How, when and why do young women use nutrition information on food labels? A qualitative analysis.

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Abstract

Background. Nutrition information on food packaging offers a public health tool which could be used to promote informed consumer choice and aid consumption of a healthy diet. Research indicates that use of nutrition information can lead to reduced energy intake and lower BMI, but little evidence is available regarding how, when or why people use nutrition information when making everyday food choices.

Methods. This qualitative study explored motivations and contexts surrounding the use of nutrition information among 25 UK-based female nutrition information users aged 23-35 years, using semi-structured individual interviews. Verbatim transcripts were analysed using thematic analysis.

Results. Six themes were identified: (1) understanding and (2) functions of nutrition information, (3) health versus appearance motives, nutrition information use in (4) affective and (5) symbolic food episodes, and (6) competing point-of-purchase influences. Notable observations included a difficulty in understanding and converting nutrition information into personally meaningful terms, and eschewal of nutrition information in settings where food plays an affective or symbolic role (e.g. food consumption after a stressful day, buying food for a dinner party).

Conclusions. We suggest evidence-based directions for future research and offer policy and practice recommendations, including the adoption of clear and consistent nutrition information formats.

KEYWORDS: food labelling, nutrition information, qualitative research, diet, motivation, food choice

Introduction

It is forecast that, by 2050, 60% of males and 50% of females in the UK will be obese, and the annual cost of overweight and obesity to the UK National Health Service (NHS) will be £9.7bn (Butland et al., 2007). Obesity is attributable to a positive energy balance, which is partly a result of excessive caloric intake. Nutritional content information has been introduced on food packaging to guide consumers' dietary choices (Lobstein & Davies, 2009). There is no agreed standard format for the presentation of food label nutrition information (NI), and in the UK, several formats are commonly used. For example, Guideline Daily Amounts (GDAs) indicate how nutrient quantities fit into the recommended average daily diet (Rayner, Scarborough, & Williams, 2004). The 'Traffic Light System' uses colour coding to show the typical health value of the quantity of each nutrient 'at-a-glance', whereby red indicates a quantity considered unhealthy, 'amber' a quantity that should be consumed in moderation, and 'green' a more healthy quantity. Such information is designed to increase the likelihood of a healthy food choice at the point of purchase (Grunert & Wills, 2007).

NI allows consumers to monitor nutrient intake, and this can translate into improved consumers' knowledge, alter purchasing patterns, and increase consumption of healthier food (Croft et al., 1994; Derby & Levy, 2001; Matson-Koffman, Brownstein, Neiner, & Greaney, 2005; but see Aaron, Evans, & Mela, 1995, and Wansink & Chandon, 2006). Several US studies showed that NI users consume less fat and cholesterol and more fruits and vegetables than do non-users (Guthrie, Fox, Cleveland, & Welsh, 1995; Kreuter, Brennan, Schraff, & Lukwago, 1997; Neuhouser, Kristal, & Patterson, 1999). A recent US study found that food label users consumed 150 fewer daily calories on average than did non-users (Ollberding, Wolf, & Contento, 2010), a deficit likely to significantly aid weight management (Cutler, Glaeser, & Shapiro, 2003). A modelling study estimated use of front-of-pack 'Traffic Light' labelling to yield a 1.3kg weight reduction (Sacks, Veerman, Moodie, & Swinburn, 2011).

While the causal direction of associations between NI use and dietary intake requires further investigation, these findings suggest that NI use has the potential to assist weight management attempts by modifying food choices and intake.

Previous studies have sought to profile the demographics and psychological characteristics that distinguish NI 'users' from 'non-users' (Raspberry, Chanley, Housman, Misra, & Miller, 2007). These studies have shown that typical NI 'users' tend to be young, predominantly female, value health and weight management, and show higher levels of nutrition knowledge and more accurate perceptions of the diet-disease relationship (Cole & Balasubramanian, 1993; Drichoutis, Lazaridis & Nayga, 2006; Neuhouser et al., 1999; Raspberry et al., 2007; Satia, Galanko, & Neuhouser, 2005). The conceptual distinction between 'users' and non-users' may however be simplistic. NI use can vary across situations, such that information is not consistently used prior to every food purchasing decision. For example, less visual attention is typically given to labels where the nutrition content of the food is understood, and labels are scrutinised more for nutritionally ambiguous foods, such as soup and pizza (Graham & Jeffery, 2012). Another study found that consumers attend more to energy and fat on NI labels (Higginson, Kirk, Rayner, & Draper, 2002). These findings suggest that, even among people who see themselves as NI 'users', there may be important situational factors that determine how, when and why NI is used.

Rates of NI use may be increased both by encouraging 'non-users' to use NI, and by promoting more consistent use among those who already use NI. Both aims may be served by understanding the motivations of NI users, and the contexts surrounding use (Cowburn & Stockley, 2005). Existing research into the determinants of NI use has been primarily based on population survey data (Cole & Balasubramanian, 1993; Drichoutis et al., 2006; Grunert, Wills, & Fernández-Celemín, 2010; Neuhouser et al., 1999; Satia et al., 2005), or lab-based designs (Graham & Jeffery, 2012). While both approaches have proved useful for developing

understanding of the psychology of NI use, population surveys do not explore individual-level experiences, and lab research can remove the participant from the real-world contexts in which NI is encountered.

Qualitative methods can be useful for documenting contextualised experiences. In under-researched domains, qualitative analyses can yield rich and in-depth insights into phenomena among those for whom the phenomena are most relevant, thereby generating evidence-based theoretical proposals suitable for testing among larger and more diverse samples. Qualitative analysis of in-depth interviews with NI users may capture idiosyncratic NI use episodes and experiences, and the complex psychological structures of motivation, understanding and decision-making that underpin them.

The present study

This study used qualitative methods to explore under what conditions, and for what purposes, NI on food labels is used. Interviews were conducted among a sample of self-classifying NI 'users' in the UK, to explore the beliefs, motivations, attitudes and perceptions underpinning experiences of NI use. Given the lack of previous such qualitative work, we sought to focus on a sample of female NI users aged 20-35, because this demographic is most likely to use NI, and so NI may have most relevance and meaning among this group (Cole & Balasubramanian, 1993; Drichoutis et al., 2006; Neuhouser et al., 1999; Satia et al., 2005). This exploratory study was designed to capture thematic patterns emergent from NI users' own reflections, and so analysis was inductive and not informed by an a priori theoretical framework (see Braun & Clarke, 2006).

Method

Participants

Twenty-five female participants were recruited via posters and an email advertisement circulated to staff at two universities (N=4 and N=16) and a voluntary health organisation (N=5) in the UK. Participants were eligible for inclusion only where they were staff members, aged between 20-35, and reported being responsible for doing the majority of their household's food shopping and using food label NI 'some', 'most' or 'all of the time'. Interested individuals were emailed a screening questionnaire to confirm they met these criteria.

Participants' age ranged from 23 to 35 years (M = 29.3, SD = 3.6). Twenty-three participants reported weight and height, allowing manual calculation of BMI (range 17.7–37.8; M = 22.4, SD=3.2). Fourteen participants were of normal weight (BMI≥18<25), seven were overweight (BMI≥25<30), and one was obese (BMI = 37.8). One participant was underweight (BMI = 17.7). Twenty-four participants had an undergraduate degree or higher qualification (Table 1). Two participants indicated that they were currently trying to lose 'a lot' of weight and fifteen reported trying to lose 'a bit' of weight. Six participants were attempting to maintain their weight. No participants reported seeking to increase their weight. Two participants did not report a weight (change) goal.

[INSERT TABLE 1 HERE]

Procedure and interview schedule

Interviews were semi-structured, lasted 20-40 minutes, and covered a range of topics, including: food label NI formats used in UK supermarkets (pie-charts, 'Traffic Light System' and front-of-pack guideline daily amounts), which was explored by providing real-world examples to participants to illustrate each format and to ensure participants understood what was meant by 'food label NI'; understanding of nutrients and food label NI; contexts in which NI was used; and reasons for use. Participants were interviewed individually, and were encouraged to talk spontaneously, with prompts used where necessary to facilitate discussion

of all topics. The extent to which each issue was explored depended upon its apparent pertinence to the participant. Interviews were recorded and transcribed verbatim.

Following the interview, participants completed measures of demographics, height, weight, and current weight goal. Institutional ethical approval was obtained for the study.

Analysis

Data were analysed using inductive thematic analysis, based on essentialist/realist epistemological assumptions (see Braun & Clarke, 2006). Verbatim transcripts were read repeatedly. Initial line-by-line coding was undertaken to assign conceptual labels to 'incidents' within the data. Secondary coding involved identifying links between conceptual labels, to create overarching clusters of related labels, or 'themes'. Concepts and themes were refined as coding progressed, using the 'constant comparison method' to compare similarly coded excerpts and identify properties of emergent themes (Glaser & Strauss, 1967).

Qualitative research is based on researchers' interpretations and so prone to researcher bias (Mays & Pope, 1995). Two steps were taken to reduce bias (see Mays & Pope, 1995). First, while the first author coded all transcripts, ongoing analysis was discussed in frequent meetings with the other authors to ensure that interpretation and categorisation was valid. Second, illustrative quotes are presented to "satisfy the sceptical reader of the relation between the interpretation and the evidence" (Mays & Pope, 1995, p.109).

Results

Six themes were extracted: (1) understanding and (2) functions of NI; (3) health versus appearance motives; NI use in (4) affective and (5) symbolic food episodes; and (6) competing point-of-purchase influences on NI use. The former two themes related mostly to *how* participants use NI, and the latter four themes to *when* and *why* NI is used. With the

exception of the first theme, themes arose spontaneously and independently of the interview schedule.

Understanding nutrition information

Difficulties were often experienced in understanding or processing NI. For some, portion sizes for which NI was provided were unrealistically small, and converting stated portion sizes into real-world portions was difficult.

> *P16 'I don't like [it when] they say a quarter of a packet of [crisps]…contain[s] this many calories, I [have to then] stand there and calculate how many in the whole bag and work out how [many calories] that would mean per [real-world] serving.'*

NI presented in a format that minimises the cognitive effort required to derive meaningful information on the health value of the product was preferred.

> *P19 'I think [the traffic light system is] good because I look at the colours, when you are shopping you don't always have time to look through all the numbers and figures. To be able to see the colour and how it is ranked is helpful for a quick…guide'*

Front-of-pack manufacturer nutrition claims were often used as 'shortcuts' to bypass the cognitive effort required when choosing foods based on NI.

> *P21 'If something says it has 3% fat in it then I do not need to look further at the nutritional information to look at the amount of fat.'*

Many participants reported consulting only part of the available NI, with most participants prioritising fat and calorie information.

> *P15 'I would probably look at the calories [they] are my main issue…that is the thing I look at first, then I look at fat.'*

NI was most valued for nutrients that the user understood to be linked with health or weight gain. Participants were aware of the adverse consequences of high fat and calorie intake, but were less aware of the role of other nutrients in diet and health.

> *P18 'I judge the nutritional value of the food on the fat content. […] I really should weigh up the other values such as protein and carbohydrate but … I don't really understand the carbohydrates information or the protein information. I tend to just look at calories and fat ... […] I have just got it into me that the fat is the bad one.'*

Functions of nutrition information

Some participants used NI as an external regulatory mechanism to regulate purchase of desired foods that are unhealthy *('I will pick up something I actually wanted and check if I am allowed to eat it',* P8, emphasis added). NI was also used for validation in some instances, to endorse decisions not to purchase tempting foods perceived to be unhealthy.

> *P10 'Sometimes when I look at the food label I know it is not going to be good [for me] but I do it because psychologically it helps me. When I see the number [of calories] it prevents me from buying it, so psychologically for me it works… it usually prevents me from buying it.'*

When uncertain about nutrition content, consulting NI served to either restrict unhealthy food choices or facilitate healthy food choices. In the former instance participants' focus was on reducing unhealthy nutrient consumption, and in the latter, participants actively sought healthy nutrients, or those that sated hunger for longer.

> *P18 '[I will always read the NI label if] I think [the food is] really unhealthy but actually "how unhealthy is it?" And if it is really unhealthy then I wouldn't purchase it. So [I use NI as] an indicator'*

P12 '[I look at] things like carbohydrate …. I see that as something that will help me feel full'

By using NI, participants felt able to make informed decisions and so in greater control of their diet and health.

P25 '[NI] helps me to make rational choices, I get to know what I am eating… I like to keep an eye on what is going on.'

Health versus appearance motives

Participants recognised the role of diet in health, and some used NI to choose more healthful foods due to concerns about developing specific diet-related diseases (e.g. obesity, diabetes, heart disease).

P9 '[For] things like high saturated fat I'm aware of the fact that it can cause problems like heart disease and the way it affects your arteries. I will look at the saturated fats because…I don't want to be consuming high amounts.'

For some, food choice was related to concerns over general health rather than specific diet-related diseases.

P2 'I am not thinking 'oh I shouldn't eat that because I may get that type of disease', but I don't want the food and my diet to impact my health. So I think about [my health] more generally and not specifically.'

Some did not think that high intake of unhealthy nutrients was relevant to the health of young women.

P12 '[T]hings like blood pressure and heart disease… the things the media tends to stress are the reasons you may need to cut down salt, but at this stage of my life that is not such a worry.'

Many participants stated that their primary motivation for reading NI was to minimise weight gain, more for physical appearance than health reasons:

> *P4 '[Using NI] is more of a vanity thing. I don't want to be eating something that could make me put on a lot of weight…I don't really care about disease'*

Nutrition information use in affective food episodes

Participants reported that their food choices were often influenced by the desire for hedonic pleasure, rather than the expected utility of foods for serving health or weight goals. Hedonically satisfying foods were often chosen with minimal rational deliberation, to alleviate negative mood.

> *P24 '[If] I am having a bad day and feel like eating some chocolate, that is much more likely to override any sort of common sense approach [involving NI use] I might have to buying a healthy food.'*

Negative affective experiences were seen as an entitlement to consume indulgent or unhealthy foods, as compensation for enduring a negative experience. Consumption of such foods helped alleviate negative affect.

> *P14 'I just think to myself that I deserve [an indulgent food after a bad day], it is not that I need it; it's just that I want it… I kind of think, well, I have had a rubbish day, it was not very fun at work, so I deserve it.'*

'Indulgent' consumption episodes were accompanied by a relaxed attitude towards food choice, and a deliberate decision not to use NI. Increased salience of health and nutrient intake during such episodes was felt to limit pleasure associated with 'indulgent' foods.

> *P7 '[When] I am thinking to myself, you know what, I just want a "blow out", I know [the food] is [unhealthy], I want to eat it [and] sometimes you don't want to know how [much] fat or how many calories it has in it'*

Consumption of indulgent foods for immediate affective benefits often led to feelings of guilt for compromising weight or appearance. Some participants chose not to consult NI, to minimise guilt.

> *P7 'It is a guilt thing, you just want to eat [indulgent foods] and not have any guilt afterwards. If you are going to [knowingly eat an unhealthy food], do it properly […] you don't do it all the time so just get over it and eat it. Don't scrutinise the label, just get on with it really… It is a guilt thing you just want to eat it in peace.'*

Alternatively, anticipated regret at consuming an indulgent food known to be unhealthy led to NI use to find the '*least unhealthy product*' (P12), and so '*limit the damage*' (P13) of unhealthy eating. This minimised negative affect associated with indulgence.

> *P13 '[For] something that I know already is going to be relatively bad or relatively high [in energy and calories] I will try and find one that is not as high so I don't feel as naughty.'*

Nutrition information use in symbolic food episodes and across settings

Food also had an affective, symbolic function for many participants during special occasions, celebrations such as holidays, anniversaries, and birthdays, or simply during the weekend:

> *P20: 'Towards the end of the week you have that [attitude of] "wahey it's Friday, it is the weekend, time to let your hair down!", [and] I [am] less concerned about the [nutrition] information on the label'.*

In these settings, food was seen as a 'treat' and participants attributed less importance to monitoring nutritional content ('*[when I dine out] I do not really care what I eat'; P23*). NI was seen to potentially limit enjoyment from eating on these occasions.

> *P12 '[If] I felt I could treat myself, so a celebration or birthday or eating out […] then I am not that strict [about using NI]'*

Eating out in a restaurant was a context in which participants felt entitled to treat themselves.

> *P18 'When you are going out for dinner it's a different approach to eating, you want something that you don't normally have, it's a bit of a treat, often it is a occasion so often you don't want to be too bogged down in the nutritional content of the food you are eating […] having the nutritional information seems quite practical and sensible and you don't necessarily want that when you are having dinner.'*

Some participants, who were dieting for weight loss purposes, preferred restaurants to provide NI so that they could remain in control of their consumption.

> *P17 '[One pizza restaurant has] recently started to tell you how many calories they have on their foods and that has been really good for me, someone who is trying to be much more aware of what is happening so I would make my decision based on what is printed on the menu.'*

While detailed NI in restaurants was unwanted by many, participants generally appreciated having a selection of special healthier meal options on the menu.

> *P14 'I like it when they [have NI] on the menus, I think I have seen it before where they do a section of lower fat meals or something. That sometimes catches my eye because I think 'ooh, maybe I should go for one of those.'*

Food choice at dinner parties also acquired a symbolic element, in which the host's aim was to provide guests with a pleasurable eating experience. When purchasing food for oneself, participants were on occasion willing to compromise on taste and purchase foods that served a utility function (e.g. sating hunger), but food choices when preparing a meal for others was largely based on taste. Participants tended to view lower-fat options as less tasty ('*low fat things never taste as good'; P6),* and so many felt it inappropriate to use NI to restrict guests' nutrient intake when preparing a meal.

P8 '[If I were to] have friends coming round for dinner...I would be more likely to go for a tastier [food] and make a really great meal. Whereas if it is just me, then I will go "Do I want to get myself extra special super tasty sandwich that is like […] 500 calories or do I want to get myself the £1 egg sandwich that has like 200 calories and tastes fine?" It does not really make a difference then.'

P22 'A dinner party is a special occasion and I want to have something that tastes nice rather than being worried about the content of what I am eating.'

Competing point-of-purchase influences

Participants reported multiple contextual factors that determined whether NI influenced food choices at the supermarket. One such factor was price, with some participants favouring cheaper options without consulting NI *('Price would override my decision [based on nutritional information]. I would go for the cheapest food as I like an offer'; P20),* though some expressed a willingness to forego cost savings for nutritional benefits *('If I am choosing between two things…I would compare [them] on [fat content] as opposed to price'; P6).*

Reading NI was viewed as time consuming, and tiredness, lack of time, hunger or stress of the supermarket crowds reduced attention to NI.

P17 'If I have a really long day at work or a really busy day and I haven't been able to go to the supermarket…I will go…and just buy something that is convenient, quick and easy and not always the healthiest choice, I would look more, not at the [nutritional] food label, but how quickly I could prepare that food.'

NI was used less often when choosing items for which participants had an established preference, and which had previously been purchased frequently. This could be attributed to prioritisation of liking for the food over NI, or because participants felt sufficiently aware of nutrition content from NI consultation on prior occasions.

> *P14 'I will never look at a food label for stuff that I have picked up several times before. […] I am so used to eating that one thing that looking [at] the food label isn't going to make any difference whether or not I eat it […] If I know I like it then I want to eat it regardless of what the label says. The information is irrelevant.'*

Perhaps consequently, NI was mostly used to guide food choice of unfamiliar foods, or comparing alternatives when preferred brands were unavailable.

> *P14 'Say the particular carbonara that I normally buy was not in for some reason but I knew I wanted carbonara and I wanted to pick another brand then maybe then I would start looking at it and comparing it, then I would choose based on [information on the nutrition] label.'*

Discussion

Six themes were identified that illustrate how, when and why food label NI is used: understanding and functions of NI; health versus appearance motives; NI use in affective and symbolic food episodes; and competing point-of-purchase influences. Results demonstrated that NI use is a psychologically complex phenomenon, variously determined by knowledge, beliefs, motivation, and perceived social rules around the acceptability of NI. While our observations are necessarily specific to our sample of young and well-educated women, findings nonetheless reflect the importance of psychological factors in NI use, and offer possible directions for future research, policy and practice.

As a public health tool, NI assumes that consumers make optimal food choices based on rational cost-benefit processing of available information. Yet, participants encountered difficulty in translating NI into personally meaningful terms. There is no reason to believe that this observation applies only to our sample: human rationality is limited by mental processing capacity, and external pressures, such as time constraints (Simon, 1991), and so

consumers often use heuristics, or ‘mental short-cuts’, to simplify decision-making (Cohen & Babey, in press). Some participants reported relying on front-of-pack nutrition claims (e.g. ‘reduced fat’) to alleviate the potential mental burden of using NI. This strategy can be sub-optimal from a health perspective, because health value claims such as ‘low-fat’ can actually lower restraint and prompt over-consumption (Hedley et al., 2004; Wansink & Chandon, 2006). Manufacturers must provide NI that is easy to understand.

Echoing previous research, we observed a tendency for fat and calories to be prioritised over other nutrients, possibly because participants better understood the consequences of excessive fat or calorie consumption (Higginson et al., 2002). Participants appeared to use NI primarily for weight management for physical appearance reasons, rather than health concerns per se. This conflicts with previous findings suggesting that NI users are more aware of diet-disease relationships (Raspberry et al., 2007; Satia et al., 2005). This may reflect greater prioritisation of physical appearance among young women in particular, though there is evidence that weight and appearance concerns are prevalent in both genders (Cohane & Pope, 2001; Jones & Crawford, 2005). In any case, food labels might fruitfully be reframed to speak to both health and physical appearance concerns. Recent evidence suggests that graphic images of obesity can reduce consumption of energy-dense foods (Hollands, Prestwich, & Marteau, 2011), and future work might explore whether placing such images alongside NI on food labels influences purchasing or consumption patterns.

Food choices were often influenced by the desire for hedonic pleasure or alleviation of negative affect, rather than the expected utility of foods for serving health or weight goals. While further research is needed to explore whether this tendency generalises beyond our young female sample, previous work has shown the relevance of affect to food choice across both genders (e.g. Contento, Michela, & Goldberg, 1988). Within our sample, affective food choice episodes were characterised by abandonment of cognitive restraint, and relaxation of

NI use. Knowledge of the nutrition content of indulgent foods often elicited feelings of guilt. Guilt arises from a conflict between short-term affective gratification and long-term health (Wansink & Chandon, 2006), so attesting to an underlying motivation to make healthy dietary choices. Increasing NI use may depend on such motivation being salient in affect-driven food episodes. Previous research shows that anticipated regret minimises engagement in unhealthy actions (e.g. Richard, van der Pligt, & de Vries, 1996). Future work might fruitfully examine the potential for health communication efforts to change food choices by highlighting likely regret following indulgent food episodes, and frame NI use as a means to reduce guilt by limiting the detrimental health impact of such episodes. Additionally, affect-driven consumers could be encouraged to form plans to choose healthier options, or mobilise cognitive restraint, during foreseeable affective food episodes. Such detailed planning can shield pursuit of long-term dietary goals from momentary temptations (e.g. Adriaanse, de Ridder, & de Wit, 2009).

Participants deemed NI inappropriate in restaurant settings because NI was seen to reduce the enjoyment of dining out (Fitzpatrick, Chapman, & Barr, 1997). It was unclear whether pleasure was reduced because of the cognitive effort involved in NI use, or because NI use was seen to conflict with normative social conduct in the restaurant setting. We also observed positive attitudes towards menu NI labelling for weight-management purposes, among some participants. The provision of ‘lighter options’ or more discreet ‘health’ logos on menus may address both groups’ concerns, by providing sufficient information to guide healthy choices while also minimising elaborate NI processing.

Previous studies have largely neglected the role of NI when preparing food for others, rather than oneself. Yet, this distinction appeared important to our participants, because the restrictive function of NI was only deemed acceptable in determining food choices for oneself. Given that many food purchase decisions are made on behalf of others (e.g. when

shopping for the family), more research is required on the decision rules and social norms surrounding NI use for oneself versus others.

Participants with established preferences and purchasing history for certain products were less likely to consider NI when making relevant purchases. Repeated purchasing of particular foods may lead to the formation of habits, which proceed automatically and in line with previous decisions, rather than being the product of deliberative reasoning (van't Riet, Sijtsema, Dagevos, & De Bruijn, 2011). A study of the decision-making process involved in habitual action, conducted in the transport mode choice domain, found that people with stronger travel mode habits used less information and less elaborate choice strategies prior to making subsequent travel decisions, even in unfamiliar settings where the utility of available options varied (Verplanken, Aarts, & Van Knippenberg, 1997). Consumers with a history of purchasing particular foods may therefore be less attentive to NI, or to changes in the nutritional composition of the foods. Further work is needed to explore the possible effects of purchasing habits on NI use.

Limitations of this study should be acknowledged. Firstly, it is unclear to what extent participants' reflections correspond with their motivations and behaviour when using NI in-situ. Self-report data are prone to self-presentational biases that may conceal participants' true beliefs, and the level of insight that people have into their own decision-making has been questioned (Nisbett & Wilson, 1977). Secondly, the small and selective sample means that results cannot be confidently generalised to other consumers. Participants were young women, typically well-educated and of normal weight, and so our findings may overlook important concerns held by other populations, or indeed other young women. Further research is needed to explore the validity and generalizability of the insights revealed by our study. Additional qualitative work might usefully explore whether other consumer groups, or those with special dietary needs, hold unique motivations around NI use which have not been

documented here. Thirdly, we did not explore the views of those who never use NI. Future research should seek to identify motivational barriers to NI use among non-users. However, our work suggests that the distinction between NI 'users' and 'non-users' is potentially unhelpful, because self-classifying 'users' did not consistently use NI in every context.

This study documented important psychological determinants of how, when and why NI is used among a sample of young women. Acknowledgement of the beliefs and meanings attached to real-world NI provides an important basis for intervention strategies to encourage NI use and remove barriers to use. Realising the potential for NI to aid dietary consumption requires that individuals are supported to understand and apply NI to their personal dietary patterns.

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Table 1: Participant characteristics

	n	Summary
Age		Range: 23–35 M = 29.3, SD = 3.6
BMI	Underweight = 1 Normal weight = 14 Overweight = 7 Obese = 1 *NR = 2*	Range: 17.7–37.8 M = 22.4, SD = 3.2
Highest education	Certificates/diploma = 1 Undergraduate degree or higher = 24	
Ethnicity	White British = 15 White Other = 5 Caribbean = 2 African = 1 Chinese = 1 Indian = 1	
Current weight goal	Lose ‘a lot’ of weight = 2 Lose ‘a bit’ of weight = 15 Maintain weight = 6 *NR = 2*	
Living arrangements	Living with partner = 15 Living alone = 6 Living with friends = 2 Living with parents/relatives = 1 *NR = 1*	

NR = Not reported.