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## The effect of energy under reporting on dietary pattern analysis

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Dietary pattern analysis has come to the fore of nutritional epidemiology in recent years with the goal of improving the effectiveness of public health recommendations. Cluster analysis is a well established method to derive dietary patterns, where patterns are based on differences in mean dietary intakes amongst individuals<sup>(1)</sup>. Under reporting of food intake is common in nutritional epidemiology<sup>(2)</sup>, however little is known on its effect on dietary pattern analysis.

The aim of this research was to identify dietary patterns amongst a sample of Irish adults and to account for the effect of energy under reporting on these patterns. The National Adult Nutrition Survey (NANS)<sup>(3)</sup> which consists of food intake data for 1500 adults, aged 18–90 years, was used for this analysis. In the NANS, a semi-weighted four day food diary was used to collect information on all foods and beverages consumed. For this analysis, food intake data was reduced to 33 food groups. For each subject, their food group intakes were expressed as the percentage contribution to total energy intake (%TE) and corresponding z-scores were calculated. K-means cluster analysis was conducted on these standardised variables to derive patterns of dietary intake in (I) Total Population (TP), (II) Adequate Reporters (AR) and (III) Under Reporters (UR)<sup>(4)</sup>.

K-means cluster analysis I		K-means cluster analysis II			K-means cluster analysis III		
Total population		Adequate reporters			Under reporters		
	<i>n</i>	Unhealthy foods <i>330</i>	Healthy foods <i>276</i>	Traditional Irish <i>258</i>	Unhealthy foods <i>195</i>	Healthy foods <i>164</i>	Traditional Irish <i>88</i>
Unhealthy foods	373	<b><u>264</u></b>	7	0	<b><u>97</u></b>	3	2
Healthy foods	307	6	<b><u>166</u></b>	12	<b><u>30</u></b>	<b><u>93</u></b>	0
Traditional Irish	210	35	4	<b><u>76</u></b>	28	3	<b><u>64</u></b>
Light meal foods	202	6	75	42	9	49	21
Snack foods	219	19	24	128	31	16	1

Numbers in bold and underlined indicate subjects who remained in the same cluster following analysis II and III.

For the TP, five distinct clusters were identified, however when the sample was split into AR and UR, this was reduced to three distinct clusters in both. Furthermore just 58% of the AR and UR were correctly classified (i.e. stayed within the same cluster). Across the TP, AR and UR, three similar clusters were identified (Unhealthy foods, Healthy foods and Traditional Irish); however based on the highest %TE, only 8 food groups remained constant across the clusters. A two-way analysis of variance (ANOVA) showed a significant interaction effect was evident for reporting status and cluster type on the contributions of energy, protein, carbohydrate, sugar, starch, total fat, saturated fat, monounsaturated fat, polyunsaturated fat, alcohol, dietary fibre, sodium, vitamin D and folate. No interaction was seen for vitamin C, calcium, iron or vitamin B12. All nutrient variables were adjusted for energy (data not shown). These findings indicate that under reporting has a significant effect on clusters identified in dietary pattern analysis, emphasizing that under reporters should be removed from data prior to analysis. Further research will examine the effects within food group intake between each cluster and reporting status.

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1. Newby PK, Muller D & Tucker KL (2004) *Am J Clin Nutr* **80**, 759–67.
2. Becker W & Welten D (2001) *Public Health Nutr* **4**, 683–687.
3. Irish Universities Nutrition Alliance (2011) The National Adult Nutrition Survey. <http://www.iuna.net/>
4. Goldberg GR, Black AE, Jebb SA *et al.* (1991) *Eur J Clin Nutr* **45**, 569–581.