



The underlying role of food guilt in adolescent food choice: A potential conceptual model for adolescent food choice negotiations under circumstances of conscious internal conflict

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ABSTRACT

Food choice decisions are challenging to conceptualise, and literature is lacking specific to adolescent food choice decisions. Understanding adolescent nutrition and food choice is becoming increasingly important. This research aims to understand what influences the food choices of Irish adolescents, and the mental negotiations occurring in food-based decisions. Additionally, it aims to develop a holistic conceptual model of food choice, specific to adolescents. A qualitative study was conducted in N = 47 Irish adolescents, *via* focus group discussions using vignettes to introduce discussion topics around food and eating habits. Data were analysed using reflexive thematic analysis, involving both semantic and latent analysis. Thirteen distinct factors related to adolescent food choices were discussed, forming one main theme and three inter-linking subthemes. The main theme relates to food choice being multi-factorial in nature, needing a balance of priorities through internal negotiations for food choice with the aim of reducing food guilt. This can change depending on the social setting. Social concerns and food guilt appear to play a strong role in adolescent food choice, with adolescents feeling guilty for eating unhealthy food, wasting food, or spending/wasting money on food. A conceptual model for food choice in adolescents was developed, named a “Food Choice Funnel”, incorporating a specific “Food Guilt Matrix”. While we should encourage healthy eating and a healthy lifestyle, it is important to understand the value placed on the social component to eating among adolescents, since they have increasing social interactions and occasions where choosing health-promoting foods may be more challenging. Healthy eating messages should be designed in a balanced manner to support healthy growth and development, while limiting the potential to induce feelings of guilt among adolescents.

1. Introduction

Eating habits in adolescence have become an area of increasing interest in recent years, with greater recognition of the fact that habits, behaviours, and health status in adolescence often track into adulthood (Craigie et al., 2011; Norris et al., 2022; Sawyer et al., 2012; Singh et al., 2008). With rates of overweight and obesity relatively high in both adolescent and adult populations (OECD/European Observatory on Health Systems and Policies, 2021), finding ways to address the situation effectively is imperative. The recent National Teens' Food Survey in Ireland (NTFS II, 2019–2020) indicated low intakes of fruit and vegetables (<3 servings per day), and intakes of salt, sugar and saturated fat higher than recommended (IUNA, 2022). Overall, adolescents across

Europe are struggling to meet healthy eating recommendations (Rippin et al., 2019). In relation to health and the concerning rise in obesity and obesity-related health conditions, it is important to understand why people, and adolescents in particular, are more likely to choose “unhealthy” foods and less likely to choose “healthy” foods.

In both an Irish context and globally, research specific to adolescents' food habits is limited (Neufeld et al., 2022). Much of the qualitative research on adolescent food choices has provided some insight into the effects of the school environment and other social, economic, and time-related factors on Irish adolescents' food choices (Browne et al., 2019; Fitzgerald et al., 2010; Kelly et al., 2019, 2021). Additionally, much of the qualitative research on adolescent eating behaviours has focussed on identifying barriers to eating healthy foods.

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Research to date has converged on the idea that several external aspects including price, availability, and convenience within the food environment are central issues that need to be addressed, as well as taste and social desirability being commonly noted factors influencing adolescents' food choices (Fitzgerald et al., 2010; Neumark-Sztainer et al., 1999; Share, 2008; Stevenson et al., 2007; Wills et al., 2005). Taste has been a recent area of critical focus, with a recent systematic review noting higher preference for sweet-tastes over bitter-tastes among adolescent, but concluding overall there was no clear link between taste perceptions and adolescent food choices (Bawajeeh et al., 2020). As children become adolescents, their level of independence increases, and time spent with peers becomes more important. Consequently, social desirability and social norms around food become more influential in food decisions (Neumark-Sztainer et al., 1999; Stevenson et al., 2007; Wills et al., 2005). Social experiences around food have been noted as being more important than the actual food itself, and for adolescents, fast-food locations often provide a suitable social setting along with affordable food, thereby influencing the quality of the food choices (Shaw et al., 2023).

However, little research to date has focussed on the adolescent-specific motivations towards healthy eating and the considerations that occur when making food choices, such as choosing foods based on their surrounding environment, current mood, or sensory expectations for the food. Recent research has found that sensory appeal, price and availability are key motivating factors in Irish adolescent food choices, and while health is important for Irish teens, practical considerations often prevent healthy food choices from being made (Daly et al., 2023). UK adolescents have also noted they want their food choices to require little effort, and that growing knowledge, supportive food environments and suitable food rules for younger adolescents would help improve their agency around food choices (Green et al., 2021; Shaw et al., 2023).

A recent *Lancet* series highlighted the current knowledge in this area in relation to physical and nutritional requirements during the period of adolescence (Norris et al., 2022), as well as what we currently know about motivations and barriers to adolescent food choices (Neufeld et al., 2022). The third paper in this *Lancet* series made recommendations for the type of data still needed to improve the health of the global adolescent and future adult population, calling for better standardisation of data collection on food choice and improved understanding of suitable platforms for improving the quality of adolescent food choices (Hargreaves et al., 2022). Individual food choices are key to understanding food consumption habits, although food choice decisions are notoriously difficult to categorise and conceptualise (Chen & Antonelli, 2020). A wide range of factors can influence food choices, encompassing internal, external, personal, cognitive, and socio-cultural factors, all of which interact with each other in the food decision-making process (Chen & Antonelli, 2020). Food choices are often described as being multi-faceted, situational, dynamic, and complex (Sobal & Bisogni, 2009).

A recent review on the different conceptual models of food choice has shed some light on what we currently know, but also on the challenges with conceptualising food choice decisions as a whole (Chen & Antonelli, 2020). The authors note that the approach taken when understanding food choice decisions can be influenced by the background of the researchers, where researchers from a food marketing background will likely have a different perspective on food choice than those from a nutrition background, or those from a social science or psychology background (Chen & Antonelli, 2020). Regardless, there are some commonalities in the research literature, which have been grouped into three main areas: i) Food-related features, ii) Individual differences, and iii) Society-related features (Chen & Antonelli, 2020). One key limitation of this specific conceptual model of food choice is that it relates only to data on adults, and therefore potentially omits some influences that are specific or relevant to adolescents. There is limited development of conceptual models specific to adolescent food choice (Bissonnette & Contento, 2001; Fitzgerald et al., 2013; Story et al., 2002; Travis et al.,

2010; Ziegler et al., 2021), hence the present research will add to this body of literature. Similarly, three elements are routinely noted in the literature as playing an influential role when making healthy or unhealthy food choices, namely individual (physical & psychological), social, and environmental factors (Bauer & Reisch, 2018). Exploring participant responses and discussions through this lens may add an extra level of understanding to how these elements relate to adolescents specifically.

The aim of this qualitative research was to understand what influences the food choices and eating behaviours of Irish adolescents, which may help explain why adolescents struggle to follow a recommended "healthy" diet, as noted in national nutrition surveys. In addition, the research attempts to provide a holistic conceptual model of adolescent food choice negotiations under circumstances of conscious internal conflict.

The specific objectives were:

- To describe the factors involved, and their interactions, in food choices of Irish adolescents, and how these might differ by sex.
- To understand the mental negotiations occurring during the food choice decision process for adolescents
- To develop a conceptual model of food choice for adolescents

2. Methods

2.1. Data collection

Data collection took place in October–December of 2020, with minor changes to recruitment and data collection needed to adapt to the COVID-19 pandemic restrictions in Ireland at the time. Ethical approval was received from TU Dublin Research Ethics & Integrity Committee (REIC) in March 2020, REC-19-13, with revisions approved in September 2020 to facilitate online data collection methods.

2.2. Study sample

Participants aged 16–17 years were recruited from a convenience sample of schools in the Republic of Ireland. Schools were approached from both Dublin city and Wexford town. Schools in Dublin served urban populations only, and schools in Wexford served students from both urban and rural locations. No distinction was made as to the socio-economic status of the schools or the individual students, but this was a proxy measure for urban/rural split. Participants were recruited with the aim of a 50:50 sex-balance. Before data collection began, all parents provided written electronic consent, and all participants provided written electronic assent in advance and verbal assent at the beginning of the session. Participants were in Transition Year (TY); a non-academic year offered as an option for students in their fourth year of secondary school.

2.3. Study design

Six semi-structured focus group discussions (FGDs) were conducted, using the Three Factor Eating Questionnaire [TFEQ-r18 (Karlsson et al., 2000),] and the Variety Seeking Scale [VARSEEK (Van Trijp & Steenkamp, 1992),] eating behaviour traits as prompts for key discussion topics, as these were tools used in the larger NTFSSII survey which this qualitative research was accompanying. Vignettes were created and used to introduce the discussion topics of restrained eating, emotional eating, uncontrolled eating, and interest in trying new foods (Supplementary Material 1). A guide was prepared to ask participants about the thoughts and actions of the characters in the vignettes, and they could offer their own experiences or opinions if desired.

Owing to the COVID-19 pandemic, five FGDs were conducted in a semi-virtual manner using Zoom Video Communications software, where the research team was present online but the participants were

present in the classroom together¹. A pilot FGD took place in March 2020 in-person, and the data from this were included in the final dataset.

2.4. Data analysis

Following each FGD, the voice recording was transcribed by the lead researcher, using free transcription software (NCH Software, Express Scribe v 9.11). The accuracy of the transcribed document was reviewed and confirmed by the second researcher. Names were changed to pseudonyms before analysis to preserve student anonymity.

NVivo 12 Plus software (QSR International) was used for organisation of the transcribed audio files and management of the data analysis process. Cases were classified into participants (N = 47) and moderator (n = 1). For each case, the following attributes were assigned: sex (male, female), participant type (student, moderator), location (Dublin, Wexford), and school type (all girls, all boys, mixed).

The data analysis method outlined by Braun and Clarke on reflexive Thematic Analysis (TA) was followed (Braun & Clarke, 2006, 2020). Results of the reflexive TA involve both description of the content (semantic analysis), and discussion around how the results interact when moving from a descriptive to an interpretive level of analysis (latent analysis) (Braun & Clarke, 2020). The active role of the researcher is shown by interpreting the meaning behind many of the statements and discussions by participants, rather than simply reporting on what they directly said.

The iterative process of thematic analysis produced new results during each phase, which led to the development of the final theme and subthemes. Phase 1 involved data familiarisation and initiated ideas for broad coding categories within the data, generating n = 30 initial codes. Phase 2 involved multiple rounds of line-by-line coding to ensure all transcripts and each data extract was coded accurately to all relevant codes, and generated n = 71 detailed codes. In phase 3, the codes from phase 2 were reviewed and combined into initial theme categories. Some codes were promoted to full themes, some supported a main theme as a subtheme, and others were combined to form a more coherent theme on the topic, to generate n = 8 potential theme areas. Also, in phase 3, the codes were combined to create sub-components of the common factors noted. Phase 4 involved developing and reviewing the themes outlined in Phase 3, with themes being scrutinised in further detail, some themes merging and others splitting or subdividing into subthemes or contributory factors within themes, generating n = 5 revised themes. Phase 5 involved further analysis and scrutiny of the themes from Phase 4. NVivo software was used to facilitate this analysis, to run queries and matrix analyses on the different codes within each theme. Upon completion of Phase 5, n = 1 main theme and n = 3 interlinking subthemes were generated. Phase 6 is specified by Braun & Clarke as the process of writing the report, which combines all the phases to generate the final report findings in text, table and figure format, evident from the content of this results section.

3. Results

3.1. Study population

Six semi-structured focus group discussions were conducted in Irish secondary school-going adolescents (N = 47). Participants came from schools in both Dublin and Wexford and included a mix of girls (n = 35) and boys (n = 12), from single-sex and mixed schools (Table 1). Despite the intention of having a sex-balance within the dataset, there were more female participants than male. All students were aged between 15

¹ Please contact Dr. Aisling Daly (adaly@brookes.ac.uk) for more details on the semi-virtual data collection methods and the vignettes used, or watch this short video for details on anticipated challenges & lessons learned https://www.youtube.com/watch?v=HT4_L9kJjgs.

Table 1

Characteristics of focus group discussion participants.

Focus Group#	Mode of FGD	n	Girls	Boys	Group Type	Location
1	In-person	9	6	3	Mixed	Dublin
2	Semi-virtual	8	8	0	All girls	Wexford
3	Semi-virtual	7	7	0	All girls	Wexford
4	Semi-virtual	8	0	8	All boys	Dublin
5	Semi-virtual	9	9	0	All girls	Dublin
6	Semi-virtual	6	5	1	Mixed	Dublin
Total/Ratio	1:5	47	35	12	3:2:1	2:4

Participants from Dublin attended schools in South, North and West Dublin city, i.e. predominantly urban. Participants from Wexford attended schools in Wexford town, which serves students from Wexford town and the surrounding towns, i.e. a mix of urban and rural.

and 17 years.

3.2. Theme & subtheme development

The six phases of TA, as outlined by Braun and Clarke, were followed for the data analysis. This iterative process generated 30 initial codes in Phase 1, increasing to 71 detailed codes in Phase 2. In Phase 3, 8 potential thematic areas were created, reducing to 5 initial themes in Phase 4, which subsequently became 1 main theme with 3 interlinking subthemes in Phase 5. Semantic analysis of the data led to the development of 13 factors commonly discussed, with numerous sub-components (Table 2). Latent analysis of these factors led to the development of the main theme and subthemes. These will be discussed in detail in this paper, as per Phase 6 of reflexive TA, focussing predominantly on the main theme to develop the conceptual model of food choice.

Latent analysis of data determined one overarching theme relating to the notion that several needs and priorities are balanced in the minds of adolescents when choosing what food to eat. This balance of priorities among factors may help to explain why adolescents often struggle to make health-promoting food choices at certain times within their food environment, how they connect with feelings of food guilt, and how these elements interact to contribute to the final food choice (Fig. 1). The level of contribution each of these factors plays in determining the final food decision varies depending on the context in which the food choice was being made, as well as on the individual priorities of the adolescent themselves.

Three interlinking subthemes were developed, to describe the considerations taking place on how these factors contributed in different ways to determine adolescent food choices, with a predominant connection to feelings of guilt. The three subthemes generated are: 1) The conflict between health and social concerns; 2) The importance of enjoying food and the eating occasion; and 3) External influential factors outside of adolescents' immediate control.

While each subtheme remains distinct in its role in adolescent food choice, this paper will focus on their relationship to feelings of guilt around food, as this was a predominant aspect connecting the factors and subthemes as part of the food choice decision-making process.

3.3. Main theme: balancing priorities through internal negotiations for food choice, with the aim of reducing food guilt

The main aim for adolescents when making a food choice was to perform a mental balance to make the best food choice available within their immediate food environment. This should support good health and enjoyment, while being socially acceptable, and with minimal feelings of guilt for their choices. Some of these mental negotiations were a conscious choice, and some were occurring subconsciously, while still being influenced by external factors like the food environment and social standards and norms.

While the thirteen factors influencing food choice were standalone at times (Table 2), for most of the discussions there was an element of "it

Table 2
Factors and sub-components involved in adolescent food choices.

Factor	Sub-components	Exemplar Quotation(s)
1 Food environment	Food availability, School/Home/Social food environments	"... It depends what's there. Like I'll eat a salad, like I'll eat healthy food as well or like whatever's in the fridge it's not always junk.." (Mary, F, FGD6)
2 Money	Financial limitations; Value for money when buying own food	"People our age, if we were going out with our friends, we don't have a lot of money on hand, so you'd probably look at the prices, and generally the less healthy food is cheaper" (Evan, M, FGD4)
3 Convenience	Low effort to prepare food; Family meals cooked for you; Passively eating food available	"... Convenience is a huge thing for me. You'd be on the go a lot you know, you don't even get to spend even 2 hours in your house before, until 9[pm], so getting something like breakfast biscuits, or a banana or an apple, just something you can grab and go is really important because sometimes you don't even have the time to make sandwiches ..." (Ciaran, M, FGD1)
4 Peer Influence	Peer influence - both positive & negative	"I'd only get it if everyone else got it" (Annie, F, FGD6) "I think when other people are eating like, nice nutritious foods around you, you might be feel more likely to want to eat it, 'cos you know you'll benefit from it" (Harry, M, FGD4)
5 Health & Nutrition	Healthy and unhealthy foods; Nutrition content of food; Dietary restriction as healthy & unhealthy	"Spaghetti Bolognese is clearly a lot more healthy than the other options. You'd get a lot of nutrition out of it ..." (Harry, M, FGD4) "She's scared that if she eats too much calories she'll, like, gain weight. Like if she eats unhealthy[Sic]" (Cora, F, FGD5)
6 Physical Needs	Effects of food on the body; Hunger driving consumption; Fullness stopping consumption; Energy needs for sport	"If you're hungry, you may as well eat something" (Nicole, F, FGD3) "I'd, like, eat a bigger lunch on days I would have training like, after school... I'd like, have a bigger lunch so it like fuels me for the training as well" (Grace, F, FGD2)
7 Emotional Needs	Mood affecting food choice; Stress changing food habits; Eating for comfort or distraction; Food affecting mental health	"I think it would depend on my mood, and how, kind of, how my day went ..." (Sally, F, FGD1) "I would eat when I'm bored sometimes ..." (Deirdre, F, FGD2) "... When I get stressed my stomach feels kind of full, like I've butterflies in my stomach, like I didn't eat much because I was studying" (Luke, M, FGD6) "... The thing is I feel like if you keep restricting yourself then It would get to you

Table 2 (continued)

Factor	Sub-components	Exemplar Quotation(s)
8 Social Concerns	Embarrassment when eating; Social comparison; Physical appearance; Usual habits vs. social/party events	eventually mentally. Then you could possibly break down ..." (Sally, F, FGD1) "It depends who I'm with... like if I know the food is going to be messy and if I was with someone I wasn't that comfortable with, I'd probably pick something that was like, something that has little to no mess ... because like it would just be embarrassing to have stuff all over you!" (Amanda, F, FGD2) "I feel like there's a pressure from society telling you, like to influence what you should eat, kind of thing" (Rebecca, F, FGD3)
9 Taste & Enjoyment	Enjoying the taste & sensory aspects of food; Familiarity & sharing food; Avoiding temptation from certain food; Enjoying the experience of eating	"A lot of people buy food even if they're not hungry sometimes they might just buy food because of the taste, like they might buy sweets, like you wouldn't buy sweets because you're hungry" (Evan, M, FGD4) "Getting food you don't like then it basically, like, kills the entire dinner" (Steven, M, FGD1)
10 Food Guilt	Feeling guilty when eating; Feeling guilty for wasting food or money; Guilt from parents	"I think that's like the biggest thing teenagers struggle with, like feeling guilty after you eat something" (Stephanie, F, FGD5)
11 Food Waste	Physical food waste; Wasting money on food; Wasting the food occasion	"I think it's kind of a waste of food, you know kind of, if it's gonna go to waste you might as well eat it" (Shauna, F, FGD3)
12 Social Media ^a	Online social food environment; Influence on perception of body & diet quality, source of information and inspiration	"... Social media can have that impact where you need to have the perfect body,, like social media can influence what you eat, when you eat, how you eat You might say, post a picture on Instagram, and someone comments on it, you might not want to eat then ..." (Mary, F, FGD6) "Either way, everyone eats differently and I think that's a good thing because it means that you feel free to eat whatever you want and you know you won't be judged" (Helen, F, FGD3) "... like everyone's appetite is very different, ...I think it just depends on the person." (Molly, F, FGD5)
13 Dietary Preferences	Individual choice and preference; Cultural differences ^b ; Vegan/Vegetarian diets ^b	

All factors were discussed throughout all FGDs, in relation to responses to the vignette prompts. Sub-components indicate elements that were discussed within FGDs, combined to create a wider-reaching parent factor.

^a This topic was not part of the vignette stories, but following the initial FGD it was considered important to ask participants about. Therefore, this was only discussed in 5 FGDs.

^b These topics were discussed less widely (featuring in only 2 FGDs) and were not part of the discussions prompted by vignette stories, however they were interesting and relevant unexpected findings from the groups.

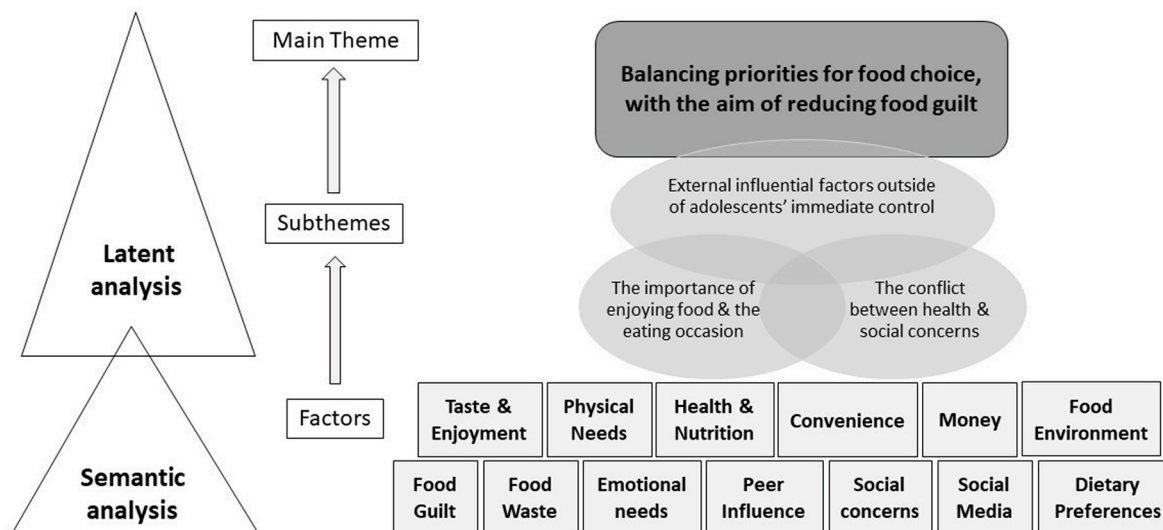


Fig. 1. Overview of thematic analysis results. Thirteen factors contributing to food choice identified from semantic analysis of data, combined through latent analysis to contribute to the three subthemes, which all contribute to the main theme of balancing these factors to make a suitable food choice within a specific context, with the aim of reducing food guilt.

depends” being mentioned, indicating that at different times and in different contexts, different factors played a role or perhaps took a higher priority when making a food choice. In general, the adolescents wanted to make a “healthy” food choice, but there were many situations and circumstances where it was not possible to do so. Analysing the implied meanings behind some of the discussions led to the development of the main theme of how adolescents balanced several factors that may be competing for priority, depending on the situation or circumstance in which the food choice was being made, ultimately choosing a food that gave minimal feelings of associated guilt.

The desire to reduce the impact of food guilt causes some internal conflict, where adolescents felt food guilt in different ways from different sources. This affected how much they could enjoy the foods they chose or, in some cases, it may change their initial food choice. Fig. 2 shows the interactions between elements involved in this matrix of food guilt in more detail, including the key elements that directly contribute to food guilt.

These interactions incorporate the main elements reported by adolescents as contributing to food guilt, and each of these elements are

weighed up in the mind of the adolescent when making a food decision, to determine the main priority at that time. Each element within this matrix has a different level of importance depending on the context of the food choice. Most adolescents seem to mentally deliberate (consciously or subconsciously) within a “Food Guilt Matrix” when making a food decision, getting a balance of their needs and priorities within the given context. Taste/enjoyment is of high importance when choosing what to eat, and equally adolescents are concerned about choosing a healthy food option, considering physical, mental, and social health concerns. For example, since food considered as being “unhealthy” generally tastes nicer, they might feel guilty for eating a tasty but unhealthy food.

3.4. Internal negotiations to mitigate or reduce food guilt

The presence of food guilt, or “feeling bad”, seemed to play an unconscious role in adolescent food choices, either by causing a modification to the food chosen, or by affecting the relationship with the food being eaten. In Fig. 3, the “Food Guilt Matrix” takes up a large

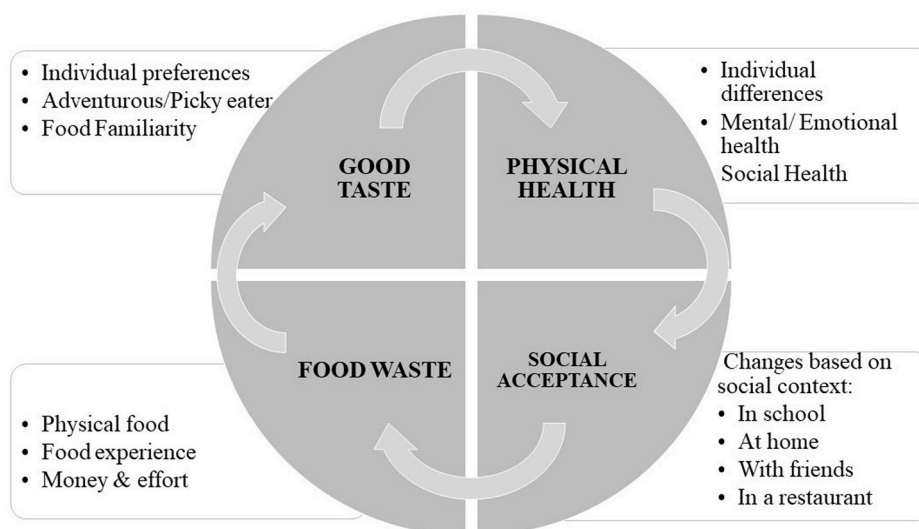


Fig. 2. Interactions between several elements of food and eating that contribute to feelings of food guilt.

component of the overall model, since this is where many of the mental value negotiations take place within the personal food system when making a food choice. Several factors can cause food guilt in different circumstances, and the mental negotiations taking place are to rationalise or minimise these causes of guilt, so the appropriate food can be chosen, eaten, and ideally, be enjoyed by the adolescent.

Guilt around food or food choices was both mentioned directly and implied within several of the discussions. Participants described wanting to make healthy food choices, but that other factors often play a conflicting role in the decision process. This can contribute to feelings of food guilt and may cause a change to the final food choice. Food guilt was so widely prevalent, as both a direct and an underlying aspect to their comments, that it became a predominant subtheme and the focus of this paper. Many of the mental negotiations occurring when making a food choice were made to balance out the sources of guilt.

3.4.1. Sources of guilt

Adolescents reported feeling bad or guilty when eating certain foods or eating in a certain way, usually linked with perceived unhealthy foods and eating behaviours.

“I think that’s like the biggest thing teenagers struggle with, like feeling guilty after you eat something.” (Stephanie, F, FGD5, strong group agreement)

Food guilt came internally from themselves, socially from peers, and from their parents, usually in relation to money spent on food. Although the groups understood that different ways of eating are okay, they still felt that there was a certain way of eating that was “right”, and if they didn’t eat that way, they would feel bad or guilty.

“I feel like there’s a pressure from society telling you, like to influence what you should eat, kind of thing... Like, people generally don’t want to eat, like things that are high in calories ... so they choose something else, even though like it might be nice but they won’t give it a try or something.” (Rebecca, F, FGD3)

They alluded to guilt being linked with being unhealthy, and that if they ate healthy foods or followed positive eating habits, they would not feel guilty.

(Group Discussion, FGD5, all female):

Isabelle: Yeah that’s horrible... like if you knew it was high in calories or stuff like I’d say you would, after eating like your own lunch you’d feel guilty after it, but it depends. But, like in the moment you’d think like, ‘oh this is massive’* like I’m not even thinking, but then after you’d be like ‘aww’ [i.e. annoyed]. [*Massive is a colloquial term for amazing, awesome, delicious etc.]

Emily: I think it’s worse when it’s like a filling food, ‘cos you could feel bloated for the rest of the day, but like if it’s just something light like a chocolate bar or something small you’d be fine.

Stephanie: Like if I was eating fruit or vegetables I wouldn’t even feel slightly guilty.

Isabelle: I’d be like ‘oh I’m healthy now!’

Emily: But if it was like a brownie filled with double chocolate... [I would feel guilty].

Molly: I’d feel so guilty. Like, I’d feel really bloated or something, like maybe I shouldn’t have eaten that, but if it was like something small just like a little bar or like maybe a banana or something, it wouldn’t really phase me, but then that’s also ‘cos I know that it’s healthy so I wouldn’t really be that phased by it.

They also noted that they could feel guilty for wasting money or wasting food, and this guilt or pressure seemed to come from their parents more than from their peers.

“I feel bad like when my mam buys something, just say like with that example of having something big in school, and mam would be like ‘oh I have to throw this in the bin now’, and I’d just feel awful ‘cos I didn’t eat what she bought!’” (Emily, F, FGD5, referring to vignette topic of buying lunch unplanned in school)

3.4.2. Waste-related guilt

Waste was mentioned regularly but the concept changed between the physical waste of food, waste of money spent on food, or sometimes a waste of the food experience linked with value for money. Wasting food or wasting money on food were both causes for feeling guilty, so the aim was to minimise this. However, to prevent food waste, all of the food purchased must be eaten, and to eat all the food, it must be enjoyable in terms of taste. But, if healthy food is not considered tasty, then there might be a struggle to eat it all. Several mental negotiations take place when aiming to make a healthy food choice while minimising food guilt.

Wasting food itself was a cause of guilt for adolescents, where they reported feeling bad about food going to waste if they didn’t eat it all. This food waste when buying their own food is also connected with wasting money on food if they weren’t going to eat it all.

“Cos there’s no point in buying something that you’re not going to eat... like you’re gonna [sic] feel bad.” (Molly, F, FGD5)

“Exactly yeah, it’s just a waste of money.” (Emily, F, FGD5, agreeing with Molly)

When eating out, there was an equal importance placed on enjoying the whole food experience as well as enjoying the food itself. If they choose a food they don’t enjoy then not only does the food go to waste, but also the experience of the occasion can be wasted, and they wouldn’t get good value for money.

“Getting food you don’t like then it basically like kills the entire dinner ... ‘cos everyone else is enjoying their food and you’re sat there with stuff you’ve barely eaten.” (Steven, M, FGD1)

When discussing food available in the school canteen, one group noted that the food quality had improved recently in that they could no longer buy sweets and crisps and they could buy more fruit. However, they saw this as a waste of money – it was “worth it” to spend the money on sweet treats, but not worth the money to spend it on health-promoting foods like fruit. This shows some insight into the adolescents’ interpretation of good value for money.

(Short discussion, all male, FGD4):

Shane: It’s much healthier now, they took away the sweet things ...

Harry: So like for example, like usually you’d get a cookie whereas now it’s just like an apple or an orange”

Moderator: ...And would you still buy the apple or banana or would you just buy nothing?

Evan: Depends if you’re hungry or not.

Harry: I’d probably just leave it, ‘cos it’s a bit of a waste of money! (Group laughs).

There were some adolescents who did not see food waste as a major concern. They would happily try new foods or eat what they wanted and if there was too much or if they disliked the taste they would throw it out or buy something else, but these were in the minority. This was more a case when they weren’t too concerned about wasting money on food.

“I can throw it away if I don’t like it!” (Mary, F, FGD6)

“Yeah I don’t think I’d have a problem doing that ‘cos I wouldn’t be the one paying for it in a way, so like if I don’t like it I actually just, either I don’t want to eat it or can just like throw it out and not eat it again.” (Molly, F, FGD5)

Adolescents also described the practice of sharing food with friends as a way to prevent food waste, most often if they wanted to taste the food but they knew the portion would be too big for them. This was a method of balancing the needs of taste, physical hunger needs, cost, and food waste, as well as facilitating the exploration of new tastes or food experiences.

“Sometimes, if I’m out with my friends like I’d get like chips and like if I know I won’t eat all of it, you could split it between two or three of you.” (Nicole, F, FGD3)

Preventing food waste often led to eating in a way that was generally considered less healthy, such as eating a meal at home even if they weren’t hungry, or finishing a whole plate of food just so the food wouldn’t go to waste. This could mean overeating, which was considered a negative eating behaviour, but it could be justified if it meant preventing the food from going to waste.

“I think it’s kind of a waste of food, you know kind of, if it’s gonna [sic] go to waste you might as well eat it.” (Shauna, F, FGD3)

Some adolescents felt that their parents would put pressure on them to eat food they had prepared even if they weren’t feeling hungry. They noted that their parents would not want the food or their effort in cooking to go to waste, and most adolescents felt they had little control over this eating decision. Eating this type of food when they weren’t hungry led to some feelings of guilt, but equally, if they did not eat what their parents prepared for them, they would feel a different kind of guilt. It was often a case where reducing one form of guilt might increase another form of guilt, hence the challenging mental negotiations taking place.

“... when your mam would force you like to eat it, ‘cos obviously she doesn’t want to like throw out what she made for dinner, and then like you’d be eating it even though you don’t want it and then you’d feel guilty after eating it afterwards.” (Isabelle, F, FGD5)

“.... I’d already had enough unhealthy stuff, but I still went again it’s not the temptation that I wanted to go for, it’s just that I know that I don’t really go out to eat that much so I kind of deserved it in the moment, and I know I’m not usually an unhealthy eater, I’m not that bad, so I know it’s not going to affect me too bad if I do eat it that one time.” (Sally, F, FGD1, describing a family occasion at an all-you-can-eat style restaurant).

Overall, the adolescent participants had a strong understanding of the idea of balance within their diet, allowing themselves to enjoy food and celebration occasions and recognising that general habits play a stronger role in health, rather than one “bad” food negating everything. Although giving into temptation or eating excessive amounts was generally considered an unhealthy behaviour, there were times when the taste or enjoyment factor justified or minimised these feelings of guilt when considered against the overall diet as a whole.

Food waste was something adolescents wanted to prevent or minimise as much as possible, and to do so they might compromise on the health quality of the food to choose something that was affordable, that they were guaranteed to enjoy and that they could finish the whole portion to prevent wasting the food. At times, reducing one type of guilt could increase another type of guilt, but the circumstance dictated which type of guilt was more acceptable at the time.

3.5. Conceptual model for food choice decisions in adolescents

Fig. 3 outlines a “Food Choice Funnel” that describes the interaction between these considerations, and how they might influence the final food choice. This model has been adapted from the “Food Choice Process Models” described by both Connors et al., 2001; Sobal & Bisogni, 2009. At the top of the model is the life course and how the food choices and considerations being described in these data are specific to adolescents.

Next are the overarching external factors. These are all elements that strongly influence food choice, but which adolescents have limited ability to directly address themselves, i.e. external influential factors outside of the adolescents’ immediate control (Subtheme 3). These include practical considerations relating to the food availability within the immediate food environment, financial autonomy or money availability, and the wider social values and concerns of adolescents and their peer community. Moving down through the funnel, the next level is the personal food system, i.e., the elements of food choice over which adolescents have more direct control. Two key factors that the adolescents described as being of high priority when choosing a food were that the food would be beneficial for their health (Subtheme 1), and that they wanted to enjoy the food and the food experience (Subtheme 2). Of note is the fact that “health” not only relates to physical health, but also mental or emotional health and the idea of “social health”, relating to peer influences or concerns with the social acceptability of foods, and often the types of food chosen to support these needs were in conflict with each other.

While enjoyment of food and eating was of high importance for the adolescents, food guilt was also present and often caused an internal conflict between the key priorities of health and enjoyment. Many adolescents appear to enter what we have termed a “Food Guilt Matrix”, where several elements can cause food guilt and where a mental balancing act seems to occur to minimise these feelings of guilt. This was the predominant component of the value negotiations being undertaken by the adolescents when making food decisions. A balance between several factors of taste, social acceptability, physical & mental health, value for money, and minimal food waste is needed to justify their food decision. This reduces the impact of guilt and supports the enjoyment of food, when trying to make positive, health-promoting food choices. There were some cases where food guilt was not present, with some adolescents simply eating a food without much second thought. For the most part, however, the adolescents would enter this “Food Guilt Matrix”, in which they contemplated and balanced their priorities at the time to choose a food they would enjoy, that met their current needs, and that minimised the impact of the guilt they might be feeling. Depending on the physical and social circumstances, different elements can cause food guilt and different elements will take priority at different times.

Once they complete these mental value negotiations and leave the “Food Guilt Matrix”, the adolescents have two possible routes. One route would lead them to consider a new food choice, which would be dependent on what was available and suitable within the food environment, thereby re-entering the Food Choice Funnel (Fig. 3). Alternatively, they would come to a mental agreement or justification that their food choice was suitable and appropriate, and minimise guilt sufficiently to allow them to choose, eat, and enjoy the food.

3.6. Differences in discussions by sex

Using NVivo query functions, the representation levels within discussions were assessed, albeit not through a statistically significant method (Houghton et al., 2017). There were three times more girls than boys within the data set ($n = 35:12$), so naturally more discussion content came from girls. However, comparing the representation of boys and girls within the data, some differences in the discussion topics appear (Table 3). Any deviation from this 3:1 ratio within the data codes suggests an over-representation of that sex, indicating it was discussed more by that sex.

The discussion from boys suggested they engage in more passive eating behaviours than girls, and that boys appear to be more influenced by the presence and availability of food, simply eating what is there, placing higher importance on convenience. Both boys and girls discussed the importance of enjoying food and the food occasion as a key priority when making food decisions in different contexts. Boys discussed practical aspects around food more than girls, in terms of

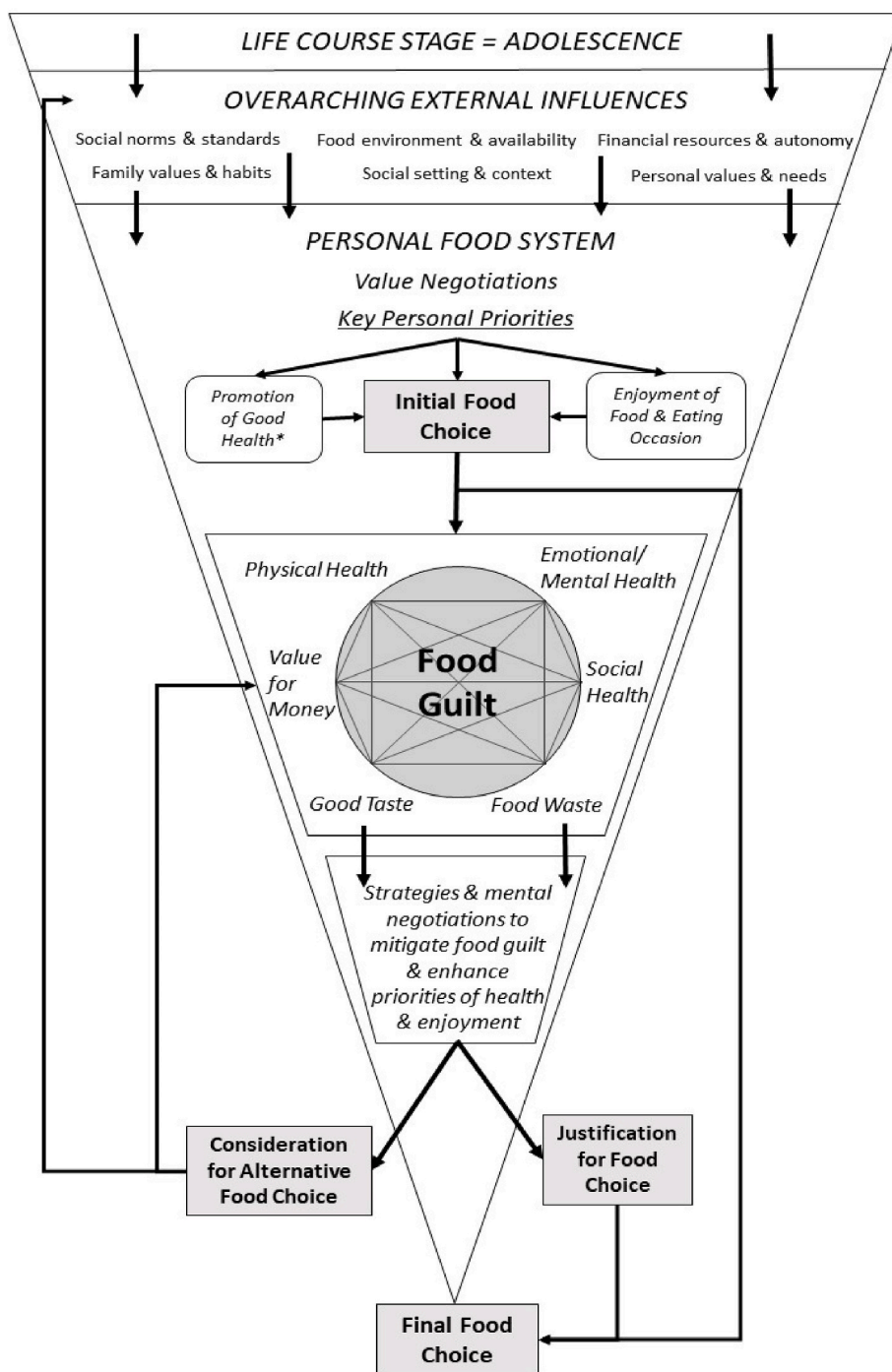


Fig. 3. A conceptual model of adolescent food choice: Food Choice Funnel incorporating a food guilt matrix. Adapted from Connors et al., 2001; Sobal & Bisogni, 2009. *Good Health refers to the combination of physical, mental/emotional and social health, which are often interlinked and cause internal conflicts when making food choices, depending on the social context.

convenience and money concerns affecting their food choices, and boys showed slightly more interest in the health and performance effect of foods around physical needs, and were slightly chattier about individual dietary preferences, although this came mainly from one boy in one group discussion. Girls were more vocal about food waste than boys, linking with a larger concern for food guilt or shame, and girls discussed the connection between food and their mood or emotions more than boys, but not exclusively. Both boys and girls discussed elements of the food environment affecting their food choices, the influence of peers and social concerns on food choices, and the role of social media. There were no major differences noted in the discussions based on location or

school-type, suggesting the adolescents in this study all share very similar concerns regardless of where they live, since all food decisions are context specific.

4. Discussion

The results of the present study highlight the multifactorial nature of food choices and how there is no single key influence or barrier to healthy eating among adolescents. This continues to emphasise the challenges with understanding and addressing food intake behaviours (Chen & Antonelli, 2020). Participants in this research described

Table 3
Proportional representation of discussion content by girls and boys.

Factor	Girls:Boys	Proportional Representation
Overall	2.92	
1 Food environment	2.04	
2 Money	1.43	
3 Convenience	1.08	
4 Peer Influence	2.16	
5 Health & nutrition	1.61	
6 Physical needs	1.59	
7 Emotional needs	3.06	
8 Social concerns	2.38	
9 Taste & enjoyment	2.07	
10 Food guilt	2.61	
11 Food waste	3.11	
12 Social Media	2.73	
13 Dietary preferences	1.73	

Since there were more girls involved in the discussions overall, any deviation from the 2.92 ratio indicated an over-representation of that group within the discussions. Ratios >2.92 indicated girls were over-represented in the coded data (yellow) and <2.92 indicated boys were over-represented in the coded data (green). The size of the coloured boxes is proportionate to the extent to which the group were over-represented in the discussions on the topic.

numerous internal and external factors that they consider in their food decisions, based on the best option(s) available, and these food choices and influences can change depending on the circumstance or social context. These results reflect, and expand upon, common classifications of influences on food choice among adolescents, i.e. macro system or societal influences, physical environment influences, social environment influences, and individual needs, priorities and preferences (Larson & Story, 2009; Story et al., 2002).

This research also shows the uniquely higher strength of social or peer influences among adolescents, and how the social setting can lead to different forms of food guilt being felt for their food choices. Adolescents are still at the stage in the life course where they are developing their own personality, priorities, and preferences, so while adult food choices are often influenced by past exposure and experience, adolescent food choices are a part of forming their identity and position in society, with a strong interplay between the food environment and the social environment (Shaw et al., 2023). Taste, enjoyment and health are important considerations in adolescent food choice, but concerns for the social acceptability of certain foods plays an important and often conflicting role. These social concerns can lead to food guilt, when they are trying to negotiate the “right” food choice to make by balancing their personal preferences and needs with what that food choice will mean for them socially (Bryan et al., 2016; Steenhuis, 2009). Food is not just for feeding hunger and satisfying physical needs, but it also contains emotional, social, and symbolic benefits for young people (Scott et al., 2019). Food can contribute to a young person’s identity or social status, and when making a food choice there might be a specifically “calculated hedonism”, whereby young people eat in a specific way, not just for enjoyment of the taste but also in order to be accepted socially (Scott et al., 2019). This “social tightrope” can be difficult to balance on, since people who eat too healthily and those who overindulge can both be subject to social pressure or ridicule (Scott et al., 2019). The symbolic role of food has recently been considered within the construct of “Food Involvement” among adults, where the relationship to food can allow people to belong to a group, be accepted by others, to share positive experiences, to express one’s creativity or moral values (Castellini & Graffigna, 2022). This could be studied further connecting constructs of “food involvement” with “food guilt”, through qualitative or quantitative methods, such as the recently developed “Psychological Food Involvement Scale” (Castellini et al., 2023). In relation to food involvement, researchers noticed higher consumption of junk food or

snacks, when social affirmation or social bonding were playing a key role, further suggesting the social aspect of food might outweigh the nutritional quality of food choices (Castellini et al., 2023).

Much research on food choice refers to the socio-economic and environmental influences or concerns, but for adolescents it appears that the social side to food choice is also playing a key role (Shaw et al., 2023; A. M. Ziegler et al., 2021). Adolescents can only eat food that is available to them in their immediate environment, so there is still an important role to make the foods available better quality and better for their health, as well as making them palatable, affordable and socially desirable. The school, home, and social/online environments are three key areas that could be addressed to improve the education, skills, and influence adolescents receive to better support them to make more health-promoting food choices (Bauer & Reisch, 2018; Green et al., 2021; Hargreaves et al., 2022; Kelly et al., 2021; Larson & Story, 2009; Shaw et al., 2023; A. M. Ziegler et al., 2021). However, regardless of the external factors outside of their immediate control, adolescents felt they had to navigate many decisions and priorities when making a food choice in different social food settings.

4.1. Interconnected factors contributing to guilt within food choices

Minimising feelings of guilt around their food choices was a key element in the food choice process. In the context of choosing food, adolescents are limited by their food environment and financial or practical autonomy, but they also must fit into the social standards and norms set by their peers and community. While the participants in this study reported feeling *bad* or *guilty* for eating certain foods or eating in a certain way, this is not necessarily a new phenomenon surrounding food choice and eating habits, particularly in relation to emotional eating (Wong & Qian, 2016). By its very name, emotional eating connects food with emotions, and an emotion commonly reported by these adolescents was guilt or shame. The adolescents also described eating when they feel sad or bored or stressed, and sometimes this led to overeating. Overeating can lead to feeling guilty, and feeling guilty can cause changes to food choices (Ruddock & Hardman, 2018). People who feel guilty around certain foods tend to have less healthy eating habits overall (Kuijjer et al., 2015), and the presence of guilt around food is not considered a useful or motivating factor for healthy food choices (Kuijjer & Boyce, 2014). In fact, the opposite is more likely to occur. Emotional eating, guilt and shame around food are more likely to lead to the

development of disordered eating habits, which can have negative physical and mental health impacts (Kuijjer & Boyce, 2014; Manjrekar et al., 2013; Wong & Qian, 2016). Therefore, understanding and addressing this component of shame and the sources of guilt are important. The presence and influential role of food guilt within the adolescents' food choice decision process depicted in this research adds to the understanding of where food guilt often comes from, and how it can influence a food choice. In some ways, it may encourage a healthier food option, but in others, it may result in a less healthy food option (in the sense of physical health). There seems to be a trade-off being made, which is mediated by feelings of guilt.

Waste in relation to food was also noted as a source of guilt among adolescents, potentially due to the impact on the environment, but more commonly linked with wasting money on food. Feeling guilty about food waste might lead to positive food waste reduction behaviours (Attiq et al., 2021; Bravi et al., 2020). Similar actions were noted in this study such as using leftovers for lunch the next day, or choosing foods you know you will like when eating out as ways to prevent food waste. The present data suggest that Irish adolescents are aware of and concerned about food waste and aim to minimise it where possible, although it is not clear if the motivations for reducing food waste were due to individual financial concerns or wider environmental sustainability concerns. The presence of guilt for wasting food was suggested as a reason for changing their food choices or eating habits, but in some cases, this may have led to more negative eating habits such as overeating certain foods, which itself could lead to internal food guilt. Understanding the key sources of food guilt will be beneficial when educating and supporting adolescents to make healthy food choices, so they can minimise the presence of food guilt while making health-promoting food decisions. The potential to use reducing food waste as a motivation for more healthy food choices among adolescents could be a suitable avenue to follow with health-promotion messages and practical skills around food preparation. Reducing food waste can save money, can improve health (if healthy foods are chosen), can reduce environmental impact, and can meet the associated social standards (Attiq et al., 2021). While Attiq et al. found that the anticipated guilt from food waste caused a change in behaviours, there was no direct analysis of the types of food being eaten when aiming to reduce food waste. This could be an interesting area for future research combining food waste reduction motivations and the impact on dietary habits.

Unsurprisingly, taste, price and convenience were all noted as important influences on the food choices of these adolescents, and how they played a role in determining if the food they chose would be health promoting and if they would enjoy eating it. These are aspects routinely mentioned when researching food choice, specifically among adolescents (Bawajeeh et al., 2020; Daly et al., 2023; Kebbe et al., 2017; Shepherd et al., 2006). A global qualitative study on adolescent food choices stated that “healthy options need to be available at a price that adolescents see as affordable and competitive with unhealthy food choices” (Fleming et al., 2020). This statement encompasses the idea that food needs to be healthy and affordable for adolescents, but that the adolescent must value and appreciate that these foods are worth the money needed, which is a sentiment reflected in the present research. Adolescents are not only concerned about the price of healthy food, but the healthy foods must taste nice and they must be as socially acceptable and as desirable as the unhealthy food options currently available and widely consumed. Understanding adolescents' specific perception of their food environment, and the values they place on different food in different settings, is an element highlighted as being lacking from the literature, but is also one that will likely be specific to groups of adolescents rather than adolescents as a whole (Kelly et al., 2021). The current research attempts to add to the literature around value perceptions in different settings, specifically how value for money can be a conflicting concern and a potential source of guilt in food choices. Framing healthy eating through the lens of the specific values held as important to adolescents can be more effective for improving healthy

eating habits, using food choice as a potential way for adolescents to establish autonomy from their parents and set their position among peers, as well as a way to promote good health (Bryan et al., 2016; Castellini & Graffigna, 2022).

4.2. Conceptual model for food choice decisions in adolescents

The present research identified subthemes that relate to the common elements of individual, social and environmental factors influencing food choice (Bauer & Reisch, 2018), and attempts to expand on the challenges faced when making a health-promoting food decision within these categories. These data also link in directly with point 4 of Chen and Antonelli's future research directions, by “enriching and improving the framework with empirical observation and data based on a feedback mechanism”, specifically by adding to the literature on **adolescent** food choice decisions, and by further expanding on the **cognitive processes** occurring when mitigating or **managing feelings of food guilt**. Notably, Chen and Antonelli systematically omitted data collected in adolescent cohorts. A subsequent review of these excluded papers highlights the limited availability of conceptual models of food choice decisions among adolescents specifically (Bissonnette & Contento, 2001; Fitzgerald et al., 2013; Story et al., 2002; Travis et al., 2010). Thus, the current research attempted to fill a gap in the literature while complementing commonly referenced food choice process models (Connors et al., 2001; Sobal & Bisogni, 2009), describing the **interactions** between influential factors, and not simply describing the factors in isolation. In addition, it particularly highlights the strong interlinking between elements within the social environment and the personal or individual influences on adolescent food choice. This is in some way reflective of the social-ecological model suggested by Zhang and Solmon (2013), encompassing the combination of influence the physical environment and the social setting has on habits in teenagers (Zhang & Solmon, 2013).

Our results follow a similar model of interacting factors as described by Connors et al., 2001 and by Sobal & Bisogni, 2009, which were both adapted from the original food choice process model outlined by (Furst et al., 1996). Hence, Fig. 3 incorporates the feedback loop from Sobal and Bisogni, while maintaining the dynamic range of value negotiations specified by Connors, through the concept of a “Food Guilt Matrix”. In this sense, the present results provide a more holistic conceptual model of food choice, specific to adolescents. All of these previous models include a personal food system, which refers to those elements over which an individual has more direct control (Connors et al., 2001; Sobal & Bisogni, 2009). In our research (Fig. 3), the personal food system for adolescents encompasses their particular priorities when it comes to making food choices, described mainly in relation to the priorities of health and enjoyment. However, due to the increasingly social nature of adolescent behaviours, adolescents may be less in control of their own thoughts and values than they may realise. They are under the influence of wider society, their closer peer network, and to a certain extent, social media (Fleming et al., 2020; Larson & Story, 2009). Within this personal food system, the “Food Guilt Matrix” plays a dominant role, whereby many of the value negotiations taking place are influenced by the physical, emotional, practical and social outcomes that may occur from the food choices they make. Connecting with the conceptual model of food choice proposed by Chen and Antonelli, these results regarding food guilt and social concerns around food relate most strongly to cognitive factors, specifically anticipated consequences and personal identity (e.g., what their food choice says about them). “Anticipated consequences” here can refer to the result of feeling guilty or shame for a food choice, but the guilt itself is due to an anticipated consequence on poor health, social unacceptability, or moral issues like food waste.

One key limitation of the Chen and Antonelli model is that it is derived from data in adults only, so while the general theoretical framework of food choice is still relevant, it does not consider the key influence social concerns can have on adolescent food choices. The

current study would support the idea that these social influences are of a higher importance among adolescents than among either younger children (who are more directly influenced by parents) or older adults (who have generally established their own social standing, values etc.) (Neufeld et al., 2022; Story et al., 2002). Despite wanting more agency around their food choices, teenagers still have a relatively strong influence from their family and home environment, but they are also living in a more social environment than younger children and are therefore influenced by their peers and friends (Green et al., 2021). Adolescents are actively developing their own sets of values, interests and priorities, and food is one realm in which their choices can be actively influenced and changed based on exposures and experiences at home but also within their social environment with friends (Story et al., 2002). Adolescents are not necessarily making these active food choices themselves, rather they are being influenced externally by the physical and social food environments through food availability, affordability, and social norms around these foods (Larson & Story, 2009; Shaw et al., 2023; Story et al., 2002). Sometimes the foods being supported in these different environments are conflicting in their role in health (Castellini et al., 2023; Chen & Antonelli, 2020; Larson & Story, 2009). Recently, authors have discussed the role of eating autonomy and how the changing environments or settings in which adolescents make food choices can change the foods chosen, similar to the findings described in the present research (A. M. Ziegler et al., 2021). The food setting or environment in which a food choice is being made can influence both the degree of control or autonomy adolescents have around the food choice (often due to food availability), but also how the social impacts of the food choice might differ (e.g., when eating with friends vs. family) (Shaw et al., 2023; A. M. Ziegler et al., 2021). The present research echoes this, by showing the interactions between the physical and social outcomes of a food choice.

4.3. Strengths and limitations

Despite the COVID-19 pandemic delaying data collection and forcing a change to data collection methods, the research team successfully adapted to the online setting to ensure the FGDs were still conducted with integrity and following best practices at the time (Archibald et al., 2019; Welsch & May 2020; J. Ziegler & Mason, 2020). Preserving the social interactions among adolescents was important, hence online FGDs were used rather than switching to individual interviews online. There were minimal differences noted in the quality of the data collected using the traditional in-person methods (FGD1), and those collected semi-virtually (FGD2-6). Since adolescents were comfortable around technology and video calls, this style of data collection suited the study group well (See Footnote¹). The use of vignettes to introduce the discussion topics was a strength which helped mitigate any discomfort that may be felt sharing their opinions on a potentially sensitive topic of food choice and eating behaviours. However, it must be noted that the scenarios presented within the vignettes relate to a limited set of scenarios where food decisions can be made. Therefore, the vignettes themselves may have influenced the direction of the discussions. While the method of reflective thematic analysis as per Braun and Clarke was followed appropriately, a potential limitation of this method is the use of a single coder to analyse the large dataset.

While the initial aim was for a diverse study population balanced for sex and geographic location, the final study sample had more girls than boys, and more adolescents from the Dublin area. This may have influenced the content of discussions, particularly from single-sex groups. As noted, most of the direct discussion on emotions and direct guilt came from female focus groups. Including more mixed-sex groups may be beneficial in future. Additionally, most of the male participants in the sample come from a school that has a high focus on sports, and this may have influenced how much of the boys' discussion was around health, nutrition, and sports performance. Therefore, the discussions from many of the boys in this sample may not be reflective of the average

male teenager in Ireland. Response bias or selection bias was also a likely limitation of this piece of research, in that the students who volunteered to participate in the discussion would most likely have been interested in food and nutrition already, and may be quite confident and open to sharing their thoughts and experiences around food. The fact participants in each FGD knew each other as schoolmates may also have affected the type of information shared. Therefore, the findings in the study may not capture the voices of those adolescents who are more shy or timid, and who may have different experiences around food. This piece of research may be missing some important insights of those more vulnerable to peer pressure, social comparison, or disordered eating habits.

Finally, with the online nature and the discussions taking place during class time, some sessions were limited by the school schedule, and therefore some discussions were cut short. The semi-structured nature of the discussions with the vignette stories ensured the key topics of interest were discussed in all FGDs. However, new discussion topics, like those around vegetarian diets or the impact of social media, had to end early when the school bell rang, potentially depriving the study of some unanticipated, interesting insights. These topics would be worthy of particular focus in future research.

5. Conclusion

This research highlights the complex and multifactorial nature of food choice in adolescents, but specifically highlights the presence and role of food guilt in many food decisions, particularly among female participants. This idea of a "Food Guilt Matrix" is a unique addition to the current literature on the topic of food choice in adolescents. While social concerns are often noted in qualitative research on food choice in adolescents, there is rarely specific detail on what these social pressures constitute or where these social pressures come from. The present research specifically highlights these feelings of guilt or shame around food choices, and begins to uncover the main sources of guilt as being from parents, peers, and from themselves internally. The guilt can arise for a variety of reasons, which change depending on the social context. Getting the balance between all considerations appears to be a challenge for adolescents. It is important to understand the value placed on the social component of eating among adolescents, since they have increasing social interactions and occasions where choosing health-promoting foods may be more challenging. Practical concerns surrounding financial autonomy, food availability, and motivation or ability to prepare food are also factors that can be addressed, alongside improved healthy eating education and support. All of these interconnected aspects should be considered when understanding adolescent eating habits and when designing health-promotion messages to adolescents. Such healthy eating messages should include an element of balance, to encourage health-promoting food choices, while allowing space for enjoyment of foods and suiting the food choice to the physical and social environment in which it is taking place, without feeling guilt for less health-promoting food choices at certain times.

Future research in this area could actively focus on the concept of food guilt, to determine specific sources of food guilt and how this food guilt might affect adolescent food choices. Future research could also investigate the different presence and roles of guilt for boys and girls, including larger and more balanced samples, more mixed-sex FGDs, and finding ways to hear the opinions and experiences of those who may be less comfortable speaking about a sensitive topic like food and eating. The role of social media in influencing adolescent food choices and food guilt, and the influences at play when considering choosing a more vegetarian-style diet in adolescents or young adults arose briefly in this research and could be explored further.

Author contributions

Aisling N Daly conducted all data collection, analysis, interpretation

and manuscript preparation. Elizabeth J O'Sullivan and John M Kearney supervised the research and provided in-depth feedback on the analysis process and manuscript preparation.

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Data statement

Dr. Aisling N Daly has full access to the data reported in the manuscript. Participants names have been anonymised for confidentiality. To request raw data containing pseudonyms only, please contact the corresponding author.

Ethics statement

Ethical approval was received from TU Dublin Research Ethics & Integrity Committee (REIC) in March 2020, REC-19-13, with revisions approved in September 2020 to facilitate online data collection methods.

Declaration of competing interest

None to declare.

Data availability

Data will be made available on request.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.appet.2023.107094>.

References

- Archibald, M. M., Ambagtsheer, R. C., Casey, M. G., & Lawless, M. (2019). Using Zoom videoconferencing for qualitative data collection: Perceptions and experiences of researchers and participants. *International Journal of Qualitative Methods*, 18, 1–8. <https://doi.org/10.1177/1609406919874596>
- Attiq, S., Chau, K. Y., Bashir, S., Habib, M. D., Azam, R. I., & Wong, W.-K. (2021). Sustainability of household food waste reduction: A fresh insight on youth's emotional and cognitive behaviors. *International Journal of Environmental Research and Public Health*, 18(13), 7013. <https://doi.org/10.3390/IJERPH18137013>
- Bauer, J. M., & Reisch, L. A. (2018). Behavioural insights and (Un)healthy dietary choices: A review of current evidence. *Journal of Consumer Policy*, 42(1), 3–45. <https://doi.org/10.1007/S10603-018-9387-Y>, 2018.
- Bawajeeh, A. O., Albar, S. A., Zhang, H., Zulyzniak, M. A., Evans, C. E. L., & Cade, J. E. (2020). Impact of taste on food choices in adolescence—systematic review and meta-analysis. *Nutrients*, 12(7), 1985. <https://doi.org/10.3390/NU12071985>
- Bissonnette, M. M., & Contento, I. R. (2001). Adolescents' perspectives and food choice behaviors in terms of the environmental impacts of food production practices: Application of a psychosocial model. *Journal of Nutrition Education and Behavior*, 33(2), 72–82. [https://doi.org/10.1016/s1499-4046\(06\)60170-x](https://doi.org/10.1016/s1499-4046(06)60170-x)
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp0630a>
- Braun, V., & Clarke, V. (2020). One size fits all? What counts as quality practice in (reflexive) thematic analysis? *Qualitative Research in Psychology*, 1–25. <https://doi.org/10.1080/14780887.2020.1769238>, 00(00).
- Bravi, L., Francioni, B., Murmura, F., & Savelli, E. (2020). Factors affecting household food waste among young consumers and actions to prevent it. A comparison among UK, Spain and Italy. *Resources, Conservation and Recycling*, 153, Article 104586. <https://doi.org/10.1016/J.RESCONREC.2019.104586>
- Browne, S., Barron, C., Staines, A., & Sweeney, M. R. (2019). 'We know what we should eat but we don't ...': A qualitative study in Irish secondary schools. *Health Promotion International*, 1–10. <https://doi.org/10.1093/heapro/daz087>
- Bryan, C. J., Yeager, D. S., Hinojosa, C. P., Chabot, A., Bergen, H., Kawamura, M., & Steubing, F. (2016). Harnessing adolescent values to motivate healthier eating. *Proceedings of the National Academy of Sciences of the United States of America*, 113(39), 10830–10835. <https://doi.org/10.1073/pnas.1604586113>
- Castellini, G., Bryant, E. J., Stewart-Knox, B. J., & Graffigna, G. (2023). Development and validation of the psychological food involvement Scale (PFIS). *Food Quality and Preference*, 105. <https://doi.org/10.1016/j.foodqual.2022.104784>
- Castellini, G., & Graffigna, G. (2022). "Food is more than just a source of nutrients": A qualitative phenomenological study on food involvement. *Appetite*, 178. <https://doi.org/10.1016/j.appet.2022.106179>
- Chen, P. J., & Antonelli, M. (2020). Conceptual models of food choice: Influential factors related to foods. *Individual Differences, and Society*. <https://doi.org/10.3390/foods9121898>
- Connors, M., Bisogni, C. A., Sobal, J., & Devine, C. M. (2001). Managing values in personal food systems. *Appetite*, 36(3), 189–200. <https://doi.org/10.1006/appe.2001.0400>
- Craigie, A. M., Lake, A. A., Kelly, S. A., Adamson, A. J., & Mathers, J. C. (2011). Tracking of obesity-related behaviours from childhood to adulthood: A systematic review. *Maturitas*, 70(3), 266–284. <https://doi.org/10.1016/j.maturitas.2011.08.005>
- Daly, A. N., O'Sullivan, E. J., Walton, J., Kehoe, L., McNulty, B. A., Flynn, A., & Kearney, J. M. (2023). Determining the food choice motivations of Irish teens and their association with dietary intakes, using the Food Choice Questionnaire. *Appetite*, 189. <https://doi.org/10.1016/j.appet.2023.106981>
- Fitzgerald, A., Heary, C., Kelly, C., Nixon, E., & Shevlin, M. (2013). Self-efficacy for healthy eating and peer support for unhealthy eating are associated with adolescents' food intake patterns. *Appetite*, 63, 48–58. <https://doi.org/10.1016/j.appet.2012.12.011>
- Fitzgerald, A., Heary, C., Nixon, E., & Kelly, C. (2010). Factors influencing the food choices of Irish children and adolescents: A qualitative investigation. *Health Promotion International*, 25(3), 289–298. <https://doi.org/10.1093/heapro/daq021>
- Fleming, C. A., De Oliveira, J. D., Hockey, K., Lala, G., Schmeid, V., Theakstone, G., & Third, A. (2020). *Food and Me. How adolescents experience nutrition Sydney, across the world. A Companion Report to The State of the World's Children 2019*. <https://doi.org/10.26183/26f6-ec12>
- Furst, T., Connors, M., Bisogni, C. A., Sobal, J., & Falk, L. W. (1996). Food choice: A conceptual model of the process. *Appetite*, 26(3), 247–266. <https://doi.org/10.1006/APPE.1996.0019>
- Green, E. M., Spivak, C., & Dollahite, J. S. (2021). Early adolescent food routines: A photo-elicitation study. *Appetite*, 158, Article 105012. <https://doi.org/10.1016/j.appet.2020.105012>
- Hargreaves, D., Mates, E., Menon, P., Alderman, H., Devakumar, D., Fawzi, W., Greenfield, G., Hammoudeh, W., He, S., Lahiri, A., Liu, Z., Nguyen, P. H., Sethi, V., Wang, H., Neufeld, L. M., & Patton, G. C. (2022). Strategies and interventions for healthy adolescent growth, nutrition, and development. *The Lancet*, 399(10320), 198–210. [https://doi.org/10.1016/s0140-6736\(21\)01593-2](https://doi.org/10.1016/s0140-6736(21)01593-2)
- Houghton, C., Murphy, K., Meehan, B., Thomas, J., Brooker, D., & Casey, D. (2017). From screening to synthesis: Using nvivo to enhance transparency in qualitative evidence synthesis. *Journal of Clinical Nursing*, 26(5–6), 873–881. <https://doi.org/10.1111/JOCN.13443>
- IUNA. (2022). *Irish universities nutrition alliance (IUNA) national teens' food survey II NTFS II (2019-2020) main survey report*. <https://www.iuna.net/surveyreports>.
- Karlsson, J., Persson, L. O., Sjöström, L., & Sullivan, M. (2000). Psychometric properties and factor structure of the Three-Factor Eating Questionnaire (TFEQ) in obese men and women. Results from the Swedish Obese Subjects (SOS) study. *International Journal of Obesity*, 24(12), 1715–1725. <https://doi.org/10.1038/sj.ijo.0801442>
- Kebbe, M., Damanhoury, S., Browne, N., Dyson, M. P., McHugh, T. L. F., & Ball, G. D. C. (2017). Barriers to and enablers of healthy lifestyle behaviours in adolescents with obesity: A scoping review and stakeholder consultation. *Obesity Reviews*, 18(12), 1439–1453. <https://doi.org/10.1111/OBR.12602>
- Kelly, C., Callaghan, M., & Gabhainn, S. N. (2021). 'It's hard to make good choices and it costs more': Adolescents' perception of the external school food environment. *Nutrients*, 13(4). <https://doi.org/10.3390/nu13041043>
- Kelly, C., Callaghan, M., Molcho, M., Nic Gabhainn, S., & Alforque Thomas, A. (2019). Food environments in and around post-primary schools in Ireland: Associations with youth dietary habits. *Appetite*, 132, 182–189. <https://doi.org/10.1016/j.appet.2018.08.021>
- Kuijjer, R. G., & Boyce, J. A. (2014). Chocolate cake. Guilt or celebration? Associations with healthy eating attitudes, perceived behavioural control, intentions and weight-loss. *Appetite*, 74, 48–54. <https://doi.org/10.1016/J.APPET.2013.11.013>
- Kuijjer, R. G., Boyce, J. A., & Marshall, E. M. (2015). Associating a prototypical forbidden food item with guilt or celebration: Relationships with indicators of (un)healthy eating and the moderating role of stress and depressive symptoms. *Psychology and Health*, 30(2), 203–217. <https://doi.org/10.1080/08870446.2014.960414>
- Larson, N., & Story, M. (2009). A review of environmental influences on food choices. *Annals of Behavioral Medicine*, 38(suppl_1), s56–s73. <https://doi.org/10.1007/S12160-009-9120-9>
- Manjrekar, E., Schoenleber, M., & Mu, W. (2013). Shame aversion and maladaptive eating-related attitudes and behaviors. *Eating Behaviors*, 14(4), 456–459. <https://doi.org/10.1016/J.EATBEH.2013.08.012>

- Neufeld, L. M., Andrade, E. B., Ballonoff Suleiman, A., Barker, M., Beal, T., Blum, L. S., Demmler, K. M., Dogra, S., Hardy-Johnson, P., Lahiri, A., Larson, N., Roberto, C. A., Rodríguez-Ramírez, S., Sethi, V., Shamah-Levy, T., Strömmer, S., Tumilowicz, A., Weller, S., & Zou, Z. (2022). Food choice in transition: Adolescent autonomy, agency, and the food environment. *The Lancet*, 399(10320), 185–197. [https://doi.org/10.1016/s0140-6736\(21\)01687-1](https://doi.org/10.1016/s0140-6736(21)01687-1)
- Neumark-Sztainer, D., Story, M., Perry, C., & Casey, M. A. (1999). Factors influencing food choices of adolescents: Findings from focus-group discussions with adolescents. *Journal of the American Dietetic Association*, 99(8), 929–937. [https://doi.org/10.1016/S0002-8223\(99\)00222-9](https://doi.org/10.1016/S0002-8223(99)00222-9)
- Norris, S. A., Frongillo, E. A., Black, M. M., Dong, Y., Fall, C., Lampl, M., Liese, A. D., Naguib, M., Prentice, A., Rochat, T., Stephensen, C. B., Tinago, C. B., Ward, K. A., Wrottesley, S. V., & Patton, G. C. (2022). Nutrition in adolescent growth and development. *The Lancet*, 399(10320), 172–184. [https://doi.org/10.1016/s0140-6736\(21\)01590-7](https://doi.org/10.1016/s0140-6736(21)01590-7)
- OECD. (2021). *European observatory on health systems and Policies*. <https://doi.org/10.1787/4f7fb3b8-en>. Ireland: Country Health Profile 2021, State of Health in the EU.
- Rippin, H. L., Hutchinson, J., Jewell, J., Breda, J. J., & Cade, J. E. (2019). Child and adolescent nutrient intakes from current national dietary surveys of European populations. *Nutrition Research Reviews*, 32(1), 38–69. <https://doi.org/10.1017/S0954422418000161>
- Ruddock, H. K., & Hardman, C. A. (2018). Guilty pleasures: The effect of perceived overeating on food addiction attributions and snack choice. *Appetite*, 121, 9–17. <https://doi.org/10.1016/j.APPET.2017.10.032>
- Sawyer, S. M., Affifi, R. A., Bearinger, L. H., Blakemore, S. J., Dick, B., Ezech, A. C., & Patton, G. C. (2012). Adolescence: A foundation for future health. *The Lancet*, 379, 1630–1640. [https://doi.org/10.1016/S0140-6736\(12\)60072-5](https://doi.org/10.1016/S0140-6736(12)60072-5)
- Scott, S., Elamin, W., Giles, E. L., Hillier-Brown, F., Byrnes, K., Connor, N., Newbury-Birch, D., & Ells, L. (2019). Socio-ecological influences on adolescent (aged 10–17) alcohol use and unhealthy eating behaviours: A systematic review and synthesis of qualitative studies. *Nutrients*, 11(8). <https://doi.org/10.3390/NU11081914>
- Share, M. (2008). Choice and resistance young people's perspectives on food and eating at school. *Youth Studies Ireland Journal*, 3(2).
- Shaw, S., Muir, S., Strömmer, S., Crozier, S., Cooper, C., Smith, D., Barker, M., & Vogel, C. (2023). The interplay between social and food environments on UK adolescents' food choices: Implications for policy. *Health Promotion International*, 38(4). <https://doi.org/10.1093/heapro/daad097>
- Shepherd, J., Harden, A., Rees, R., Brunton, G., Garcia, J., Oliver, S., & Oakley, A. (2006). Young people and healthy eating: A systematic review of research on barriers and facilitators. *Health Education Research*, 21(2), 239–257. <https://doi.org/10.1093/her/cyh060>
- Singh, A. S., Mulder, C., Twisk, J. W. R., Van Mechelen, W., & Chinapaw, M. J. M. (2008). Tracking of childhood overweight into adulthood: A systematic review of the literature. *Obesity Reviews*, 9(5), 474–488. <https://doi.org/10.1111/j.1467-789X.2008.00475.x>
- Sobal, J., & Bisogni, C. A. (2009). Constructing food choice decisions. *Annals of Behavioral Medicine: A Publication of the Society of Behavioral Medicine*, 38(Suppl 1). <https://doi.org/10.1007/S12160-009-9124-5>
- Steenhuis, I. (2009). Guilty or not? Feelings of guilt about food among college women. *Appetite*, 52(2), 531–534. <https://doi.org/10.1016/j.appet.2008.12.004>
- Stevenson, C., Doherty, G., Barnett, J., Muldoon, O. T., & Trew, K. (2007). Adolescents' views of food and eating: Identifying barriers to healthy eating. *Journal of Adolescence*, 30(3), 417–434. <https://doi.org/10.1016/j.ADOLESCENCE.2006.04.005>
- Story, M., Neumark-Sztainer, D., & French, S. (2002). Individual and environmental influences on adolescent eating behaviors. *Journal of the American Dietetic Association*, 102(3), S40–S51. [https://doi.org/10.1016/S0002-8223\(02\)90421-9](https://doi.org/10.1016/S0002-8223(02)90421-9)
- Travis, S., Bisogni, C., & Ranzenhofer, L. (2010). A conceptual model of how US families with athletic adolescent daughters manage food and eating. *Appetite*, 54(1), 108–117. <https://doi.org/10.1016/j.appet.2009.09.015>
- Van Trijp, H. C. M., & Steenkamp, J.-B. E. M. (1992). Consumers' variety seeking tendency with respect to foods: Measurement and managerial implications. *European Review of Agricultural Economics*, 19(2), 181–195. <https://doi.org/10.1093/erae/19.2.181>
- Welsch, W., & May, J. (2020). *The new normal: Collecting data amidst A global pandemic*. Joint IDP Profiling Service. May, 1–14.
- Wills, W., Backett-Milburn, K., Gregory, S., & Lawton, J. (2005). The influence of the secondary school setting on the food practices of young teenagers from disadvantaged backgrounds in Scotland. *Health Education Research*, 20(4), 458–465. <https://doi.org/10.1093/her/cyg132>
- Wong, M., & Qian, M. (2016). The role of shame in emotional eating. *Eating Behaviors*, 23, 41–47. <https://doi.org/10.1016/j.EATBEH.2016.07.004>
- Zhang, T., & Solmon, M. (2013). Integrating self-determination theory with the social ecological model to understand students' physical activity behaviors. *International Review of Sport and Exercise Psychology*, 6(1), 54–76. <https://doi.org/10.1080/1750984X.2012.723727>
- Ziegler, A. M., Kasprzak, C. M., Mansouri, T. H., Gregory, A. M., Barich, R. A., Hatzinger, L. A., Leone, L. A., & Temple, J. L. (2021). An ecological perspective of food choice and eating autonomy among adolescents. *Frontiers in Psychology*, 12(April), 1–12. <https://doi.org/10.3389/fpsyg.2021.654139>
- Ziegler, J., & Mason, P. (2020). *Adapting data collection and utilisation to a Covid-19 reality*. <https://odi.org/en/publications/adapting-data-collection-and-utilisation-to-a-covid-19-reality-monitoring-evaluation-and-learning-approaches-for-adaptive-management/>.