



Factors influencing adolescent whole grain intake: A theory-based qualitative study



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ABSTRACT

Whole grain consumption is associated with reduced risk of chronic disease. One-fifth of UK adults and children do not consume any whole grains, and adolescents have low consumption rates. Factors affecting whole grain intake among adolescents are not well understood. This study examined the socio-economic, environmental, lifestyle and psychological factors likely to influence consumption and explored whether outcomes aligned with behavioural predictors proposed in the Reasoned Action Approach. Five focus groups explored young people's attitudes towards, knowledge and consumption of wholegrain foods, as well as barriers to, and facilitators of, consumption. Participants were male and female adolescents ($n = 50$) aged 11–16 years from mixed socioeconomic backgrounds and ethnicities, recruited through schools in the city of Leeds, UK. Focus groups were analysed using thematic analysis. Most participants had tried wholegrain food products, with cereal products being the most popular. Many recognised whole grain health benefits related to digestive health but not those related to heart disease or cancers. Several barriers to eating whole grains were identified including: difficulties in identifying wholegrain products and their health benefits; taste and visual appeal; and poor availability outside the home. Suggested facilitators of consumption were advertisements and educational campaigns, followed by improved sensory appeal, increased availability and choice, and tailoring products for young people. All constructs of the Theory of Reasoned Action were identifiable in the data, suggesting that the factors influencing whole grain intake in adolescents are well captured by this model. Study outcomes may inform research and health promotion to increase whole grain intake in this age group.

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1. Introduction

Whole grains are a major source of dietary fibre and are rich in protein, vitamins, minerals, and phyto-chemicals (McKeown et al., 2013; Slavin, Jacobs, Marquart, & Weimer, 2001). Systematic reviews indicate that increased whole grain consumption may lead to improved insulin sensitivity and reductions in blood pressure, total and LDL cholesterol, colorectal cancer, breast cancer, and CVD risk (Aune et al., 2011; Kelly, Summerbell, Brynes, Whittaker, & Frost, 2007; Mellen, Walsh, & Herrington, 2008; Slavin, Marquart, & Jacobs, 2000; Ye, Chacko, Chou, Kugizaki, & Liu, 2012) as well as improved weight status and reduced waist circumference (Du et al., 2010; Harland & Garton, 2008).

It has been suggested that daily intake of around one to three 30 g servings of wholegrain foods per day can achieve improvement in health and disease outcomes (Bjorck et al., 2012; HEALTHGRAIN EU, 2005–2010; Seal & Brownlee, 2015). Although the U.S. Department of Agriculture (USDA) recommends 85 g of wholegrain foods per day (converted from ounce equivalents) (Reicks, Jonnalagadda, Albertson, & Joshi, 2014; U.S. Department of Agriculture and U.S. Department of Health and Human Services, 2010), the most recent National Health and Nutrition Examination Survey (NHANES) 2011–2012 data show that the mean intakes among American adults and children were around 27 g/day and 21 g/day, respectively (Albertson, Reicks, Joshi, & Gugger, 2016). Similarly low levels of intake are reported in the United Kingdom (UK). The U.K.'s National Dietary Survey of British Adults (NDNS) (2008–2011) reported that 18% of adults and 15% of children/adolescents do not consume any wholegrain foods, with the median intake for adults and children/teenagers being around 20 g/day and 13 g/day respectively (Mann, Pearce, McKeivith, Thielecke, & Seal,

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2015a; Mann, Pearce, McKeivith, Thielecke, & Seal, 2015b). In the UK, adolescents and individuals from lower socio-economic groups appear to have the lowest levels of intake (Mann et al., 2015a, 2015b; Nelson, Erens, Bates, Church, & Boshier, 2007).

In order to develop effective interventions to increase whole grain intake, we need a better understanding of the factors that influence dietary behaviour (Larson, Neumark-Sztainer, Story, & Burgess-Champoux, 2010). To our knowledge, there are no studies that explore whole grain intake correlates in UK adolescents, and only a small number of studies on whole grain intake correlates in different age groups (Burgess-Champoux, Marquart, Vickers, & Reicks, 2006; Chase, Reicks, Smith, Henry, & Reimer, 2003; Kuznesof et al., 2012; Larson et al., 2010; McMackin, Dean, Woodside, & McKinley, 2012; Muhihi et al., 2012; Rosen, Sadeghi, Schroeder, Reicks, & Marquart, 2008). Previous research has reported the following as possible barriers to whole grain intake among adults and children: lack of awareness and misconceptions about wholegrain food products; inability to identify them; lack of awareness of the health benefits; perceived or experienced negative sensory properties; high price; low availability; and lack of knowledge of preparation techniques (Adams & Engstrom, 2000; Arvola et al., 2007; Burgess-Champoux, Chan, Rosen, Marquart, & Reicks, 2008; Burgess-Champoux et al., 2006; Burgess-Champoux, Rosen, Marquart, & Reicks, 2008; Chase et al., 2003; Ellis, Johnson, Fischer, & Hargrove, 2005; Kantor, Variyam, Allshouse, Putnam, & Lin, 2001; Kuznesof et al., 2012; Larson et al., 2010; McMackin et al., 2012; Muhihi et al., 2012; Smith, Richardson, Kuznesof, & Seal, 2001; Smith, Kuznesof, Richardson, & Seal, 2003).

Although many of these barriers are likely to be the same for adolescents, their sensitivity to social norms may render them particularly vulnerable to reduced dietary quality and whole grain intake (Stevenson, Doherty, Barnett, Muldoon, & Trew, 2007; Story, Neumark-Sztainer, & French, 2002). Furthermore, eating patterns and preferences established during adolescence have an impact on health outcomes, making adolescence a particularly important time to promote healthy eating (Croll, Neumark-Sztainer, & Story, 2001; Shepherd et al., 2006; Story et al., 2002).

The present study aimed to explore, via focus groups, adolescents' views on whole grain intake. The focus group results were considered in relation to the constructs in the Reasoned Action Approach (RAA), (Fishbein & Ajzen, 2011; Head & Noar, 2014). We examined how well the theory reflects factors influencing whole grain intake as reported by this age group. This study was a formative stage in the development of a theory-based questionnaire study to quantify intake and measure determinants of whole grain intake in a large representative sample of UK adolescents.

1.1. Theoretical framework

The RAA was developed from Ajzen's Theory of Planned Behaviour (TPB) (Ajzen, 1991; Young, Lierman, Powell-Cope, Kasprzyk, & Benoliel, 1991), and Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975). The TPB proposes that health behaviour can be predicted by direct and indirect determinants. Direct determinants are intentions (to perform the behaviour) and perceived behavioural control (PBC; capacity to complete the behaviour). Intentions are influenced by attitudes (to the behaviour), subjective norms (perceptions of whether others think one should engage in a behaviour) and PBC. Indirect determinants are those that underlie attitudes, subjective norms and PBC. According to the model, attitudes are underpinned by beliefs about the likelihood of important outcomes of the behaviour weighted by the evaluation of those outcomes. Subjective norms are influenced by beliefs about whether key referents think that one should perform the behaviour, weighted by the motivation to comply. Finally, PBC is affected

by beliefs about the prevalence of factors facilitating or inhibiting the behaviour weighted by the perceived power of each factor to influence engagement with the behaviour (Conner & Sparks, 2005). The TPB appears to be an effective model for predicting food choice among adults (Conner, Norman, & Bell, 2002; McEachan, Conner, Taylor, & Lawton, 2011) and adolescents (Blanchard et al., 2009; Conner, Hugh-Jones, & Berg, 2011).

However, although the model is helpful, a recent meta-analysis (controlling for the impact of past behaviour) indicates that it explains 19% of the variance in behaviour and 44% of the variation in intentions (McEachan et al., 2011) suggesting that there are factors other than the model's constructs which influence engagement in health behaviour. The Reasoned Action Approach (RAA) (see Fig. 1), a recently developed, integrative health behaviour theory, contributes new environmental and knowledge-related variables that were not explicit in the TPB model, and treats them as background variables that distally influence health behaviour. Moreover, the RAA model adds that behaviour is determined by intention and moderated by actual control.

There is a lack of qualitative research in relation to the RAA in the domain of nutrition in particular, despite evidence that such approaches could elucidate important personal, situated, and cultural influences on dietary behaviour (Hardeman et al., 2002; Harris et al., 2009; Zoellner et al., 2012). Additionally, the model does not explain how determinants emerge in an individual's life or what form they take; for example, how do adolescents come to understand the norms around a particular dietary behaviour and how does it come to influence them? Furthermore, researchers rarely conduct exploratory studies to inform the targeting of appropriate theoretical determinants via intervention (Harris et al., 2009); e.g. should dietary interventions for adolescents focus on each health behaviour determinant equally or would it be more effective to change one in particular. Better knowledge of how adolescents contextualise and personally articulate their experiences of determinants of behaviours may help to improve the effectiveness of new RAA-informed interventions for that demographic.

2. Methods

2.1. Whole grain definition used

The attempt to reach a standardised definition of whole grains has been an ongoing and controversial process (Ferruzzi et al., 2014). Researchers and organisations have adopted and proposed many definitions, with varying percentages of whole grain content in foods required to qualify as a wholegrain product (Bjorck et al., 2012; Ferruzzi et al., 2014; van der Kamp, Poutanen, Seal, & Richardson, 2014; Richardson et al., 2003; Ross, Kristensen, Seal, Jacques, & McKeown, 2015). In this study, the recently proposed definition in 2014 will be used, which states that "a food providing at least 8 g of whole grains/30-g serving be defined as a wholegrain food" (Ferruzzi et al., 2014).

2.2. Ethical approval

The University of Leeds MEEC Faculty Research Ethics Committee approved the study protocol (MEEC 13-003). This study adhered to the guidelines laid down in the Declaration of Helsinki. Head teachers and all adolescent participants provided written informed consent along with parental/legal guardian assent.

Assistant researchers were postgraduate students, with experience in qualitative research, focus groups, and working with adolescents. Both the principal researcher and assistants were female with appropriate clearance for working with young people. The

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