forms: compliance, conformity and obedience. Compliance is defined as the kind of response to kind of communication, usually a request (Cialdini et al. 2004). An example of the compliance in the field of sports nutrition is the compliance of the athletes towards the request of their sports dietitians/nutritionists and medical officer. Social conformity is the change of one's attitude, beliefs or behaviours to match group norms that are implicitly or explicitly shared by a group of individuals (Xie et al. 2016; Cialdini et al. 2004; Asch 1951). Friends or peers' influence is a good example of this. Obedience, on the other hand refers to the direct request from an authority figure to one or more person. (Nail et al. 2000). Coach (Poczwadowski 2002) and parent (Xie et al. 2016) are categorized under this social influence.

Apart from social influence, the rise of multimedia could be another influencing factor to the athletes' food choices. The findings by WHO (2002) shows that media was part of the factors influencing food choices of adolescent. In Malaysia, it was reported that Malaysian youth age 18-25 are at high risk of internet addiction (Kapahi 2013). The higher internet usage exposed the adolescent to internet influence on their food choices. It was reported by Jacobson & Gemmell (1991) that magazine is one of the common source of nutrition information for softball players.

As of today, while there are many studies that looked into the amount and when the snacks should be taken to improve the athletes performance, there is a lack of study that considers the effect of social and multimedia influence on the athletes' preferred snack choices. Therefore, the objective of this study is to investigate the effects of social influences and multimedia on the preferred snacks and beverages of the Malaysian endurance athletes.

## EXPERIMENTAL METHODS

Athletes of National Sports Institute (NSI) were recruited in this study. The inclusion criteria of the study were endurance sports athletes, while the exclusion criteria were paralympic athletes, strength and power athletes. Sample size calculation was made based on formula by Daniel (1999). The total population provided was 72 and at 5% significant value, the prevalence was set at 0.5. Therefore, the total sample size needed was 69 people. Convenience sampling was applied and all athletes were recruited.

A separate list of 26 snacks and 6 beverages, were given with a picture booklet for reference. The subjects were required to rank their top 3 preferred snacks; with "1" as their most preferred snack, "2" as their second

preferred snack, "3" as their third preferred snack. This was followed by the beverages; with "1" as their most preferred beverage, "2" as their second preferred beverage, "3" as their third preferred beverage. The top 3 preferred snacks and beverages choices were determined based on the frequencies of the snacks or beverages chosen by the subjects. The list of snacks and beverages were taken from the recipe book entitled "The Competition Nutrition Snack Idea." The complete list can be found in Appendix A. This recipe book was chosen because it was developed by NSI and the food and beverages listed were the commonly known snacks to the athletes. Therefore, the definition of snacks was self-explained.

A questionnaire was also given to inquire athletes' source of nutritional advice. The sources of nutritional advice were then categorized base on the social influence as defined earlier (Table 1). The athletes could pick as many source of nutritional advice as they can. Statistical analysis was performed using SPSS software version 22 (IBM, USA). Descriptive statistics were used to analyse the demographic information. Mann-Whitney test was performed on the relationship between snack's ranking with different nutritional advice sources & multimedia factor. Ethical approval was obtained from Universiti Kebangsaan Malaysia (NN-068-2015) and subjects' written consent was obtained, before the list of snacks and questionnaire were given.

TABLE 1. Category of social influence with its sources of nutritional advice in the questionnaire

Compliance	Conformity	Obedience
Sports Dietitian/Nutritionist	Peers/Friend	Coach
Medical Officer		Parent
Multimedia		
Internet		
Magazine		
Newspapers		

## RESULTS

Only 69 endurance athletes were included in the data analysis, as 3 participants were excluded because they did not complete the questionnaire. Characteristic of the participants were summarized in Table 2.

As shown in Figure 1, the most preferred snack choice (S #1) of the athletes were *Popiah* and Mixed Fruit Jelly. The second preferred snack (S #2) is Chicken Salad, and the third preferred snack (S #3) is Egg & Cheese Sandwich. Sports drinks is the most preferred beverage (B #1) among the athletes. The second preferred beverage (B #2) is orange smoothie, and the third preferred beverage (B #3) is apple smoothie (Figure 2).

TABLE 2. Characteristics of participants

Characteristic	n	%	Mean
Subjects	69		
Gender			
Male	57	83	
Female	12	17	
Age			19.2 ± 3.0
Ethnic			
Malay	33	48	
Chinese	29	42	
Indian	2	3	
Others	5	7	
Education level			
High school	47	68	
Matriculation	10	14	
University	12	18	
Years of involvement			5.7 ± 3.0
Types of sports			
Cycling	35	51	
Swimming	13	19	
Athletic	11	16	
Football	7	10	
Others	3	4	

It was found that the most preferred snack (Table 3), was significantly related to those who acknowledge that they received nutritional advice from their parent ( $p = 0.041$ ). The second preferred snack was significantly related to the dietitian influence factor ( $p = 0.020$ ) while the third preferred snacks was significantly related to multimedia, the internet ( $p = 0.024$ ). There was no significant difference observed between the preferred snacks with gender, age, ethnic, education level, years of involvement and the types of sports. There was significant parent's influence on the most preferred beverage choice among the athletes in Table 4 ( $p = 0.043$ ). No significant influence from the multimedia to the preferred beverages choices was observed.

## DISCUSSION

The social influence from parent were significantly related to the most preferred snack and beverage choice of snack of the athletes. This results indicate that the learned and practised eating habits developed since young, due to their obedience to the parent's requirement (Xie et al. 2016), still has its effects as the athletes enter adolescent. Apart from

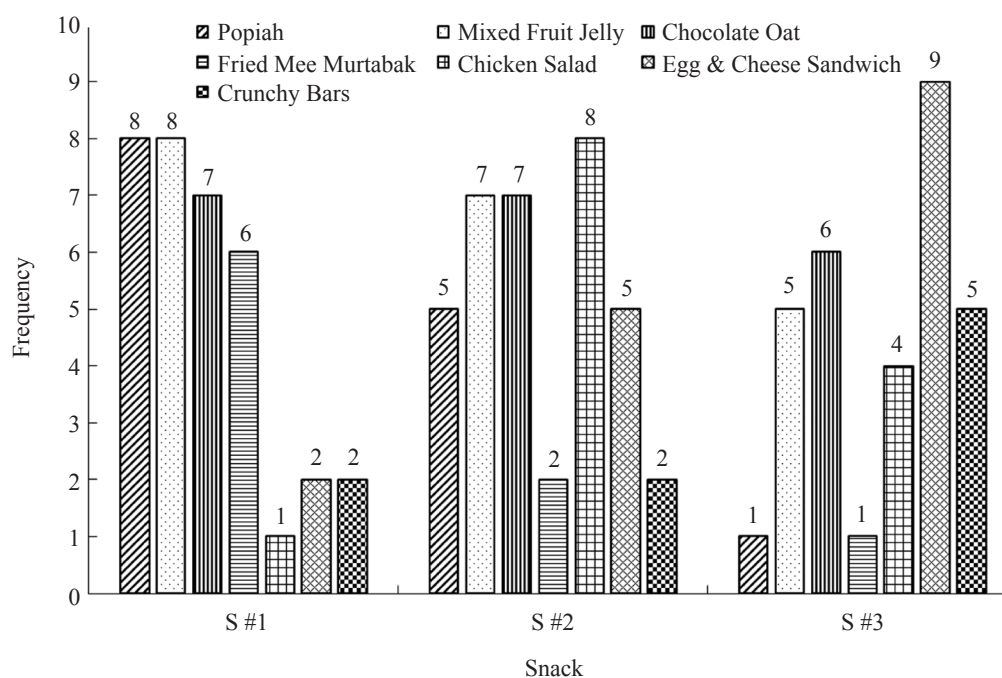


FIGURE 1. Athletes' top 3 preferred snacks

parent, coach is also considered as an authoritative figure. Poczwadowski (2002) theorized that the athlete-coach relationship provided a channel in which influence can be realized. However, in this study, the social influence from the coach has no significant effect on the athlete's preferred snack choices. Although both parent and coach falls under the social influence category of "Obedience," only the parent factor showed significant effect. The possible

explanation may be due to the negative influence of parent on the coach-athlete relationship (Jowett & Timson-Katchis 2005). For example, if the athletes are still young and dependent on the parent, they tend to listen to their parent more and result in a less secure, strong coach-athlete bond. A coach-athlete weaker bond signifies a lesser influence that the coach can has on the athletes.

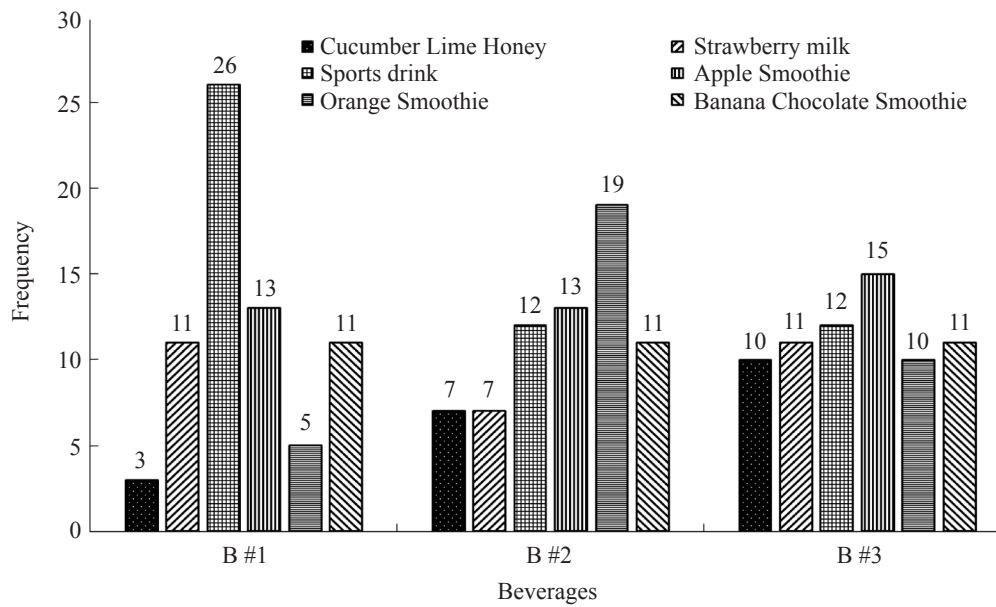


FIGURE 2. Athletes' top 3 preferred beverages

TABLE 3. Social influence & multimedia influence on athlete's top 3 preferred snack

Snacks Rank	Social Influence	p	Multimedia	p
1	Parent <sup>a</sup>	0.041*	Newspaper	0.585
	Friend <sup>b</sup>	0.438	Internet	0.143
	Coach <sup>a</sup>	0.965	Magazine	0.862
	Dietitian <sup>c</sup>	0.435		
	Doctor/Medical Officer <sup>c</sup>	0.438		
2	Parent <sup>a</sup>	0.074	Newspaper	0.659
	Friend <sup>b</sup>	0.355	Internet	0.828
	Coach <sup>a</sup>	0.430	Magazine	0.727
	Dietitian <sup>c</sup>	0.020*		
	Doctor/Medical Officer <sup>c</sup>	0.355		
3	Parent <sup>a</sup>	0.865	Newspaper	0.921
	Friend <sup>b</sup>	0.276	Internet	0.024*
	Coach <sup>a</sup>	0.758	Magazine	0.878
	Dietitian <sup>c</sup>	0.308		
	Doctor/Medical Officer <sup>c</sup>	0.78		

<sup>a</sup>Obedience, <sup>b</sup>Conformity, <sup>c</sup>Compliance. \*significance at  $p < 0.05$  between those who say yes and no to this source of nutritional information

TABLE 4. Social influence on athlete's top 3 preferred beverages

Drinks Rank	Social Influence	p
1	Parent <sup>a</sup>	0.043*
	Friend <sup>b</sup>	0.068
	Coach <sup>a</sup>	0.185
	Dietitian <sup>c</sup>	0.641
	Doctor/Medical Officer <sup>c</sup>	0.722
2	Parent <sup>a</sup>	0.614
	Friend <sup>b</sup>	0.233
	Coach <sup>a</sup>	0.930
	Dietitian <sup>c</sup>	0.381
	Doctor/Medical Officer <sup>c</sup>	0.560
3	Parent <sup>a</sup>	0.111
	Friend <sup>b</sup>	1.000
	Coach <sup>a</sup>	0.862
	Dietitian <sup>c</sup>	0.308
	Doctor/Medical Officer <sup>c</sup>	1.000

<sup>a</sup>Obedience, <sup>b</sup>Conformity, <sup>c</sup>Compliance \*significance at  $p < 0.05$  between those who say yes and no to this source of nutritional information

The second preferred snack were strongly related to nutritional advice from dietitian, the compliance influence factor. This result is consistent with other literature findings that the dietitian was often seek for nutritional advice (Jacobson 1991; Heaney 2011). Such response may be due to the effectiveness of persuasion from an expert. It was reported that when the product was matched with an expertise, the participants attitude towards the objects were favoured by 12% and the probability of the object recognition will be increased by 10% (Klucharev et al. 2008). In Coakley (1986, 1990), they reported that the coach has a big impact on the athletes' training and performance outcomes. It may be due to the different area of expertise that the coach has, as compare to the dietitian that the athletes tend to obtain their nutritional advice from the right expert. Therefore, social influence from dietitian played a significant role as their altered the athlete's eating habits, with their expertise in nutrition counselling.



As for the third preferred snacks, the results showed that multimedia, the internet, was strongly related to the athlete's snack choices. This finding was consistent with the previous report that internet coverage of nutrition issues has an influence on the adolescent food preference (Spendlove 2012; Ostry 2008; Rosenbloom 2006). Although it was proposed by Spear (1996) that magazines probably have more influence than any other form of mass media, but magazine does not have any effect on the athletes' preferred snack choices in this study. It is possible that with the highly accessible internet has make it easier and faster for the athletes to look for nutritional information, as compared to printed materials (Holroyd et al. 2007). However, it is important to take note and suggested by Devlin (2015), that there is a need to ensure the information provided in the internet are accurate or validated.

As compared to the Mixed fruit jelly, the results showed that the rest of the preferred snacks were protein rich snacks (Table 5). Chicken salad (33.3 g of protein per serving) and egg & cheese sandwich (15.3 g of protein per serving) are considered as snacks that provide good source of protein. This is not ideal as, it was recommended by Jeukendrup & Killer (2010) that pre-exercise carbohydrate, not protein, is beneficial to the endurance athletes. Seemingly, the influence from parent is strongly related to their most preferred snacks, it is not surprised to see the choices snacks may not be appropriate to the nature of their sports. Reminders and education should be given to the athletes to ensure they outsource nutritional information from the expert.

TABLE 5. Nutrient content of athlete's top 3 preferred snack

Snack	Per Serving			
	Energy/kcal	CHO/g	PRO/g	Fat/g
Mixed Fruit Jelly	108	26.6	0.5	0.0
Chicken Salad	258	18.5	33.3	5.5
Egg & Cheese Sandwich	236	22.5	15.3	9.5

The limitation of this study was the types of snacks that were listed (26 snacks) may not be representative of the substantial amount of sport snacks available in the market. However, taking into consideration that the list of snacks was developed by NSI and based on its availability to the athletes, we find this list most relevant to the athletes. For future studies, it is recommended to apply clinical interviews, after the questionnaire, for a two-tier approach. The same can be applied to investigate if the same social influence and media effect falls on other category of sports, as the current study only covered endurance sports.

## CONCLUSION

In conclusion, this study indicated that social influences from parent, dietitian and the internet were strongly related

to athletes' top three preferred snack choices. Other social influences such as coach, friends & medical officer; or other multimedia such as newspaper & magazine, has no significant influence on the athlete's preferred snack choices. Parent's influence was also related to the athletes' most preferred beverage choices.

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Appendix A: List of Snacks & Beverages

Snacks

Soy Lychee Pudding  
Popiah  
Fried Mee Murtabak  
Egg Tortilla  
Sausage Tortilla  
Mixed Fruit Jelly  
Crunchy Bars  
Fish Burger  
Chocolate Oat  
Bolognese Oat  
Dark Chocolate coated Oat  
Banana and Grape Parfait  
Fish Finger  
Chicken Salad  
Homemade Energy Gel  
Apple Tortilla  
Blue Berries Pancake  
Tuna Pizza  
Tuna Macaroni  
Fruit Salad  
Peanut Butter Oat  
Egg & Cheese Sandwich  
Pita Sausage & Peanut Sandwich  
Nata de Coco Jelly  
Banana Pancake

Beverages

Cucumber Lime Honey  
Cold Milk  
Sports drinks  
Apple Smoothie  
Orange Smoothie  
Banana Chocolate Smoothie

