



Factors influencing food choice of athletes at international competition events

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ABSTRACT

Although the nutrient requirements and dietary intake of athletes have been thoroughly investigated, little is known about the influences on their food choice, particularly prior to and during competition. This study sought to investigate factors that influence food selection of athletes at two similar international competition events: the Melbourne 2006 and Delhi 2010 Commonwealth Games. A secondary aim was to explore differences in these factors between at each event given the culturally diverse locations. A survey developed for this study was distributed to athletes in the village dining hall at both events. Athletes scored a selection of factors influencing food choice on a scale of 1 (not important) to 5 (very important). A total of 769 individuals completed the questionnaire in total, with 351 (46%) from Delhi and 418 (54%) from Melbourne. Overall, athletes rated nutrient composition ($M = 4.22$), stage of competition ($M = 4.09$), time of day ($M = 4.02$) and familiarity of the food ($M = 4.07$) higher than sensory properties (smell $M = 3.88$; visual appearance $M = 3.22$) when making a food selection. Visual appearance ($p = 0.01$), stage of competition ($p < 0.001$) and time of day ($p = 0.01$) had greater influence in Delhi than Melbourne. Overall, a significantly higher proportion of female athletes rated smell ($p < 0.001$) and familiar food ($p < 0.001$) as important compared to males. The stage of competition and nutrition composition was rated as very important by the greatest proportion of athletes from weight category sports (61.9%) and endurance sports (57.9%) respectively. The influence of the coach and team mates was less of an influence than other factors, but more so for athletes from Non-Western regions. Further investigation of the various determinants and motives for food selection of athletes from a range of sports and cultures is warranted.

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1. Introduction

Athletes are a unique population with specialised dietary needs. An adequate energy intake in combination with the right balance of carbohydrate, protein and fat, is essential for optimal athletic performance and recovery (Thomas, Erdman & Burke, 2016). However, appropriate dietary intake for performance is not the only factor that drives the food choice of an athlete. The process of food selection in the broader population is complex and in addition to biological factors including taste and sensory perception, selection may be influenced by food quality, and convenience, health and nutrition beliefs in addition to psychological, social, cultural and economic influence (Furst, Connors, Bisogni, Sobal, & Falk, 1996). The recently

developed DONE framework (Determinants of Nutrition and Eating Behaviour) (Symmank et al., 2017) suggests that adult food choice can be divided into four major categories that include individual, interpersonal, environment and policy factors. A systematic review using the DONE framework found that to date most research has focused on individual factors such biological (sensory factors), demographic (e.g. cultural influences) and psychological (mood, emotion, food beliefs and health) and influence of the individual product attributes (prices and food labels) (Symmank et al., 2017).

Despite the growth in research in this field in the general population, few studies have investigated food choice amongst athletes. Most studies on athletic populations have focused on eating behaviours, nutrition knowledge or nutrient intake of specific athletic groups with the majority of studies centred on the eating behaviours of female athletes with eating disorders and minimal investigating food choice itself (Long, Perry, Unruh, Lewis, & Stanek-Krogstrand, 2011; Smart & Bisogni, 2001). The results of these studies tend to support the findings of non-athletic populations. For example,

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investigation of food choice and meal selection of army personnel in a live-in camp with a cafeteria, found taste and quality, followed by size of portions (related to cost), length of the serving line, individual cravings, nutrient density of the food, amount of time available to eat and appetite had the most influence on food selection (Sproull, Canter, & Schmidt, 2003). A recent narrative review of food choice in athletes supported the lack of research on this group, and suggested that food selection in athletes may be influenced by additional factors that are specific to their sport such as performance expectations, concerns about body composition and stage of training, as well as factors common to the general population such as taste, convenience, culture or religious beliefs, peer influences, marketing, health and cost (Birkenhead & Slater, 2015). This review recommended further focus on the influence of culture given the growing international participation of athletes from around the world (Birkenhead & Slater, 2015). Thus, further research is needed to explore food choice determinants of athletes and how this translates into eating behaviours, particularly as athletes can spend time both travelling and living away from their home environment for both training and competition. There is evidence to suggest that groups that are analogous to athletes, such as musicians and singers, who also travel regularly to perform, report difficulties with food selection and reported that they would benefit from support with their food choice (Cizek, Kelly, Kress, & Mattfeldt-Beman, 2016).

Large scale competition events such as the Olympic and Commonwealth Games may involve athletes living in a village environment for long periods of time. Some athletes are away from home for the first time and may not have previously travelled to another country. The country that hosts these events is different on each occasion, which in turn influences the food environment including cultural beliefs, food availability and food handling practices. The food provision within the village is provided by large scale catering companies and thus the range of items provided is extensive, with the aim of catering for many cultures, religions, ages, and sporting needs (Burkhart & Pelly, 2013a; Pelly, O'Connor, Denyer, & Caterson, 2009; Pelly, O'Connor, Denyer, & Caterson, 2011). Thus, decisions about appropriate food and ultimately dietary intake by the athlete in this environment may vary to their home environment. We have previously shown a relationship between both cultural background and sport in terms of athlete opinion of the suitability of the food (Burkhart & Pelly, 2013a). We have also shown that dietary intake for some individual athletes is not consistent with performance nutrition, yet the reason may be related to lack of education on what to select (Burkhart & Pelly, 2016).

The cross section of athletes from many countries and sports that compete at major competition events is unique and access by researchers is often limited. Commonwealth Games events occur every four years and thus the ability to investigate change over time in a similar culturally diverse population group participating in similar sports is limited. To date, no studies have investigated food choice relevant to the environment of an athletes' village with a culturally diverse group of athletes at two analogous events, four years apart. Thus, the aim of this study was to investigate the influence of a selection of factors relevant to athletes that could potentially influence food choice in the dining hall in the athletes' village at two similar international competition events: the Melbourne 2006 and Delhi 2010 Commonwealth Games. A secondary aim was to explore differences in the food choice factors reported by the athlete cohorts at each event after adjusting for confounders.

2. Material and methods

2.1. Questionnaire

A survey was designed specifically for the purpose of this

observational study and is described elsewhere (Pelly, King, & O'Connor, 2006). Questions rating food choice included: 1) individual factors of nutrient content, visual appearance and smell, familiarity, stage of competition and time of day; 2) an environmental factor of proximity to entrance; and, 3) interpersonal factors of presence of team mates or coach. These were based on a five-point Likert scale ranging from 1 "not important" to 5 "very important". Demographic characteristics such as age, gender, sport, event, nationality, and previous attendance at a Commonwealth or Olympic Games were also collected. The questions relating to food choice were not altered after the Melbourne 2006 games and thus were identical for both events to allow direct comparison.

2.2. Participants

Athletes that were present in the main dining hall of the athletes' village at the Melbourne 2006 or the Delhi 2010 Commonwealth Games were invited to participate in this study. The competition events were similar in terms of participation, sporting events and level of competition, but were held in different countries (Australia and India) four years apart. Surveys were distributed to diners and completed on a voluntary basis during March 2006 and September–October 2010. The study was approved by the University of the Sunshine Coast Human Research Ethics Committee. (A/10/253).

2.3. Data analysis

Data were analyzed separately and pooled from both competition events. Seven sport categories and seven regional categories were determined *a priori* to classify survey respondents. Sport categories were based on those used in previous studies (Burkhart & Pelly, 2013a) including aesthetic (e.g. gymnastics, diving), endurance (e.g. distance runners, marathon, triathlon), power/sprint (e.g. athletic field events), racquet (e.g. badminton, tennis), skill (e.g. archery, shooting), team (e.g. hockey, basketball, netball), and weight (e.g. wrestling, weightlifting, boxing). Statistical analyses were undertaken using SPSS for Windows (Version 22.0, SPSS Inc, Chicago, IL) and R (R Core team, 2016). Categorical questionnaire responses were analyzed using Chi-Square tests, Kruskal-Wallis Anova test was used to compare the medians of groups, and *t*-tests to compare the means between groups. Descriptive statistics including frequencies, means, and standard deviations were calculated. A lower *n* was used where data was incomplete. Significance was considered to be $p \leq 0.05$. *P*-values were corrected within tables using the method of Holm (1979) as noted.

3. Results

A total of 769 individuals completed the questionnaire in total, with 351 (46%) from the Delhi 2010 and 418 (54%) from the Melbourne 2006 Commonwealth Games, representing 9.3% and 7.2% of the athlete population residing in the village. The characteristics of the individual and combined cohorts are presented in Table 1. The Melbourne cohort of athletes were significantly older and less experienced than participants at the Delhi Commonwealth Games.

The factors that were reported to influence food choice are reported in Table 2. Nutrient composition, stage of competition, familiar food and time of day were rated important by the majority of athletes. After adjusting for confounders, the visual appearance and time of day were rated more important in Delhi with a higher proportion agreeing/strongly agreeing, whereas the nutrient composition was considered more important in Melbourne. The coach and team mates did not influence the food choice of most athletes, but the coach had more influence in Delhi than in

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