Proceedings of the Nutrition Society (2009), **67 (OCE7)**, E263 doi:10.1017/S0029665108009269

The challenge of translating nutrition research into public health nutrition, University College, Dublin, 18–20 June 2008

Dietary patterns in adolescents: a comparison of cluster and principal component analyses

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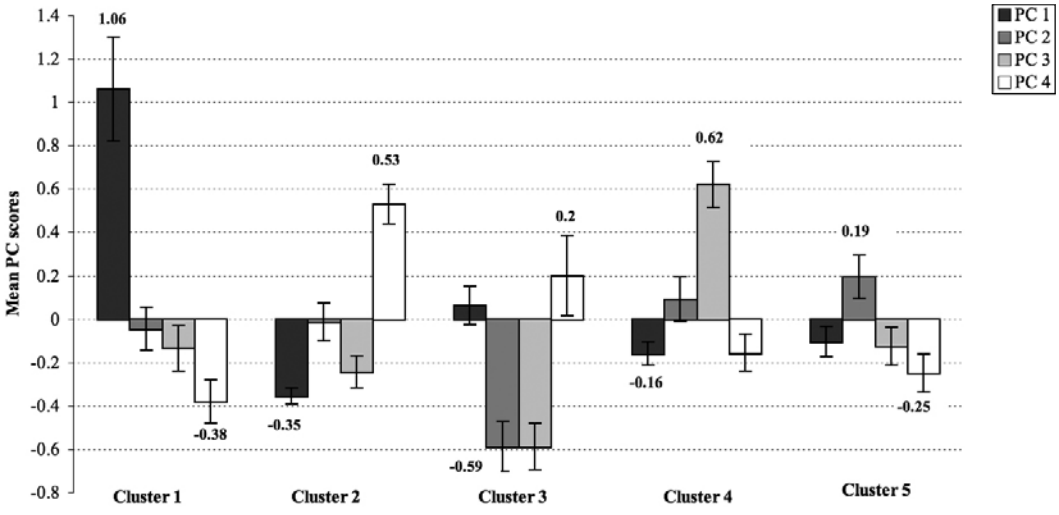
Traditionally, nutrition research has been focused on the detailed examination of nutrients and dietary components. However, in more recent years public health nutrition has seen a move from research at the nutrient level to the food level. Both cluster and principal component (PC) analysis (PCA) offer a means of exploring dietary patterns at this level. In cluster analysis dietary data are reduced into mutually-exclusive patterns based on differences in dietary intakes. In PCA dietary patterns are derived based on the correlation matrix of the original food variables and individuals receive a continuous factor score for each PC. Without effective intervention poor eating habits developed during adolescence may 'track' into adulthood[1].Thus, it is important to document their dietary practices and identify areas in which strategies can be focused. In the literature there are only a few studies on the dietary patterns of adolescents[2,3] and there appear to be none that have compared cluster and PCA methods. The National Teens' Food Survey was conducted in the Republic of Ireland in 2005–6 on a representative sample of 441 teenagers aged 13–17 years[4]. A semi-quantitative 7 d food diary was used to collect information on foods and beverages consumed. Food intake data were reduced to thirty-two food groups. Food groups were expressed either as mean intake (g/d) or as the percentage contribution to total energy intake (%TE). In order to compare the patterns derived by both methods, mean PC scores were calculated and computed across the cluster solutions.



Key: Cluster 1: 'Healthy', Cluster 2: 'Unhealthy', Cluster 3: 'Rice/Pasta Dishes', Cluster 4: 'Sandwich', Cluster 5: 'Breakfast cereal & main meal type foods'. PC=Principal Component. PC 1: 'Healthy', PC 2: 'Traditional', PC 3: 'Sandwich', PC 4: 'Unhealthy'

The most sensible clusters were derived based on %TE, which were labelled as 'Healthy', 'Unhealthy', 'Rice/pasta dishes', 'Sandwich' and 'Breakfast cereal & main meal-type foods'. The most interpretable patterns using PCA were derived based on intake (g/d) and were labelled as 'Healthy', 'Traditional', 'Sandwich' and 'Unhealthy'. Cluster 1 scored highest for PC 1 and lowest for PC 4, indicating that close similarities exist between the 'Healthy' pattern derived by both methods, and that it is most different from the 'Unhealthy' PC. Cluster 2 scored highest for PC 4, also indicating that for the 'Unhealthy' pattern both cluster and PCA derived very similar patterns. In summary, cluster analysis and PCA, although statistically-different methods, identified similar dietary patterns when presented with the same dataset, and these patterns were directly comparable in the adolescent sample.

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