The association between habitual breakfast consumption, psychological wellbeing and food insecurity in children and adolescents

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Abstract

Previous research has highlighted that food insecurity can have a negative impact on psychological wellbeing. A separate body of research suggests that breakfast consumption can positively impact psychological wellbeing and reduce hunger in children and adolescents. During the coronavirus lockdown, food insecurity and poor psychological wellbeing were exacerbated. The potential for breakfast consumption to impact these factors has not been considered. This thesis, therefore, examined the association between self-reported habitual breakfast consumption, psychological wellbeing, and food insecurity in primary and secondary schoolchildren pre-lockdown. The impact of lockdown on primary schoolchildren's habitual breakfast consumption, psychological wellbeing, and food insecurity was also considered. These aims were achieved through four studies. Study 1 and 2 were cross-sectional studies examining the association between habitual breakfast consumption, psychological wellbeing, and food insecurity pre-lockdown. Study 3 was a cross-sectional study examining these associations during and post lockdown. Finally, Study 4 was a longitudinal study examining the impact of lockdown on habitual breakfast consumption, psychological wellbeing, and food insecurity. Overall, the four studies presented in this thesis demonstrated a consistent relationship pre, during and post lockdown between food insecurity and poorer psychological wellbeing, and an association between frequent breakfast consumption and better psychological wellbeing pre-lockdown. Secondary schoolchildren who rarely consumed breakfast pre-lockdown were more likely to be food insecure. However, there was no impact of lockdown on primary schoolchildren's breakfast consumption. The wider ramifications of lockdown on schoolchildren's wellbeing, such as increased food insecurity and reduced psychological wellbeing, highlights the potential for adverse outcomes on schoolchildren's wellbeing.

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Abbreviations

ANCOVA Analysis of Covariance

APA American Psychological Association

CAMHS Child and Adolescent Mental Health Servic

CFSSM Child Food Security Survey Module

COVID-19 Coronavirus disease 2019

DHA Docosahexaenoic acid

DWP Department for Work and Pensions

EHA Eicosapentaenoic acid

EU-SILC European Union Statistics on Income and Living Conditions

FAO Food and Agriculture Organization

FBC Frequent breakfast consumer

FI Food insecurity

FIES Food Insecurity Experiences Scale

FIS Food insecure schoolchildren

FSA Food Standards Agency

FSM Free school meal

FSS Food secure schoolchildren

GI Glycaemic index

GL Glycaemic load

HBC Habitual breakfast consumption

HFSSM Household Food Security Survey Module

M&MF Me and My Feelings

MHMS My Health My School

MP Member of Parliament

NFS National Food Strategy

NHS National Health Service

NSBP National School Breakfast Programme

OBC Occasional breakfast consumer

OR Odds ratio

RBC Rare breakfast consumer

SBP School Breakfast Programme

SDQ Strength and Difficulties Questionnaire

SES Socioeconomic status

SPSS Statistical Package for the Social Sciences

USDA United States Department of Agriculture

WHO World Health Organization

1. General introduction

1.1. Food insecurity

Food insecurity (FI) can be defined as a "limited or uncertain availability of nutritionally adequate and safe foods, or limited or uncertain ability to acquire acceptable foods in socially acceptable ways" (Anderson, 1990, p. 6). Radimer, Olson, Greene, Campbell and Habicht (1992) refer to FI as "the inability to acquire or consume an adequate quality or sufficient quantity of food in socially acceptable ways, or the uncertainty that one will be able to do so" (p.39). These very similar definitions are widely used. The Food and Agriculture Organization's (FAO) definition states that FI is "a situation that exists when people lack secure access to sufficient amounts of safe and nutritious food for normal growth and development and an active and healthy lifestyle" (FAO, 2015, p. 53). Most definitions of FI incorporate economic access, food quality, food quantity, and social aspects of FI (Radimer, Olson, & Campbell, 1990; Fram, Frongillo, Draper, & Fishbein, 2013; O'Connor et al., 2016). However, FI also includes other qualitative components and psychological factors (Fram et al., 2013). The definitions do not reflect the economic or structural causes of FI, nor the lived experiences of those suffering it (Long, Gonçalves, Stretesky, & Defeyter, 2020).

FI is often used synonymously with food poverty and interchangeably with food security. Food security was originally used to describe a country's availability of adequate, nutritious and safe food. However, the term food security is now used to reflect access to sufficient and nutritionally adequate food at the household level (Beacom, Furey, Hollywood, & Humphreys, 2020b). The four domains of food security focus on access, availability, utilisation, and stability of food (O'Connor et al., 2016). Despite this, the literature utilises these four domains in the definitions of FI (Beacom, Furey, Hollywood, & Humphreys, 2020a; Beacom et al., 2020b). Another aspect related to FI is hunger which refers to the physical sensation experienced due to lack of food. However, hunger can occur in the absence of FI. For clarity and accuracy, the term FI will be used in this thesis to refer to those experiencing FI and food security will be used to refer to those *not* experiencing FI.

In comparison to other developed countries such as the United States of America (USA) and Canada, where the authorities adopt Anderson's (1990) definition, the United Kingdom (UK) has no commonly agreed definition of FI. A clear definition of FI in the UK would allow researchers to accurately measure FI and would increase awareness and understanding of FI in the media and at governmental level (Beacom et al., 2020a).

1.2. Measuring food insecurity

1.2.1. Quantitative measures

There are a range of measurements to assess FI experiences in adults and adolescents. However, there is no gold-standard measure of FI in the UK or worldwide (Lambie-Mumford & Dowler, 2015). Existing measures often examine FI quantitatively based on ratings of severity of various aspects of the experience. One of the most widely utilised measures is the Household Food Security Survey Module (HFSSM) created by the United States Department of Agriculture (USDA; 2012). The full 18-item measure assesses adult respondents' level of household food security using ten items, while the remaining eight items ask about the experiences of children and adolescents <18 years living in the same household. There are shorter 10-item and 6-item versions of this measure that focus only on adult household FI. The USDA also created the Child Food Security Survey Module (CFSSM) which measures the food security experience directly from the child's perspective for those ≥12 years (Connell, Lofton, Yadrick, & Rehner, 2005). This measure is often used in the literature to capture experiences of adolescent FI (Dush, 2020), however there is a lack of research using validated measures in children aged <12 years.

The American Psychological Association (APA) defines a 'child' as an individual ≤12 years old and uses 'adolescent' for those aged 13-17 years (APA, 2019). In the UK school system, aged 4-11 years corresponds to primary school age and 11-16 years refers to secondary school age. In this thesis, the APA definitions of children and adolescents will be used and the terms for educational stage by school type will also be referred to.

Although, the HFSSM is validated in USA populations, it has been used to measure FI in the UK. For example, the Food Standards Agency (FSA) Food and You survey

(2019) utilised the 10-item USDA Adult Food Security Module to measure FI in England, Wales, and Northern Ireland. Similarly, the Low Income Diet and Nutrition Survey utilised the same measure to assess FI in the UK (Nelson, Erens, Bates, Church, & Boshier, 2007). Therefore, current UK estimates are based on a measure that has not been validated in the UK, and thresholds are based on the FI experiences in the USA. Other measures, such as the Food Insecurity Experiences Scale (FIES; Food and Agriculture Organization of the United Nations, 2018) and the European Union Statistics on Income and Living Conditions (EU-SILC; Eurostat, 2020), also measure FI. The FIES is an 8-item measure of FI measured at the individual and household level which asks similar questions to the HFSSM. The EU-SILC is a one-item measure of FI and asks if the respondent was "unable to afford a meal with meat, chicken, fish (or vegetarian equivalent) every second day" (Office for National Statistics, 2017, p.65), this question only captures one aspect of FI, namely food quality/quantity rather than the wider aspects or experiences of FI. Research comparing these three measures (FIES, EU-SILC and HFSSM) has reported good inter-rater reliability and concurrent validity (Furey, 2019). These measures are categorised as 'experience based' indicators of FI as they measure how people experience FI. There are other dimensions of FI, such as dietary diversity and coping strategies. However, these aspects of FI are rarely included in measures of FI. This is because they are unlikely to be relevant to assess population level FI in developed countries as they focus on only one aspect of the FI experience, compared to the various elements assessed in the widely used experience based measures (Beacom et al., 2020b).

1.2.2. Measuring the prevalence of food insecurity in the UK

The USA and Canada have been monitoring levels of FI for more than 15 years (Rafiei, Nord, Sadeghizadeh, & Entezari, 2009; Tarasuk, Dachner, & Loopstra, 2014). There have been calls from non-governmental organisations, researchers and Members of Parliament (MP) for over three years to monitor the levels of FI in the UK (Sustain, 2020; The Food Foundation, 2019). Following the FI measurement bill in 2017, the UK Department for Work and Pensions (DWP) began to monitor FI using the 10-item USDA Adult Food Security Survey Module in the annual Family Resources Survey in 2019-2020 (DWP, 2021). The survey was distributed to approximately 19,000 households and found that 8% of the population sampled in England, Wales and Northern Ireland were food insecure (DWP, 2021). The results

of this survey also indicated that single adult households with children were more likely to experience FI (than households with ≥2 adults), and the rate of FI increased as the number of children in a household increased. However, children's direct FI experiences were not measured. Another limitation of this measure is that the reference period is the last month so it does not reflect longer-term levels of FI and is likely to underestimate FI compared to a reference period of 12 months (Loopstra, 2019). The 30-day temporal framing utilised by the DWP also makes it difficult to understand how persistent FI experiences are in the UK.

Although there is no official national statistic in the UK for FI rates in children/adolescents, several studies have attempted to measure the level of FI in British children, adolescents and adults. Using the FIES, approximately 10% of British children and adolescents <15 years old lived in a household that experienced severe FI, with these children and adolescents skipping meals and going hungry as a result (Pereira, Handa, & Holmqvist, 2017). The Food and You survey found that from over 2,200 adult respondents in England, Wales and Northern Ireland, 10% reported living in households with low or very low food security over a 12-month period (FSA, 2019). Furthermore, the FSA (2019) demonstrated that adults living with children and adolescents <16 years old were less likely to have high food security compared to households without children. Moreover, those living in low-income households had very low food security (FSA, 2019). In 2018, The Food Foundation estimated that 4 million British children lived in a household that was unable to meet UK Eatwell guidelines, such that they were unable to purchase and consume recommended portions of fruit, vegetables, fish, and other healthy foods (Scott, Sutherland, & Taylor, 2018). The degree of FI varies but increasingly more families and children are living in food insecure households. These estimates are some of the highest figures in developed countries in Europe, demonstrating that FI is a significant issue in the UK (House of Commons, 2019).

1.2.2.1. Free school meals

All children up until the age of seven in government funded schools are provided with a free school meal (FSM) regardless of eligibility due to the universal FSMs policy (Department for Education, 2018a). Beyond this age, only families or their children in receipt of certain welfare benefits are eligible for FSMs. One way to ascertain levels of child and adolescent FI is to use eligibility for FSMs as a proxy measure. This is

because research consistently demonstrates that adults in receipt of welfare benefits or low incomes are more likely to experience FI than those not in receipt of welfare support (FSA, 2018). FI is also higher in households with children and adolescents than those without (The Food Foundation, 2017). In June 2020, 17.3% of children and adolescents in the UK were eligible for FSMs, an increase from 15.4% in 2019 (Department for Education, 2018b, 2020d). These figures reflect the number of children and adolescents from the poorest households, equating to 1.4 million children and adolescents. This figure is likely to be an underestimate of the potential number of children living in poor, and possibly food insecure households due to the reforms in the welfare system and eligibility criteria of FSMs. In April 2018, the English government stated that families receiving Universal Credit and earning over £7,400 annually were no longer able to claim FSMs. This is described as 'the FSMs poverty trap', and it is estimated that by 2022 when Universal Credit is fully implemented, 700,00 children and adolescents from the poorest households could be negatively impacted (Child Poverty Action Group, 2018). Furthermore, the stigma surrounding FSMs may impact uptake. In 2013, it was estimated that 11% of children and adolescents (equating to 161,400) in England who were eligible for FSMs did not claim them (Lord, Easby, & Evans, 2013). Therefore, FSM eligibility is unlikely to accurately reflect the number of children and adolescents living in food insecure households.

1.2.2.2. Food bank usage

Another insight into UK FI is via the data from foodbank usage. Food banks provide food items to people from low-income backgrounds or those struggling with hunger. Individuals who access food banks are likely to experience FI, such that 6-12 months after accessing a food bank, approximately 75% of people reported that they were severely food insecure (Loopstra, 2020; Prayogo et al., 2018). The most frequently cited reasons for accessing foodbanks are low income, benefit delays, and benefit changes (The Trussell Trust, 2020b). There has been a significant rise in the number of food banks in the UK since the 2008 recession, from one food bank in 2001, to 1,200 Trussell Trust food banks in 2020, which account for 60% of UK food banks (The Trussell Trust, 2020; Caraher & Furey, 2019). During the 2019-2020 tax year it was estimated that 1.9 million people accessed a food bank, an 18% increase on the previous year, with over 720,500 food parcels supplied to families with children and adolescents (The Trussell Trust, 2020b).

These figures are a poor estimate of the true extent of FI in the UK. Most research into food banks has been conducted with The Trussell Trust and there are barriers to accessing food banks, such as accessibility, the requirement of a referral, time restrictions of opening hours as well as those who do not take up food bank provision due to shame (Loopstra, Lambie-Mumford, & Fledderjohann, 2019). Other organisations also report informally providing children, adolescents and their families with food aid (Human Rights Watch, 2019). Although food banks provide access to emergency food, the food provided is often of low nutritional value and the provision of food banks are a 'sticking plaster' for the underlying issue of hunger (Caraher & Furey, 2019).

1.3. Child and adolescent FI

1.3.1.1. Measuring child and adolescent FI

Levels of child and adolescent FI are not always reported in official reports or surveys as the measures employed do not routinely ask questions about the child's or adolescent's experience. This includes the measure that the UK government has employed to measure FI (see section 1.2.2).

Even when measures include questions specific to the child's or adolescent's experience of FI, such as the HFSSM, the child and adolescent relevant questions may be completed by a parent rather than the child/adolescent. Hence, they are not self-reported experiences of FI from the child or adolescent, but reliant on the adult's perception which incorrectly assumes that children and adolescents are not active participants in their food experiences and practices (Knight, O'Connell, & Brannen, 2018; Laverty, 2019). Parental vs. child or adolescent experiences of FI are different and distinct (Fram, Bernal, & Frongillo, 2015), such that parents may underreport their child/adolescents' experience (Nalty, Sharkey, & Dean, 2013). Hence, it is important to directly measure child and adolescent experiences of FI to accurately and reliably assess current levels of child and adolescent FI (Fram et al., 2015).

The experience of FI is individual, yet most research is based on the report of one adult per household. This method of measurement disregards the uniqueness of the experience of each individual in a given household (Aceves-Martins, Cruickshank,

Fraser, & Brazzelli, 2018). A child or adolescent and an adult's experience of FI varies, even if they reside in the same house. Despite this, validated child and adolescent FI measures are scarce, with only one validated measure for adolescents (see section 1.3.1.3). Often children's experiences are based on interviews, which has shown that children as young as five demonstrate cognitive, psychological, and physical awareness of their FI experience (Aceves-Martins et al., 2018; Knight et al., 2018).

1.3.1.2. Parent vs. child/adolescent experiences of FI

Parents in food insecure households try to protect their children from the impact of FI by engaging in behaviours such as reducing their own portion sizes or skipping meals (Cook, 2013; Harvey, 2016). This behaviour can contribute towards parents believing that their child or adolescent is sheltered from the effects of FI and may be why parents underestimate their child or adolescents' experience or remain unaware of it (Fram et al., 2011). However, some research has suggested that despite efforts to shield children from the impact of FI, children and adolescents remain aware of household FI (Frongillo et al., 2019; Harvey, 2016).

To understand the difference between adult and child/adolescent experiences of FI, research has examined the concordance between self-reported FI in adults vs. children/adolescents. In a South American sample comparing the HFSSM and the CFSSM, Chavez, Hernandez, Harris and Grzywacz (2017) found differences in self-reported FI in parents and adolescents such that 17% of adolescents reported FI whereas their parents did not report any FI. Conversely, another study demonstrated a positive correlation between parental and adolescent reports of FI in the same household (Bruening, Dinour, & Chavez, 2017). Chavez et al. (2017) demonstrated that parents do not always underestimate FI with 34% of parents reporting that adolescents experienced elements of FI, while the adolescents did not report FI. Fram et al. (2013) found that almost half of the parents of 6-17-year-olds were unable to recognise that their child or adolescent was experiencing hunger due to FI. Similarly, Bernard et al. (2018) found that although responses were significantly correlated between parents and their child/adolescent, parents underestimated the worry children and adolescents experienced about food running out. An American study of over 2,400 parent-child dyads found that parents' views of their child's FI experience were weakly related to the child's reports (see Landry et al., 2019a). Parents completed the

child related questions of the HFSSM and children aged 8-12 years completed an adapted 5-item Child Food Security Assessment. Approximately 70% of children reported experiencing more FI than their parent reported. These findings reinforce the complex nature of measuring FI and suggest that parents often underestimate the level of their child's FI experience. Moreover, most parental responses in FI questionnaires are from the mother's perspective. Consequently, current assessments of household FI are insufficient and based on the perception of one person in a household (Landry et al., 2019a). Therefore, research findings in adult samples may inaccurately reflect children and adolescents' FI experiences. Thus, more research is needed to measure FI directly from children's or adolescents' perspective.

1.3.1.3. Validated measures of child and adolescent food insecurity

The CFSSM is one of the few validated measures of FI to assess adolescent FI experiences (see section 1.2.1). However, children as young as seven can express and report their FI using non-validated measures (Bernard et al., 2018; Fram et al., 2013; Sharkey, Nalty, Johnson, & Dean, 2012). Sharkey et al. (2012) utilised the CFSSM in 6–11-year-olds of Mexican-origin in the USA and found that the measure demonstrated good internal consistency (α=0.81). More recently, Maia, Severo and Santos (2020) translated the CFSSM into Portuguese to measure FI in 11-year-old Portuguese children and found good internal consistency (α =0.617). A short-version of the CFSSM, utilising five of the nine items has been used in the USA National Health and Nutrition Examination Survey and demonstrated good internal consistency (α=0.67-0.82) in children aged 10 years (Baxter et al., 2015, 2018). The suitability of the CFSSM in 9–11-year-old children has also been recently assessed in England. Focus groups and interviews were conducted with children to explore their understanding of the measure. The preliminary findings indicated that children demonstrated a good understanding of the language and concepts within the measure (Fildes, personal communication, August 12, 2020). Together, the research findings suggest that the CFSSM may be suitable to use in children aged <12 years old.

1.3.1.4. Socio-political context of food insecurity

Within the UK, causes of FI include low income, rising living costs, austerity measures, and changes in the social welfare system (House of Commons, 2019; UK Stakeholders for Sustainable Development, 2018). The current social welfare system is not meeting the needs of the population and exposing both children, adolescents and their families to the detrimental impact of FI (Loopstra, Reeves, & Tarasuk,

2019). FI is a major socio-political issue, however the governmental response to FI in adults and children/adolescents has been described as inadequate (House of Commons, 2019; UK Stakeholders for Sustainable Development, 2018). In 2014, the Child Poverty Strategy stated that the government aimed to end child poverty by 2020 (Department for Education, 2014). The UK, alongside the United Nations, has committed to the Sustainable Development Goals which include to end hunger, by 2030 and achieve food security, but how the causes of FI will be addressed remains unclear (UK Stakeholders for Sustainable Development, 2018). Despite this, the National Food Strategy (NFS) with support from the Child Food Poverty Task Force (End Child Food Poverty, 2021) aims to prompt the government into action to tackle FI (Dimbleby, 2020).

Interventions have been implemented to try to reduce child and adolescent hunger. These include FSMs provision, breakfast clubs, and holiday clubs in disadvantaged areas to reduce the impact of holiday hunger, which is the FI or hunger experienced during school holidays (Defeyter, Stretesky & Long, 2020). A recent systematic review of food initiatives in developed countries including the UK and USA found that although interventions such as breakfast programmes, holiday clubs, and FSMs try to address FI in children and adolescents, the evidence on their effectiveness is somewhat mixed (Holley & Mason, 2019). It also remains unclear how these programmes would reduce FI. These initiatives are a means to reduce the impact of FI rather than tackling the root causes of poverty and FI (Lambie-Mumford & Green, 2017). Longer-term solutions lean towards increasing access to affordable housing, increasing income for those with low incomes, and redesigning the social welfare system so that it better supports disadvantaged children, adolescents, and their families (Barnard, 2019).

1.4. Psychological wellbeing of children and adolescents

1.4.1. Defining psychological wellbeing

The World Health Organization (WHO) defines mental health as “a state of wellbeing in which an individual realises his or her own abilities, can cope with the normal stresses of life, can work productively and is able to make a contribution to his or her community” (WHO, 2018, para. 2). This definition incorporates aspects of emotional wellbeing, psychological wellbeing and social wellbeing (Westerhof & Keyes, 2010).

In contrast, poor mental health can be viewed as the occurrence of mental health difficulties which may receive a clinical diagnosis. A range of terms such as mental wellbeing, psychological wellbeing, and emotional wellbeing are used to describe the mental health of an individual. Often the focus has been on emotional wellbeing, feelings of happiness and satisfaction, whereas psychological wellbeing focuses on the functioning of an individual based on their own potential, autonomy and control over life (Coverdale & Long, 2015; Huppert & So, 2013). These aspects of wellbeing and mental health difficulties can be viewed on the same spectrum, but are distinct entities (Huppert & So, 2013; Westerhof & Keyes, 2010). Others suggest that they are weakly correlated and separate entities (Patalay & Fitzsimons, 2016). The terms psychological wellbeing, emotional wellbeing and mental health are complex, appear to be on a continuum, yet distinct. The variability in the literature utilising the terms highlights the multi-dimensional nature of mental health and wellbeing (Diener & Seligman, 2004). The term psychological wellbeing will be used to refer to both emotional and psychological wellbeing in this thesis.

1.4.2. Measuring psychological wellbeing

The assessment of psychological wellbeing can include screening tools or diagnostic measures (Flannery, Glew, Brewster, & Christie, 2017; Wolpert et al., 2008). Most often these measures are related to a cluster of symptoms associated with a clinical presentation or they can be broader, measuring aspects of psychological wellbeing. Psychological measures can be useful to assess outcomes in clinical and non-clinical settings and to track wellbeing to support and initiate appropriate interventions.

There are a number of measures that are available for use in children and adolescents. Generally, self-report measures are employed in children aged ≥11 years and parental and or other informants' reports for children <11 years (Wolpert et al., 2008). Since informant responses do not always accurately reflect children's experiences, with low to moderate correspondence between estimates (De Los Reyes et al., 2015; Van Roy, Groholt, Heyerdahl, & Clench-Aas, 2010), developing robust self-report measures for psychological wellbeing in children <11 years is important. Support for utilising self-report measures in younger children comes from studies demonstrating that children as young as 7-years-old are able to accurately report their own mental health and psychological wellbeing (Norwood, 2007; Patalay, Deighton, Fonagy, Vostanis, & Wolpert, 2014). Psychological wellbeing measures can distinguish between clinical

and community samples and highlight specific difficulties a child might be experiencing (Patalay et al., 2014; Sharp, Goodyer, & Croudace, 2006).

1.4.3. Statistics in children and adolescents

Mental health difficulties in children and adolescents have been increasing since 1995 (Pitchforth et al., 2019). In 2017, it was estimated by the National Health Service (NHS) that one in ten 5-10-year-olds and one in nine 5-16-year-olds had a probable mental health disorder in England (NHS Digital, 2018b). In 2020, this increased to one in seven 5–10-year-olds and one in six 5–16-year-olds (Vizard et al., 2020). Children and adolescents with mental health disorders are less likely to have better mental wellbeing, are likely to have a parent with a mental health difficulty and are more likely to have experienced an adverse life event compared to those without a mental health problem (NHS Digital, 2018b; Vizard et al., 2020). These statistics are derived from parental reports on the Strength and Difficulties Questionnaire (SDQ; Goodman, 2001) for children <11 years and self-reports for 11-16-year-olds. The most recent statistics available for England include the period during the coronavirus disease 2019 (COVID-19) pandemic (see section 1.8.5). Nevertheless, these figures are alarming given that approximately 50% of the population sampled in Europe, America, Africa, Asia, and the Middle East develop mental health difficulties by age 14 (Kessler et al., 2005).

1.5. Impact of food insecurity on children and adolescents

FI can have multiple negative consequences on children's and adolescents' learning, social, emotional and physical wellbeing (Lee & Kim, 2019).

1.5.1. Food insecurity and psychological wellbeing

FI is a multi-dimensional phenomenon, which includes a psychological element. A substantial amount of recent research suggests that FI has a negative impact on psychological wellbeing in adults, children, and adolescents (Aceves-Martins et al., 2018; Jessiman-Perreault & McIntyre, 2017; Jones, 2017; Shankar-Krishnan, Deu, & Sánchez-Carracedo, 2020).

A relationship between FI and specific mental health problems has also been reported. Children and adolescents who live in a food insecure household are more likely to experience mental health difficulties (Melchior et al., 2012). Living in a food scarce

or uncertain environment is stress-inducing, which could lead to mental health difficulties (Shankar-Krishnan et al., 2020). A systematic review of 12 studies in children and adults using FI measures, including the HFSSM, reported poor psychological wellbeing can increase the risk of FI (Bruening et al., 2017). Similarly, Burke, Martini, Çayir, Hartline-Grafton and Meade (2016) demonstrated that higher levels of household FI levels were associated with an increased risk of mental disorders (as defined by the SDQ) in 4–17-year-olds. Particularly, children and adolescents from very food insecure households were more likely to report a mental disorder with severe levels of difficulties in their functioning than those from food secure households. Shankar, Chung and Frank (2017) found a relationship between child/adolescent FI and internalising (e.g. emotional problems such as anxiety and depression) and externalising difficulties (e.g. behavioural problems such as aggression, attention deficit, and hyperactivity). Children and adolescents from food insecure households in Western countries, including the UK, were more likely to demonstrate internalising and externalising difficulties than those in food secure households. Shankar et al. (2017) also reported that those experiencing FI were also more likely to display higher rates of depression and anxiety, which is consistent with findings from other studies (Slack & Yoo, 2005; Slopen, Fitzmaurice, Williams, & Gilman, 2010; Whitsett, Sherman, & Kotchick, 2019). A Canadian study demonstrated that children in food insecure households were more likely to experience anxiety and depressive symptoms between the ages of 4-8 years (Melchior et al., 2012). After controlling for socio-demographic factors, FI predicted a two-fold increase in hyperactivity inattention behaviour (Melchior et al., 2012). Children aged 6-11-years-old from food insecure homes in America were twice as likely to have seen a psychologist (Alaimo, Olson & Frongillo, 2001). However, a study by Huang and Vaughn (2016) in the USA of over 7,300 children aged 4 who were followed up until 11-years-old found no relationship between child FI and mental health difficulties as defined by externalising and internalising problems. It is possible that a longitudinal association between FI and mental health problems was not found because behavioural reports were based on teacher's perceptions. Taken together, the evidence suggests that FI is associated with adverse outcomes in children and adolescents' psychological wellbeing and mental health.

It has been suggested that FI impacts health via nutritional and non-nutritional factors. Lack of adequate nutrition can negatively affect cognition (Spencer, Korosi, Layé, Shukitt-Hale, & Barrientos, 2017) and increase socio-behavioural difficulties (Cook, 2013). Additionally, non-nutritional factors such as stress, anxiety, and worry can arise from experiencing FI, and could contribute to mental health difficulties. Furthermore, the psychological elements of FI are not fully captured by current measures, with most measures focusing only on the 'worry' aspect of FI. However, children as young as 7 years report feelings of sadness, anxiety, anger and embarrassment due to FI (Connell et al., 2005; Leung et al., 2020). This suggests that FI during childhood and adolescence could be a risk factor for mental health problems. However, there is limited research on the association between FI and psychological wellbeing and mental health using age-appropriate measures (Weaver & Hadley, 2009).

1.5.2. Food insecurity and physical wellbeing

The links between nutrition and physical wellbeing (e.g. growth, development and health conditions) in children and adolescents are well-established (Weichselbaum & Buttriss, 2011). Poor nutritional intake because of FI can have a detrimental impact on physical wellbeing. Children and adolescents experiencing FI are twice as likely to report being in poor or fair health compared to food secure children and adolescents (Gundersen & Ziliak, 2015). FI can negatively impact overall physical health as measured by physical health status and presence of a chronic health condition (Aceves-Martins et al., 2018). There is some evidence supporting a relationship between FI and nutritional intake of specific food-types. Landry et al. (2019b) found that 7–11-year-olds from the USA who reported FI consumed less vegetables, beans, and seafood than children who were food secure. Moreover, food-insecure children consumed higher levels of free sugars compared to food secure children. Fram, Ritchie, Rosen and Frongillo (2015) also found that children with FI consumed more daily energy, fat, and total sugars compared to children who were food secure. Hanson and Connor's (2014) review reported that 14% of studies indicated a negative association between food security status and nutritional intake. Food insecure children had poorer diet quality measured by a range of factors which included consuming less fruit and vegetables, more free sugars, and not meeting recommendations for carbohydrates, proteins, vitamins, and minerals (Hanson & Connor, 2014). However,

the review also reported that 78% of the results examining the association between FI and nutritional intake in children found no association.

1.5.3. Breakfast and food insecurity

FI also impacts breakfast eating behaviour, with children from deprived or food insecure backgrounds more likely to skip breakfast (Harvey-Golding, Donkin, Blackledge, & Defeyter, 2015; Rampersaud, 2009). Frequently cited reasons for breakfast skipping in general are lack of time for breakfast, not being hungry, and never usually having breakfast (Fugas, Berta, Walz, Fortino, & Martinelli, 2013; Hoyland, Mcwilliams, Duff, & Walton, 2012). One of the contributing factors to breakfast skipping may be lack of access to or availability of food. For example, children from low socio-economic status (SES) and food insecure families are most likely to report lack of regular breakfast consumption (O'Dea & Caputi, 2001; Widome, Neumark-Sztainer, Hannan, Haines, & Story, 2009). It is plausible that children and adolescents from food insecure backgrounds, who are also more likely to be from a low SES (Chang, Chatterjee, & Kim, 2014; Tingay et al., 2003), lack access to breakfast foods which affects their ability to consume a breakfast meal and contributes towards the increased breakfast skipping observed. However, the exact nature of the relationship between FI and breakfast eating in different samples of children remains unclear and the causal factors for increased breakfast skipping in food insecure families have often been overlooked in previous research.

School breakfast programmes (SBP) can help reduce FI for families and those on low incomes. Fletcher and Frisvold (2017) examined the relationship between SBPs and FI. They found that access to a breakfast club reduced the likelihood of FI by 15%. Bartfeld and Ahn (2011) found that children from low-income families in American schools with a SBP, were at a reduced risk of marginal FI compared to children who did not have access to a SBP. This suggests that SBPs may protect children from FI. However, Bartfeld and Ahn (2011) found that there was no impact of the USA SBP on families who were already experiencing a high level of FI. This suggests that SBPs may only have a beneficial impact on children with mild FI experiences. Moreover, these studies did not directly assess SBP attendance or breakfast consumption, and therefore, we cannot confidently conclude that breakfast intake via a SBP combats FI.

School food interventions such as FSMs and SBPs could reduce or mitigate the impact of child and adolescent FI, especially given that children and adolescents spend the majority of their time at school (Long et al., 2018). In a review of programmes to enhance food provision and nutritional intake (which included school meals and breakfast provision) in American schools, Goreja (2019) found that school food programmes were only beneficial to reduce experiences of FI during school time and not during holidays or weekends. However, most studies included in the review were observational. Long et al. (2018) examined the impact of a holiday club in the UK where food including breakfast was provided outside of term-time. They found that holiday clubs may help reduce household FI for those from food insecure households. This suggests that the provision of food through SBPs or other food programmes delivered during term-time and non-term time could reduce the financial demands and increase resources for families.

1.6. Breakfast consumption habits in children and adolescents

1.6.1. Defining and measuring breakfast consumption

Breakfast has been described as "the first meal that breaks an extended period of fasting, which is overnight for most people, and consumed within 2 to 3 hours of waking" (O'Neil et al., 2014, p. 59). Despite this suggested definition there is no universally agreed definition of breakfast and this impacts how it is measured, which may contribute to the varying results in breakfast research (Adolphus et al., 2017; Adolphus, Lawton, & Dye, 2015; Gibney, Barr, Bellisle, Drewnowski, Fagt, Livingstone, et al., 2018; O'Neil et al., 2014). Studies have used varying definitions of breakfast to measure breakfast intake. Certain studies require the participants to define and interpret breakfast, whereas other studies provide a definition of breakfast. Furthermore, few studies measure the nutritional quality of breakfast. Breakfast quality can be measured by the energy, macronutrient, micronutrient, and food type consumed at breakfast. Most often, energy intake from the breakfast meal is measured and reported as a percentage of total energy expenditure (Gibney, Barr, Bellisle, Drewnowski, Fagt, Hopkins, et al., 2018). Breakfast intake typically constitutes 15-25% of total daily energy in children and adolescents (Gibney, Barr, Bellisle, Drewnowski, Fagt, Hopkins, et al., 2018). Habitual breakfast consumption (HBC) refers to how often breakfast is consumed on a weekly basis and this frequency is often measured in terms of number of days per week (Adolphus et al., 2015).

However, inconsistencies between research exist on the time period used to assess HBC and cut-offs to define habitual or non-habitual intake (Adolphus et al., 2017). Weekday or school week intake is not often differentiated from weekend intake, and given school initiatives providing breakfast, school day consumption and non-school day consumption could differ (see section 1.6.1). A consensus on a universal definition of breakfast is difficult due to varying methodology in dietary surveys which impacts the data on breakfast that is obtained (Gibney, Barr, Bellisle, Drewnowski, Fagt, Livingstone, et al., 2018).

1.6.2. Breakfast provision in UK schools

Despite the well-publicised benefits of breakfast, one in seven children in the UK attend school without breakfast and one third of teachers report that every day at least one child arrives at school hungry (Dye, 2017; Hoyland et al., 2012). It is also estimated that 1.8 million British schoolchildren are at risk of being hungry every morning (Magic Breakfast, 2019). Particularly in those experiencing impoverished circumstances and lack of access to adequate food supplies, breakfast is reported to be the most likely skipped meal of the day (Potamites & Gordon, 2010). Arriving at school hungry or without adequate nutrition may have a negative impact on children and adolescents' learning, health, and wellbeing (Aceves-Martins et al., 2018; Kellogg's, 2013). However, research is somewhat mixed.

There has been a rapid growth of SBPs in England over the past 20 years. SBPs were introduced into policy to tackle social and health inequalities (Lambie-Mumford & Sims, 2018). SBPs can be funded by the government through the National School Breakfast Programme (NSBP), charities (e.g. Magic Breakfast), food industry partnerships (e.g. Greggs, Heinz and Kellogg's) or through a school's budget. The NSBP supports schools to set up a sustainable breakfast provision and provides free healthy breakfasts to over 280,000 pupils in 1,775 eligible schools in England, particularly schools in disadvantaged areas (Department for Education, 2018c; Family Action & Magic Breakfast, 2019). The breakfast provision at school is often provided free of charge or for a small cost to children and adolescents. There are various models of SBPs that can be implemented. These include breakfast clubs, breakfast in the classroom and 'grab and go' breakfasts (Family Action & Magic Breakfast, 2019). The breakfast club model often involves breakfast provided in school before the start of the school day (Defeyter, Graham, Walton, & Apicella, 2010). It was estimated

that 85% of primary and secondary schools in the UK have a breakfast club, with 63% of primary schools and 49% of secondary schools implementing a breakfast club (Hoyland et al., 2012). Although the availability of breakfast clubs is high, the uptake is low. It has been estimated that in schools with 35% or more of their pupils eligible for FSMs, 22-27% of primary schoolchildren and 12-24% of secondary school pupils attend a breakfast club (Graham, Puts, & Beadle, 2017). There are several barriers to attending school breakfast clubs, for example schoolchildren have to arrive at school earlier to consume breakfast and this can reduce accessibility (Kellogg's, 2016). Also, stigma related to SBPs, such that they are often viewed as being for those from low SES, could be a contributing factor to poor uptake (Harvey-Golding, Donkin, & Defeyter, 2016; Moore et al., 2014). These barriers could explain why the uptake of breakfast programmes is lower than FSMs uptake (Graham et al., 2017).

A recent report by Magic Breakfast (2019b) urges for changes to policy and legislation so that it becomes a legal requirement for all schools to provide breakfast. The report recognises the necessary and beneficial impacts of providing children and adolescents with breakfast at the start of the school day. However, it is important to note the conflict of interest in Magic Breakfast's advocation of a universal school breakfast programme as at the time they were funded to deliver the NSBP. FSM entitlement, unlike school breakfast provision, is a government funded statutory benefit (DWP, 2013). The FSM provision recognises that children in social adversity struggle to obtain adequate nutrition, however breakfast provision at school is not a statutory requirement. Furthermore, the current NSBP funded by the Department for Education supports only one fifth of children at risk of hunger (Magic Breakfast, 2020b).

1.6.3. Benefits of breakfast

Consuming breakfast has been associated with improved physical health outcomes, better cognitive performance and better psychological wellbeing (see Gibney, Barr, Bellisle, Drewnowski, Fagt, Livingstone, et al., 2018 for a review).

1.6.3.1. Physical health

Regular breakfast consumers are less likely to be obese and more likely to achieve their recommended daily intake of macronutrients and micronutrients (Coulthard, Palla & Pot, 2017; Rampersaud, 2009). In a study of 4-10-year-old children from the UK, Coulthard et al. (2017) found that those who consumed breakfast often had higher

fibre, calcium, iron and folate intake than those who skipped breakfast. Children who do not consume breakfast are more likely to be less physically active and have a lower cardiorespiratory fitness level (Sandercock, Voss, & Dye, 2010). A recent systematic review of children and adolescents found that breakfast skipping was associated with being overweight and obese in 94.7% of these individuals (Monzani et al., 2019). However, the specific components of breakfast associated with positive physical health are inconclusive (Gibney, Barr, Bellisle, Drewnowski, Fagt, Livingstone, et al., 2018).

1.6.3.2. Cognitive function

Breakfast consumption is also associated with positive effects on cognitive function (see Adolphus, Lawton, Champ, & Dye, 2016; Hoyland, Dye, & Lawton, 2009 for reviews). Systematic reviews have demonstrated that breakfast consumption has an acute positive effect on memory and attention compared to no breakfast (Adolphus et al., 2016; Hoyland et al., 2009), although positive effects are more pronounced in children with poor nutritional status (e.g. children who are below height- or weight-for-age). In a study of 9-11-year-olds, Mahoney, Taylor, Kanarek and Samuel (2005) found that cognitive task performance was enhanced following breakfast consumption, but differences were dependent on type of breakfast consumed. Those who consumed oatmeal displayed better spatial memory than those who consumed ready to eat cereal. The findings suggests that the cognitive benefits observed are dependent on the glycaemic index[1] (GI) of the breakfast consumed and the nutritional status of the consumer.

1.6.3.3. Academic performance

Breakfast consumption also appears to be associated with better academic performance. In a systematic review of 36 studies, HBC was linked to better academic performance in children and adolescents (Adolphus, Lawton, & Dye, 2013). It was also concluded that the beneficial effects of breakfast were most pronounced in mathematics performance and under-nourished children (Adolphus et al., 2013). A parallel group study of 106 schools implementing a Magic Breakfast club model found that Year 2 pupils in schools with this breakfast club displayed an additional two months progress in their overall performance, compared to children in the control

[1] GI measures how much carbohydrate consumption increases glucose levels in the blood.

condition, which consisted of usual school provision of breakfast or no breakfast provision (Crawford et al., 2019). This result was specific to younger pupils and was not observed in Year 6 pupils. However, the study is not a randomised controlled trial which weakens confidence in the findings. Additionally, 40% of schools in the comparison group had their own school breakfast club. It is also plausible that the finding was not present in Year 6 pupils as the academic results were based on externally marked examinations, whereas Year 2 pupils were assessed solely by teachers. In 9-11-year-olds, Littlecott, Moore, Moore, Lyons and Murphy (2016) observed that children who consumed breakfast were twice as likely to score above average on Statutory Assessment Tests compared to children who reported they did not consume breakfast. Adolphus, Lawton and Dye (2019) demonstrated that breakfast consumption was related to better General Certificate of Secondary Education performance in 16–18-year-olds, such that those who regularly consumed breakfast on school days achieved almost two grades higher than those who rarely consumed breakfast on school days. However, in a study of 11-13-year-old British school pupils, there was no effect of HBC on the Cognitive Abilities Test, a test of academic ability (Adolphus et al., 2015). The Cognitive Abilities Test is a reasoning test that is not based on the taught academic curriculum of secondary school pupils, rendering the study outcomes not comparable. Additionally, school day and weekend breakfast consumption were not distinguished and participants applied their own interpretation of 'breakfast'.

1.6.3.4. Psychological wellbeing

Psychological benefits of acute breakfast consumption include improved mood defined as feeling content compared to those who skip breakfast (Defeyter & Russo, 2013). Higher quality breakfast, defined by breakfast that does not contain processed baked foods or food that is from three of more food groups, was associated with better health related quality of life as measured by KIDSCREEN-52 (Ravens-Sieberer et al., 2005) and better mental health in adolescents (Ferrer-Cascales et al., 2018; O'Sullivan et al., 2008). Adolescents who habitually consume breakfast were more likely to experience better mental health (Lien, 2007). Children in the UK who consumed breakfast cereal compared to those who skipped breakfast displayed better wellbeing, positive mood and reported less mental health difficulties at baseline (Smith, 2010). Following two weeks of daily cereal consumption, breakfast consumers continued to display better psychological wellbeing, with parents reporting lower depression and

emotional distress in their children (Smith, 2010). In a study of British adolescents, Jacka, Rothon, Taylor, Berk and Stansfeld (2013) used the SDQ and Short Mood and Feelings Questionnaire (Angold et al., 1995) to assess psychological wellbeing and mental health. They found that consuming a healthy diet (defined by regular breakfast consumption and consumption of fruits and vegetables) was related to lower scores on the psychological wellbeing measures, although breakfast quality was not controlled for. However, they also found that an unhealthy diet quality, defined by consumption of unhealthy snacks, fast foods and high saturated fat was associated with increased self-reported mental health difficulties in adolescents.

1.6.3.5. Social benefits

Breakfast consumption is also associated with positive effects on social outcomes. This may be because breakfast consumption is often part of a social interaction and is typically consumed with family or as part of a SBP with peers. Shared mealtimes can provide opportunities for communication within families and increase social interaction (Fiese & Schwartz, 2008). Research has suggested that eating with others can increase social skills in children (Graham, Russo, Blackledge, & Defeyter, 2014; Graham, Russo, & Defeyter, 2015). Within adult populations, research has demonstrated that those who eat with others report feeling happier and more satisfied with life than those who do not eat with others (Dunbar, 2017). Although these studies do not specifically focus on breakfast, research has demonstrated that breakfast club attendance has an impact on social behaviour. Defeyter, Graham and Russo (2015) found that children who attended a breakfast club reported an increase in their friendship quality with their best friend and a reduction in peer victimisation. Similarly, consuming breakfast at school with other peers was recognised as an opportunity to increase social interaction by both children and their parents (Graham et al., 2014). Furthermore, in 2019, Magic Breakfast reported that 87% of teachers in their survey reported that consuming breakfast at school improved children's social skills. These findings highlight that consuming a breakfast meal with others encourages social interactions and has the potential to increase social skills and social bonding.

1.6.4. Breakfast behaviours and socio-demographic factors

Breakfast consumption behaviours are associated with socio-demographic variables such as age, gender, SES, and ethnicity.

1.6.4.1. Age and gender

Breakfast skipping behaviour varies according to gender, with the consistent finding that females are more likely to skip breakfast compared to males (Hoyland et al., 2012; Kesztyüs, Traub, Lauer, Kesztyüs, & Steinacker, 2017). Breakfast skipping also increases with age, with adolescents more likely to skip breakfast than children (Gibney, Barr, Bellisle, Drewnowski, Fagt, Hopkins, et al., 2018). It is estimated that 20-30% of adolescents skip breakfast (Deshmukh-Taskar et al., 2010), whereas Hoyland et al.'s (2012) study of over 3,000 British schoolchildren found that 6% of 7–10-year-olds also skip breakfast. Due to the high percentage of adolescents skipping breakfast, breakfast studies often focus on adolescent populations.

1.6.4.2. Socio-economic status

Breakfast skipping behaviour is also more common in individuals from low SES. Moore et al. (2007) found that British schoolchildren aged 8-11-years-old who were eligible for FSMs were more likely to skip breakfast. SES is also related to children's attitudes towards eating breakfast, such that low SES children display more negative attitudes to breakfast and are more likely to consume unhealthy food items (e.g. sweets and crisps) for breakfast. In a German study of primary aged schoolchildren, Kesztyüs et al. (2017) found that children who skipped breakfast were also more likely to be from single parent families.

1.6.4.3. Ethnicity

Differences in breakfast intake exist across ethnic groups. In a UK based study of 11-13-year-olds, Black Caribbean and Black African children were more likely to skip breakfast compared to their White British peers, whereas Indian children were less likely to skip breakfast (Harding, Teyhan, Maynard, & Cruickshank, 2008). Similarly, in the Netherlands, Wijtzes et al. (2015) found that children age 6 years from ethnic minority backgrounds were more likely to skip breakfast compared to non-ethnic minority Dutch children. However, Coulthard et al.'s (2017) research found no differences in the breakfast behaviours of British children based on ethnicity. Differences in breakfast intake between ethnic groups may reflect cultural differences in food behaviours and family food practices.

1.7. The association between HBC, FI and psychological wellbeing

The evidence reviewed above indicates that breakfast consumption is associated with better psychological wellbeing (see section 1.6.3.4) , whereas FI is associated with breakfast skipping and poorer psychological wellbeing (see section 1.5.3). However, there appears to be limited research which explores the direct association between FI and breakfast eating in children. The research literature is clearer on the causal impact of breakfast consumption upon psychological wellbeing (Defeyter & Russo, 2013; Smith, 2010). Despite this, research to date has not demonstrated whether breakfast mediates the negative impact of FI upon psychological wellbeing.

1.8. The socio-political context of food insecurity and psychological wellbeing

1.8.1. Services for child and adolescent mental health

There are services for children and adolescents' mental health which support psychological wellbeing. This support can be provided at a primary care level, such as in schools or general practices, or as part of specialised services such as child and adolescent mental health services (CAMHS). Given the increasingly high levels of mental health difficulties (see section 1.4.3), it is imperative that timely and adequate support is provided to protect, treat, and enhance the psychological wellbeing and mental health of children and adolescents. Children and adolescents from the poorest families suffer a range of health inequalities which have widened over time, and those in the poorest areas have worse mental health than those from the most affluent (Gutman, Joshi, Parsonage, & Schoon, 2015; Royal College of Paediatrics and Health, 2020a).

Current mental health service provision appears insufficient to fully meet the needs of children and adolescents and enable them to live well and give them equal opportunities in life (Royal College of Paediatrics and Child Health, 2020b). These issues are partly due to limited workforce numbers to meet the demand, increases in waiting times, and a lack of provision for children and adolescents to get the support they require (Children's Commissioner, 2020c). Additionally, NHS spending is almost 2.5 times higher per person for adult mental health compared to child and adolescent mental health (The Lancet, 2020). This is a critical concern since early

intervention and prevention in childhood is vital to ensuring good long-term mental health outcomes.

The Transforming Child and Young People's Mental Health Provision green paper (Department of Health and Department of Education, 2017) highlights priorities to improve access to and service provision of mental health services for children and adolescents. This green paper emphasises the need to create health equalities and early intervention for children and adolescents who experience mental health difficulties. As a result, the government pledged an additional £1.4 billion to expand mental health service provision. The more recent NHS Long Term Plan (NHS, 2019) upholds the pledge, highlighting the importance of creating mental health services for children and adolescents that are fit for purpose. Part of the proposed transformation included expansion of the workforce. New roles such as school-based mental health practitioners were created to provide low intensity treatment for common mental health difficulties to reduce waiting times (Ludlow, Hurn, & Lansdell, 2020). Despite this, a report by the Children's Commissioner in January 2020 stated that both low level support and specialist support for mental health are variable depending on location and few children are receiving the support that they require (Children's Commissioner, 2020c). It was also estimated that services providing specialist mental health support in England need to treble in size by 2028 to meet the increase in demand. This is based on the number of children and adolescents that require this support and the promises made in the Transforming Child and Young People's Mental Health Provision green paper (Children's Commissioner, 2020c). Based on the current trajectory of the expansion of specialist services, the Children's Commissioner (2020c) report that this is achievable. However, the NHS Long Term Plan (NHS, 2019) only outlines plans for child and adolescent mental health until 2025 and although services are improving, the rate at which this is occurring is too slow (Iacobucci, 2020).

1.8.2. The COVID-19 lockdown and impact on children and adolescents

Many countries, including the UK, imposed national lockdown restrictions due to the outbreak of COVID-19. The UK first went into lockdown on 23rd March 2020 and the restrictions in England began to ease from 4th July 2020. However, there was a second national lockdown in England 5th November 2020-2nd December 2020. Subsequently, a third lockdown was imposed on 6th January 2021, which was eased on 8th March

2021 with children going back to school. The focus of this thesis will be on the impact of the first lockdown. The first lockdown led to the closure of schools and non-essential shops. The government also asked UK residents to limit their time outdoors and reduced the ability of individuals to meet indoors with those not part of their household. Hence, due to these restrictions, the pandemic has had a multifaceted impact, such as a reduction in the physical and mental health of children and adolescents and an increase in FI, which might further exacerbate physical and mental health (Leddy, Weiser, Palar, & Seligman, 2020).

1.8.3. Impact of lockdown on food insecurity

During the first few weeks of lockdown, the rates of FI in the UK more than quadrupled and more than 3 million people reported going hungry, with others skipping meals due to a lack of access to food (Evidence and Network on UK Household FI 2020; The Food Foundation, 2020). The significant increase in FI could be due to a number of factors such as the economic impact of the pandemic, the loss of household income for some families and an increase in basic costs including food exacerbated by school closures. Two months into lockdown, in May 2020, The Food Foundation estimated that almost 5 million adults were continuing to experience FI, with 1.7 million children and adolescents living in these households. During COVID-19 lockdown (July-October 2020) it was reported that 16% of households surveyed in England, Wales and Northern Ireland were food insecure (FSA, 2021). This is double the pre-pandemic prevalence (8%) reported by the DWP (see section 1.2.2). Increased rates of FI coincided with a sharp increase in foodbank use, which was more prevalent in younger people, households with children and adolescents, and those experiencing mental health difficulties (FSA, 2020). Those who were poor or skipping meals prior to lockdown were likely to suffer more and were at the greatest risk of FI (Connors et al., 2020; Swinnen, 2020). It is estimated that a third of children and adolescents experienced FI in the first month of lockdown (Environment Food and Rural Affairs Committee, 2020). Given that children and adolescents eligible for FSMs live in the poorest households and already suffer disadvantages, lockdown is likely to have exacerbated health inequalities and increased the rates of poverty and FI these individuals experience (Defeyter, Mann, Wonders & Goodwin, 2020; Pérez-Escamilla, Cunningham & Moran, 2020).

Schools closed from March-June 2020, except for offspring of key workers and those pupils classed as 'vulnerable'. However, only 10% of those classed as 'vulnerable' attended school during the first lockdown (Department for Education, 2020b). As a result of school closures, the government launched the national food voucher scheme on 31st March 2020 for children and adolescents eligible for FSMs (Department for Education, 2020c). The scheme provided £15 vouchers per week during term-time for children and adolescents in England and Scotland who were not attending school but were eligible for means-tested FSMs, but excluded pupils eligible for universal FSMs. Schools were expected to order vouchers via an online system to distribute to eligible families as paper or online vouchers. The vouchers could be redeemed in one of eight supermarkets, but the type of food purchased was not tracked. There were significant issues with the voucher system, for example, there was a lack of accessibility of supermarkets in low SES areas and problems with accessing the online system for those experiencing digital poverty (Environment Food and Rural Affairs Committee, 2020; House of Commons, 2020). Additionally, 49% of children and adolescents sampled who were eligible for means-tested or universal FSMs did not receive the vouchers during the first lockdown (Parnham, Laverty, Majeed, & Vamos, 2020). Moreover, children and adolescents in receipt of the vouchers skipped meals during lockdown and their dietary quality was poor (Defeyter & Mann, 2020). The types of food children and adolescents consumed is unclear. The ineffective voucher scheme may have contributed towards the 200,000 children and adolescents who reported skipping meals during the first lockdown (The Food Foundation, 2020a).

1.8.4. Impact of lockdown on breakfast provision and consumption

The food voucher scheme highlighted the importance of providing food to children and adolescents eligible for FSMs. However, the food voucher scheme did not adequately address breakfast provision. Many schoolchildren in England from low-income families have access to a SBP, for example the Department for Education funded NSBP. When schools first closed on 20th March 2020, the provision of breakfast through the NSBP was overlooked in the 'school meals during COVID-19' guidance, this meant that children and adolescents who were eligible for free school breakfasts did not receive them in the initial few weeks of lockdown (Department for Education, 2020c).

At the start of lockdown, Magic Breakfast recognised the importance of school breakfast provision for children and adolescents. From the end of March-August 2020 they provided at least two-thirds of their partner schools, that were not part of the NSBP, with breakfasts through home deliveries or packed breakfasts (Magic Breakfast, 2020a). In April 2020, the government decided to extend the food provision for children and adolescents during lockdown to include breakfast for those who received a NSBP breakfast prior to lockdown. Schools participating in the NSBP were able to deliver breakfast foods to families or allowed families to collect food parcels from schools (Department for Education, 2020a). However, five weeks into the first lockdown, it was estimated that from the families sampled, only 22% of children and adolescents who received a free school breakfast pre-lockdown were receiving some form of school breakfast provision at the end of April 2020 (The Food Foundation, 2020a). When schools in England reopened to certain schools years (reception, Year 1, Year 6 and Year 10) in June 2020, the breakfast provision during COVID-19 lockdown was extended to provide breakfast to children and adolescents not attending school during July-August 2020, which included school holidays (Department for Education, 2020e). Although some attempts have been made to provide breakfast to children and adolescents not attending school, the rise in children and adolescents' experiences of FI during lockdown suggests that it is likely that lockdown impacted children and adolescents' breakfast consumption habits. However, there is little research available that explores the association between lockdown and breakfast consumption in British children and adolescents.

1.8.5. Impact of lockdown on psychological wellbeing

The COVID-19 pandemic has increased rates of mental health problems and reduced psychological wellbeing. Following lockdown, rates of anxiety and depression in adults increased, with estimates of almost half of adults in England, Wales, and Scotland reporting high levels of anxiety (Office for National Statistics, 2020c). Other associations with psychological wellbeing such as increased loneliness, reduced levels of happiness and satisfaction following lockdown were also reported, with high levels of anxiety persisting after the end of the first national lockdown (Office for National Statistics, 2020a, 2020d). Other aspects of psychological wellbeing, such as increased rates of stress were also present across 26 countries and higher stress levels were associated with lower education and living with more children (Kowal et al., 2020). Parental mental health can impact a child's wellbeing and therefore, the impact

of lockdown on parents is likely to have affected children (Darmody, Smyth, & Russell, 2020).

In children and adolescents, lockdown restrictions have negatively affected psychological wellbeing. Lockdown reduced social contact, increased isolation, and disrupted schoolchildren's education and routine. During the first three months of lockdown (March-May 2020), The Children's Society (2020) reported that 18% of the 2,000 10-17-year-olds sampled reported not feeling satisfied with their life. Furthermore, a study in 13-24-year-olds reported increased levels of anxiety (Levita, 2020). In countries such as Italy and Spain which were initially most affected by COVID-19 rates, there were reported reductions in children's and adolescents' psychological wellbeing and increased loneliness and irritability (Orgilés, Morales, Delvecchio, Mazzeschi, & Espada, 2020). At the start of lockdown, 47% of the 1,851 8-11-year-olds sampled in the UK reported feeling stressed some of the time (Children's Commissioner, 2020b). From this sample, 26% reported that they had become more stressed about their mental and physical health, whilst 13% reported feeling more stressed about not having enough food or clothes during lockdown. A British study of parents with children aged between 4-10 years found that parents from low-income households reported that their children displayed higher levels of emotional and behavioural difficulties during lockdown compared to parents from higher income households (Pearcey, Shum, Waite, Patalay, & Creswell, 2020). However, a significant increase in emotional and behavioural difficulties was not demonstrated in 11-16-year-olds (Pearcey et al., 2020).

1.9. Rationale for the research study of breakfast, food insecurity and psychological wellbeing

The research findings discussed here underscore the potential deleterious effect of FI on physical and psychological wellbeing. The evidence that breakfast consumption can positively impact physical and psychological wellbeing offers a potential strategy to reduce hunger and improve psychological outcomes in children and adolescents. Both FI and mental health difficulties in children and adolescents are currently increasing in the UK. In the context of psychological wellbeing in children and adolescents, Clinical Psychologists rarely consider the relationship between these factors and their association in assessment, formulation and treatment plans.

Therefore, awareness of FI and its possible impact upon presenting symptoms could allow for a better understanding of a child or adolescents' psychological difficulties. To date, no study has evaluated the association between HBC, psychological wellbeing, and FI in children and adolescents. Research on the impact of these factors has largely been based on parental reports or has focused on adolescent samples. Child self-reported experiences of FI measures have rarely been utilised and this means that the experiences of children are not well understood. Within the context of the COVID-19 pandemic, the impact of lockdown on HBC, psychological wellbeing and FI has not yet been explored in the literature. This research is timely given the COVID-19 pandemic and early findings that highlight a reduction in psychological wellbeing and an increase in FI.

2. Thesis aims

The main aim of this thesis is to examine the association between HBC, psychological wellbeing and FI in children and adolescents. The impact of COVID-19 lockdown on these associations is also considered. The aims of the thesis are summarised in Table 2.1 and detailed below.

Aim 1: To examine the association between HBC, psychological wellbeing and FI in children and adolescents. This is explored in Study 1, reported in Chapter 3 and in Study 2, reported in Chapter 4. These studies address the following objectives:

1. To examine the association between HBC and psychological wellbeing in children and adolescents.
2. To examine the association between FI and psychological wellbeing in children and adolescents.
3. To examine the association between HBC and FI in children and adolescents.

Aim 2: To examine the impact of lockdown on HBC, psychological wellbeing and FI in children. This is explored in Study 3, reported in Chapter 5 and in Study 4, reported in Chapter 6. These studies address the following objectives:

4. To examine whether lockdown impacted levels of FI in 9-11-year-olds.
5. To examine whether lockdown impacted psychological wellbeing in 9–11-year-olds.
6. To examine whether lockdown impacted breakfast consumption habits in 9–11-year-olds.

Table 2.1: Overview of each study design, sample, main outcome variables and their relationship to each of the thesis aims

Aim	Objective	Chapter, study title	Research method	Sample	Main outcomes
1	1-3	Chapter 3 Study 1	Cross-sectional secondary data study	Children and adolescents (9-16 years)	HBC Psychological wellbeing FI
1	1-3	Chapter 4, Study 2	Cross-sectional study	Children (9-11 years)	HBC Psychological wellbeing FI
2	4-6	Chapter 5, Study 3	Cross-sectional study	Children (9-11 years)	HBC Psychological wellbeing FI
2	4-6	Chapter 6, Study 4	Longitudinal study	Children (9-11 years)	HBC Psychological wellbeing FI

3. Study 1: The association between HBC, psychological wellbeing and FI in primary and secondary schoolchildren: a cross-sectional analysis of the My Health My School survey

3.1. Introduction

The literature reviewed in Chapter 1 highlighted evidence suggesting that breakfast consumption is related to better psychological wellbeing, whereas FI is negatively associated with psychological wellbeing. However, the association between HBC, psychological wellbeing and FI in children and adolescents is unclear. The majority of research focuses on adolescents and there is a lack research exploring these associations using children's self-reports. In this study, data from primary and secondary schoolchildren were both utilised. The data from secondary schoolchildren provided a useful comparison with the primary school sample as adolescents are different to samples of children (e.g. adolescents are more likely to skip breakfast (Gibney, Barr, Bellisle, Drewnowski, Fagt, Hopkins, et al., 2018), and are more likely to have poorer psychological wellbeing (Vizard et al., 2020) than children). Therefore, the study presented in this chapter explores the association between HBC, psychological wellbeing, and FI by analysing the My Health My School Survey. This survey includes >17,000 primary (n=10456) and secondary schoolchildren (n=6939) in Leeds, West Yorkshire, and was administered pre-lockdown in 2018-2019.

3.2. Study aims

The aims of the study were:

1. To examine the association between HBC and psychological wellbeing in primary and secondary schoolchildren.
2. To examine the association between FI and psychological wellbeing in primary and secondary schoolchildren.
3. To examine the association between HBC and FI in primary and secondary schoolchildren.

3.3. Hypotheses

It was hypothesised that:

1. HBC will be significantly associated with psychological wellbeing.
2. FI will be significantly associated with psychological wellbeing. Schoolchildren who experience FI will report poorer psychological wellbeing than those not experiencing FI (see section 1.5.1 for evidence).
3. HBC will be significantly negatively associated with FI.

3.4. Methodology

3.4.1. Participants

Participants were males and females, aged 9-16 years, from primary (9-11 years) and secondary schools (11-16 years) in Leeds (see Table 3.1). Data from school years 5, 6, 7, 9 and 11 within schools subscribing to the My Health My School (MHMS) survey during the 2018-2019 academic year were included. A total of 267 schools completed the survey, with 222 primary schools and 45 secondary schools. The 2018-2019 survey data responses reflected almost half of the population of 9-16 year olds in Leeds (My Health My School, 2020). The survey data were stratified by primary (years 5 and 6) and secondary school years (years 7, 9 and 11).

Table 3.1: Participant demographics and FSM eligibility for primary and secondary schoolchildren

	School type	
n (%)	**Primary**	**Secondary**
Gender		
Male	5175 (49.49)	3257 (46.94)
Female	5050 (48.30)	3470 (50.01)
Other	57 (.55)	64 (.92)
Prefer not to say	174 (1.66)	81 (1.17)
Transgender*	-	67 (.97)
Ethnicity		
White	6561 (62.75)	4471 (64.43)
Asian	1307 (12.50)	1167 (16.82)
Black	766 (7.33)	466 (6.72)
Mixed	672 (6.43)	461 (6.64)
Other	944 (9.03)	374 (5.39)
Missing	1 (.01)	0
FSMs*		
Eligible	-	1105 (15.92)
Not Eligible	-	5389 (77.66)
Don't know	-	445 (6.41)
Total	10456 (100)	6939 (100)

*question asked of secondary schoolchildren only

Figure 3.1 illustrates the flow of participants through the phases, data cleaning and processing. The primary school data included 5 incomplete responses that were missing at random and the secondary school data included 7 incomplete responses that were missing at random. All missing data were removed from both primary and secondary school data providing final samples sizes of n=10456 and n=6939 respectively.

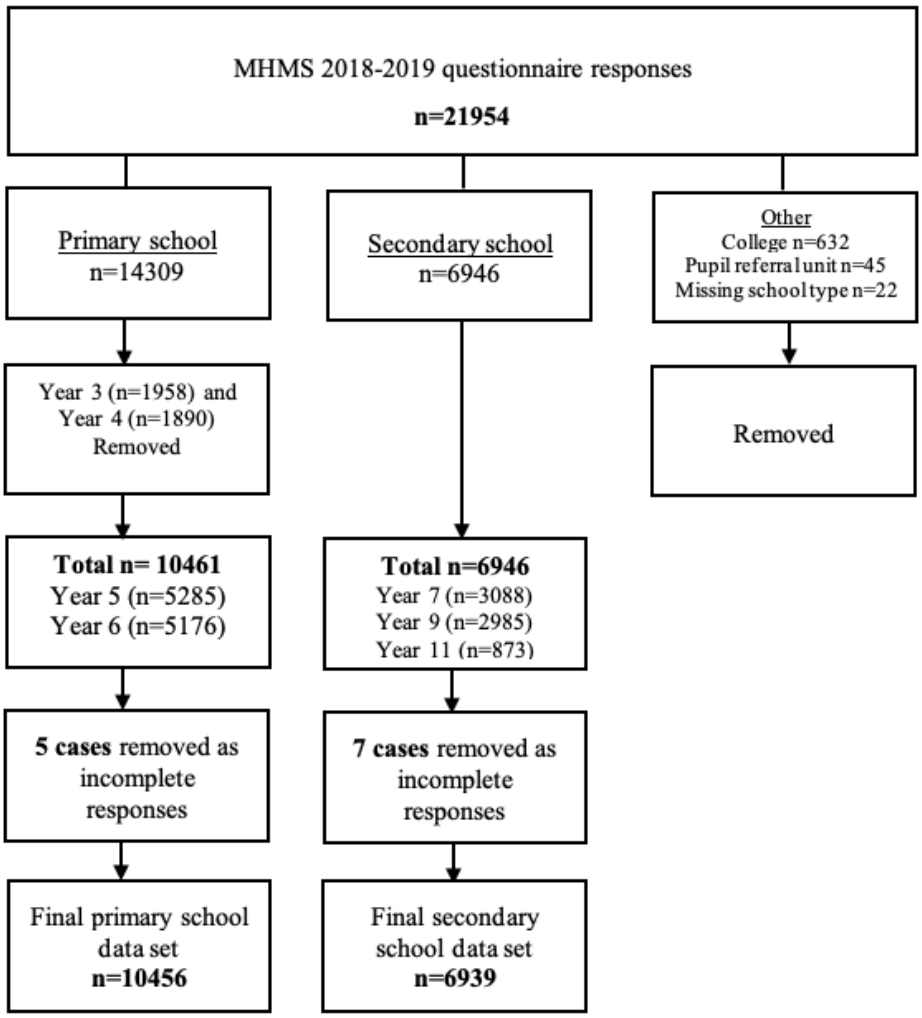

Figure 3.1: Flow-chart depicting the flow of inclusion of pupils in primary and secondary schools.

3.4.2. Inclusion and exclusion criteria

All participants included in the study met the following inclusion and exclusion criteria.

3.4.2.1. Inclusion criteria

- Male or female aged 9-16 years in Leeds schools in years 5, 6, 7, 9 and 11.
- Completed the MHMS 2018-2019 survey at school.

3.4.2.2. Exclusion criteria

- Participants attending pupil referral units and specialist schools.
- Schools that did not subscribe and complete the MHMS survey for 2018-2019.
- Incomplete survey responses.

3.5. Design

The study was a cross-sectional survey in which secondary data from the MHMS survey were analysed.

3.5.1. Measures

3.5.1.1. My Health My School

The MHMS survey (see Appendix 9 for survey) is an online schoolchildren perception survey conducted by Leeds City Council which has been administered annually since the 2007-2008 academic year. The aim of the survey is to gather information on key indicators of health and wellbeing to create tailor-made intervention strategies to improve the lives of children and adolescents in Leeds schools. The survey asks schoolchildren a range of questions covering broad topics including 1) socio-demographics, 2) personal, social and health education, 3) social, emotional, and mental health, 4) healthy eating, and 5) physical activity. The questions are tailored age-appropriately, and therefore some questions are only asked of secondary school schoolchildren (see Appendix 9). The survey is completed within school hours and its administration is led by teachers. Teachers provide an explanation of the survey, after which schoolchildren complete the online survey individually during a school lesson. The questionnaire takes on average 45 minutes to 1 hour to complete.

3.5.1.2. Socio-demographic measures

Demographic information from the 'About Me' subsection of the survey (see Appendix 9) on gender and ethnicity were used as socio-demographic variables in this study.

3.5.1.3. Habitual breakfast consumption

The MHMS survey contains one question about breakfast frequency during a normal school week and this was used as a proxy for HBC. HBC frequency was categorised as rare breakfast consumer (RBC; 0-1 days per week), occasional breakfast consumer (OBC; 2-3 days per week) or frequent breakfast consumer (FBC; 4-7 days per week).

3.5.1.4. Psychological wellbeing

Psychological wellbeing was assessed using relevant questions from the 'Social, Emotional and Mental Health' section of the questionnaire (Appendix 9; questions 53-59, 63-64 (secondary school data only), 68, 60). This section includes questions about emotions, bullying and life enjoyment. These questions were selected for comparison between the study reported in this chapter and Study 2 (see Ch.4), as the questions are similar to those included in the validated psychological wellbeing measures used in Study 2.

3.5.1.5. Food insecurity

The survey contains one item relevant to FI. Question 68, in the 'Social, Emotional and Mental Health' section asks, 'over the last 12 months have you worried about…not having enough to eat because my family didn't have enough money for food' (see Appendix 9). If this item was endorsed respondents were considered food insecure schoolchildren (FIS) and those who did not select the item categorised as food secure schoolchildren (FSS).

3.5.2. Procedure

Schoolchildren from school years 5, 6, 7, 9 and 11 within subscribing Leeds schools were identified by the school to complete the online survey. The researcher was not present during data collection. All questionnaires were completed in school hours online during the 2018-2019 academic year with teacher supervision.

3.5.3. Ethical considerations

This study received ethical approval from the University of Leeds, School of Psychology Research Ethics Committee (reference number: PSC-873; date: 16.12.19). All survey responses were anonymous, and no personal or identifiable information was collected. Schools were coded numerically within the dataset and hence were also anonymised. A letter was sent home from the school to inform parents about the survey content, dates for completion, confidentiality and anonymisation procedures, and utility of results. Parents/guardians were also informed and provided agreement to their child/adolescents' information being shared with third parties, which included research and evaluation partners (e.g. University of Leeds). Parents/guardians were informed that if they were happy for their child/adolescent to take part in the survey they did not need to respond to the letter or notify the researchers, and consent would be assumed. If they did not want their child/adolescent

to take part they were required to complete the form and return this to school. Participant consent was indicated by the act of completing the online survey. The survey also included a welcome note describing the survey, how to complete it, and the process of sharing with third parties. The children/adolescents were asked to tick whether or not they agree for their data to be shared. Data from any participants who did not wish for their data to be shared were not passed on to researchers. Parents/guardians could withdraw their child/adolescent from the study up until the point of their child/adolescent submitting their responses to the survey. After this, data were anonymised, and it was not possible to link responses to specific participants. Data transfer, handling, and reporting were performed in compliance with data protection regulations and in accordance with the data transfer agreement between the University of Leeds and Leeds City Council.

3.5.4. Statistical analysis

The data were entered and cleaned in Excel before analysis using the Statistical Package for the Social Sciences (SPSS) version 27 (IBM Corp., Armonk, NY). Certain variables were recoded for both primary and secondary schoolchildren by collapsing categories with low frequencies to permit more powerful statistical analysis (see Appendix 9.2). The number of sleep hours on a school night was categorised based on the NHS (2020) recommended hours of sleep for children and adolescents. All analyses assumed a significance level of $\alpha = .05$.

To examine the association between HBC (3 levels) and psychological wellbeing questions, chi-square analyses were carried out. The association between HBC and 1) emotions, 2) emotional coping, 3) friendship satisfaction, 4) bullied frequency, 5) feelings of safety at home, 6) sleep, 7) life enjoyment, and 8) self-harm (for secondary schoolchildren only) was examined. To assess the association between FI (2 levels) and psychological wellbeing, chi-square analyses using the same psychological wellbeing questions were conducted. To assess the association between HBC (3 levels) and FI (2 levels), chi-square analyses were also performed.

For the secondary school data, an additional chi-square analysis was conducted to examine the association between HBC, FI and self-harm. Secondary schoolchildren with a mental health disorder are more likely to self-harm (NHS Digital, 2018b). Therefore, secondary schoolchildren reporting self-harm were assumed to have

poorer psychological wellbeing. When tables larger than 2x2 returned a significant chi-square association, adjusted residuals were explored (Sharpe, 2015). A Bonferroni correction was applied to the α value to adjust for the number of comparisons made and to reduce the likelihood of a Type I error due to familywise error, and to identify which expected counts were significantly more or less likely to have occurred by chance. Due to the large sample size, and the increased likelihood of Type I error, effect sizes were considered to measure the strength of the association (Tabachnick & Fidell, 2007). Cramér's V (Φ_c) was used to examine the strength of association for tables larger than 2x2, Phi (Φ) was used for 2x2 tables, and odds ratios (OR) were calculated for 2x2 contingency tables (Field, 2017). Significant results were considered meaningful associations if the effect size was >.10, where >.10 is moderate, >.15 is strong and >.25 is very strong association (Akoglu, 2018). If assumptions of cell sizes were violated for 2x2 tables, Fisher's exact test was applied (Field, 2017).

3.6. Results

3.6.1. Demographic characteristics of the sample

Table 3.2 displays the frequencies and percentage of the study sample for HBC category and FI category by primary and secondary school. Table 3.2 indicates that most primary and secondary schoolchildren were FBCs and more secondary schoolchildren reported FI than primary schoolchildren.

Table 3.2: Frequencies and percentage of HBC and FI of the study sample by school type

	School type	
	Primary	**Secondary**
	n(%)	**n(%)**
HBC		
Rare	444 (4.25)	1415 (20.39)
Occasional	611 (5.84)	1057 (15.23)
Frequent	9401 (89.91)	4467 (64.38)
FI		
Food secure	10293 (98.44)	6720 (96.84)
Food insecure	163 (1.56)	219 (3.16)
Total	10456 (100)	6939 (100)

3.6.2. The association between habitual breakfast consumption and psychological wellbeing

3.6.2.1. Emotional experience and coping

Table 3.3 demonstrates the frequencies for each emotional experience according to HBC with Table 3.4 displaying frequencies for coping with each emotion according to HBC. Appendix 9.3 (Table 9.1-Table 9.10) reports the output for these analyses. In primary schoolchildren, there was no association between HBC and sadness, loneliness, stress/anxiety, or anger (see Table 3.3). There was also no association between HBC and coping with sadness, loneliness, stress/anxiety or anger in primary schoolchildren (see Table 3.4). There was no association between HBC and coping with loneliness in secondary schoolchildren (see Table 3.4).

3.6.2.1.1. Confidence

There was a significant moderate association between HBC and confidence in primary schoolchildren, $\chi^2(8, N=10456)=262.22$, $p<.001$, $\Phi_c=.11$, and a strong significant association in secondary schoolchildren, $\chi^2(8, N=6939)=383.28$, $p<.001$, $\Phi_c=.17$ (see Table 3.3). In both samples, RBCs were significantly more likely than expected to never or rarely feel confident ($p=.003$), and less likely to feel confident most days or everyday ($p=.003$). OBCs in primary and secondary school were less likely to feel confident everyday ($p=.003$), and FBCs were more likely than expected to feel confident most days or everyday ($p=.003$), and significantly less likely to never or rarely feel confident ($p=.003$). Primary school OBCs were also significantly more likely than expected to never or rarely feel confident ($p=.003$), and less likely to feel confident most days ($p=.003$).

3.6.2.1.2. Happiness

A significant moderate association between HBC and happiness in primary schoolchildren, $\chi^2(8, N=10456)=318.70$, $p<.001$, $\Phi_c=.12$, and a significant strong association in secondary schoolchildren was found, $\chi^2(8, N=6939)=497.93$, $p<.001$, $\Phi_c=.19$ (see Table 3.3). In both samples, RBCs were significantly more likely than expected to feel happy never, rarely or some days ($p=.003$), and less likely to feel happy most days or everyday ($p=.003$). OBCs in primary school were significantly more likely than expected to rarely feel happy ($p=.003$), and OBCs in primary and secondary schoolchildren were more likely than expected to feel happy some days,

and less likely to feel happy everyday (p=.003). FBCs in both samples were significantly less likely than expected to never, rarely or some days feel happy (p=.003), and more likely to feel happy most days or everyday (p=.003).

3.6.2.1.3. Sadness

There was a strong significant association between HBC and sadness in secondary schoolchildren, $\chi^2(8, N=6939)=370.25$, $p<.001$, $\Phi_c=.16$ (see Table 3.3). RBCs were significantly less likely than expected to rarely feel sad (p=.003), and more likely to feel sad most days or everyday (p=.003). OBCs were significantly less likely than expected to rarely feel sad (p=.003), and were more likely to feel sad most days (p=.003). FBCs were significantly more likely than expected to rarely feel sad or upset (p=.003), and less likely to feel sad most days or everyday (p=.003). There was a significant moderate association between HBC and coping with sadness in secondary schoolchildren, $\chi^2(8, N=6938)=227.70$, $p<.001$, $\Phi_c=.13$ (see Table 3.4). RBCs were significantly more likely than expected to not cope well or not cope well at all with sadness (p=.003), and less likely to cope well or very well with sadness (p=.003). OBCs were significantly more likely than expected to cope well with sadness (p=.003). FBCs were significantly less likely than expected to not cope (not well at all and not well) with sadness (p=.003), and more likely to cope well or very well with sadness (p=.003).

3.6.2.1.4. Loneliness

There was a significant moderate association between HBC and loneliness in secondary schoolchildren, $\chi^2(8, N=6939)=260.17$, $p<.001$, $\Phi_c=.14$ (see Table 3.3). RBCs were significantly less likely than expected to never or rarely feel lonely (p=.003), and more likely to feel lonely most days or everyday (p=.003). FBCs were significantly more likely than expected to never or rarely feel lonely (p=.003), and less likely to feel lonely some days, most days or everyday (p=.003).

3.6.2.1.5. Stress/anxiety

There was a strong significant association between HBC and stress/anxiety in secondary schoolchildren, $\chi^2(8, N=6939)=392.26$, $p<.001$, $\Phi_c=.17$ (see Table 3.3). RBCs were significantly less likely than expected to never, rarely or on some days feel stressed/anxious (p=.003), and significantly more likely to feel stressed/anxious

most days or everyday (p=.003). OBCs were significantly more likely than expected to feel stressed/anxious most days (p=.003). FBCs were significantly more likely than expected to feel stressed/anxious never, rarely or on some days (p=.003), and less likely to feel stressed/anxious most days or everyday (p=.003). There was a significant moderate association between HBC and coping with stress/anxiety in secondary schoolchildren, $\chi^2(8, N=6938)=263.26$, $p<.001$, $\Phi_c=.14$ (see Table 3.4). RBCs were significantly more likely than expected to not cope well at all or not cope well with stress/anxiety (p=.003), and were less likely to cope ok, well or very well with stress/anxiety (p=.003). FBCs were significantly less likely than expected to not cope well at all or not cope well with stress/anxiety (p=.003), and more likely to cope well or cope very well with stress/anxiety (p=.003).

Table 3.3: Association between reported emotional experience and HBC for primary and secondary schoolchildren

Emotional experience		Primary school										Secondary school									
		Never		Rarely		Some days		Most days		Everyday		Never		Rarely		Some days		Most days		Everyday	
	HBC	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]
Confidence	Rare	65	14.64	79	17.79	110	24.77	93	20.95	97	21.85	232	16.40	349	24.66	351	24.81	254	17.95	229	16.18
	Occasional	39	6.38	101	16.53	155	25.37	165	27.00	151	24.71	77	7.28	203	19.21	322	30.46	271	25.64	184	17.41
	Frequent	315	3.35	828	8.81	2126	22.61	3157	33.58	2975	31.65	199	4.45	652	14.60	1191	26.66	1353	30.29	1072	24.00
	Total	419	4.01	1008	9.64	2391	22.87	3415	32.66	3223	30.82	508	7.32	1204	17.35	1864	26.86	1878	27.06	1485	21.40
	Statistic	**χ^2 (8, N=10456) = 262.22, p<.001, Φ_c=.11**										**χ^2 (8, N=6939) = 383.28, p<.001, Φ_c=.17**									
Happiness	Rare	29	6.53	50	11.26	114	25.68	144	32.43	107	24.10	89	6.29	181	12.79	457	32.30	437	30.88	251	17.74
	Occasional	9	1.47	44	7.20	164	26.84	249	40.75	145	23.73	22	2.08	74	7.00	312	29.52	426	40.30	223	21.10
	Frequent	95	1.01	312	3.32	1439	15.31	4056	43.14	3499	37.22	64	1.43	192	4.30	812	18.18	1890	42.31	1509	33.78
	Total	133	1.27	406	3.88	1717	16.42	4449	42.55	3751	35.87	175	2.52	447	6.44	1581	22.78	2753	39.67	1983	28.58
	Statistic	**χ^2 (8, N=10456) = 318.70, p<.001, Φ_c=.12**										**χ^2 (8, N=6939) = 497.93, p<.001, Φ_c=.19**									
Sadness	Rare	43	9.68	122	27.48	149	33.56	81	18.24	49	11.04	72	5.09	306	21.63	477	33.71	325	22.97	235	16.61
	Occasional	34	5.56	221	36.17	228	37.32	82	13.42	46	7.53	52	4.92	316	29.90	405	38.32	197	18.64	87	8.23
	Frequent	590	6.28	4078	43.38	3490	37.12	915	9.73	328	3.49	253	5.66	1795	40.18	1639	36.69	514	11.51	266	5.95
	Total	667	6.38	4421	42.28	3867	36.98	1078	10.31	423	4.05	377	5.43	2417	34.83	2521	36.33	1036	14.93	588	8.47
	Statistic	χ^2 (8, N=10456) = 155.99, p<.001, Φ_c=.09										**χ^2 (8, N=6939) = 370.25, p<.001, Φ_c=.16**									
Loneliness	Rare	163	36.71	109	24.55	81	18.24	43	9.68	48	10.81	415	29.33	364	25.72	248	17.53	144	10.18	244	17.24
	Occasional	239	39.12	165	27.00	102	16.69	51	8.35	54	8.84	389	36.80	333	31.50	185	17.50	73	6.91	77	7.28
	Frequent	4186	44.53	2985	31.46	1354	14.40	506	5.38	397	4.22	1884	42.18	1420	31.79	622	13.92	271	6.07	270	6.04
	Total	4588	43.88	3232	30.91	1537	14.70	600	5.74	4999	4.77	2688	38.74	2117	30.51	1055	15.20	488	7.03	591	8.52
	Statistic	χ^2 (8, N=10456) = 107.43, p<.001, Φ_c=.07										**χ^2 (8, N=6939) = 260.17, p<.001, Φ_c=.14**									

Table 3.3: Association between reported emotional experience and HBC for primary and secondary schoolchildren

Stress/anxiety	Rare	84	18.92	88	19.82	107	24.10	83	18.69	82	18.47	127	8.98	226	15.97	327	23.11	327	23.11	408	28.83
	Occasional	121	19.80	186	30.44	143	23.40	90	14.73	71	11.62	111	10.50	245	23.18	273	25.83	239	22.61	189	17.88
	Frequent	1887	20.07	3502	37.25	2453	26.09	1003	10.67	556	5.91	657	14.71	1339	29.98	1264	28.30	717	16.05	490	10.97
	Total	2092	20.01	3776	36.11	2703	25.85	1176	11.25	709	6.78	895	12.90	1810	26.08	1864	26.86	1283	18.49	1087	15.67
	Statistic	χ^2 (8, N=10456) = 196.14, p<.001, Φ_c =.10												**χ^2 (8, N=6939) = 392.26, p<.001, Φ_c=.17**							
Anger	Rare	53	11.94	94	21.17	127	28.60	84	18.92	86	19.37	67	4.73	233	16.47	429	30.32	330	23.32	356	25.16
	Occasional	73	11.95	182	29.79	184	30.11	113	18.49	59	9.66	59	5.58	224	21.19	381	36.05	245	23.18	148	14.00
	Frequent	1256	13.36	3646	38.78	2857	30.39	1065	11.33	577	6.14	347	7.77	1453	32.53	1589	35.57	676	15.13	402	9.00
	Total	1382	13.22	3922	37.51	3168	30.30	1262	12.07	722	6.91	473	6.82	1910	27.52	2399	34.57	1251	18.03	906	13.06
	Statistic	χ^2 (8, N=10456) = 204.31, p<.001, Φ_c =.10												**χ^2 (8, N=6939) = 419.62, p<.001, Φ_c=.17**							

[a] % within HBC category

Bold indicates a **significant** association is present

Table 3.4: Association between reported emotional coping and HBC for primary and secondary schoolchildren

Emotional coping		Primary school										Secondary school									
		Not well at all		Not well		Ok		Well		Very well		Not well at all		Not well		Ok		Well		Very well	
	HBC	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]
Sadness	Rare	84	18.92	72	16.22	178	40.09	55	12.39	55	12.39	234	16.54	251	17.74	497	35.12	247	17.46	186	13.14
	Occasional	75	12.27	102	16.69	237	38.79	115	18.82	82	13.42	101	9.56	188	17.79	365	34.53	246	23.27	157	14.85
	Frequent	753	8.01	1201	12.78	3460	36.81	2290	24.36	1696	18.04	287	6.43	540	12.09	1576	35.29	1256	28.12	807	18.07
	Total	912	8.72	1375	13.15	3875	37.06	2460	23.53	1833	17.53	622	8.97	979	14.11	2438	35.14	1749	25.21	1150	16.58
	Statistic	χ^2 (8, N=10455) = 124.92, p<.001, Φ_c=.08												**χ^2 (8, N=6938) = 227.70, p<.001, Φ_c=.13**							
Loneliness	Rare	99	22.30	58	13.06	109	24.55	51	11.49	127	28.60	229	16.18	186	13.14	387	27.35	226	15.97	387	27.35
	Occasional	84	13.75	75	12.27	168	27.50	88	14.40	196	32.08	108	10.22	120	11.35	296	28.00	192	18.16	341	32.26
	Frequent	1155	12.29	1080	11.49	2367	25.18	1666	17.72	3132	33.32	360	8.06	431	9.65	1155	25.86	940	21.05	1580	35.38
	Total	1338	12.8	1213	11.60	2644	25.29	1805	17.26	3455	33.05	697	10.05	737	10.62	1838	26.49	1358	19.57	2308	33.27
	Statistic	χ^2 (8, N=10455) = 51.80, p<.001, Φ_c=.05												χ^2 (8, N=6938) = 122.17, p<.001, Φ_c=.09							
Stress/anxiety	Rare	101	22.75	97	21.85	123	27.70	54	12.16	69	15.54	350	24.73	335	23.67	389	27.49	160	11.31	181	12.79
	Occasional	100	16.37	116	18.99	178	29.13	104	17.02	113	18.49	159	15.04	216	20.44	347	32.83	176	16.65	159	15.04
	Frequent	1044	11.11	1590	16.91	2858	16.91	1884	20.04	2024	21.53	463	10.37	800	17.91	1462	32.74	925	20.71	816	18.27
	Total	1245	11.91	1803	17.25	3159	30.22	2042	19.53	2206	21.10	972	14.01	1351	19.47	2198	31.68	1261	18.18	1156	16.66
	Statistic	χ^2 (8, N=10455) = 92.35, p<.001, Φ_c=.07												**χ^2 (8, N=6938) = 263.26, p<.001, Φ_c=.14**							
Anger	Rare	137	30.86	88	19.82	113	25.45	42	9.46	64	14.41	398	28.13	342	24.17	337	23.82	174	12.30	164	11.59
	Occasional	151	24.71	113	18.49	182	29.79	99	16.20	66	10.80	214	20.25	247	23.37	291	27.53	180	17.03	125	11.83
	Frequent	1378	14.66	1932	20.55	2762	29.38	1747	18.59	1581	16.82	588	13.17	925	20.71	1377	30.83	924	20.69	652	14.60
	Total	1666	15.93	2133	20.40	3057	29.24	1888	18.06	1711	16.37	1200	17.30	1514	21.82	2005	28.90	1278	18.42	941	13.56
	Statistic	χ^2 (8, N=10455) = 139.32, p<.001, Φ_c=.08												χ^2 (8, N=6938) = 224.05, p<.001, Φ_c=.13							

[a] % within HBC category

Bold indicates a **significant** association is present

3.6.2.1.6. Anger

There was a strong significant association between HBC and anger in secondary schoolchildren, $\chi^2(8, N=6939)=419.62$, $p<.001$, $\Phi_c=.17$ (see Table 3.3). RBCs were significantly less likely than expected to report that they felt angry never, rarely or some days ($p=.003$), and more likely to report feeling angry most days or everyday ($p=.003$). OBCs were significantly less likely than expected to report rarely feeling angry ($p=.003$), and more likely to feeling angry most days ($p=.003$). FBCs were significantly more likely than expected to report feeling angry never or rarely ($p=.003$), and less likely to report feeling angry most days or everyday ($p=.003$). There was a significant moderate association between HBC and coping with anger in secondary schoolchildren, $\chi^2(8, N=6938)=224.05$, $p<.001$, $\Phi_c=.13$ (see Table 3.4). RBCs were significantly more likely than expected to not cope well at all with anger ($p=.003$), and less likely to cope ok or well with anger. FBCs were significantly less likely than expected to not cope well at all with anger ($p=.003$), and more likely to be able to cope ok, well or very well with anger ($p=.003$).

3.6.2.2. Feelings of safety at home

There was no association between HBC and feeling safe at home in primary schoolchildren, $\chi^2(2, N=10456)=54.37$, $p<.001$, $\Phi_c=.07$, whilst in secondary schoolchildren there was a significant moderate association, $\chi^2(2, N=6939)=141.66$, $p<.001$, $\Phi_c=.14$ (see Table 3.5). RBCs were significantly less likely than expected to feel safe at home ($p=.008$), and more likely to not feel safe at home ($p=.008$). FBCs were significantly more likely than expected to feel safe at home ($p=.008$), and less likely to not feel safe at home ($p=.008$; see Appendix 9.3, Table 9.14).

Table 3.5: Feelings of safety at home according to HBC for primary and secondary schoolchildren

Home safety	Primary school				Secondary school			
	Safe		Not safe		Safe		Not safe	
HBC	n	%[a]	n	%[a]	n	%[a]	n	%[a]
Rare	413	93.02	31	6.98	1284	90.74	131	9.26
Occasional	582	95.25	29	4.75	1020	96.50	37	40.98
Frequent	9200	97.86	201	2.14	4366	97.74	101	2.26
Total	10195	97.5	261	2.5	6670	96.12	269	3.88

[a] % within HBC category

3.6.2.3. Friendship satisfaction

In primary schoolchildren, there was no association between HBC and feeling happy with the number of good friends an individual has, $\chi^2(8, N=10456)=120.30$, $p<.001$, $\Phi_c=.08$. However, in secondary schoolchildren there was a significant moderate association, $\chi^2(8, N=6939)=164.84$, $p<.001$, $\Phi_c=.11$ (see Table 3.6). Secondary school RBCs were significantly more likely than expected to be very unhappy or ok with the number of good friends they had ($p=.003$), and less likely to be very happy with the number of good friends they had ($p=.003$). FBCs were significantly less likely than expected to be very unhappy or ok with the number of good friends they had ($p=.003$), and more likely to be very happy with the number of good friends they had (see Appendix 9.3, Table 9.12).

3.6.2.4. Sleep

There was a significant moderate association between HBC and school-night sleep in primary schoolchildren, $\chi^2(4, N=10456)=221.56$, $p<.001$, $\Phi_c=.10$, and a strong significant association in secondary schoolchildren, χ^2 $(4, N=6939)=640.60$, $p<.001$, $\Phi_c=.22$ (see Table 3.7). In both samples, RBCs were significantly more likely than expected to sleep below the recommended number of hours ($p=.006$), and less likely to sleep for the recommended number of hours ($p=.006$). OBCs were significantly more likely than expected to sleep below the recommended number of hours ($p=.006$), and were less likely to sleep for the recommended number of hours ($p=.006$). FBCs were significantly less likely to sleep below the recommended number of hours ($p=.006$), and more likely to sleep for the recommended number of hours ($p=.006$). In secondary schoolchildren, OBCs were significantly less likely to sleep above the recommended number of hours ($p=.006$), and were significantly more likely to sleep above the recommended hours if they were FBCs ($p<.006$; see Appendix 9.3,Table 9.18).

Table 3.6: Friendship satisfaction according to HBC for primary and secondary schoolchildren

Friendship satisfaction	Primary school										Secondary school									
	Very unhappy		Unhappy		Ok		Happy		Very happy		Very unhappy		Unhappy		Ok		Happy		Very happy	
HBC	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]
Rare	22	4.95	22	4.95	89	20.05	61	13.74	250	56.31	103	7.28	53	3.75	220	15.55	373	26.36	666	47.07
Occasional	21	3.44	24	3.93	93	15.22	114	18.66	359	58.76	22	2.08	33	3.12	141	13.34	281	26.58	580	54.87
Frequent	143	1.52	202	2.15	995	10.58	1720	18.30	6341	67.45	79	1.77	123	2.75	475	10.63	1193	26.71	2597	58.14
Total	186	1.78	248	2.37	1177	11.26	1895	18.12	6950	66.47	204	2.94	209	3.01	836	12.05	1847	26.62	3843	55.38

[a] % within HBC category

Table 3.7: Sleep hours according to HBC for primary and secondary schoolchildren

Sleep	Primary school						Secondary school					
	4-8 hours		9-12 hours		13 hours		4-7 hours		8-12 hours		13 hours	
HBC	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]
Rare	215	48.42	188	42.34	41	9.23	932	65.87	445	31.45	38	2.69
Occasional	254	41.57	299	48.94	58	9.49	481	45.51	540	51.09	36	3.41
Frequent	2231	23.73	6151	65.43	1019	10.84	1291	28.90	2950	66.04	226	193.13
Total	2700	25.82	6638	63.49	1118	10.69	2704	38.97	3935	56.71	300	4.32

[a] % within HBC category

3.6.2.5. Life enjoyment

There was a moderate significant association between HBC and life enjoyment in primary schoolchildren, $\chi^2(4, N=10454)=242.76$, $p<.001$, $\Phi_c=.11$, and a strong significant association in secondary schoolchildren, $\chi^2(4, N=6939)=452.50$, $p<.001$, $\Phi_c=.18$ (see Table 3.8). In both samples, RBCs were significantly less likely than expected to enjoy life ($p=.006$), and more likely to be unsure if life was enjoyable or to state that they did not enjoy life ($p=.006$). OBCs were significantly less likely than expected to enjoy life ($p=.006$), and were more likely to feel unsure about life enjoyment or report that they did not enjoy life ($p=.006$). FBCs were significantly more likely than expected to enjoy life ($p=.006$), and less likely to feel unsure about life enjoyment or report not enjoying life ($p=.006$). In primary schoolchildren only, OBCs were significantly more likely than expected to report not enjoying life ($p=.006$, see Appendix 9.3, Table 9.19).

Table 3.8: Life enjoyment according to HBC for primary and secondary schoolchildren

Life enjoyment	Primary school						Secondary school					
	Enjoy		Unsure		Do not enjoy		Enjoy		Unsure		Do not enjoy	
HBC	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]
Rare	262	59.14	107	24.15	74	16.70	718	50.74	379	26.78	318	22.47
Occasional	423	69.23	113	83.46	75	35.01	681	64.43	250	23.65	126	11.92
Frequent	7742	82.36	1208	12.85	450	4.79	3475	77.79	689	15.42	303	6.78
Total	8427	80.61	1428	13.66	599	5.73	4874	70.24	1318	18.99	747	10.77

[a] % within HBC category

3.6.2.6. Number of reasons for worrying

There was no association between HBC and the number of reasons for worrying in primary, $\chi^2(4, N=10456)=40.18$, $p<.001$, $\Phi_c=.044$, and secondary schoolchildren $\chi^2(4, N=6939)= 132.67$, $p<.001$, $\Phi_c=.098$ (see Appendix 9.3, Table 9.11). There were no significant associations between HBC and each worrying reason (see Appendix 9.3, Table 9.13).

3.6.2.7. Bullying

There was no association between HBC and being bullied in primary, χ^2 (4, N=10456)= 92.21, p<.001, Φ_c=.07, and secondary schoolchildren χ^2(4, N=6939)=107.22, p<.001, Φ_c=.09 (Appendix 9.3, Table 9.15). There was also no association between HBC and the number of reasons for bullying reported in primary, χ^2(4, N=10456)=79.98, p<.001, Φ_c=.06, and secondary schoolchildren, χ^2(4, N=6939)=79.35, p<.001, Φ_c=.08 (see Appendix 9.3, Table 9.17).

3.6.2.8. Self-harm

There was a strong significant association between HBC and self-harm in secondary school children, χ^2(2, N=6939)=227.90, p<.001, Φ_c=.18 (see Table 3.9). RBCs were significantly less likely than expected not to self-harm (p=.008), and more likely to report self-harm (p=.008). FBCs were significantly more likely than expected to not self-harm (p=.008), and less likely to report self-harm (p=.008; see Appendix 9.3, Table 9.20).

Table 3.9: Self-harm according to HBC for secondary schoolchildren

Self-harm	No		Yes	
HBC	n	%[a]	n	%[a]
Rare	924	65.30	491	34.70
Occasional	809	76.54	248	23.46
Frequent	3747	83.88	720	16.12
Total	5480	78.97	1459	21.03

[a] % within HBC category

3.6.3. The association between food insecurity and psychological wellbeing

3.6.3.1. Emotional experience and coping

Table 3.10 displays the frequencies for each emotional experience reported according to FI. Table 3.11 displays frequencies related to coping with each emotion by HBC. In primary schoolchildren there was no association between FI and feelings of sadness, confidence, stress/anxiety, happiness, and anger (see Table 3.10), and no association between FI and ability to cope with sadness, loneliness, stress/anxiety and anger (see Table 3.11). There was also no association between FI and coping with

anger in secondary schoolchildren (see Table 3.11; also see Appendix 9.4, Table 9.21 to Table 9.30).

3.6.3.1.1. Confidence

There was a significant moderate association between FI and confidence in secondary schoolchildren, $\chi^2(4, N=6939)=147.88$, $p<.001$, $\Phi_c=.15$ (see Table 3.10). FIS were significantly more likely than expected to report never feeling confident ($p=.005$), and less likely to report feeling confident most days or everyday ($p=.005$). FSS were significantly less likely than expected to never feel confident ($p=.005$), and more likely to feel confident most days or everyday.

3.6.3.1.2. Happiness

There was a strong significant association between FI and happiness in secondary schoolchildren, $\chi^2(4, N=6939)=283.55$, $p<.001$, $\Phi_c=.20$ (see Table 3.10). FIS were significantly more likely than expected to report never or rarely feeling happy ($p=.005$), and less likely to report feeling happy most days or everyday ($p=.005$). FSS were significantly less likely than expected to never or rarely feel happy ($p=.005$), and more likely to feel happy most days or everyday ($p=.005$).

3.6.3.1.3. Sadness

There was a strong significant association between FI and sadness in secondary schoolchildren, $\chi^2(4, N=6939)=172.38$, $p<.001$, $\Phi_c=.16$ (see Table 3.10). FIS were significantly less likely than expected to report feeling sad rarely or some days ($p=.005$), and significantly more likely to feel sad most days or everyday ($p=.005$). FSS were significantly more likely than expected to feel sad rarely or some days ($p=.005$), and less likely to feel sad most days or everyday ($p=.005$). In secondary schoolchildren, there was a significant moderate association between FI and coping with sadness, $\chi^2(4, N=6938)=102.19$, $p<.001$, $\Phi_c=.12$ (see Table 3.11). FIS were significantly more likely than expected to not cope well at all with sadness ($p=.005$), and were less likely to cope well with sadness ($p=.005$). FSS were significantly less likely to not cope well at all with sadness ($p=.005$), and more likely to cope well with sadness ($p=.005$).

3.6.3.1.4. Anger

There was a significant moderate association between FI and anger in secondary schoolchildren, $\chi^2(4, N=6939)=87.49$, $p<.001$, $\Phi_c=.11$ (see Table 3.10). FIS were significantly less likely than expected to rarely feel angry ($p=.005$), and more likely to feel angry everyday ($p=.005$). FSS were significantly more likely than expected to rarely feel angry ($p=.005$), and less likely to feel angry everyday ($p=.005$).

Table 3.10: Association between reported emotional experience and FI for primary and secondary schoolchildren

Emotional experience		Primary school										Secondary school									
		Never		Rarely		Some days		Most days		Everyday		Never		Rarely		Some days		Most days		Everyday	
	FI	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%	n	%	n	%	n	%	n	%
Confidence	Food secure	402	3.91	986	9.58	2341	22.74	3379	32.83	3185	30.94	448	6.67	1156	17.20	1815	27.01	1844	27.44	1457	21.68
	Food insecure	17	10.43	22	13.5	50	30.67	36	22.09	38	23.31	60	27.40	48	21.92	49	22.37	34	15.53	28	12.79
	Total	419	4.01	1008	9.64	2391	22.87	3415	32.66	3223	30.82	508	7.32	1204	17.35	1864	26.86	1878	27.06	1485	21.40
	Statistic	χ^2 (4, N=10456) = 32.71, p<.001, Φ_c=.06										**χ^2 (4, N=6939) = 147.88, p<.001, Φ_c=.15**									
Happiness	Food secure	123	1.19	386	3.75	1681	16.33	4398	42.73	3705	36.00	137	2.04	408	6.07	1516	22.56	2708	40.30	1951	29.03
	Food insecure	10	6.13	20	12.27	36	22.09	51	31.29	46	28.22	38	17.35	39	17.81	65	29.68	45	20.55	32	14.61
	Total	133	1.27	406	3.88	1717	16.42	4449	42.55	3751	35.87	175	2.52	447	6.44	1581	22.78	2753	39.67	1983	28.58
	Statistic	χ^2 (4, N=10456) = 71.66, p<.001, Φ_c=.08										**χ^2 (4, N=6939) = 283.55, p<.001, Φ_c=.20**									
Sadness	Food secure	656	6.37	4377	45.52	3815	37.06	1045	10.15	400	3.89	369	5.49	2380	35.42	2466	36.70	984	14.64	521	7.75
	Food insecure	11	6.75	44	26.99	52	31.90	33	20.25	23	14.11	8	3.65	37	16.89	55	25.11	52	23.74	67	30.59
	Total	667	6.38	4421	42.28	3867	36.98	1078	10.31	423	4.05	377	5.43	2417	34.83	2521	36.33	1036	14.93	588	8.47
	Statistic	χ^2 (4, N=10456) = 67.66, p<.001, Φ_c=.08										**χ^2 (4, N=6939) = 172.38, p<.001, Φ_c=.16**									
Loneliness	Food secure	4553	44.23	3194	31.03	1498	14.55	581	5.64	467	4.54	2645	39.36	2083	31.00	1020	15.18	458	6.82	514	7.65
	Food insecure	35	21.47	38	23.31	39	23.93	19	11.66	32	19.63	43	19.63	34	15.53	35	15.98	30	13.70	77	35.16
	Total	4588	43.88	3232	30.91	1537	14.70	600	5.74	499	4.77	2688	38.74	2117	30.51	1055	15.20	488	7.03	591	8.52
	Statistic	**χ^2 (4, N=10456) = 118.34, p<.001, Φ_c=.11**										**χ^2 (4, N=6939) = 240.79, p<.001, Φ_c=.19**									
Stress/anxiety	Food secure	2072	20.13	3738	36.32	2666	25.90	1144	11.11	673	6.54	880	13.10	1789	26.62	1827	27.19	1225	18.23	999	14.87
	Food insecure	20	12.27	38	23.31	37	22.70	32	19.63	36	22.09	15	6.85	21	9.59	37	16.89	58	26.48	88	40.18
	Total	2092	20.01	3776	36.11	2703	25.85	1176	11.25	709	6.78	895	12.90	1810	26.08	1864	26.86	1283	18.49	1087	15.67
	Statistic	χ^2 (4, N=10456) = 80.66, p<.001, Φ_c=.09										**χ^2 (4, N=6939) = 132.96, p<.001, Φ_c=.14**									

Table 3.10: Association between reported emotional experience and FI for primary and secondary schoolchildren

Anger	Food secure	1367	13.28	3885	37.74	3124	30.35	1228	11.93	689	6.69	462	6.88	1881	27.99	2341	34.84	1200	17.86	836	12.44
	Food insecure	15	9.20	37	22.70	44	26.99	34	20.86	33	20.25	11	5.02	29	13.24	58	26.48	51	23.29	70	31.96
	Total	1382	13.22	3922	37.51	3168	30.30	1262	12.07	722	6.91	473	6.82	1910	27.53	2399	34.57	1251	18.03	906	13.06
	Statistic	χ^2 (4, N=10456) = 65.57, p<.001, Φ_c=.08												**χ^2 (4, N=6939) = 87.49, p<.001, Φ_c=.11**							

[a] % within FI category
Bold indicates a **significant** association is present

	FI	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%	n	%	n	%	n	%	n	%
Sadness	Food secure	878	8.53	1350	13.12	3817	37.09	2437	23.68	1810	17.59	563	8.38	937	13.95	2379	35.41	1716	25.54	1124	16.73
	Food insecure	34	20.86	25	15.34	58	35.58	23	14.11	23	14.11	59	26.94	42	19.18	59	26.94	33	15.07	26	11.87
	Total	912	8.72	1375	13.15	3875	37.06	2460	25.53	1833	17.53	622	8.97	979	14.11	2438	35.14	1749	25.21	1150	16.58
	Statistic	χ^2 (4, N=10455) = 36.01, p<.001, Φ_c=.06												**χ^2 (4, N=6939) = 172.38, p<.001, Φ_c=.16**							
Loneliness	Food secure	1300	12.63	1192	11.58	2609	25.35	1780	17.29	3411	33.14	627	9.33	703	10.46	1792	26.67	1335	19.87	2262	33.67
	Food insecure	38	23.31	21	12.88	35	21.47	25	15.34	44	26.99	70	31.96	34	15.53	46	21.00	23	10.50	46	21.00
	Total	1338	12.80	1213	11.60	2644	25.29	1805	17.26	3455	33.05	697	10.05	737	10.62	1838	26.49	1358	19.57	2308	33.27
	Statistic	χ^2 (4, N=10455) = 17.69, p<.001, Φ_c=.04												**χ^2 (4, N=6939) = 240.79, p<.001, Φ_c=.19**							
Stress/anxiety	Food secure	1209	11.75	1777	17.27	3108	30.20	2026	19.69	2172	21.20	899	13.38	1301	19.36	2144	31.91	1242	18.48	1133	16.86
	Food insecure	36	22.09	26	15.95	51	31.29	16	9.82	34	20.86	73	33.33	50	22.83	54	24.66	19	8.68	23	10.50
	Total	1245	11.91	1803	17.25	3159	30.22	2042	19.53	2206	21.10	972	14.01	1351	19.47	2198	31.68	1261	18.18	1156	16.66
	Statistic	χ^2 (4, N=10455) = 22.63, p<.001, Φ_c=.05												**χ^2 (4, N=6939) = 132.96, p<.001, Φ_c=.14**							
Anger	Food secure	1622	15.76	2096	20.37	3024	29.38	1868	18.15	1682	16.34	1121	16.68	1466	21.82	1961	29.19	1251	18.62	920	13.69
	Food insecure	44	26.99	37	22.70	33	20.25	20	12.27	29	17.79	79	36.07	48	21.92	44	20.09	27	40.34	21	29.70
	Total	1666	15.93	2133	20.40	3057	29.24	1888	18.06	1711	16.37	1200	17.30	1514	21.82	2005	28.90	1278	18.42	941	13.56
	Statistic	χ^2 (4, N=10455) = 21.00, p<.001, Φ_c=.05												χ^2 (4, N=6938) = 59.36, p<.001, Φ_c=.09							

[a] % within FI category
Bold indicates an association is present
Bold indicates a **significant** association is present

3.6.3.1.5. Loneliness

There was a significant moderate association between FI and loneliness in primary schoolchildren, $\chi^2(4, N=10456)=118.34$, $p<.001$, $\Phi_c=.11$, and a strong significant association in secondary schoolchildren, $\chi^2(4, N=6939)=240.79$, $p<.001$, $\Phi_c=.19$ (see Table 3.10). In both samples, FIS were significantly more likely than expected to feel lonely most days or everyday ($p=.005$), and less likely to never feel lonely ($p=.005$). In primary schoolchildren, FIS were significantly more likely to feel loneliness on some days ($p=.005$), and secondary schoolchildren with FI were significantly less likely to report rarely feeling lonely ($p=.005$). In both samples, FSS were significantly less likely than expected to experience loneliness most days or everyday ($p=.005$), and more likely to never feel lonely ($p=.005$). In primary schoolchildren, FSS were significantly less likely to feel loneliness on some days ($p=.005$), and secondary school FSS were significantly more likely to rarely feel lonely ($p=.005$). There was also a significant moderate association between FI and coping with loneliness in secondary schoolchildren, $\chi^2(4, N=6938)=135.55$, $p<.001$, $\Phi_c=.14$ (see Table 3.11). FIS were significantly more likely than expected to not cope well at all with loneliness ($p=.005$), and less likely be able to cope well or very well with loneliness ($p=.005$). FSS were significantly less likely than expected to not cope well at all with loneliness ($p=.005$), and more likely able to cope well or very well with loneliness ($p=.005$).

3.6.3.1.6. Stress/anxiety

There was a significant moderate association between FI and stress/anxiety in secondary schoolchildren, $\chi^2(4, N=6939)=132.96$, $p<.001$, $\Phi_c=.14$ (see Table 3.10). FIS were significantly less likely than expected to report feeling stressed/anxious rarely or on some days ($p=.005$), and more likely to feel stressed/anxious most days or everyday ($p=.005$). FSS were significantly more likely than expected to feel stressed/anxious rarely or some days ($p=.005$), and less likely to feel stressed/anxious most days or everyday ($p=.005$). There was also a significant moderate association between FI and coping with stress/anxiety in secondary schoolchildren, $\chi^2(4, N=6938)=81.48$, $p<.001$, $\Phi_c=.11$ (see Table 3.11). FIS were significantly more likely than expected to not cope well at all with stress/anxiety ($p=.005$), and were less likely ($p=.005$) to cope well with stress/anxiety. FSS were significantly less likely to report

not coping well at all with stress/anxiety (p<.005), and more likely to report coping well with stress/anxiety (p=.005).

3.6.3.2. Number of reasons for worrying

There was a significant moderate association between FI and the number of worries in primary, $\chi^2(2, N=10456)=209.67$, p<.001, Φ_c=.14, and secondary schoolchildren, $\chi^2(2, N=6939)=155.01$, p<.001, Φ_c=.15 (see Appendix 9.4, Table 9.34). FIS were significantly less likely to not worry or worry for 1-2 reasons (p=.008), and were significantly more likely to report worrying for >3 reasons (p=.008). FSS were significantly more likely than expected to not worry or were worried for only 1-2 reasons (p=.008), and significantly less likely than expected to worry for >3 reasons (p=.008). The reasons for worrying over the last 12 months and the association with FI are shown in Table 3.12. The strongest associations were observed in primary schoolchildren with FI who worried about money problems, drugs, alcohol or tobacco and travelling to school (see Table 3.12). In secondary schoolchildren with FI, the strongest associations were worrying about money problems, travelling to school, gambling and their disability (see Table 3.12).

Table 3.12: Association between FI and each reason for worrying

	Primary school				Secondary school			
Reason for worrying	χ^{2*}	Φ	OR	95% CI	χ^{2**}	Φ	OR	95% CI
Money problems (self/family)	1091.84	.32	36.36	26.16, 50.53	1011.74	.38	32.16	23.52, 42.97
Drugs, alcohol or tobacco	350.66	.18	14.27	9.94, 20.48	413.21	.24	12.16	9.02, 16.40
Travelling to school	-	.16	12.06	8.31, 17.52	495.96	.27	13.25	9.96, 17.63
My disability	-	.14	10.33	6.70, 15.24	461.27	.26	13.64	10.09, 18.44
Gambling[a]	-	-	-	-	-	.38	53.50	35.29, 81.12
Health problems (self/family)	217.46	.14	7.65	5.58, 10.50	323.70	.22	9.78	7.25, 13.18
Going places on my own	123.42	.11	5.27	3.80, 7.30	266.56	.20	7.30	5.55, 9.61
A separation	192.55	.14	7.41	5.33, 10.30	414.42	.24	10.76	8.15, 14.20
My parents/family	164.90	.13	6.12	4.47, 8.37	263.28	.20	9.75	6.70, 13.60
Pressure to do the same as friends	160.00	.12	6.45	4.63, 8.97	288.93	.20	7.83	5.94, 10.31
Being bullied	151.92	.12	5.75	4.21, 7.86	227.61	.19	6.44	4.89, 8.47
Death	143.93	.12	5.54	4.05, 7.57	174.81	.16	5.42	4.10, 7.15
School work	126.02	.11	5.22	3.79, 7.19	132.39	.14	4.89	3.64, 6.59
Appearance	98.21	.10	4.39	3.19, 6.03	109.78	.13	5.68	3.95, 8.18
Exams	84.03	.09	3.87	2.84, 5.28	64.41	.10	3.08	2.31, 4.11
Friendships	96.67	.10	4.29	3.13, 5.88	144.65	.14	5.59	4.09, 7.65
Other	35.01	.06	2.70	1.92, 3.80	88.89	.11	3.69	2.77, 4.93
Going university[a]	-	-	-	-	254.58	.19	7.37	5.56, 9.78
Getting an apprenticeship[a]	-	-	-	-	282.62	.20	9.50	6.93, 13.01
Getting a job[a]	-	-	-	-	173.32	.16	5.57	4.19, 7.40
Girlfriends/boyfriends[a]	-	-	-	-	169.95	.16	5.18	3.94, 6.80
Sex/pregnancy[a]	-	-	-	-	363.18	.23	11.80	8.61, 16.16

*df=1, p<.001, N=10456

**df=1, p<.001, N=6939

[a]question asked of secondary schoolchildren only

3.6.3.3. Life enjoyment

There was no association between FI and life enjoyment in primary schoolchildren, χ^2 (2, *N*=10454)=100.525, *p*<.001, Φ_c=.10, but a strong significant association was found in secondary school schoolchildren, χ^2 (2, *N*=6939) =346.00, *p*<.001, Φ_c=.22 (see Table 3.13). FIS were less likely to report enjoying life (*p*=.008), and more likely to report not enjoying life (*p*=.008). FSS were significantly more likely than expected to report enjoying life (*p*=.008), and less likely to not enjoy life (*p*=.008; see Appendix 9.4, Table 9.37).

Table 3.13: Life enjoyment according to FI in primary and secondary schoolchildren

Life enjoyment	Primary school						Secondary school					
	Enjoy		Unsure		Do not enjoy		Enjoy		Unsure		Do not enjoy	
FI	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]
Food secure	8339	81.03	1388	13.49	564	5.48	4805	71.50	1274	18.96	641	9.54
Food insecure	88	53.99	40	24.54	35	21.47	69	31.51	44	20.09	106	48.40
Total	8427	80.61	1428	13.66	599	5.73	4874	70.24	1318	18.99	747	10.77

[a] % within FI category

3.6.3.4. Feelings of safety at home

There was no association between FI and feelings of safety at home in primary schoolchildren, (*p*<.001, Φ=.10), but a strong association in secondary schoolchildren was evident, χ^2 (1, *N*=6939) = 310.16, *p*<.001, Φ=.21 (see Table 3.14). In secondary schoolchildren, the odds of not feeling safe at home was 11.11 times greater (95% CI [7.99, 15.46]) for FIS than FSS (see Appendix 9.4, Table 9.32).

Table 3.14: Frequency and percentage of primary and secondary schoolchildren reporting feelings of safety at home according to FI

Home safety	Primary school				Secondary school			
	Safe		Not safe		Safe		Not safe	
FI	n	%[a]	n	%[a]	n	%[a]	n	%[a]
Food secure	10056	97.70	237	2.30	6509	96.86	211	3.14
Food insecure	139	85.28	24	14.72	161	73.52	58	26.48
Total	10195	97.50	261	2.50	6670	96.12	269	3.88

[a] % within FI category

3.6.3.5. Bullying

There was no association between FI and being bullied in primary schoolchildren, $\chi^2(2, N=10456)=75.54$, $p<.001$, $\Phi_c=.09$, but a significant strong association was evident in secondary schoolchildren, $\chi^2(2, N=6939)=175.64$, $p<.001$, $\Phi_c=.16$ (see Table 3.15). FIS were significantly less likely than expected to not be bullied ($p=.008$), and more likely to report being bullied almost always/always ($p=.008$). FSS were significantly more likely to have never been bullied ($p=.008$), and less likely to be bullied almost always/always ($p=.008$; see Appendix 9.4, Table 9.33).

Table 3.15: Frequency and percentage of primary and secondary schoolchildren reporting bullying according to FI

Bullying	Primary school						Secondary school					
	Not bullied		Occasionally		Almost always/always		Not bullied		Occasionally		Almost always/always	
FI	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]
Food secure	6617	64.29	3042	29.55	634	6.16	4497	66.92	1722	26.37	451	6.71
Food insecure	71	43.56	56	34.36	36	22.09	87	39.73	67	30.59	54	29.68
Total	6688	63.96	3098	29.63	670	6.41	4584	66.06	1839	26.50	516	7.44

[a] % within FI category

3.6.3.6. Friendship satisfaction

There was no association between FI and feeling happy with the number of good friends primary schoolchildren had, $\chi^2(4, N=10456)=50.84$, $p<.001$, $\Phi_c=.07$. In secondary schoolchildren there was a significant strong association, $\chi^2(4, N=6939) = 353.12$, $p<.001$, $\Phi_c=.23$ (see Table 3.16). FIS were significantly more likely than expected to be very unhappy or ok with the number of good friends they had ($p=.005$), and less likely to be happy or very happy with the number of good friends they had ($p=.005$). FSS were significantly less likely than expected to be very unhappy or ok with the number of good friends ($p=.005$), and more likely to be happy and very happy with the number of good friends they had ($p=.005$; see Appendix 9.4, Table 9.31).

Table 3.16: Frequency and percentage of primary and secondary schoolchildren reporting friendship satisfaction according to FI

Friendship satisfaction	Primary school										Secondary school									
	Very unhappy		Unhappy		Ok		Happy		Very happy		Very unhappy		Unhappy		Ok		Happy		Very happy	
FI	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]
Food secure	173	1.68	244	2.37	1146	11.13	1863	18.10	6867	66.72	153	2.28	198	2.95	795	11.83	1810	26.93	3764	56.01
Food insecure	13	7.98	4	2.45	31	19.02	32	19.63	83	50.92	51	23.29	11	5.02	41	18.72	37	16.89	79	39.07
Total	186	1.78	248	2.37	1177	11.26	1895	18.12	6950	66.47	204	2.94	209	3.01	836	12.05	1847	26.62	3843	55.38

[a] % within FI category

Table 3.17: Association between FI and reason for bullying

Bullying reason	Primary school				Secondary school			
	χ^2*	Φ value	OR	95% CI	χ^2**	Φ value	OR	95% CI
Family income	94.69	.10	10.42	5.80, 18.70	-	**.25**	**17.99**	**12.41, 26.07**
FSMs	84.05	.09	15.57	7.09, 34.19	-	**.23**	**30.34**	**17.76, 51.83**
Personal hygiene	80.95	.09	9.61	5.26, 17.56	-	**.20**	**14.49**	**9.68, 21.69**
A disability/special need	92.32	.09	8.70	5.12, 14.77	**223.17**	**.18**	**10.54**	**7.25, 15.31**
Gender	88.49	.09	8.38	4.94, 14.23	**222.58**	**.18**	**11.37**	**7.64, 16.92**
Age	69.61	.08	6.60	3.96, 11.00	-	**.17**	**14.24**	**8.19, 22.98**
Family members	44.95	.07	5.15	3.02, 8.78	**198.38**	**.17**	**9.69**	**6.61, 14.21**
Gay (self/family)	**134.72**	**.11**	**8.77**	**5.65, 13.62**	**175.55**	**.16**	**7.54**	**5.24, 10.68**
Religion	21.20	.05	4.78	2.29, 9.97	-	**.16**	**11.44**	**7.29, 17.96**
Height	13.98	.04	2.51	1.52, 4.12	**148.02**	**.15**	**6.52**	**4.62, 9.22**
Appearance	38.89	.06	3.32	2.23, 4.94	**138.58**	**.14**	**4.71**	**3.55, 6.24**
Size (overweight/underweight)	40.03	.06	3.65	2.38, 5.60	**124.44**	**.13**	**4.89**	**3.60, 6.64**
Skin colour, race, culture	24.59	.05	3.62	2.10, 6.25	**90.83**	**.11**	**5.46**	**3.70, 8.06**
Other	4.84	.02	1.55	1.05, 2.28	37.45	.07	2.57	1.88, 3.51
No reason	4.26	.02	1.61	1.02, 2.53	33.16	.07	2.81	1.95, 4.05

*df=1, p<.05, N=10456
**df=1, p<.001, N=6939
Bold indicates a **significant** association is present

3.6.3.7. Number of reasons for bullying

There was a significant moderate association between FI and the number of reasons for being bullied reported by primary schoolchildren, χ^2 (2, N=10456) = 136.23, p<.001, Φ_c=.11, and a significant strong association in secondary schoolchildren χ^2 (2, N=6939) = 208.96, p<.001, Φ_c=.17 (see Appendix 9.4, Table 9.35). FIS were significantly less likely (p=.008) to report not being bullied, and more likely to report that they were bullied for >3 reasons (p=.008). FSS were significantly more likely than expected to report not being bullied (p=.008), and less likely to be bullied for >3 reasons (p=.008). The reasons for being bullied over the last 12 months and the association with FI was explored and is displayed in Table 3.17. In primary schoolchildren there was a significant moderate association between FI and reporting being bullied for being gay (see Table 3.17). In secondary schoolchildren, the strongest associations were observed in FIS who were more likely to report being bullied because of their family income, receiving FSMs, personal hygiene, a disability/special need, gender, age, family members, being gay or their religion (see Table 3.17).

3.6.3.8. Sleep

There was no association between FI and school-night sleep in primary χ^2(2, N=10456)=17.13, p<.001, Φ_c=.04, or secondary schoolchildren χ^2(2, N=6939)=67.98, p<.001, Φ_c=.10 (see Appendix 9.4, Table 9.36).

3.6.3.9. Self-harm

There was a significant moderate association between FI and self-harm in secondary schoolchildren, χ^2(1, N=6939)=151.12, p<.001, Φ=.15 (Table 3.18). The odds of self-harming were 4.78 times greater (95% CI [3.64, 6.28]) for FIS than FSS (see Appendix 9.4, Table 9.38).

Table 3.18: Frequency and percentage of secondary schoolchildren reporting self-harm according to FI

Self-harm	No		Yes	
FI	n	%[a]	n	%[a]
Food secure	5380	80.06	1340	19.94
Food insecure	100	45.66	119	54.34
Total	5480	78.97	1459	21.03

[a] % within FI category

3.6.4. The association between habitual breakfast consumption and food insecurity

In primary schoolchildren there was no association between HBC and FI, $\chi^2(2, N=10456)=21.83$, $p<.001$, $\Phi_c=.05$ (see Table 3.19). In secondary schoolchildren there was a significant moderate association between HBC and FI, $\chi^2(2, N=6939)=80.35$, $p<.001$, $\Phi_c=.11$. RBCs were significantly more likely to be FIS ($p=.008$), and less likely than expected to be FSS ($p=.008$). FBCs were significantly more likely than expected to be FSS ($p=.008$), and less likely to be FIS ($p=.008$; see Appendix 9.5, Table 9.39).

Table 3.19: Frequency and percentage of primary and secondary schoolchildren reporting FI according to HBC

FI	Primary school				Secondary school			
	Food secure		Food insecure		Food secure		Food insecure	
HBC	n	%[a]	n	%[a]	n	%[a]	n	%[a]
Rare	426	95.95	18	4.05	1320	93.29	95	6.71
Occasional	597	97.71	4.43	2.29	1020	96.50	37	3.50
Frequent	9270	98.61	131	1.39	4380	98.05	87	1.95
Total	10293	98.44	163	1.56	6720	96.84	219	3.16

[a] % within FI category

3.6.5. The association between habitual breakfast consumption, food insecurity and self-harm

In secondary schoolchildren there was no association between HBC and FI in those who do not self-harm, $\chi^2(2, N=6939)=14.68$, $p<.01$, $\Phi_c=.05$ (see Table 3.20). There was a significant moderate association between HBC, FI and self-harm, $\chi^2(2,$

N=6939)=30.29 *p*<.001, Φ_c=.14. Those who self-harmed were significantly more likely to experience FI and rarely consume breakfast (*p*=.008). Also, those who self-harmed and were food insecure were less likely to be FBCs (*p*<.008; see Appendix 9.6, Table 9.40).

Table 3.20: Frequency and percentage of secondary schoolchildren reporting self-harm according to HBC and FI

		FI			
		Food secure		Food insecure	
	HBC	n	%[a]	n	%[a]
Do not self-harm	Rare	896	96.97	28	3.03
	Occasional	788	97.40	21	2.60
	Frequent	3696	98.64	51	1.36
Self-harm	Rare	424	86.35	67	13.65
	Occasional	232	93.55	16	6.45
	Frequent	684	95.00	36	5.00

[a] % within in FI category

3.7. Interim summary of results

The findings from this study can be summarised as follows:

1. **Frequent breakfast consumption was related to better psychological wellbeing.**

- FBCs in primary and secondary school were:
    - more likely to feel happy, confident and enjoy life. This was not observed in those who rarely ate breakfast.
    - more likely to sleep the recommended number of hours. This was not found in those who rarely or occasionally ate breakfast.
    - These associations were present in primary schoolchildren but were stronger in secondary schoolchildren.
- FBCs in secondary school were:
    - less likely to report feeling sad, lonely, stress/anxiety and angry. This was not observed in those who rarely ate breakfast.
    - more likely to report being better able to cope with sadness, stress/anxiety and anger, whereas emotional coping was reportedly more difficult for RBCs.

  - less likely to self-harm, whereas those who rarely ate breakfast were more likely to report self-harming.
  - less likely to worry about a range of aspects of their life (e.g. appearance, relationships, finances and health), whereas those who rarely ate breakfast were more likely to worry about these issues.
  - more likely to be satisfied with their friendships and less likely to be bullied for their size. This was not observed in those who rarely ate breakfast.
- There was no association between HBC and negative emotional experiences, emotional coping, sleep, home safety, bullying and worrying in primary schoolchildren.

2. FI was associated with poor psychological wellbeing.

- Primary and secondary schoolchildren who were food insecure were:
  - more likely to feel lonely, whereas FSS were less likely.
  - more likely to report being bullied because of being gay.
  - more likely to worry about money problems and travelling to school.
  - These associations whilst present in primary schoolchildren were stronger in secondary schoolchildren.
- Secondary schoolchildren who experienced FI were:
  - more likely to experience negative emotions (loneliness, sadness, anger and stress/anxiety), report not being able to cope with these feelings and were more likely to self-harm.
  - less likely to report positive emotions (happiness and confidence) or to enjoy life.
  - more likely to be unhappy with their friendships and be bullied. Those who were bullied were more likely to be bullied due to finances, personal relations, certain socio-demographics (e.g. age, gender, FSM eligibility and family income) or a personal reason.
  - more likely to self-harm and rarely have breakfast.
- In primary schoolchildren, there was no association between FI and emotional coping, home safety, sleep, and friendship satisfaction.

3. HBC was associated with FI only in secondary schoolchildren.

3.8. Discussion

3.8.1. Habitual breakfast consumption and psychological wellbeing

In line with hypothesis 1, HBC was significantly associated with psychological wellbeing in both primary and secondary schoolchildren, with schoolchildren frequently consuming breakfast reporting better psychological wellbeing. This finding is consistent with cross-sectional research in adolescents (Lien, 2007), and intervention studies in children and adolescents demonstrating acute effects of breakfast consumption on mood and mental health (Defeyter & Russo, 2013; Smith, 2010). The findings from intervention studies suggest a short-term causal relationship between breakfast consumption vs. no breakfast and enhanced psychological wellbeing on the same morning of consumption (Defeyter & Russo, 2013; Smith, 2010). Other cross-sectional studies in adolescents have demonstrated that breakfast composition is associated with better psychological wellbeing and mental health (Ferrer-Cascales et al., 2018; O'Sullivan et al., 2008). These studies report that higher quality breakfast (as defined by food that is from three of more food group) is associated with fewer reports of internalising and externalising difficulties (O'Sullivan et al., 2008), and better health related of quality of life which includes psychological wellbeing (Ferrer-Cascales et al., 2018). The findings of the current study indicate that irrespective of breakfast quality, HBC in children and adolescents is associated with better psychological wellbeing compared to rarely eating breakfast.

Analysis of the MHMS data showed frequent breakfast consumption was associated with a greater number of psychological wellbeing domains in secondary schoolchildren compared to primary schoolchildren. FBCs in secondary school were more likely to report friendship satisfaction compared to RBCs. Research suggests that good quality friendships are associated with better psychological wellbeing in children and adolescents (Bakalım & Taşdelen Karçkay, 2016; Schwartz-Mette, Shankman, Dueweke, Borowski, & Rose, 2020). Peers have shown to influence the breakfast eating behaviour of adolescents, such that adolescents are more likely to consume breakfast if their best friend or friendship group also eat breakfast (Bruening et al., 2012). Peers exert a significant influence in adolescence and this may facilitate the association between friendship satisfaction and frequent breakfast consumption in secondary schoolchildren observed in the present study. Social breakfast consumption, such as breakfast in a school breakfast club environment is associated

with increased friendship quality in children (Defeyter et al., 2015), and in adults, eating meals with others is related to happiness and life satisfaction compared to eating alone (Dunbar, 2017). Social eating and interaction during breakfast may be associated with breakfast consumption and friendship quality, however the social context of breakfast consumption was not measured in the cross-sectional MHMS study reported here.

FBCs in secondary school were less likely to self-harm than RBCs in the MHMS survey analysis. This difference in self-harm according to breakfast consumption may be associated with emotional coping ability, as FBCs reported better ability to cope with negative emotions compared to those who rarely ate breakfast. This finding is consistent with studies reported above linking breakfast consumption to better mental health (Lien, 2007). The MHMS analyses found that the percentage of self-harming behaviours in secondary schoolchildren (21.03%) was comparable with data from a national survey (25.5%; NHS Digital, 2018b), indicating that the sample was representative of British secondary schoolchildren. The question that explored self-harm behaviours was not asked of primary schoolchildren and therefore it remains unclear if the findings also relate to younger schoolchildren.

3.8.2. Food insecurity and psychological wellbeing

As predicted in hypothesis 2, FI was significantly associated with psychological wellbeing, such that primary and secondary FIS reported poorer psychological wellbeing compared to FSS. This finding has been observed in previous research studies (Bruening et al., 2017; Shankar-Krishnan et al., 2020; Shankar et al., 2017). These studies suggest an association between FI and behavioural and emotional difficulties across the lifespan (Bruening et al., 2017; Shankar et al., 2017). Adolescents with FI also report lower self-esteem and greater levels of stress compared to those who are food secure (Shankar-Krishnan et al., 2020). FI can be a distressing experience, for example, anxiety and worry can arise from feelings of hunger and uncertainty about food supply (Cook, 2013). Difficult emotions experienced during FI may facilitate the association between FI and poor psychological wellbeing found in the study reported here.

Loneliness was associated with FI in the present analysis and adds support to the small number of studies that also demonstrate this finding. American adults who report

loneliness are more likely to be food insecure (Hunt, Benjamins, Khan, & Hirschtick, 2019). A qualitative study in the USA pre-COVID-19 lockdown found that some 7-14-year-olds who were food insecure reported loneliness (Leung et al., 2020). Reasons for loneliness included feeling isolated and unable to share FI experiences with others (Leung et al., 2020). Such feelings may prevent schoolchildren openly reporting their FI and could explain the small number of schoolchildren who identified as food insecure in the MHMS analysis (1.56% of primary and 3.16% of secondary schoolchildren), compared to the much larger 10% of British children and adolescents that are estimated to live in a household that experiences severe FI (Pereira et al., 2017).

The way in which FI was measured in the MHMS survey may also explain the low rates of FI. The survey utilised one question to assess FI, however FI is a multi-dimensional phenomenon and single item measures can underestimate FI (McKay, Haines, & Dunn, 2019). Some schoolchildren who experienced FI may not be recognised as food insecure in the MHMS survey. The FI question specifically asked if schoolchildren were 'worried about money for food running out'. Although definitions of FI often incorporate the financial aspect of food accessibility, this focus undermines other components of FI such as food quality, food quantity, and social features (O'Connor et al., 2016; Radimer et al., 1990).

An association between FI and financial reasons was found within the analysis, such that FIS reported worry about money problems and FIS in secondary school were more likely to report being bullied for their family income and FSM eligibility. This association between FI and money related questions is not surprising because FI is more likely to occur in families with low income or fewer financial resources (Chang et al., 2014; Prayogo et al., 2018; Tingay et al., 2003). The findings of the present study may also be explained by the monetary focus of the FI question in the MHMS survey, and suggests that despite using one item to measure FI, it was sensitive enough to identify some schoolchildren who worried about financial access to obtain food.

3.8.3. Habitual breakfast consumption and food insecurity

In support of hypothesis 3, HBC was associated with FI, but only in secondary schoolchildren. RBCs in secondary school were more likely to experience FI compared to those who frequently ate breakfast. Skipping breakfast is a common

behaviour in FI families (O'Dea & Caputi, 2001; Widome, Neumark-Sztainer, Hannan, Haines, & Story, 2009) and in adolescents compared to younger children (Gibney, Barr, Bellisle, Drewnowski, Fagt, Livingstone, et al., 2018). Breakfast consumption may be protected in younger children living in food insecure environments because parents may attempt to shield a younger child from the effects of FI more so than adolescent offspring, and parents may do so by skipping meals themselves to avoid their child going hungry (Coleman-Jensen, McFall, & Nord, 2013; Fram et al., 2011). The lack of an association between HBC and FI in primary schoolchildren may reflect differences in parental behaviour towards children compared to adolescents.

3.8.4. Limitations

The use of secondary data in the form of the MHMS survey was a major limitation of this study. The survey was designed for the purpose of trend data to support council decision making and service provision planning. The survey is not designed to address specific research questions and some question phrasing, response formats and coding vary between primary and secondary schoolchildren which is problematic. The survey does not include validated items to measure psychological wellbeing or FI, and therefore the questions which were analysed here were selected to examine the association of different aspects of psychological wellbeing (e.g. emotions, peer relations) with FI and HBC. The absence of a validated psychological wellbeing scale also means that the current study could not classify respondents in terms of non-clinical or clinical psychological difficulties.

Another limitation of the MHMS survey is that it is not possible to track schoolchildren over time due to lack of data linkage and preservation of anonymity. The MHMS is completed annually and it would be useful to examine changes in HBC, psychological wellbeing and FI over school years, and data linkage would majorly strengthen the veracity of the data. If the survey data could allow individual schoolchildren to be tracked across their school years, longitudinal associations could be examined between HBC, psychological wellbeing and FI. This longitudinal analysis could provide further understanding of the increased associations found in secondary schoolchildren compared to primary schoolchildren in the cross-sectional MHMS study reported here.

3.8.5. Conclusion

The data presented in this chapter suggests that there are some associations between HBC, FI and psychological wellbeing based on a large cross-sectional survey of children and adolescents. Since the MHMS survey failed to employ validated measures of psychological wellbeing and FI, and did not ask some questions of younger respondents, it is important to examine children's experiences of FI and the association with psychological wellbeing using appropriate questionnaires. This is attempted in Study 2.

4. Study 2: The association between HBC, psychological wellbeing, and FI in 9–11-year-olds: a cross-sectional study

4.1. Introduction

Prior to the COVID-19 pandemic, the incidence of FI and poor psychological wellbeing in children was increasing (see Ch. 1). However, there is a lack of research exploring the potential influence of breakfast consumption upon these factors. Furthermore, research utilising self-report measures to explore psychological wellbeing and FI in younger children aged <11 years has not often been conducted. Study 1 (Ch. 3) examined the association between HBC, psychological wellbeing and FI in children and adolescents. However, a major limitation of the MHMS survey is that it does not include validated measures of psychological wellbeing or FI. The study presented in this chapter aims to address these limitations by using validated self-report measures of psychological wellbeing and FI in a sample of 9–11-year-old children. Self-report measures of psychological wellbeing are usually validated for children >8 years and children 9–11-years-old demonstrate an understanding FI using the CFSSM (Fildes, personal communication, August 12, 2020; see section 1.3.1.3). Therefore, children aged 9-11 years old were the focus of this study and the subsequent studies in this thesis as their direct experiences of psychological wellbeing and FI could be examined using suitable measures. This is the first study to the author's knowledge to explore the association between HBC, psychological wellbeing and FI using validated measures of psychological wellbeing and FI in children ages ≤11 years. The study reported in this chapter addresses aim 1 of this thesis (see Ch. 2).

4.2. Study aims

1) To examine the difference in psychological wellbeing according to HBC in children.
2) To consider the association between FI upon differences in psychological wellbeing and HBC in children.

4.3. Hypotheses

It was hypothesised that:

1) There will be a difference in psychological wellbeing based on HBC.
2) There will be a difference in psychological wellbeing and FI. Children who experience FI will report poorer psychological wellbeing than those who do not report FI (see section 1.5.1 for evidence).

4.4. Methodology

4.4.1. Participants

Participants were males and females, aged 9-11 years (*M*=10.04 years, *SD*=0.35), in school years 5 and 6 in two state schools in Leeds. Table 4.1 shows the demographic characteristics and FSM eligibility of the sample. A total of 302 participants from the two schools were eligible to take part in the study. From these, 58 consent forms (19.2%) were received and 47 participants (response rate=15.6%) completed the questionnaire. Both schools were large primary schools and had higher than national average FSM eligibility (25 and 62% compared to the national average 17.7%, Department for Education, 2020d). A further four schools expressed an interest to participate and consent forms were received, however, data collection in these schools was not possible due to COVID-19 related school closures.

Table 4.1: Demographic characteristics and FSM eligibility of the study sample

	n (%)
Gender	
Male	21 (44.68)
Female	25 (53.19)
Other	0
Prefer not to say	1 (2.13)
Ethnicity	
White	31 (65.96)
Asian	4 (8.51)
Black	2 (4.26)
Mixed	4 (8.51)
Other	6 (12.77)
FSMs	
Eligible	14 (29.79)
Not Eligible	22 (46.81)
Don't know	11 (23.40)
Total	**47 (100)**

4.4.2. Inclusion and exclusion criteria

All participants recruited met the following inclusion and exclusion criteria.

4.4.2.1. Inclusion criteria

- Male or female aged 9-11 years in school years 5 and 6.
- Ability to follow verbal and written instructions in English.
- Ability to understand and/or complete the questionnaires with support from school staff.

4.4.2.2. Exclusion criteria

- Acute illness, feeling unwell, and/or circumstances (e.g. holiday) on the day of the school accessing the online questionnaire link.

4.4.3. Design

The study was a cross-sectional survey. All of the questionnaire data were collected in the school environment via the online Qualtrics Survey Software (Qualtrics, Provo, UT, USA) during a normal school day.

4.4.4. Measures

4.4.4.1. Socio-demographic measures

Socio-demographic information on age and gender was gathered using questions similar to the MHMS survey (see Appendix 9.8).

4.4.4.2. Habitual breakfast consumption

HBC was assessed via the same question used in the MHMS survey (see Appendix 9.8) which had 5 response categories: (never (0 days), rarely (1-2 days), some days (2-3 days), most days (4-6 days) and everyday (7 days)).

4.4.4.3. Psychological wellbeing

Psychological wellbeing was assessed using two validated measures: KIDSCREEN-52 (Ravens-Sieberer et al., 2005; see Appendix 9.7) and Me and My Feelings (M&MF; Deighton et al., 2013; see Appendix 9.10).

4.4.4.3.1. KIDSCREEN-52

The KIDSCREEN-52 (Ravens-Sieberer et al., 2005) questionnaire assesses subjective health-related quality of life in children aged 8-18 years. KIDSCREEN-52 contains 52 questions assessing ten dimensions: 1) physical wellbeing, 2) psychological wellbeing, 3) moods & emotions, 4) self-perception, 5) autonomy, 6) parent relation

& home life, 7) financial resources, 8) social support & peers, 9) school environment, and 10) social acceptance (bullying). Items are scored on a 5-point Likert scale and the measure takes 10-15 minutes to complete. The self-report measure was originally validated in a European sample, which included the UK. KIDSCREEN-52 has good psychometric properties and is reported to be a valid and reliable measure (α=0.78-0.83; Ravens-Sieberer et al., 2005). Registration to use the questionnaire for research purposes was obtained from the KIDSCREEN group (Appendix 9.8). Higher scores indicate higher quality of life within each domain, with a population norm mean=50 (*SD*=10), and scores below this indicates lower quality of life on each KIDSCREEN domain.

4.4.4.3.2. Me & My Feelings

The M&MF (Deighton et al., 2013) questionnaire is a 16-item self-report measure which assesses emotional and behavioural difficulties in children ≥8 years. The measure was originally developed in England and validated in a large sample of English schoolchildren. Items are scored on a 3-point Likert scale and the measure takes 10 minutes to complete. M&MF has good internal consistency (behavioural difficulties α=0.78-0.80; emotional difficulties: α=0.72-0.77), construct, convergent and discriminant validity (Deighton et al., 2013). The M&MF can be utilised to obtain self-reports of mental health in both community and clinical samples (Patalay et al., 2014).

4.4.4.4. Food insecurity

4.4.4.4.1. Child Food Security Survey Module

FI status was measured using the CFSSM (Connell, Nord, Lofton, & Yadrick, 2004; see Appendix 9.11). This 9-item measure assesses the FI experiences in the household directly from the perspective of adolescents aged ≥12 years. Items are scored on a 3-point Likert scale and the measure takes 10 minutes to complete. Higher total scores indicate more severe levels of food insecurity. The measure can accurately categorise food security (scores 0-1) and provides an ordinal measure of FI (scores 2-9). The measure has been validated in children aged ≥12 years in North America (Connell et al., 2004). It has shown good reliability (0.69) and demonstrated internal consistency with all items fitting a Rasch model. Connell et al. (2004) have questionned the reliability of the measure in children aged <12 years. However, as discussed in

Chapter 1 (see section 1.3.1.3), research has successfully utilised the measure or adapted versions in children aged <12 years (Maia et al., 2020; Sharkey et al., 2012). Since there are currently no other validated self-report measures of FI for children aged <12 years, the CFSSM was utilised in the current study.

4.4.5. Procedure

Key contacts in schools were made aware of the procedures and requirements for the study and information on how to access the online questionnaire link. Participants completed the questionnaires independently, but support was available from school staff if required. The researcher was not present during data collection. All questionnaires were administered during February and early March 2020, prior to the first COVID-19 lockdown. Questionnaire completion took between 30-40 minutes. Participants were prompted to respond to questions before being able to proceed to the next question and therefore there were no missing data.

4.4.6. Ethical considerations

The study received ethical approval from the University of Leeds, School of Psychology Research Ethics Committee (reference number: PSC-873; date: 16.12.19; and PSYC-13, 02.04.20[2]). A process of informed consent was utilised to determine whether potential participants and their parents/guardians consented for participants to take part in the study. Primary schools within Leeds were informed of the study via email and once interest to participate was expressed the schools were briefed about the research by the researcher. Schools were provided with the parent/guardian information sheet, child information sheet and consent form to send home with potential participants (Appendix 9.12). Parents/guardians were requested to return a form to the teachers, enclosed with the letter to indicate informed consent to take part in the study. Participants were requested to provide verbal consent to their teacher before accessing the online questionnaire link. Participants and their parents/guardians were informed in the information sheet that participants could withdraw at any point before or during the study without giving a reason. Schools collated all signed consent forms and sent them to the researcher. An inclusion log was created (a list of participants names with corresponding unique participant numbers). The inclusion log was stored in a separate file from the study questionnaire

[2] This ethics approval date refers to an amendment to the version of the KIDSCREEN questionnaire utilised (KIDSCREEN-52 used instead of KIDSCREEN-27).

data to maintain anonymity of survey responses. This log was sent to the key contact in each school and the research brief was shared with them in person or via email.

If a participant withdrew part way through completing the questionnaire, any data collected were excluded from the analysis. Parents were informed via the information sheet that if their child participated in the study, they could request the withdrawal of their information up until completion of work for publication (03.04.2020), after this date if they wanted to remove their child's data from the study to contact the researcher. Participants who completed the questionnaire received a £5 gift voucher for their participation. All information gathered was treated as strictly confidential and questionnaire data were anonymised. The consent forms contained personal data (e.g. names of participants) and therefore anonymised data from the questionnaires and corresponding personal data from consent forms were stored separately. Anonymisation of participants' questionnaire data were carried out using unique participant numbers. Data were coded by unique participant numbers in data sets, so no personal details were stored alongside the study questionnaire data. All data were stored on the secure university drive accessible only to the research team. Key contacts in schools informed any adverse event because of the study to the researcher. If required, an adverse events form was completed (Appendix 9.13), the event was reported to the ethics committee and followed up until resolved. No such adverse events took place during the study.

4.4.7. Statistical analysis

Data were entered and checked in Excel before analysis using SPSS version 27 (IBM Corp., Armonk, NY). To assess the difference in psychological wellbeing scores according to HBC (between-subjects factor with 3 levels[3], everyday (7 days), most days (4-6 days) and some days (2-3 days)), one-way Analysis of Covariance (ANCOVA) was performed with FI score included as a covariate. Psychological wellbeing was measured using: 1) M&MF emotional subscale, 2) M&MF behavioural subscale, 3) M&MF total, and KIDSCREEN domains 4) physical wellbeing, 5) psychological wellbeing, 6) moods & emotions, 7) self-perception, 8) autonomy, 9) parent relation & home life, 10) finances, 11) social support & peers, 12) school, 13)

[3] Participants endorsed only three of the five HBC categories, everyday, most days and some days. No participant reported rarely (1-2 days) or never (0 days) consuming breakfast.

bullying. Homogeneity of variance was checked using Levene's test, and standardized residuals were inspected for outliers (Std. Residual >± 3) for each analysis. If Levene's test was significant but the residual analysis did not identify any outliers, transformations of the data were not deemed necessary (Tabachnick & Fidell, 2007). Homogeneity of regression lines was examined by including the interaction term (covariate*factor) in the ANCOVA and the term was removed from the model if the interaction was non-significant and if its removal increased the proportion of the variance explained by the final model. The final model that was retained was the model that explained the greatest proportion of variance. The adjusted R^2 (R^2_{adj}) was used to measure how much of the variance in psychological wellbeing the model accounted for, with a R^2 value >.10 explaining an adequate amount of variance (Falk & Miller, 1992). Significance was assessed at $\alpha<.05$. Main effects were explored using Sidak corrected post-hoc tests (Field, 2017). Eta squared (η^2) was used to estimate effect size, and interpreted as >.01 small, >.09 medium and .>25 large (Tabachnick & Fidell, 2007).

4.5. Results

4.5.1. Access to food in the study sample

Table 4.2 displays the frequency and percentage of the study sample for HBC and FI category and indicates that the majority of the sample consumed breakfast everyday, and 21.28% of the sample were food insecure. When considering the association of FSM eligibility with FI (see Appendix 9.17, Table 9.45), 5 participants with FI were eligible for FSMs, and 4 food insecure participants were not eligible for FSMs. The cell occupancy was too small to test the significance of the association between FSM eligibility and FI status.

Table 4.2: Frequency and percentage for HBC and FI in the study sample

HBC	**n (%)**
Everyday	33 (70.21)
Most days	7 (14.89)
Some days	7 (14.89)
FI	
Food insecure	10 (21.28)
Food secure	37 (78.72)
Total	47 (100)

4.5.2. The effects of HBC and FI on psychological wellbeing

The ANCOVA models which examined the effects of HBC and FI on psychological wellbeing are shown in Appendix 9.14 and 9.15. The interaction between HBC*FI was non-significant. Therefore, this interaction was removed from relevant model if its removal increased the proportion of the variance explained by the final model. The final ANCOVA models discussed below are also displayed in Appendix 9.16.

4.5.2.1. M&MF

There was no significant main effect of HBC on total M&MF scores, $F(2,43)=2.25$, $p=.12$, $\eta^2=.10$. The covariate FI also showed a non-significant trend, $F(1,43)=3.19$, $p= .08$, $\eta^2=.07$. Figure 4.1 displays the estimated marginal means for total M&MF scores by HBC. The model including the covariate accounted for 12.5% ($R^2_{adj}=.125$) of the variance in M&MF total scores.

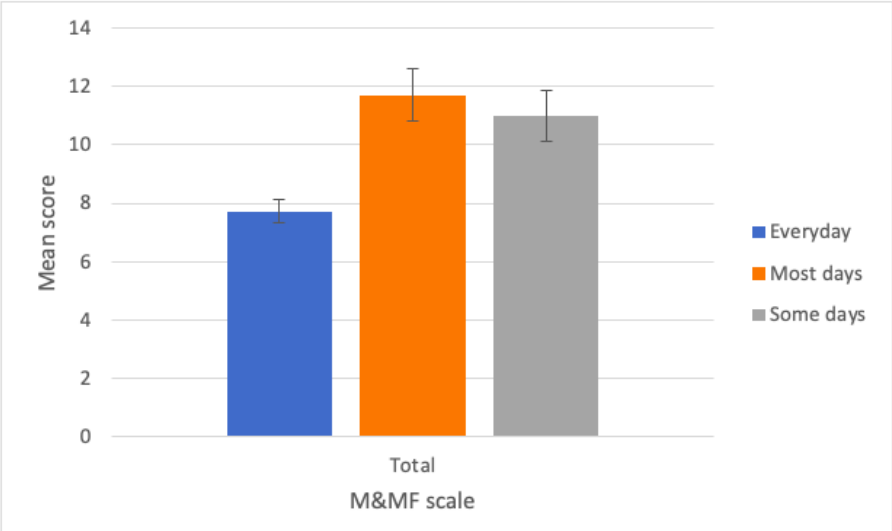

Figure 4.1: Total M&MF estimated marginal means by HBC category.

Figure 4.2 shows the estimated marginal means for M&MF behavioural and emotional scores by HBC, adjusted for the covariate FI. It is clear in Figure 4.2 that children who ate breakfast everyday had lower scores on the emotional subscale than children who ate breakfast less frequently. However, there was no significant main effect of HBC on the M&MF emotional subscale, $F(2,43)=2.76$, $p=.08$, $\eta^2=.12$. FI failed to reach conventional significance, $F(1,43)=3.80$, $p= .06$, $\eta^2=.08$. The model with the covariate accounted for 15.8% ($R^2_{adj} =.158$) of the variance in M&MF emotional scores. The effect size for HBC was medium and was small to medium for FI. There was no significant main effect of HBC on the M&MF behavioural subscale,

$F(2,43)=.89$, $p=.42$, $\eta^2=.04$, $R^2_{adj}=.005$. The covariate FI was not significant, $F(1,43) = .92$, $p= .34$, $\eta^2=.02$.

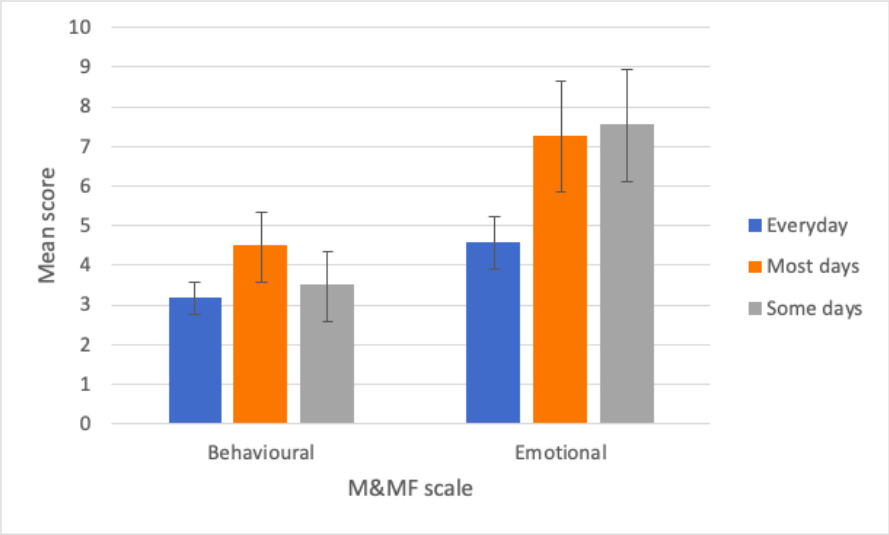

Figure 4.2: M&MF behavioural and emotional subscale estimated marginal means by HBC category.

4.5.2.2. KIDSCREEN-52

Figure 4.3 displays the estimated marginal mean scores for each KIDSCREEN-52 subscale and the ANCOVA outputs for each subscale are reported in Appendix 9.15.

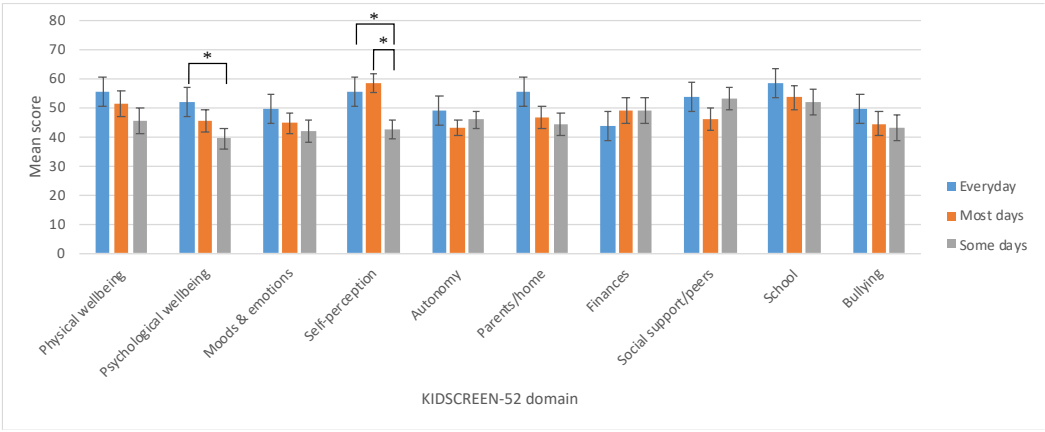

Figure 4.3: KIDSCREEN-52 estimated marginal means for each domain by HBC category.

4.5.2.2.1. Psychological wellbeing subscale

There was a significant main effect of HBC on the psychological wellbeing subscale, with a medium effect size, $F(2,43) = 5.21$, $p = .01$, $\eta^2 = .20$. FI was not a significant covariate, $F(1,43) = .30$, $p = .59$, $\eta^2 = .01$, but was retained in the model which accounted for 16.1% ($R^2_{adj} = .161$) of the variance in psychological wellbeing subscale scores. Sidak corrected post-hoc tests indicated that those consuming breakfast everyday ($M = 52.14$) had significantly greater psychological wellbeing (i.e. happy, perceive life positively, see Appendix 9.7, for questions on this subscale) than those who had breakfast on some days ($p = .01$, $M = 39.55$), but not most days ($p = .31$, $M = 45.57$). The psychological wellbeing estimated marginal mean for those consuming breakfast some days was lower than the expected population norm mean.

4.5.2.2.2. Self-perception subscale

There was a significant main effect of HBC on the self-perception subscale, with a large effect size, $F(2,43) = 8.41$, $p < .001$, $\eta^2 = .28$. FI was also a significant covariate, $F(1,43) = 8.06$, $p = .007$, $\eta^2 = .16$. The model with the covariate retained accounted for 34.8% ($R^2_{adj} = .348$) of the variance in self-perception subscale scores. FI was negatively correlated with the self-perception subscale, $r(45) = -.39$, $p = .007$, such that higher FI was associated with lower self-perception score. Sidak corrected post-hoc tests indicated that those consuming breakfast everyday ($M = 55.66$) had significantly greater self-perception (i.e. happy with appearance, better self-confidence and self-esteem, see Appendix 9.7, for questions on this subscale) than those who had breakfast on some days ($p = .002$, $M = 42.77$), but not most days ($p = .76$, $M = 58.71$). Those consuming breakfast most days had significantly greater self-perception than those who had breakfast on some days ($p = .002$), but not everyday ($p = .76$). The self-perception estimated marginal mean for those consuming breakfast some days was lower than the expected population norm mean.

4.5.2.2.3. Parents/home subscale

There was no main effect of HBC on the parent/home subscale, $F(2,41) = 1.72$, $p = .19$, $\eta^2 = .08$. FI was a significant covariate, $F(1,41) = 4.84$, $p = .03$, $\eta^2 = .11$. The interaction was non-significant, $F(2,41) = 2.11$, $p = .13$, $\eta^2 = .09$. However, the model with the covariate and interaction retained accounted for 23.8% ($R^2_{adj} = .238$) of the variance in parents/home subscale scores. The correlation between FI and parents/home subscale

did not reach conventional significance, $r(45)=-.27$, $p=.06$, but showed a negative trend, such that higher FI was related with lower parents/home subscale score

4.5.2.2.4. Mood and emotions subscale

There was no significant main effect of HBC on the mood and emotions subscale, despite a medium effect size, $F(2,43)=2.04$, $p=.14$, $\eta^2=.09$. The covariate FI was significant, $F(1,43)=5.60$, $p=.02$, $\eta^2=.12$. The model with the covariate retained accounted for 16.4% ($R^2_{adj}=.164$) of the variance in mood and emotion scores. FI was negatively correlated with the mood and emotions subscale, $r(45)=-.38$, $p=.008$, such that higher FI was associated with lower mood and emotions subscale score.

4.5.2.2.5. Bullying subscale

There was no significant main effect of HBC on the bullying subscale, $F(2,43)=1.41$, $p=.26$, $\eta^2=.06$. FI was a significant covariate, $F(1,43)=7.00$, $p=.01$, $\eta^2=.14$. The model accounted for 16.5% ($R^2_{adj}=.165$) of the variance in bullying scores. FI was negatively correlated with the bullying subscale, $r(45)= -.41$, $p=.004$, such that higher FI was associated with lower bullying subscale score.

4.5.2.2.6. Finances subscale

There was no significant main effect of HBC on the finances subscale, $F(2,41)=.43$, $p=.65$, $\eta^2=.02$. FI was a significant covariate, $F(1,41)=11.53$, $p=.002$, $\eta^2=.22$. The interaction (HBC*FI) was non-significant $F(2,41)=1.65$, $p=.20$, $\eta^2=.08$, but the model with the interaction term and covariate retained accounted for 15.5% ($R^2_{adj}=.155$) of the variance in finances scores. FI was negatively correlated with finances subscale, $r(45)= -.42$, $p=.004$, such that higher FI was associated with lower finances subscale score.

There was no significant main effect of HBC on the autonomy, physical wellbeing, school, and social support/peers subscales (largest: $F\leq1.99$, $p\leq.78$). The covariate FI was also not significant for these subscales (largest: $F\leq2.39$, $p\leq.64$). The interaction term was also not significant for the models that retained this and accounted for a greater proportion of variance (largest: $F\leq2.45$, $p\leq.22$). The ANCOVA models are displayed in Appendix 9.16.

4.5.3. The difference in psychological wellbeing according to FSM eligibility

There was no significant difference in psychological wellbeing scores on the KIDSCREEN-52 domains and M&MF subscales between those who were eligible for FSMs and those who were not eligible for FSMs (see Appendix 9.18; Table 9.46).

4.5.4. Interim summary of results

1. Children who consumed breakfast everyday had significantly better psychological wellbeing than those who had breakfast some days.
2. There was a trend for less emotional difficulties reported in those who had breakfast everyday, but no difference in behavioural difficulties according to breakfast consumption.
3. Children who consumed breakfast everyday had significantly better self-perception than those who reported that they ate breakfast on some days.
4. Children who had higher FI scores also reported more difficulties in mood and emotions, finances, and bullying.

4.6. Discussion

4.6.1. Habitual breakfast consumption and psychological wellbeing

A significant difference in psychological wellbeing between children who ate breakfast everyday and children who ate breakfast some days was found, consistent with hypothesis 1 and the findings of Study 1 (see Ch. 3). This finding has been observed in cross-sectional studies of adolescents (Lien, 2007) and children (Smith, 2010; see section 3.8.1). Smith (2010) relied on parental reports of British children's psychological wellbeing while Study 1 examined children's self-reports using a non-validated measure of psychological wellbeing. Study 2 (see Ch. 4), reported in this chapter, explored children's self-reported psychological wellbeing using two validated measures (KIDSCREEN-52 and M&MF). The difference in psychological wellbeing was detected only on KIDSCREEN-52. The consistency of findings here and in previous studies suggests that the association between frequent breakfast consumption and better psychological wellbeing is robust in both children and adolescents. Additionally, the findings of the present study suggests that younger respondents can reliably report their own psychological wellbeing.

The M&MF scale did not detect a difference in psychological wellbeing between children who ate breakfast regularly and those who ate breakfast some days. This is

inconsistent with Smith's (2010) study which found an association between children's regular breakfast consumption and lower levels of anxiety and depression using the Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983). Both the HADS and M&MF measures are brief screening tools and both measures distinguish between clinical and non-clinical psychological difficulties. However, the HADS is used in adults and is not validated for use in children. The use of the HADS by Smith (2010) may have resulted in inaccurate reports of children's psychological wellbeing. Nevertheless, the small sample size and underrepresentation of infrequent habitual breakfast consumers may have meant there was insufficient power to detect a difference on the M&MF measure used in this study.

4.6.2. Food insecurity and psychological wellbeing

As predicted by hypothesis 2, a significant difference between FI status groups was observed with respect to psychological wellbeing, with FIS reporting poorer psychological wellbeing than FSS. The KIDSCREEN-52 subscales that differentiated FIS from FSS, suggests that FIS reported greater feelings of depression and unhappiness. This finding is in line with findings from Study 1 (see Ch. 3) and previous research (see section 3.8.2). Bruening et al. (2017) suggest that the relationship between FI and poor psychological wellbeing is bi-directional, such that FI is a risk factor for poor psychological wellbeing and poor psychological wellbeing increases the likelihood of FI. However, the cross-sectional nature of the present study means that the direction of the relationship cannot be determined.

Similar to Study 1, children who reported being bullied or rejected by peers had higher FI scores. Previous research suggests a relationship between bullying and FI, with children and adolescents who experience FI or hunger more likely to be victims of bullying (Edwards & Taub, 2017; Mwambene, Muula, & Leo, 2013). It is plausible that food insecure children may be more vulnerable and stand out compared to their food secure peers, which may increase the likelihood of bullying. The higher level of psychosocial difficulties, along with poorer psychological wellbeing in food insecure children highlights the multi-faceted impact of FI on children's wellbeing. However, studies from the USA also reveal that children and adolescents experiencing FI are more likely to perpetrate bullying (Edwards & Taub, 2017). Moreover, childhood FI predicts the bullying of peers by adolescent males (Jackson & Vaughn, 2017). The study reported here did not examine bullying perpetration and therefore it is unknown

whether food insecure children in the present study were also more likely to display behavioural difficulties such as bullying others.

Children experiencing FI were also more likely to report financial disadvantage, consistent with Study 1. Difficulties experienced with food access includes having the resources to purchase food (Beacom et al., 2020a). This money-related element of FI is assessed in the CFSSM and may further explain the association between FI and finances. The association between FI and finances in the study reported in this chapter and a good distribution of FI scores provides confidence that the CFSSM is a feasible measure for use in 9–11-year-olds.

4.6.3. Habitual breakfast consumption and food insecurity

No difference in children's breakfast consumption habits according to FI status was found which is consistent with findings of Study 1 (see Ch. 3). This lack of difference between primary school children's HBC and FI in both studies may be explained by the availability of breakfast programmes for children. Opportunities to consume a free or subsidised breakfast through initiatives such as the NSBP and other SBPs in deprived areas, are more prevalent in primary schools compared to secondary schools. There are 1,384 NSBP provisions in primary schools, whereas there are only 332 in secondary schools (Family Action and Magic Breakfast, 2019), and it is estimated that 63% of primary schools have a breakfast club compared to 49% of secondary schools (Hoyland et al., 2012). The greater availability of breakfast in primary schools (see section 1.6.1) ensures food availability for primary schoolchildren and supports them to maintain their breakfast eating habits despite experiencing FI. However, the current study did not measure attendance at a SBP and therefore it is unclear if FIS consumed breakfast as part of a SBP and this provision meant no association was observed.

4.6.4. Limitations

An important limitation of the present study is the small sample size. Due to the first lockdown, data collection was halted and the sample was smaller than originally anticipated. The small sample size contributed towards the low cell count of some HBC categories. The rarely/never categories were not occupied by any children in contrast to Study 1, and therefore it was not possible to examine the relationship between breakfast consumption and psychological wellbeing in children whose HBC was infrequent. Since the present study followed an opt-in process of consent which

this may have reduced the recruitment and representation of under-served populations in the study sample. The opt-in method of consent employed in this thesis may have meant that the study sample was unrepresentative of the population of children. Therefore opt-out consent could have resulted in greater inclusion of children from the whole population under study. Opt-out consent means that individuals who actively dissent do not take part in the research but everyone else is included. This opt-out process is therefore likely to increase both the study sample size and increase representation from under-served populations. However, opt-in consent was chosen for the present study as disclosing information about psychological wellbeing and FI could be considered sensitive information and opt in is recommended by the Medical Research Council (2020) and the Information Commissioner's Office (2021). The FSM eligibility of the sample (29.79%) was lower than would have been expected given the variability in the FSM eligibility of the two schools (25% and 62%). Although the study FSM eligibility was representative of one school it was not representative of the other school. It may have been that children from the school with the higher FSM eligibility may have been more likely to have FI and thus less willing to participate in the research due to stigma associated with FI. In addition, data on ethnicity was not considered in the analyses due to the small cell occupancy for non-white ethnicity and overall limited sample size. Breakfast consumption may vary according to ethnicity (see section 1.6.4.3). Thus, the associations observed in the present study may have been influenced by ethnicity which the present study was unable to account for.

4.6.5. Conclusion

The study presented in this chapter highlights a relationship between breakfast consumption and psychological wellbeing, and an association between FI and psychological wellbeing in primary schoolchildren. Exploring the association between these variables is an important addition to the research literature as there are limited cross-sectional studies using children's self-reports that examine psychological wellbeing and FI, and consider breakfast consumption. The findings obtained are specific to children's experiences pre-lockdown and should not be extrapolated beyond this period or during lockdown. Study 3, therefore, considers the impact of lockdown upon children's breakfast consumption, psychological wellbeing and FI.

5. Study 3: Examining the impact of the COVID-19 lockdown on HBC, psychological wellbeing and FI in 9–11-year-olds: a cross-sectional study

5.1. Introduction

During the COVID-19 pandemic, rates of FI increased in children and adolescents and lockdown had a negative impact on children and adolescents' psychological wellbeing (see section 1.8.2). The closure of schools in the first lockdown also meant that children did not consume breakfast via usual free or subsidised SBPs, but no study has examined the association between breakfast consumption, FI and psychological wellbeing during lockdown (see section 1.8.4). Hence, evidence indicates that lockdown impacted FI and psychological wellbeing in children in adolescents, but the influence of breakfast consumption in this relationship is unclear. The previous study (Study 2, see Ch. 4) examined the association between HBC, psychological wellbeing and FI in 9–11-year-old schoolchildren prior to the first lockdown in March 2020. However, Study 2 did not consider the influence of the COVID-19 lockdown. The study presented in this chapter permits examination of the change in FI and psychological wellbeing and the influence of HBC during lockdown (23rd March-3rd July 2020) and post-lockdown (October-December 2020) in 9-11-year-olds. It is important to note that a second national lockdown was imposed in England from 5th November-2nd December 2020, however schools remained open for all pupils during this time. Therefore, the study reported in this chapter focuses on the impact of the first national lockdown only (23rd March-3rd July 2020) and addresses aim 2 of this thesis (see Ch. 2).

5.2. Study aims

1) To examine the impact of lockdown on FI and psychological wellbeing in 9-11-year-olds.
2) To examine differences in psychological wellbeing according to HBC in 9-11-year-olds and consider the influence of FI during lockdown and post-lockdown.

5.3. Hypotheses

It was hypothesised that:

1) There will be a difference in psychological wellbeing during lockdown compared to post-lockdown.
2) There will be a difference in FI during lockdown compared to post-lockdown.
3) There will be a difference in HBC during lockdown compared to post-lockdown.

5.4. Methodology

5.4.1. Participants

Participants were males and females, aged 9-11 years (*M*=9.89, *SD*=.48), in school years 5 and 6, from five state schools in Leeds. A total of 59 participants took part in the study, with one participant's data excluded from the final analysis (see section 5.4.7 for details). There was variability in the schools when considering FSM eligibility (8.1-64.5%). One school was below the national average, with the remaining four schools' FSM eligibility higher than the national average (17.7%, Department for Education, 2020d). The final sample size was n=58 and Table 5.1 displays the demographics, FSM status and lockdown characteristics of the study sample.

Table 5.1: Participant demographics, FSM eligibility and lockdown related characteristics

	n (%)
Gender	
Male	29 (50)
Female	29 (50)
Ethnicity	
White	38 (65.52)
Asian	6 (10.34)
Mixed	2 (3.45)
Other	12 (20.69)
FSMs	
Eligible	17 (29.31)
Not Eligible	35 (60.34)
Don't know	6 (10.34)
Attended school during lockdown	
Yes	22 (37.93)
No	36 (62.07)
Keyworker parent/guardian	
Yes	37 (63.79)
No	21 (36.21)
Shielding	
Yes	16 (27.59)
No	42 (72.41)
Total	**58 (100)**

5.4.2. Inclusion and exclusion criteria

The recruited participants met the following inclusion and exclusion criteria.

5.4.2.1. Inclusion criteria

- Male or female, aged 9-11 years.
- Ability to follow verbal and written instructions in English.
- Ability to understand and/or complete the questionnaires with their school teaching staff.

5.4.2.2. Exclusion criteria

- Acute illness, feeling unwell, and/or circumstances (e.g. holiday) on the day of the school accessing the online questionnaire link.

5.4.3. Design

The study was a cross-sectional survey design. All of the questionnaire data were collected at school during a normal school day via the online Qualtrics Survey Software (Qualtrics, Provo, UT, USA).

5.4.4. Measures

5.4.4.1. Socio-demographic measures

Socio-demographic information on age, gender, and FSM status was gathered using a questionnaire (see Appendix 9.19).

5.4.4.2. Lockdown related questions

Within the socio-demographic section, three specific questions related to the first lockdown that occurred in England (see Appendix 9.19). These questions ask about participants' circumstances during lockdown which included school attendance, shielding and key worker status of their parent/guardian. These questions were added as lockdown was a unique experience in children's lives and therefore these were included to consider their impact on children's experiences of lockdown.

5.4.4.3. Habitual breakfast consumption

HBC was assessed via the question used in the MHMS survey (see Study 1, section 3.5.1.3 and Study 2, section 4.4.4.2), which had five response categories (see Appendix 9.19). This measure was modified to capture HBC both during lockdown (23rd March-3rd July) and current/post lockdown HBC.

5.4.4.4. Psychological wellbeing

5.4.4.4.1. Me and My Feelings

The M&MF questionnaire used in Study 2 (see Ch. 4, section 4.4.4.3.2) was utilised to measure psychological wellbeing. This measure was modified to capture psychological wellbeing both during lockdown (23rd March-3rd July) and current/post lockdown psychological wellbeing (see Appendix 9.20).

5.4.4.5. Food insecurity

5.4.4.5.1. Child Food Security Survey Module

FI was measured using the CFSSM used in Study 2 (see section 4.4.4.4.1). This measure was modified to capture FI both during lockdown (23rd March-3rd July) and FI during the previous month (see Appendix 9.21). An additional item was added to

capture whether participants' parents missed meals due to lack of food during lockdown and during the previous month, given the increased FI rates during lockdown (FSA, 2021).

5.4.5. Procedure

The procedure was the same as Study 2 (see section 4.4.5). In addition, the researcher was not present during data collection nor had any face-to-face contact with the schools due to the COVID-19 pandemic. There was no time limit on completing the questionnaire, but most questionnaires took between 20-25 minutes to complete. Questionnaires were completed via an online link between 19th October and 18th December 2020, which included a period during the second national lockdown (5th November-2nd December 2020).

5.4.6. Ethical considerations

Ethical approval was obtained from the University of Leeds, School of Psychology, Research Ethics Committee (reference number: PSYC-88; date: 09.09.20). The ethical considerations were the same as for Study 2 (see section 4.4.6). In addition, due to the COVID-19 pandemic, consent was obtained via an online link. Key contacts in schools were sent a link to email/text potential participants' parents/guardians. This link contained the information sheet, child information sheet and consent form (see Appendix 9.22). Consent was assumed if parents/guardians completed the online consent form. Parents were informed via the invitation letter (see Appendix 9.22) and information sheet that if their child participated in the study, they could request the withdrawal of their information up until completion of work for analysis (30.03.2021). Participants who completed the questionnaire were placed into a prize draw to win one of 20 £10 gift vouchers. Lockdown may have been a difficult experience for some children, and therefore schools were briefed about this and advised to support participants if they felt distressed when participating in the research.

5.4.7. Statistical analysis

Data were entered and checked in Excel before analysis using SPSS version 27 (IBM Corp., Armonk, NY). To compare during lockdown and post-lockdown differences in psychological wellbeing and FI, paired samples t-tests were conducted. Cohen's d was used to estimate effect size, and interpreted as >.2 small, >.5 medium, and >.8 large (Field, 2017). To compare the difference between HBC during lockdown and

post lockdown, McNemar's test was conducted. One-way ANCOVAs were performed to assess the difference in psychological wellbeing according to HBC (between-subjects factor with 2 levels[4] (everyday and not everyday, see Appendix 9.23), with FI score included as a covariate. Separate ANCOVAs were performed for data pertinent to during lockdown and post-lockdown because HBC frequency changed during vs. post-lockdown (see Table 5.2). The relevant assumptions for the ANCOVAs were checked as described in Study 2 (see section 4.4.7). One participant was removed from the analysis because their standardised residual was >3. Independent samples t-tests were conducted to assess the difference in psychological wellbeing and FI according to FSM eligibility (coded as eligible/not eligible), and to examine differences in psychological wellbeing and FI according to lockdown characteristics (school attendance, shielding and keyworker status).

5.5. Results

5.5.1. Access to food in the study sample

Table 5.2 displays the frequency and percentage of children in each HBC and FI category. This indicates that most of the sample consumed breakfast everyday during lockdown and post-lockdown, although fewer children reported consuming breakfast everyday during lockdown. Incidence of FI during lockdown was more than double post-lockdown. A total of 4 participants reported that they were not hungry but their parent missed a meal during lockdown and 6 participants reported this post-lockdown.

Table 5.2: HBC and FI frequency and percentage for during and post lockdown

	n (%)	
HBC	**During lockdown**	**Post-lockdown**
Everyday	45 (77.59)	51 (87.93)
Not everyday	13 (22.41)	7 (12.07)
FI[a]		
Food insecure	24 (41.38)	12 (20.69)
Food secure	34 (58.62)	46 (79.31)
Total	58 (100)	58 (100)

[a]FI categories: food secure (0-1 score), food insecure (2-9 score)

[4] Due to low frequencies, the HBC categories were collapsed into 2 categories, everyday and not everyday (see Appendix 9.23).

5.5.2. Difference in FI, psychological wellbeing and HBC during vs. post lockdown

5.5.2.1. Food insecurity

There was a significant difference in FI scores during lockdown compared with post-lockdown with a medium effect, $t(57)=4.09$, $p<.001$, d=.54, such that mean FI scores were significantly higher during lockdown ($M=1.60$, $SD=1.94$) than post-lockdown (M=.88, $SD=1.54$).

5.5.2.2. Psychological wellbeing

There was a significant difference in M&MF total scores during lockdown compared with post-lockdown with a small effect, $t(57)=3.70$, $p<.001$, d=.48, such that total scores were significantly higher during lockdown ($M=6.03$, $SD=2.85$) than post-lockdown ($M=4.79$, $SD=3.74$). There was a significant difference in M&MF emotional subscale scores during lockdown compared to post-lockdown with a medium effect, $t(57)=4.49$, $p<.001$, d=.59. Reports on the emotional subscale were significantly higher during lockdown ($M=6.03$, $SD=2.85$) than post-lockdown (M=4.79, $SD=3.74$). There was no significant difference in M&MF behavioural subscale scores during lockdown compared with post-lockdown, $t(57)=.84$, $p=.41$, d=.11.

5.5.2.3. Habitual breakfast consumption

McNemar's test ($p=.11$) indicated that there was no significant difference in breakfast consumption habits during lockdown and post-lockdown, with the majority of the children reporting breakfast consumption everyday during lockdown and post-lockdown (see Table 5.2).

5.5.3. HBC, psychological wellbeing and FI during and post lockdown

The final ANCOVA models reported below that examine the effects of HBC and FI on psychological wellbeing during and post lockdown are shown in Appendix 9.24-9.25. The FI*HBC interaction for each analysis was non-significant, excluding the post-lockdown M&MF behavioural subscale. Therefore, this interaction was removed from the relevant models if its removal increased the proportion of the variance explained by the final model (see Appendix 9.26).

5.5.3.1. M&MF total

Figure 5.1 displays the estimated marginal means for total M&MF scores by HBC, adjusted for the covariate FI. There was no significant main effect of HBC on M&MF

total scores during lockdown, $F(1,54)=.30$, $p=.56$, $\eta^2=.01$. FI during lockdown was a significant covariate, $F(1,54)=6.73$, $p=.01$, $\eta^2=.11$. The interaction (FI*HBC) during lockdown was non-significant, $F(1,54)=.05$, $p=.83$, $\eta^2=.001$ in this model. The final model with the covariate and interaction retained accounted for 12.9% ($R^2_{adj}=.129$) of the variance in total M&MF scores during lockdown. FI during lockdown was positively correlated with the total score, $r(56)=.40$, $p=.002$, such that higher FI was associated with higher total M&MF score during lockdown.

There was no significant main effect of HBC on the M&MF total scores post-lockdown, $F(1,54)=.29$, $p=.59$, $\eta^2=.01$. FI post-lockdown was a significant covariate, $F(1,54)=7.80$, $p=.01$, $\eta^2=.13$, and the interaction (FI*HBC) post-lockdown was non-significant, $F(1,54)=1.30$, $p=.26$ $\eta^2=.02$. The final model with the covariate and interaction retained accounted for 13.6% ($R^2_{adj}=.136$) of the variance in M&MF total scores post-lockdown. FI post-lockdown was positively correlated with total M&MF score, $r(56)=.40$, $p=.002$, such that higher FI was associated with higher total M&MF score post-lockdown.

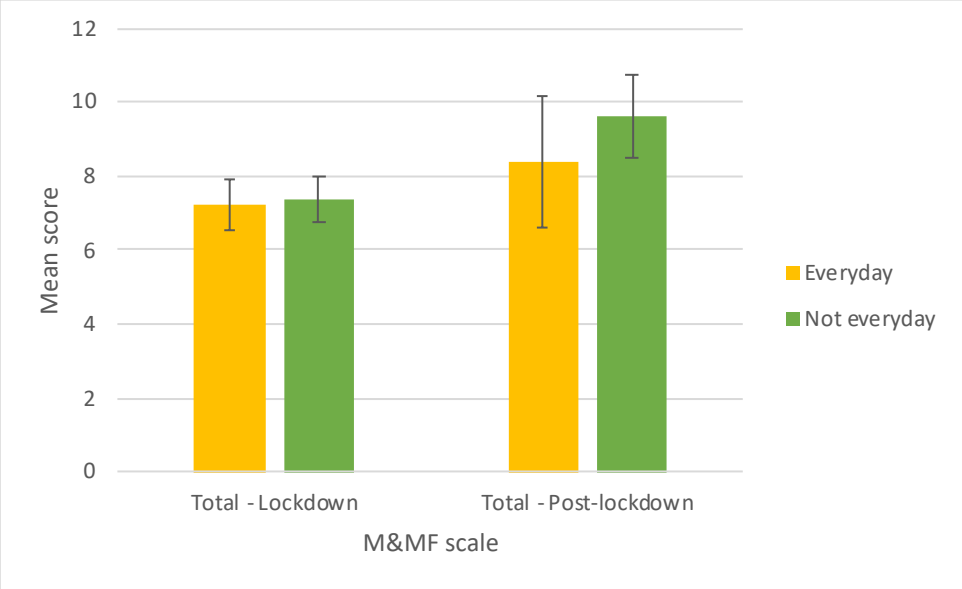

Figure 5.1: Estimated marginal means for M&MF (total scale) by HBC category during and post lockdown.

5.5.3.2. M&MF emotional subscale

Figure 5.2 displays the estimated marginal means for M&MF behavioural and emotional subscale scores according to HBC, adjusted for the covariate, FI (see Appendix 9.25).Figure 5.2 illustrates that children who ate breakfast everyday had lower emotional scores during lockdown than those who did not have breakfast

everyday, whereas everyday breakfast consumers had higher emotional scores post lockdown.

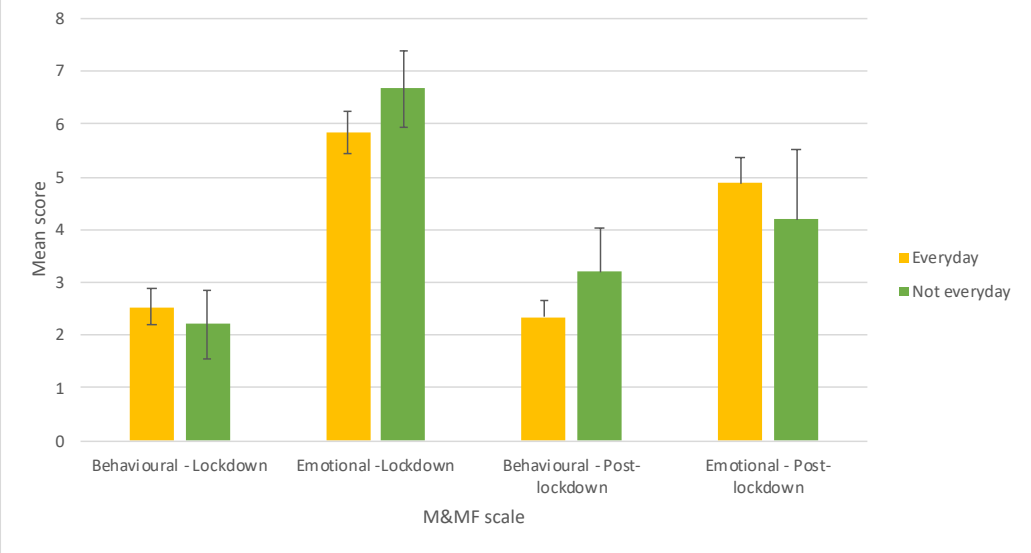

Figure 5.2: Estimated marginal means for M&MF behavioural and emotional subscales by HBC category during and post lockdown.

There was no significant main effect of HBC on M&MF emotional subscale scores during lockdown, $F(1,55)=.95$, $p=.33$, $\eta^2=.02$. FI during lockdown was a significant covariate, $F(1,55)=9.83$, $p=.003$, $\eta^2=.15$. The model with the covariate retained accounted for 14.2% ($R^2_{adj}=.142$) of the variance in emotional subscale scores during lockdown. FI during lockdown was positively correlated with the emotional subscale, $r(56)=.40$, $p=.002$, such that higher FI was associated with higher emotional subscale score during lockdown.

There was no significant main effect of HBC on M&MF emotional subscale scores post lockdown, $F(1,55)=.23$, $p=.63$, $\eta^2=.004$. FI post lockdown was a significant covariate, $F(1,55)=7.10$, $p=.01$, $\eta^2=.11$. The model with the covariate retained accounted for 8.4% ($R^2_{adj}=.084$) of the variance in M&MF emotional subscale scores post-lockdown. FI post-lockdown was positively correlated with the emotional subscale, $r(56)=.34$, $p=.01$, such that higher FI was associated with higher emotional subscale scores post-lockdown.

5.5.3.3. M&MF behavioural subscale

There was no significant main effect of HBC on the M&MF behavioural subscale scores during lockdown, $F(1,55)=.20$, $p=.66$, $\eta^2=.004$. FI during lockdown was a non-significant covariate, $F(1,55)=3.79$, $p=.06$, $\eta^2=.15$, $R^2_{adj}=.032$. There was no significant main effect of HBC on the M&MF behavioural subscale scores post-

lockdown, $F(1,54)=.21$, $p=.65$, $\eta^2=.004$. FI post-lockdown was a significant covariate, $F(1,54)=12.18$, $p<.001$, $\eta^2=.18$. FI post-lockdown was positively correlated with behavioural scores, $r(56)=.34$, $p=.01$, such that higher FI was associated with higher behavioural subscale scores post-lockdown. There was a significant interaction between HBC and FI post-lockdown, $F(1,54)=5.46$, $p=.02$, $\eta^2=.09$. For those who did not consume breakfast everyday, there was a significant positive correlation between FI and behavioural subscale scores post-lockdown, $r(5)=.76$, $p<.05$. Upon further examination, this significant interaction was driven by one extreme case (FI score=4, behavioural subscale score=10). For those who had breakfast everyday there was no significant correlation between FI and behavioural subscale scores post-lockdown, $r(49)=.27$, $p=.06$. The model with the covariate and interaction retained accounted for 16.9% ($R^2_{adj}=.169$) of the variance in M&MF behavioural subscale scores post-lockdown.

5.5.4. The influence of FSM eligibility on psychological wellbeing and FI during and post lockdown

The was no difference in psychological wellbeing scores on the M&MF subscales according to FSM eligibility both during and post-lockdown (Appendix 9.27, Table 9.63). However, there was a trend for higher total M&MF scores post-lockdown ($p=.06$) in participants eligible for FSMs ($M=9.18$, $SD=5.58$), compared to those who were ineligible ($M=6.34$, $SD=4.58$), with this trend driven by scores on the emotional subscale ($p=.08$). During lockdown 6 participants with FI were eligible for FSMs and 16 participants with FI were not eligible for FSMs (see Appendix 9.28, Table 9.52). At post lockdown, 6 participants reported FI and FSM eligibility, and 5 participants with FI reported that they were not eligible for FSMs.

5.5.5. Lockdown related characteristics and difference in psychological wellbeing and FI during and post lockdown

There was a significant difference in total M&MF scores during lockdown in participants who shielded compared to those who did not shield, $t(56)=2.22$, $p=.03$. Those who shielded ($M=10.63$, $SD=3.61$) had significantly higher total M&MF scores during lockdown than those who did not shield ($M=7.93$, $SD=4.32$). This difference in total M&MF scores during lockdown, was driven by emotional subscale scores, $t(56)=2.06$, $p=.04$, as those who shielded reported significantly higher emotional subscale scores during lockdown ($M=7.25$, $SD=2.38$) than those who did not shield ($M=5.57$, $SD=2.90$).

The difference in total M&MF scores post-lockdown of participants who shielded compared to those who did not shield was marginally significant t(56) =2.00, *p*=.05, with those shielding reporting greater total M&MF scores post-lockdown (*M*=9.38, *SD*=4.94), compared to those who did not shield (*M*=6.45, *SD*=5.02). There was also a trend for lower behavioural difficulties during lockdown, t(56)=-1.90, *p*=.06, in participants who reported that their parent/guardian had keyworker status (*M*=2.22, *SD*=2.04), compared to participants whose parent/guardians were not keyworkers (*M*=3.38, *SD*=2.56), and a trend for lower behavioural, t(56)=-1.78, *p*=.08, and total M&MF scores t(56)=-1.83, *p*=.07, post-lockdown in participants who reported their parent/guardian had keyworker status compared to those who did not have keyworker status. There was no difference in psychological wellbeing scores on the M&MF subscales when comparing school attendance during lockdown and post-lockdown (see Appendix 9.29, Table 9.52). There was also no difference in FI scores according to lockdown characteristics (see Appendix 9.29, Table 9.52).

5.6. Interim summary of results

1. There were significantly higher levels of FI during lockdown compared to post-lockdown.
2. Lockdown negatively impacted psychological wellbeing.
    - Total psychological wellbeing scores were higher during lockdown compared to post-lockdown. This difference was driven by emotional subscale scores.
    - There was no difference in behavioural scores during vs. post lockdown.
    - Those who shielded during lockdown had significantly higher emotional and total psychological wellbeing scores compared to those who did not shield.
3. There was no significant difference in HBC during lockdown compared to post-lockdown.
4. FI and psychological wellbeing were related during and post lockdown
    - Higher FI scores were significantly associated with higher emotional subscale scores and total M&MF scores during lockdown.
    - Higher FI scores were significantly associated with higher emotional, behavioural and total M&MF scores post-lockdown.
5. There was no effect of HBC on psychological wellbeing during lockdown or post-lockdown.

5.7. Discussion

5.7.1. Impact of lockdown on psychological wellbeing

In line with hypothesis 1, children reported poorer psychological wellbeing during lockdown compared to post-lockdown, an effect specific to the emotional rather than behavioural component of psychological wellbeing assessed by the M&MF measure. This finding is consistent with several research studies in British children and adolescents. Morgül, Kallitsoglou and Essau (2020) demonstrated that approximately two-thirds of parents reported that their 5–11-year-old child felt lonely or frustration during lockdown. In England, 42.8% of 11-16-year-olds reported that lockdown made their life worse, with those with a probable mental health disorder at higher risk of reporting such feelings (Vizard et al., 2020). In contrast to these studies and the present study, some studies have reported better psychological wellbeing during lockdown in British children and adolescents. For example, James, Marchant, Defeyter, Woodside and Brophy (2021) found a sample of 574 8-11-year-olds self-reported less emotional difficulties on items from the M&MF questionnaire, with 20.96% of children reporting emotional difficulties during the first lockdown compared to 12.17% pre-lockdown. There was also a 12.64% increase in children reporting that they felt happier with life during lockdown compared to pre-lockdown (James et al., 2021). In another study, 83% of primary schoolchildren reported moderate to high mental wellbeing during the first lockdown, although it was unclear from the study findings how many children answered the mental wellbeing question (Mansfield, Jindra, & Fazel, 2020).

The conflicting findings of studies that report positive and negative associations on psychological wellbeing during lockdown, including the present study which found a negative association, suggests that lockdown was a varied experience for children. Potential reasons for the discrepancies between studies may be related to children's circumstances during lockdown. In the present study, a quarter of children reported that they or their family member shielded, and those who shielded reported poorer psychological wellbeing during lockdown compared to those who did not shield. In adults, 35% of those who shielded during lockdown reported a deterioration in their mental health (Office for National Statistics, 2020b), and British adolescents with a keyworker parent reported greater COVID-19-related anxiety and trauma than adolescents whose parents were not keyworkers (Levita, 2020). In contrast, in the

present study, there was no difference in the emotional aspect of psychological wellbeing in offspring of keyworkers compared to non-keyworkers. Some of the unique aspects of lockdown, such as shielding, may have contributed towards the negative association on children's psychological wellbeing reported during lockdown in the present study. Additionally, the discrepancies in findings may be explained by the varying research methodologies across studies. The present study relied on children's retrospective reports during lockdown, whereas James et al. (2021) and Mansfield et al. (2020) gathered responses from children and adolescents during lockdown. Therefore, retrospective responses in the present study may reflect recall bias which could explain the greater negative association on psychological wellbeing during lockdown that was reported.

Although poorer psychological wellbeing was reported on the emotional domain of M&MF during lockdown, the behavioural aspect of psychological wellbeing did not differ during or post-lockdown. This means that the deleterious effects of lockdown were specific to children's emotions and lockdown had no significant association on children's behaviour. This finding contradicts studies in British children that demonstrate an increase in behavioural difficulties during lockdown such as hyperactivity, restlessness and arguing (Morgül, Kallitsoglou, & Essau, 2020; Pearcey et al., 2020). It is plausible that the discrepancies between the findings of these studies and the present study may be explained by the respondents (i.e. parents as proxies of children's experience vs. child respondents). Morgül et al. (2020) and Pearcey et al. (2020) relied on parental proxy reports of children's psychological wellbeing, whereas the present study captured children's self-reported psychological wellbeing. Parental proxy measures are less accurate than child self-reported measures (see section 1.4.21.3.1.2) and during lockdown parents experienced increased stress which may have altered their perceptions of their child's behaviour (Morgül et al., 2020; Pearcey et al., 2020).

5.7.2. Impact of lockdown on food insecurity

Confirming hypothesis 2, there was a difference in FI during lockdown vs. post-lockdown, with higher FI reported during lockdown. This finding suggests that children experienced more elements of FI such as hunger, skipping meals or running out of money for food during lockdown than subsequently. An increase in FI during lockdown is supported by findings that more British households experienced FI

during the first lockdown compared to pre-lockdown (Goudie & McIntyre, 2021). In households with children, FI levels between March-August 2020 were more elevated than households without children (Goudie & McIntyre, 2021). For example, 11.93% of households with children experienced FI (Goudie & McIntyre, 2021) and 14% reported very low food security (Bhattacharya & Shepherd, 2020). The higher levels of FI in households with children suggests that children's food availability was disproportionately affected by lockdown. This could be due to the economic impact of lockdown such as unemployment and a reduction in household income, which reduced money for food in households with children, as well as the closure of schools which impacted children's availability of food from provisions such as FSMs and SBPs.

The proportion of the present sample categorised as food insecure during lockdown (41.38%) is considerably higher than levels of FI in studies of British children reported by previous studies (14%; Bhattacharya & Shepherd, 2020; 11.93%; Goudie & McIntyre, 2021). A potential reason for higher FI levels during lockdown in the present study may be due to the respondent reporting their own FI experience. The CFSSM was utilised to obtain children's self-reported FI, whereas previous research has focused on FI reports from one adult within a household. The concordance of FI responses between an adult and child in the same household can vary. Furthermore, research indicates that adults underestimate children's FI experiences (see section 1.3.1.2). Therefore, measures that rely on an adult's perception of FI as a proxy for children's FI experiences may have underreported FI in children during lockdown.

5.7.3. Impact of lockdown on food insecurity and psychological wellbeing

The present study found that greater levels of FI were related to poorer psychological wellbeing in children during lockdown and post-lockdown. Hence, this finding is consistent across the studies reported in this thesis, and previous studies, and therefore appears to be a reliable finding pre-lockdown (see sections 1.5.1 and 3.8.2). Studies in adults demonstrate that those experiencing FI during lockdown reported stress, anxiety and depression, with FI exacerbating existing mental health difficulties of these British adults (Connors et al., 2020). In American adults with low-income, FI during the COVID-19 pandemic was related to a greater risk of anxiety and depression (Fang, Thomsen, & Nayga, 2021). These findings are therefore consistent in both adults and children. Additionally, the relationship between FI and poorer

psychological wellbeing was demonstrated both during and post lockdown in the present study, which demonstrates enduring effects of the COVID-19 pandemic on the wellbeing and food availability of children.

5.7.4. Impact of lockdown on breakfast consumption

HBC did not differ during lockdown vs. post-lockdown which refutes hypothesis 3. There was also no difference during lockdown vs. post-lockdown in children's psychological wellbeing in relation to HBC and FI levels did not differ according to HBC groups. These findings suggest that children's breakfast consumption habits remained the same despite lockdown. Lockdown provided an opportunity for increased family interactions, with some families reporting that they ate breakfast together more often during lockdown (Clayton, Clayton, & Potter, 2020; Kantar, 2020). A greater proportion of British primary schoolchildren reported breakfast consumption during lockdown compared to pre-lockdown (James et al., 2021). The continued provision of breakfast at home by the NSBP and Magic Breakfast during lockdown (see section 1.8.4) may have supported a small percentage of children to continue eating breakfast during lockdown. However, the schools sampled in the present study did not provide alternative forms of breakfast provision to children who did not attend school during lockdown, and only one school sampled continued to provide breakfast for those who attended school during lockdown. Therefore, since children's breakfast eating remained the same during lockdown and post-lockdown in the present study, it demonstrates that habitual breakfast consumption was consistent.

5.7.5. Limitations

There are a number of methodological limitations of the present study. Firstly, the lack of variability in the HBC of children in the study sample meant that HBC was categorised as a binary variable (everyday or not everyday), with the 'not everyday' category mainly consisting of children who ate breakfast most but not all days. Since the majority of the sample frequently ate breakfast, children who skipped breakfast were underrepresented in the present study. It is plausible that a larger sample size could have led to a better representation of the range of HBC patterns in children. A larger sample would have also allowed more robust statistical tests to be conducted and provided greater power to detect a difference. Secondly, the post-lockdown period examined in the present study was not a true 'post-lockdown' period. The time point categorised as post-lockdown is likely to have been impacted by some form of restrictions such as the regional tiered systems that were implemented in England in

2020. Part way through data collection for the present study (19th October-18th December 2020), the 'very high alert' tier 3 was imposed in Leeds (2nd November 2020), which led to the closure of indoor hospitality and restricted social gatherings. In addition, post-lockdown data of the present study may have been confounded by the second national lockdown (5th November-2nd December 2020). Although schools remained open during the second lockdown, other changes such as the closure of non-essential retail and leisure, and reduced social contact may have additionally impacted children's wellbeing. Therefore, the present study was unable to control for the impact of regional restrictions and the second lockdown on children's wellbeing reported at post-lockdown. Additionally, the cross-sectional design of the study only allowed the experiences during lockdown to be compared to post-lockdown, and was unable to examine whether the changes in children's psychological wellbeing and FI during lockdown was greater in comparison to pre-lockdown. Data on ethnicity was not able to be considered in the analyses due to the small cell count for non-white ethnicity. Nevertheless, breakfast consumption has been reported to vary according to ethnicity (see section 1.6.4.3), and FI may also vary according to ethnicity (Power et al., 2018). Therefore, the associations observed in the present study may have been influenced by ethnicity which was not accounted for.

5.7.6. Conclusion

The present study found that psychological wellbeing was poorer during lockdown and FI rates increased during lockdown in comparison to post-lockdown. The breakfast consumption habits of children remained the same despite lockdown. Although this present study provided insight into the impact of lockdown on children's self-reported HBC, psychological wellbeing and FI, the study was unable to assess pre-lockdown experiences. Study 4, therefore, attempts to examine the impact of lockdown by considering the change in HBC, psychological wellbeing and FI between pre-lockdown and during lockdown using a longitudinal design.

6. Study 4: The impact of the COVID-19 lockdown on HBC, psychological wellbeing and FI in 9–11-year-olds: a longitudinal study pre and during lockdown

6.1. Introduction

The previous study (Study 3, Ch. 5) explored the impact of the COVID-19 lockdown on HBC, psychological wellbeing and FI in 9–11-year-old schoolchildren. Study 3 found increased levels of FI and poorer psychological wellbeing during lockdown compared to post-lockdown. However, it was unclear whether increased FI and poor psychological wellbeing observed during lockdown was greater than pre-lockdown levels, due to the cross-sectional design. The pre-lockdown data from Study 2 (see Ch. 4) provided a fortuitous opportunity to compare pre-lockdown with data on during lockdown (23rd March-3rd July) to examine the impact of COVID-19 lockdown on HBC, psychological wellbeing and FI. Therefore, this study offers a unique perspective to examine changes in HBC, FI and psychological wellbeing using a longitudinal design.

6.2. Study aims

1) To examine the impact of lockdown on FI and psychological wellbeing in 9-11-year-olds.
2) To examine the impact of lockdown on HBC in 9–11-year-olds.

6.3. Hypotheses

It was hypothesised that:

1) There will be a difference in psychological wellbeing pre-lockdown compared to during lockdown.
2) There will be a difference in FI pre-lockdown compared to during lockdown.
3) There will be a difference in HBC pre-lockdown compared to during lockdown.

6.4. Methodology

6.4.1. Participants

Participants were males and females, aged 9-11 years (*M*=10.69, *SD*=.35), from two state schools in Leeds who also participated in Study 2 (see Ch. 4). Participants were from school years 5 and 6. The schools that took part in this study were the same schools that participated in Study 2. A total of 47 participants from the two schools were eligible to take part in the study as they had taken part in Study 2 pre-lockdown. From these eligible participants, 13 (response rate=28.3%) completed the questionnaire. Table 6.1 displays the demographics, FSM eligibility and lockdown related characteristics of the sample.

Table 6.1: Participant demographics, FSM eligibility and lockdown related characteristics

	n (%)
Gender	
Male	7 (53.85)
Female	5 (38.46)
Prefer not to say	1 (7.69)
Ethnicity	
White	8 (61.54)
Black	1 (7.69)
Mixed	3 (23.08)
Other	1 (7.69)
FSMs	
Eligible	4 (30.77)
Not Eligible	6 (46.15)
Don't know	3 (23.08)
Attended school during lockdown	
Yes	0
No	13 (100)
Keyworker parent/guardian	
Yes	6 (46.15)
No	7 (53.85)
Shielding	
Yes	6 (46.15)
No	7 (53.85)
Total	**13 (100)**

6.4.2. Inclusion and exclusion criteria

The recruited participants met the following inclusion and exclusion criteria.

6.4.2.1. Inclusion criteria

- Male or female, aged 9-11 years.
- Participated in Study 2.
- Ability to follow verbal and written instructions in English.
- Ability to understand and/or complete the questionnaires with their school teaching staff.

6.4.2.2. Exclusion criteria

- Acute illness, feeling unwell, and/or circumstances (e.g. holiday) on the day of the school accessing the online questionnaire link.

6.4.3. Design

The study employed a longitudinal design in participants who took part in Study 2 (pre-COVID-19 lockdown; see Study 2, Ch. 4) and who completed a further questionnaire after the first lockdown. All data were collected at school during a normal school day via the online Qualtrics Survey Software (Qualtrics, Provo, UT, USA).

6.4.4. Measures

6.4.4.1. Socio-demographic measures

Socio-demographic information on age, gender, and FSM status was gathered using the same questionnaire as Study 2 (Appendix 9.8, see section 4.4.4.1) for pre-lockdown data with the questionnaire used in Study 3 (Appendix 9.19, see section 5.4.4.1) used to capture during lockdown.

6.4.4.2. Lockdown related questions

Within the socio-demographic section, three specific questions related to the first lockdown as asked in Study 3 were also posed (see Appendix 9.19, see section 5.4.4.2).

6.4.4.3. Habitual breakfast consumption

HBC was assessed via the question used in the MHMS survey (see Study 1, section 3.5.1.3), which had five response categories (see Appendix 9.19). This measure was utilised to assess HBC at two time points: pre-lockdown (as in Study 2, see section 4.4.4.2) and during lockdown (as in Study 3, see section 5.4.4.3).

6.4.4.4. Psychological wellbeing

6.4.4.4.1. Me and My Feelings

The M&MF questionnaire as used in Study 2 and 3 was utilised to measure psychological wellbeing. This measure was utilised at two time points, pre-lockdown (see section 4.4.4.3.2, Appendix 9.10) and during lockdown (see section 5.4.4.4.1, Appendix 9.20).

6.4.4.5. Food insecurity

6.4.4.5.1. Child Food Security Survey Module

FI was measured using the CFSSM as used in Study 2 (see Appendix 9.11). This measure was utilised at two time points: pre-lockdown (as in Study 2, section 4.4.4.4.1) and during lockdown (as in Study 3, see section 5.4.4.5.1, Appendix 9.21).

6.4.5. Procedure

The procedure outlined for Study 2 (see section 4.4.5) was followed to collect pre-lockdown data. There was no time limit on completing the questionnaire, but most questionnaires took between 20-25 minutes to complete. The pre-lockdown questionnaires were completed between 3rd March–18th March 2020. The second data collection for measures pertinent to during lockdown was completed between 19th October-12th November 2020 and the procedure outlined for Study 3 (see section 5.4.5) was followed to collect during lockdown data. The data from pre-lockdown and during lockdown were linked and anonymised.

6.4.6. Ethical considerations

The study received ethical approval from the University of Leeds, School of Psychology Research Ethics Committee (reference number: PSYC-88; date: 09.09.20). Schools with pupils who took part in Study 2 (see Ch. 4) were emailed to inform them of the study and if they expressed an interest in the research, they were briefed about the research. Key contacts in the schools were informed of pupils who had taken part in the research pre-lockdown and the key contacts sent emails/texts to parents/guardians with an online link to the parent/guardian information sheet, child information sheet and consent form (Appendix 9.22). Once online consent forms were received the researcher created an inclusion log. The inclusion log was sent to the key contact in each school to highlight participants names to complete the questionnaire. Participants who completed the questionnaire were placed into a prize draw to win

one of 20 £10 gift vouchers. The same ethical considerations outlined in Study 3 (see section 5.4.6) were also considered for this study. In addition, participants' responses from the two phases (pre and during lockdown) of the study were linked to the same participant number from the original study by the researcher only. Once this link was made the responses were anonymised. When considering participant demographics, it is important to note that FSM status of the study sample did not change between pre-lockdown and during lockdown. There was also no change in other socio-demographic data between the two time points.

6.4.7. Statistical analysis

Although questionnaire data were collected for pre-lockdown, during lockdown and post lockdown in the current study, only during lockdown data were compared with pre-lockdown data in this study. This was to address the research question about the impact of COVID-19 lockdown. Additionally, there was lack of variability in the post-lockdown data and therefore this was excluded from the analysis. Data were entered and checked in Excel before analysis using SPSS version 27 (IBM Corp., Armonk, NY). To compare pre-lockdown and during lockdown differences in psychological wellbeing, paired samples t-tests were conducted. Cohen's d was used to estimate effect size, and interpreted as >.2 small, >.5 medium, and >.8 large (Field, 2017). Due to the small sample size, other inferential statistics were not performed and only descriptive statistics such as frequencies and percentages were used to describe the data for FI, psychological wellbeing, and HBC. The small sample size also meant that it was not possible to perform inferential statistics to examine the influence of FSM eligibility and lockdown characteristics on FI and psychological wellbeing.

6.5. Results

6.5.1. Psychological wellbeing pre and during lockdown

There was no significant difference in M&MF total scores pre-lockdown compared with during lockdown, $t(12)=-.30$, $p=.77$, d=-.08. There was no significant difference in M&MF emotional subscale scores pre-lockdown compared to during lockdown, although there was a small to medium effect, $t(12)=-1.43$, $p=.18$, d=-.40. There was also no significant difference in M&MF behavioural subscale scores pre-lockdown compared with during lockdown, although there was a small to medium effect, $t(12)=1.72$, $p=.11$, d=.48. Figure 6.1 displays pre and during lockdown means for the M&MF subscales. Figure 6.1 illustrates a decrease in behavioural subscale scores

during lockdown compared to pre-lockdown. The figure also illustrates an increase in emotional subscale scores pre-lockdown compared to during lockdown. Although there was no significant difference in M&MF behavioural and emotional subscale scores, it is likely that the small sample size in this study precluded the detection of a significant effect.

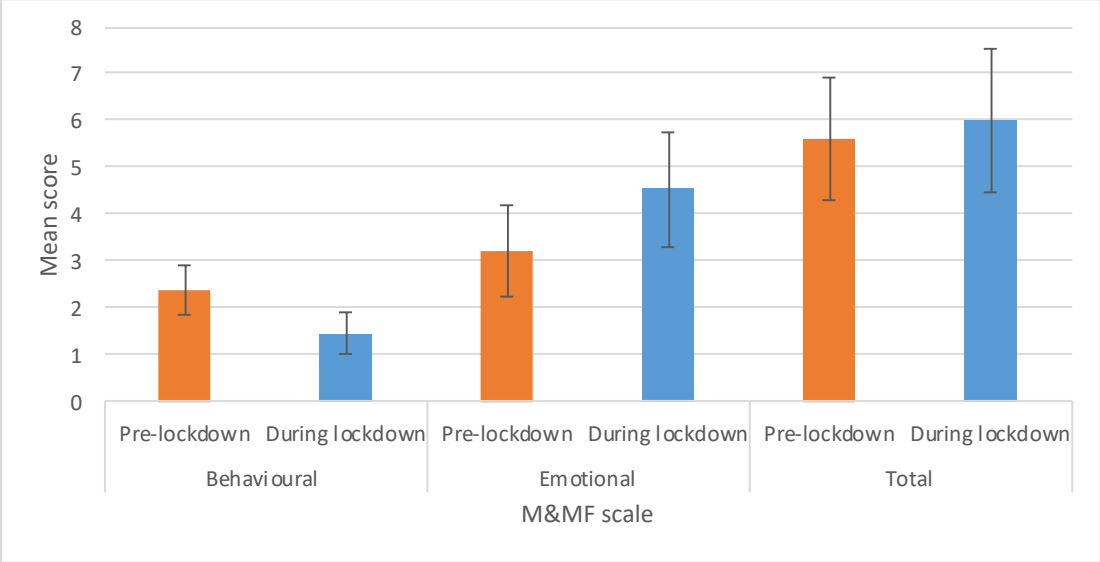

Figure 6.1: M&MF behavioural, emotional and total subscale mean scores at pre-lockdown and during lockdown.

6.5.2. Food insecurity pre and during lockdown

Table 6.2 displays the FI categories for pre and during lockdown for the study sample. There were more participants classified as food insecure at pre-lockdown compared to during lockdown. No participants reported that their parent skipped meals during lockdown. Furthermore, during lockdown all participants were within the food secure range. Figure 6.2 displays each participant's FI score pre and during lockdown.

Table 6.2: Pre and during lockdown FI categories for the study sample.

	n (%)	
FI category	**Pre-lockdown**	**During lockdown**
Food secure[a]	10 (76.92)	13 (100)
Food insecure[a]	3 (23.08)	0
Total	13 (100)	

[a]FI categories: food secure (0-1 score), food insecure (2-9 score)

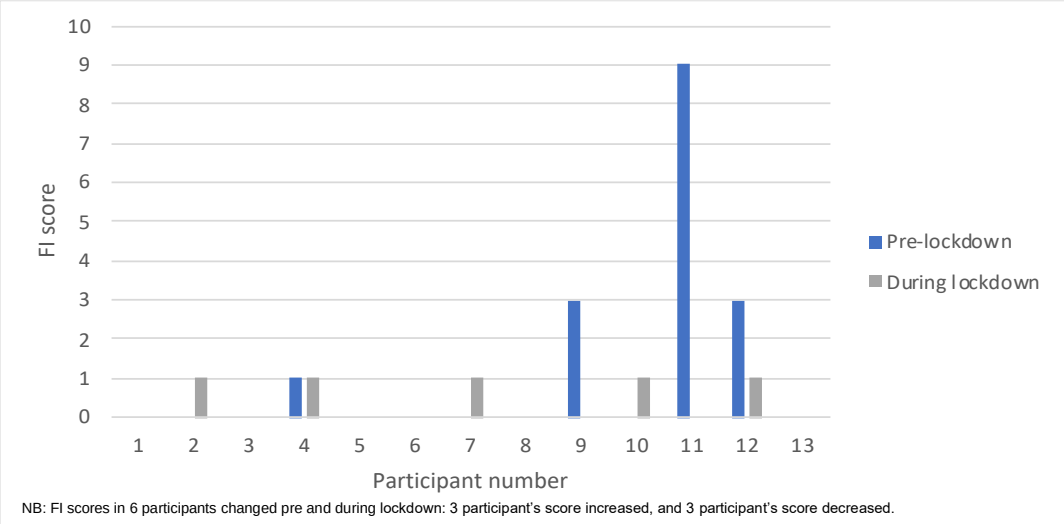

Figure 6.2: FI scores for each participant at pre-lockdown and during lockdown.

6.5.3. Habitual breakfast consumption pre and during lockdown

Table 6.3 displays the HBC frequency reported pre-lockdown and during lockdown and illustrates that HBC frequency remained the same across the two time points. When exploring individual cases, there was no change in any participant's HBC frequency over lockdown.

Table 6.3: HBC frequency at pre-lockdown and during lockdown

	n (%)	
HBC	**Pre-lockdown**	**During lockdown**
Everyday	11 (84.62)	11 (84.62)
Most days	2 (15.38)	2 (15.38)
Total	13 (100)	

6.6. Interim summary of results

The present study found no difference in HBC, psychological wellbeing or FI pre-lockdown compared to during lockdown.

6.7. Discussion

6.7.1. Impact of lockdown on psychological wellbeing

The findings of Study 4 demonstrated no difference in psychological wellbeing pre-lockdown compared to during lockdown, supporting the null hypothesis for hypothesis 1. It appears that lockdown did not have a substantial impact on children's psychological wellbeing. Research findings indicate that lockdown was a variable experience for children, with studies in children demonstrating better psychological wellbeing during lockdown (James et al., 2021; Mansfield et al., 2020, see section 5.7.1). However, Study 3 (see Ch. 5) and other studies reported a deterioration in children's psychological wellbeing during lockdown (Morgül et al., 2020; Vizard et al., 2020, see section 5.7.1). Since children's psychological wellbeing did not change between pre-lockdown vs. during lockdown, it is plausible that the children in the present study sample may have been psychologically resilient and able to cope with lockdown. Alternatively, methodological differences, such as differences in the respondent (parental proxy reports vs. child self-reports) and the time period the responses were captured (responses during lockdown vs. retrospective reports) may account for the lack of an effect of lockdown. Given that all of the study sample reported that they did not attend school during lockdown, the increased time at home with their families may have also supported their psychological wellbeing. Being at home during lockdown may have created opportunities for positive experiences such as more family interactions and time for recreational activities (Clayton et al., 2020). Therefore, these experiences during lockdown may have helped maintain the psychological wellbeing of children.

6.7.2. Impact of lockdown on food insecurity

There was no change in children's FI pre-lockdown compared to during lockdown, which fails to support hypothesis 2. This finding was unexpected given that Study 3 demonstrated an increase in FI during lockdown and most research indicates that FI increased during lockdown in the UK (Bhattacharya & Shepherd, 2020; Goudie & McIntyre, 2021, see section 5.7.2). Given the moderate level of FSM eligibility in the present sample (31%), it is surprising that FI did not change pre-lockdown compared to during lockdown. Children eligible for FSMs reside in some of the poorest households and FI was exacerbated during lockdown in deprived households (Swinnen, 2020). It could be speculated that the provision from food banks and

welfare benefits may have helped support food availability in some children during lockdown. During the first 6 months of lockdown there was a 47% increase in food bank usage (The Trussell Trust, 2020a), and the government increased Universal Credit by £20/week during this period (Emmerson, Joyce, & Waters, 2021). Therefore, these extra provisions may have supported children in food insecure households in the current study during lockdown, but such provisions were not directly assessed in the current study.

6.7.3. Impact of lockdown on habitual breakfast consumption

There was no change in the breakfast consumption habits of children pre-lockdown compared to during lockdown, which supports the null hypothesis for hypothesis 3. Similar findings were observed in Study 3. These findings may be explained by the increased presence of parents during lockdown and parental control of children's dietary habits. The entire sample reported that they did not attend school during lockdown. Parental breakfast consumption is related to their offspring's breakfast consumption, such that adolescents are likely to eat breakfast if their parent consumes breakfast (Pearson, Biddle, & Gorely, 2009). Parents also have substantial control over children's food environments as children rely on parents to purchase food and make meals. This parental control influences children's dietary habits (Scaglioni, Arrizza, Vecchi, & Tedeschi, 2011). Therefore, the increased time spent at home with parents during lockdown and parental control over dietary habits of children may have helped maintain children's breakfast eating habits.

6.7.4. Limitations

A pertinent limitation is the small sample size which could account for the lack of significant findings. There was a low response rate with only 28.3% of eligible children who participated pre-lockdown also completing the 'during lockdown' questionnaire. The small sample size and low expected cell frequency for non-white ethnicity also meant that the influence of ethnicity on the findings could not be considered. The difficulties in participant recruitment may have been due to the method used to obtain consent. Consent in the present study was online as COVID-19 restrictions meant that face-to-face contact between schools and parent/guardians was limited. Additionally, some disadvantaged families experience digital poverty (Vibert, 2020), which may have meant that they were unable to access the online link to provide consent. If parents/guardians were unable to provide online consent, it may have prevented children from these families being able to participate in the research

study at school. An additional limitation includes the reliance on children's retrospective self-reports of HBC, psychological wellbeing and FI during lockdown, which may reflect recall bias and therefore impacted the study findings.

6.7.5. Conclusion

The present study found that lockdown did not influence children's HBC, psychological wellbeing or FI. To the author's knowledge, this study is the first study to examine self-reported experiences of children's psychological wellbeing, FI and HBC pre-lockdown vs. during lockdown. To gain a better understanding, longitudinal studies with larger samples of children are required.

7. General discussion

This thesis has presented four studies that have examined the relationship between HBC, FI and psychological wellbeing pre-lockdown and in the context of the COVID-19 lockdown. Taken together, the studies have examined data from over 17,500 children and adolescents using varying methods, measures and time points providing a comprehensive and systematic assessment of HBC, FI and psychological wellbeing. Figure 7.1 summarises the findings, strengths and limitations of the four studies. The findings from pre-lockdown data demonstrated that frequent breakfast consumption was associated with better psychological wellbeing and FI was associated with poorer psychological wellbeing. Secondary schoolchildren who rarely consumed breakfast were also more likely to be food insecure. During lockdown, FI rates increased and children's psychological wellbeing was poorer. Children's HBC during lockdown, however, was unchanged. Across the studies, the variance in psychological wellbeing scores accounted for by FI and HBC ranged from 8.4 to 34.8%, which suggests that other unmeasured factors contributed to the relationship with psychological wellbeing (see section 7.3).

7.1. Food and psychological wellbeing

7.1.1. The influence of dietary intake upon psychological wellbeing

Dietary intake from frequent breakfast consumption and lack of dietary intake due to FI are associated with psychological wellbeing as demonstrated in this thesis. The findings that frequent breakfast is associated with better psychological wellbeing (see section 1.6.3.4), and FI is associated with poorer psychological wellbeing (see section 1.5.1) are robust findings across childhood, adolescence, and adulthood. However, irrespective of breakfast intake or FI which is characterised by hunger, a large body of evidence in children, adolescents and adults demonstrates that overall dietary intake is also linked to better psychological wellbeing. Systematic reviews in adults highlight that good dietary quality (e.g. high intake of fruit, vegetables, fish, wholegrains) is associated with a reduced risk of depression and anxiety (Collins, Dash, Allender, Jacka, & Hoare, 2020; Lai et al., 2014; Lassale et al., 2019). In children and adolescents, systematic reviews demonstrate that healthy diets defined by high fruit and vegetable intake and less unhealthy foods are associated with lower levels of depression and better mental health, whereas unhealthy dietary intake such as fast

foods, snacks and sugar-sweetened drink consumption are associated with poorer mental health (O'Neil et al., 2014). The finding that overall dietary quality is important for psychological wellbeing is valuable when considering how to best support schoolchildren's psychological wellbeing post-pandemic, as school food provision beyond breakfast intake may be beneficial for schoolchildren (see section 7.2.1).

	Study 1: MHMS survey 2018-19	Study 2: Pre-lockdown	Study 3: During lockdown vs. post-lockdown	Study 4: Pre-lockdown vs. during lockdown
Study design and characteristics	Cross-sectional secondary data Children and adolescents (9-16 years) n=17,395	Cross-sectional Children (9-11 years) n=47	Cross-sectional Children (9-11 years) n=58	Longitudinal Children (9-11 years) n=13
Main findings	• FBC related to better psychological wellbeing • FI associated with poor psychological wellbeing • HBC associated with FI in secondary schoolchildren only	• Everyday breakfast consumers had better psychological wellbeing than those eating breakfast some days • Everyday breakfast consumers had better self-perception than those eating breakfast some days • Higher FI related to difficulties in mood & emotions, finances and bullying	• Higher FI during lockdown vs. post-lockdown • Poorer psychological wellbeing (emotional) during lockdown vs .post-lockdown • No difference in HBC during vs. post-lockdown • Higher FI during lockdown associated with poorer psychological wellbeing (emotional & total score) • Higher FI post lockdown associated with poorer psychological wellbeing (emotional, behavioural & total) • No effect of HBC on psychological wellbeing during vs. post-lockdown	• No change pre-lockdown vs. during lockdown in: ○ HBC ○ Psychological wellbeing ○ FI
Strengths	✓ Children's self-reports rather than secondary reporting by parents/carers/other ✓ Large sample size	✓ Examines children rather than adolescents ✓ Validated self-report measures of psychological wellbeing ✓ Demonstrated that CFSSM is feasible measure for 9–11-year-olds	✓ Validated self-report measure of psychological wellbeing ✓ Unique study examining the impact of lockdown	✓ Longitudinal design permitting comparison of pre-lockdown vs. during lockdown
Limitations	X Secondary data X Non-validated questionnaire X Unable to track individual children over time	X Small sample size X Low cell count of HBC categories (rarely/never not occupied)	X Lack of HBC variability X Not a true post-lockdown period X Retrospective reports of lockdown	X Small sample size X Low response rate X Retrospective self-reports during lockdown

Figure 7.1: Summary of the design, findings, strengths and limitations of the four studies.

Although the association between dietary intake and better psychological wellbeing are well-established, the mechanisms underpinning this relationship are unclear (Firth, Gangwisch, Borisini, Wootton, & Mayer, 2020). Many studies that examine the link between dietary intake and psychological wellbeing are cross-sectional, which makes it difficult to infer causality. Despite this, some potential mechanisms underlying the association between dietary intake and psychological wellbeing have been suggested. One of these mechanisms includes the effects of carbohydrates on mood. Chemicals in the brain such as tryptophan and serotonin, which are important in promoting positive psychological wellbeing, are elevated when consuming foods rich in carbohydrates (Benton, 2002; Strasser, Gostner, & Fuchs, 2016). The metabolism of glucose from carbohydrates impacts glucose levels in the blood, and is reflected in the GI of foods. Research has demonstrated acute increases in mood when adolescents consume a low GI breakfast vs. breakfast skipping (Defeyter & Russo, 2013), and increased reports of confidence and happiness when adolescents consume low GI breakfast (Micha, Rogers, & Nelson, 2011). In the context of FI, food insecure individuals often rely on highly processed foods which are high in free sugars (Nettle & Bateson, 2019). These foods often have a high GI and lack nutritional value and quickly increase blood glucose levels (Bergmans et al., 2018). Such foods could negatively impact psychological wellbeing, as high GI diets are associated with reports of depression in adults (Gangwisch et al., 2015; Haghighatdoost et al., 2016).

Micronutrients such as vitamin B are also linked to psychological wellbeing. B vitamins include thiamine, riboflavin and vitamin B_{12} which are important for cell functioning and synthesis of neurotransmitters such as serotonin. Cross-sectional research in Australian adolescents demonstrated that dietary intake low in vitamin B (e.g. thiamine and riboflavin) was associated with reports of externalising problems, but lower reports of internalising problems were associated with higher vitamin B_6 and folate dietary intake (Herbison et al., 2012). In a meta-analysis of 12 studies with samples of adults, supplementation of B vitamins was associated with beneficial effects on stress (Young, Pipingas, White, Gauci, & Scholey, 2019). Therefore, B vitamins may help support positive psychological wellbeing. However, those with FI have dietary intake that is poor in nutritional quality (Fram et al., 2015; Landry et al., 2019b). For example, adults and adolescents with FI have reported lower levels of B vitamins such as thiamine, vitamin B_{12}, riboflavin, vitamin B_6 and folate (Kirkpatrick

& Tarasuk, 2008). However, breakfast products commonly consumed in the UK such as bread and cereal are fortified with vitamins and minerals which include B vitamins, which may support the micronutrient intake of British breakfast consumers who frequently eat breakfast (Department of Health and Social Care, 2021).

The anti-inflammatory effects of food have also been considered as a potential influence in the association between dietary intake and psychological wellbeing. Foods that have properties or nutrients considered anti-inflammatory include fruits, vegetables, nuts and fish. Diets that contain these foods are believed to play a role in mood. For example, omega-3 fatty acids, often found in oily fish, are associated with anti-inflammatory effects. In particular, eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) which are important for brain function (McNamara, 2015). DHA is found at high concentrations in the brain and there is substantial evidence that relates DHA levels to better brain functioning (Calder, 2016). Research suggests that lower levels of EPA and DHA are associated with depression, whereas supplementation of these have been found to reduce depressive symptoms in adults (Larrieu & Layé, 2018; McNamara, 2016). Fruits and vegetables, which are often high in flavonoids and other polyphenols have also been associated with better psychological wellbeing. In a randomised controlled trial in 50 British children 7-10-years-old who consumed a blueberry drink, high in flavonoids, an acute increase in mood was demonstrated (Khalid et al., 2017). In longitudinal research, low fruit and vegetable consumption in British adolescents was associated with poorer psychological wellbeing across adolescence (Huang et al., 2019). However, a systematic review of 61 studies found that adults who consumed diets high in fruits and vegetables consistently reported better mental health such as lower psychological distress and depression (Głąbska, Guzek, Groele, & Gutkowska, 2020). Thus, the anti-inflammatory and other properties of these foods may help reduce the risk of poor psychological wellbeing.

Dietary inflammation has also been explored within the context of psychological wellbeing. For example, a systematic review of children and adolescents found that dietary intake of vegetables, fruits, vitamin C and E was associated with reduced biological markers of inflammation (Bujtor et al., 2021). A study of 843 Australian adolescents found a relationship between diets high in fruits, vegetables, fish and wholegrains, and lower inflammation levels and less mental health difficulties

(Gowda, Hadley, & Aiello, 2012). When considering breakfast, one study has examined the influence of breakfast eating upon dietary inflammation and psychological wellbeing. In a study of 2876 adults, regular breakfast consumption was associated with lower dietary inflammation and better psychological wellbeing, whereas breakfast skipping was associated with higher dietary inflammation and greater risk of mental health difficulties (Haghighatdoost et al., 2021). In comparison, those who lack adequate dietary intake, such as those who experience FI, are also more likely to have higher dietary inflammation. Adults with FI display elevated levels of biological biomarkers of inflammation than food secure individuals (Bergmans et al., 2018; Gowda et al., 2012). Food insecure individuals are also more likely to have higher dietary inflammation levels (Daneshzad et al., 2020). These findings suggest that healthy dietary intake, which includes breakfast consumption, is associated with less dietary inflammation and better psychological wellbeing, whereas as poor dietary intake, as is likely during FI, is linked to higher dietary inflammation and poorer psychological wellbeing.

The association between dietary intake and psychological wellbeing may be further explained by the 'stress response'. Persistent experiences of lack of food or uncertainty about food supply due to FI can increase worry and stress. This stress can be considered as a form of 'toxic stress' which can have a negative effect on psychological wellbeing (Cook, 2013). There is also an association between FI and cortisol, a stress hormone, with food insecure children displaying higher cortisol levels compared to those who are food secure (Ling, Robbins, & Xu, 2019).

7.1.2. The influence of dietary intake upon cognitive functioning

In addition to the importance of diet for psychological wellbeing, dietary intake is also associated with children and adolescents' cognitive function. Cognitive functions such as memory, learning and attention are important to support schoolchildren's academic attainment. A number of systematic reviews demonstrate that children and adolescents' breakfast consumption is associated with better performance on attention, executive functioning and memory tasks compared to breakfast skipping (Adolphus et al., 2016; Hoyland et al., 2009; see section 1.6.3.2), and regular breakfast consumption is also associated with better academic performance (see section 1.6.3.3). These benefits of breakfast consumption upon cognitive function appear to be more pronounced in under-nourished children (Adolphus et al., 2016, 2013;

Hoyland et al., 2009). Children and adolescents who are food insecure are more likely to be malnourished as their diets are poor and lower in nutritional quality compared to food secure children and adolescents (Fram et al., 2015; Landry et al., 2019b). The influence of FI on children and adolescents suggests that hunger may also negatively impact cognition. In a systematic review by Shankar et al. (2017), FI in infants, children and adolescents was associated with poorer academic performance and inattention. In longitudinal studies, FI has been related to poor cognitive development. For example, a study of >21,000 American children found that FI at the age of 4 years predicted poorer maths and reading scores at age 7-8 years (Jyoti, Frongillo, & Jones, 2005). Furthermore, a study of >1,100 British twins found that those raised in a household with FI were more likely to have lower intelligence quotient scores at the age of 12 years compared to those from a food secure household (Belsky, Moffitt, Arseneault, Melchior, & Caspi, 2010). These findings combined with the findings from section 7.1.1 demonstrate that poor dietary intake has a detrimental association with both the cognitive functioning and psychological wellbeing of children and adolescents. Thus, interventions that focus on enhancing dietary intake to support psychological wellbeing (see section 7.2) may also have a beneficial effect on cognitive functioning, which could also support schoolchildren's learning.

7.2. Food provision to support psychological wellbeing and learning

The association between FI and poor psychological wellbeing, and frequent breakfast consumption and better psychological wellbeing observed in this thesis, suggests that food provision such as food provided in schools may play a critical role to support schoolchildren's psychological wellbeing, reduce hunger and promote learning. In the school environment, food provision for both breakfast and lunch is regulated by law (School Food Regulations, 2014; No. 1603 Education, England). The School Food Standards and legislation (School Food Regulations, 2014) stipulate that schoolchildren should be provided a balanced diet (e.g. fruit, vegetables, unrefined starchy foods, dairy and meat) and stipulate how often certain foods should be provided (Department for Education, 2019). These standards mean that foods offered at schools have to meet a minimum nutritional standard so that schoolchildren obtain healthy dietary intake. The NFS (Dimbleby, 2021) acknowledges the importance of school food provision and the school environment for healthy eating. The NFS

recommends that food should be made part of schoolchildren's day via a 'whole school approach' and for the FSM eligibility to be expanded (see section 7.2.3).

7.2.1. Breakfast provision

The associated benefits of breakfast consumption for children and adolescents in previous research (see section 1.6.3, 7.1.1 and 7.1.2) and this thesis highlights the importance of schoolchildren's breakfast consumption. This thesis demonstrated a consistent association between breakfast consumption and better psychological wellbeing, irrespective of breakfast location. Breakfast location may influence the type of breakfast consumed. For example, breakfast provided by schools is regulated (see section 7.2), and may differ from the types of food consumed for breakfast at home or on the way to school. Breakfast location was not reported on the various questionnaires in a manner which permitted its inclusion as a variable in the analysis of the associations between HBC, FI and psychological wellbeing in this thesis. Therefore, it remains unclear whether breakfast location was associated with psychological wellbeing and FI.

The present thesis demonstrates the importance breakfast consumption to support schoolchildren's wellbeing. There are a number of ways in which schoolchildren could be encouraged to eat breakfast. One way that schoolchildren could be supported to consume breakfast is through SBPs (see section 1.6.2). These programmes are typically targeted at schoolchildren from low-income families, those who experience deprivation or attend a school that is in a deprived area. However, targeted breakfast provision excludes disadvantaged schoolchildren attending a school that does not meet the stringent criteria for a supported SBP such as Magic Breakfast. SBPs also do not reach other schoolchildren who might benefit from school breakfasts which encourage attendance and social interaction with peers. In comparison to targeted provision, a universal free breakfast programme, similar to the one implemented in Wales (Welsh Government, 2015) could ensure all schoolchildren are given the best start to their school day and support their wellbeing. An evaluation of the Welsh universal SBP in 2013 found that schoolchildren who attended a school that implemented the SBP, there was a reduction in breakfast skipping and children consumed a greater number of healthy breakfast items compared to schoolchildren attending schools that were waiting to implement the SBP (Moore et al., 2014). These benefits were greater in schools located in more deprived areas (as measured by FSM

eligibility). However, more recent evaluations of the Welsh programme are required to examine if these benefits remain and if there are any additional benefits to schoolchildren's wellbeing and learning.

Other ways in which schoolchildren could be encouraged to consume breakfast is through nutritional education and breakfast campaigns. Research has found that negative attitudes towards breakfast consumption in children and adolescents is associated with breakfast skipping (Martens, Assema, & Brug, 2005; Tapper et al., 2008; see section 7.3.2). Therefore, education about the benefits of breakfast may increase breakfast consumption. In a study of mothers of 1-5-year-old children in the USA from low-income backgrounds, the effectiveness of one session of breakfast education (which focused on how to reduce breakfast skipping and the importance of healthy breakfasts) was examined (Au, Whaley, Rosen, Meza, & Ritchie, 2016). Mothers were randomly assigned to receive the educational information either in person or online. The researchers found that at 2 and 4 months follow-up, mothers in both groups reported a reduction in barriers to breakfast consumption and both parents' and children's breakfast frequency increased. Although these findings focus on younger children than those sampled in the present thesis, a similar approach to educate schoolchildren and their parents about breakfast may help increase breakfast consumption for schoolchildren and support their wellbeing. The NFS (2021) also recommends an improvement in food education in schools. This recommendation may increase healthier eating habits in schoolchildren and highlights the importance of the school environment for schoolchildren's wellbeing.

Focused breakfast campaigns by the government may also increase schoolchildren's breakfast consumption. For example, the current Change4Life campaign led by Public Health England (2021) could specifically focus on breakfast eating as a health promotion strategy. A breakfast campaign could encourage parents to provide children breakfast at home and may be a cost-effective opportunity to promote schoolchildren's breakfast consumption. However, it was estimated that the amount of money spent by the food industry to advertise unhealthy eating was approximately 30 times the amount spent on the Change4Life campaign (O'Dowd, 2017). Campaigns that promote positive eating habits such as breakfast are required, but how

beneficial health promotion campaigns are to offset the influences from advertising that encourages unhealthy eating is unclear.

Many children from low SES backgrounds or from food insecure families are more likely to skip breakfast (Harvey-Golding et al., 2016; Rampersaud, 2009). The present thesis analysed data from >17,500 schoolchildren from different schools across Leeds and consistently demonstrated that food insecure schoolchildren reported poorer psychological wellbeing (see Study 1-3). Some of the causes of FI can be attributed to inadequacies in the welfare system and lack of income for some families (House of Commons, 2019; UK Stakeholders for Sustainable Development, 2018). Therefore to support schoolchildren from these backgrounds and encourage consumption of breakfast, increasing welfare support in the form of vouchers which allow families to purchase breakfast foods could further encourage breakfast consumption.

7.2.2. Food insecurity and psychological wellbeing

FI was consistently associated with poorer psychological wellbeing pre, during and post-lockdown (Study 1-3). However, FI only accounted for a small variance in psychological wellbeing scores (see Study 2-3). This means that there are other factors which explain the relationship between FI and psychological wellbeing that the studies presented in this thesis were unable to account for. Some of these additional factors may include food accessed via wider provision such as FSMs, food banks and holiday food programmes. This provision was not directly examined in this thesis, but it is useful to consider as some schoolchildren may rely on these provisions as a source of food intake. Moreover, these provisions were available at the time of data collection for this thesis and may have offset some of the negative effects observed or may have enhanced some of the positive relationships that were observed.

7.2.3. Free school meals

FSMs for children and adolescents from some of the poorest households allows schoolchildren to access a healthy meal and may help reduce hunger, increase psychological wellbeing and promote learning in schoolchildren (see section 1.2.2.1 and 1.8.3). However, 2 in 5 schoolchildren below the UK's poverty line are not eligible for FSMs (Child Poverty Action Group, 2020b). This thesis found that the number of children with FI pre-lockdown (see Study 2, Ch. 4) who were not eligible for FSMs (n=4), and those food insecure and eligible for FSMs (n=5) was similar. These findings highlight that schoolchildren at risk of FI or experiencing FI were not

receiving FSMs prior to the pandemic. The Children's Society and Child Poverty Action Group asked the government in 2018 to provide FSMs for all children from families receiving Universal Credit in England (Child Poverty Action Group, 2018). However, eligibility criteria for FSMs did not change which meant that many schoolchildren in hardship during the pandemic were not able to access FSMs. The FSMs criteria may have contributed towards the increased FI during lockdown demonstrated in the present thesis findings (see Study 3, Ch. 5) and other studies (Bhattacharya & Shepherd, 2020; Goudie & McIntyre, 2021). This thesis (see Study 3) also found that during lockdown a greater number of children who experienced FI were not eligible for FSMs (n=16) compared to those who were food insecure and eligible for FSMs (n=6).

The government provided food vouchers as a substitute for FSMs during the first lockdown (see section 1.8.3). However, this scheme was inadequate to meet the food needs of schoolchildren. The scheme excluded those eligible for universal FSMs and there were issues with food accessibility for families eligible for the vouchers. Despite these issues, the government continued to implement the scheme with the same supplier in the third national lockdown (Lalli, 2021). FSMs provided in the school environment are regulated in terms of their nutritional quality (see section 7.2). However, food purchased via the food vouchers were not regulated and families could use the vouchers to buy any type of food. Dietary quality of schoolchildren who accessed the voucher scheme was likely to be poor during the first lockdown. It has been found that 45% of schoolchildren who used the voucher scheme did not have any fruit and 55% had no vegetables during a 3-day dietary assessment (Defeyter & Mann, 2020). Furthermore, schoolchildren also reported that intake of unhealthy snacks (e.g. crisps, chocolates, sweets) and sugar-sweetened beverages increased in comparison to pre-lockdown (Defeyter & Mann, 2020). The nutritional quality of schoolchildren's diet during lockdown was compromised as was their ability to access food via the voucher scheme, which may have increased the risk of FI and reduced psychological wellbeing.

The increased financial hardship due to the pandemic contributed towards lack of food and further exacerbated FI for some families. However, the Job Retention Scheme offered some financial protection for families but this is due to end in September 2021.

This means that unemployment could rise and more families may face financial difficulties (Francis-Devine & Ferguson, 2021). The impact of further financial hardship may increase FI in these families and negatively impact children's psychological wellbeing, which highlights the need for further support from the government. There have been recommendations for the government to support schoolchildren's wellbeing through increasing access to FSMs. For example, Child Poverty Action Group (2020a) proposed a universal FSMs approach to support all schoolchildren and reduce inequalities, increase healthy dietary intake, reduce financial burden on families and support schoolchildren's learning. Universal FSMs provision may help increase the food intake of all schoolchildren, including those experiencing FI but not eligible for FSMs. However, it is unlikely that this universal FSMs proposal will be implemented by the government as it would cost an additional £1.6 billion (Child Poverty Action Group, 2020a). Alternatively, the NFS (Dimbleby, 2021) recommends that the government increases the income threshold for FSM eligibility from £7,400 to £20,000 in order to support an additional 1.1 million schoolchildren. If implemented, it is projected that approximately 75% of schoolchildren with FI would be provided with FSMs. There has not yet been a governmental response to the NFS plan, therefore it remains unclear if this recommendation will be fulfilled.

7.2.4. Food banks and holiday food programmes

Other wider food provisions that were available at the time of this thesis included food banks and holiday programmes. The existence of and need for these provisions highlights that some schoolchildren rely on food banks and holiday programmes as a source of food pre, during and post-lockdown. Pre-COVID-19 food bank usage in the UK was a major concern, with the number of food parcels distributed to families with children and adolescents increasing yearly (The Trussell Trust 2020b; see section 1.2.2.2). Moreover, many food insecure families relied on food banks as a source of food pre-pandemic (Loopstra, 2020; Prayogo et al., 2018). Rates of food bank usage increased during the pandemic, with an 84% increase in food parcels distributed in April 2020, compared to February 2020 (Bramley, Treanor, Filip, & Littlewood, 2021). When examining rates of food parcels provided to children during April 2020, there was a 107% increase compared to the previous year (The Trussell Trust, 2020c). These figures highlight the high rates of hunger children and adolescents experienced during lockdown, and are consistent with the findings of this thesis (see Study 3).

Although, food parcels may protect some families from FI and reduce hunger, the nutritional quality of food provided in food parcels is poor. Research demonstrates that food parcels often contain high levels of free sugars and the food does not meet the recommended UK dietary reference values (British Nutrition Foundation, 2019) for vitamin A, vitamin D and calcium (Fallaize, Newlove, White, & Lovegrove, 2020; Turnbull & Bhakta, 2016). These findings suggest that the dietary intake of those accessing food banks could be compromised. Poor dietary intake is related to poorer psychological wellbeing and cognitive function (see sections 7.1.1 and 7.1.2), therefore, children and adolescents who rely on food bank parcels and experience FI may also experience poorer wellbeing.

Holiday clubs are another type of food provision that support schoolchildren. Holiday clubs are typically funded by the Department for Education (2021) through the Holiday and Activities Food programme or by voluntary organisations such as religious groups and charities (Mann, Long, Stretesky, & Defeyter, 2018). The aim of these programmes is to reduce hunger that some schoolchildren from low-income families or those eligible for FSMs experience in the school holidays by providing meals and an enriching environment to support schoolchildren's wellbeing and learning. Schoolchildren from families that experience FI benefit from attending holiday clubs as these clubs can reduce food costs during the holidays and may help reduce household FI (Long et al., 2018). Holiday clubs were available pre-pandemic as it was recognised that schoolchildren from poor families were disproportionately affected by the lack of school food provision during the holidays and can experience holiday hunger. However, due to the COVID-19 restrictions many of these holiday programmes were unable to operate in the usual way. The Department for Education (2021) stipulated that if face-to-face holiday programmes were unable to go ahead due to COVID-19 restrictions, schoolchildren eligible for the programme needed to be provided with activities, social support and healthy food. However, it is unclear how these programmes were delivered during the pandemic and whether schoolchildren were able to access a holiday club.

In recognition of the need for these food provisions for disadvantaged schoolchildren, the government committed to providing more funding for food banks and the Holiday Activities Food programme in 2021 (Policy in Practice, 2020). Although these are

welcomed provisions, they are short-term solutions to reduce the impact of the pandemic on schoolchildren's FI. There is also no indication whether funding will be extended beyond 2021. The NFS (Dimbleby, 2021) advocates for an extension of the Holiday and Activities Food programme until 2024. The strategy asks the government to widen this provision to more schoolchildren by increasing the income threshold for FSM eligibility (see section 7.2.3), which means that 1.38 million schoolchildren would become eligible for the programme. Longer-term solutions to increase schoolchildren's dietary intake such as universal FSMs, universal SBPs, increasing access to holiday clubs, and increasing income for poor families may be better strategies to mitigate the potential long-term impact of the pandemic and to protect the wellbeing of all schoolchildren.

7.3. Unmeasured variables in this thesis

Factors that were not measured in the studies in this thesis may have impacted the findings and offer further explanations of the relationships between FI and psychological wellbeing, and HBC and psychological wellbeing. This is likely given that FI accounted for a small variance in the relationship between HBC and psychological wellbeing in this thesis. **Error! Reference source not found.** displays the influence of these unmeasured factors alongside the relationships observed in this thesis.

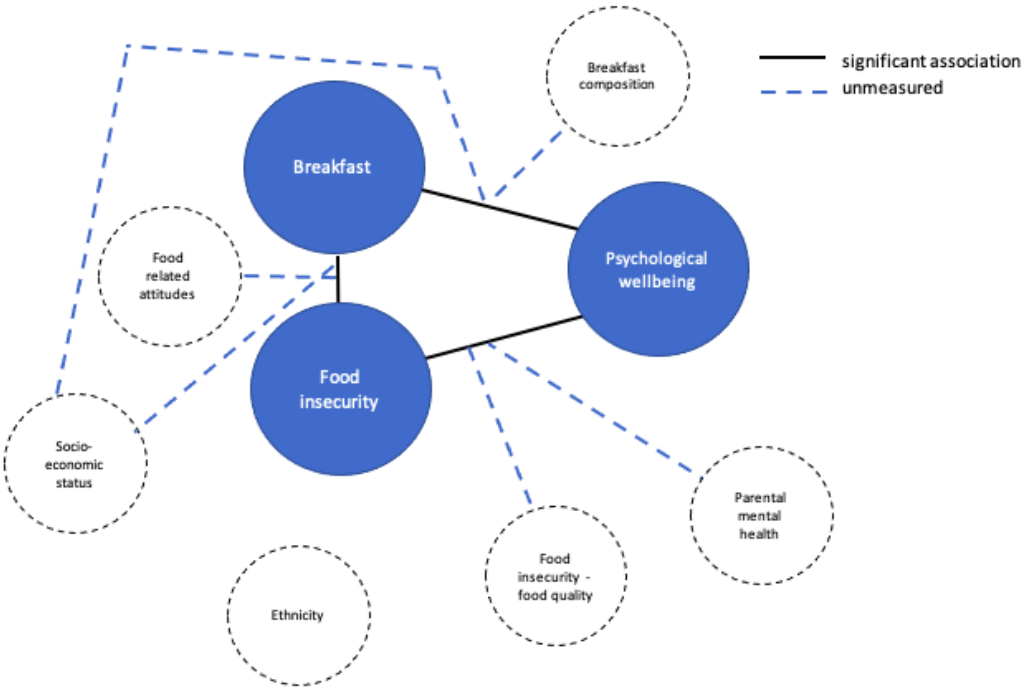

Figure 7.2: Diagram showing the associations observed in this thesis and potential influence of related unmeasured factors.

7.3.1. Breakfast composition and definition

Breakfast composition was not measured in this thesis. Food diaries or food frequency questionnaires could have been utilised to understand the importance of breakfast composition in the association between HBC and psychological wellbeing, since research suggests that breakfast quality is associated with psychological wellbeing (Ferrer-Cascales et al., 2018; see section 3.8.1). Breakfast was also not defined for participants as there is no universally agreed definition of breakfast (Gibney, Barr, Bellisle, Drewnowski, Fagt, Livingstone, et al., 2018; see section 1.6.1). Some researchers define breakfast whilst in other studies the definition of breakfast is open to interpretation by the participant (Adolphus et al., 2017; O'Neil et al., 2014). Differentiating between weekday vs. weekend breakfast was also not considered. In the four studies in this thesis, one-item assessed breakfast frequency across the whole week and the studies were unable to determine if breakfast consumption varied on weekdays vs. weekend. However, children and adolescents' breakfast consumption can vary between weekdays and the weekend, with breakfast skipping more likely on a weekend, and the types of foods consumed for breakfast during weekdays and weekend vary (Alexy, Wicher, & Kersting, 2010; Coulthard et al., 2017).

7.3.2. Food related attitudes

Food related attitudes are important in promoting eating behaviours and may have influenced the association between frequent breakfast consumption and better psychological wellbeing, and FI and poor psychological wellbeing. Positive attitudes towards breakfast consumption are associated with more frequent breakfast consumption in children and adolescents (Martens et al., 2005; Tapper et al., 2008), whereas negative attitudes towards breakfast are related to breakfast skipping (Tapper et al., 2008). Food insecure adolescents also demonstrate more negative attitudes towards healthy eating (Widome et al., 2009), and negative attitudes towards healthy eating have also been observed in children from deprived backgrounds (Moore et al., 2007).

7.3.3. Parental mental health

Children and adolescents' parental mental health was not measured in the studies in this thesis. Parental mental health can impact children and adolescents' psychological wellbeing. Numerous studies suggest that the mental health of parents is associated

with their offspring's mental health, with children and adolescents more likely to report mental health difficulties if their parent has poor mental health (NHS Digital, 2018a; Vizard et al., 2020; Wolicki et al., 2021). There is also a similar association between parental mental health and FI, with reports of maternal depression significantly higher in food insecure children compared to food secure children (Melchior et al., 2012). Other studies also suggest that maternal depression is a risk factor for FI, with higher rates of FI in households where mothers report depression (Garg, Toy, Tripodis, Cook, & Cordella, 2015; Leung, Epel, Willett, Rimm, & Laraia, 2015).

7.3.4. Food quality in the context of food insecurity

FI was measured in two ways, through the one-item FI measure in the MHMS survey (see Study 1, Ch. 3) and the 9-item validated CFSSM. However, neither measure specifically examined food quality in the context of FI. The MHMS survey examined the worry aspect of FI, whereas the 'experience based' CFSSM examined broader aspects of FI such as food access, availability and stability. It would have been beneficial to assess food quality alongside these measures through the use of dietary diversity measures (Beacom et al., 2020b). This may have allowed for consideration of the types of food consumed and dietary quality, as FI has been found to be associated with poor diet quality (Fram et al., 2015; Landry et al., 2019b).

7.3.5. Ethnicity

Although ethnicity data was gathered in all studies in this thesis, ethnicity was not considered in the analysis of associations between HBC, FI and psychological wellbeing (see sections 4.6.4, 5.7.5 and 6.7.4).The majority of the samples in each study were White and the small cell count for other ethnicities did not permit consideration of ethnicity in these tests of association. Previous research considering differences in breakfast consumption and psychological wellbeing according to ethnicity is mixed. Some research in the UK suggests that Black Caribbean and Black African adolescents are more likely to skip breakfast compared to their white British peers (Harding et al., 2008), whereas other research suggests no difference in breakfast behaviour according to ethnicity (see section 1.6.4.3). When considering the influence of ethnicity on psychological wellbeing, some researchers report that girls from mixed ethnic backgrounds are more likely to have mental health difficulties than white British peers (Roe, 2018). However, a systematic review reported that children

and adolescents from minority ethnic backgrounds had similar or better psychological wellbeing than White British children and adolescents (Gutman et al., 2015).

7.3.6. Socio-economic status

The moderating effect of SES could not be confirmed in the present thesis due to the study design. FSM eligibility was utilised as a proxy indicator for SES in the present thesis. There was no difference in psychological wellbeing or FI between different categories of FSM eligibility (see section 4.5.3 and 5.5.4). There were a similar number of children who indicated that they were food insecure who reported that they were eligible for FSM and children who were food insecure and not eligible for FSM. It could be speculated that in the present thesis, SES moderated the relationship between infrequent HBC and poorer psychological wellbeing, and FI and poorer psychological wellbeing. Both FI and poor psychological wellbeing have been found to be associated with low SES in previous research (see section 1.7). However, utilising FSM eligibility as a proxy for SES was unlikely to identify all children from deprived backgrounds (Child Poverty Action Group, 2020b; see section 7.2.3) which could explain why psychological wellbeing or FI status did not differ according to FSM eligibility. An alternative and more accurate measurement of SES is the Index of Multiple Deprivation (Ministry of Housing Communities & Local Government, 2019). This index may have been able to identify more children who were from deprived backgrounds but the index was not considered in the present thesis.

7.4. The socio-political context and longer-term implications of lockdown on food insecurity and psychological wellbeing

The high rates of FI (FSA, 2019; see section 1.2.2) and poor mental health in British children and adolescents (Vizard et al., 2020; see section 1.4.3) pre-COVID-19 were increasing yearly. This underpinned the rationale for the research presented in this thesis, prior to the COVID-19 pandemic and associated lockdown. However, during lockdown increased reports of FI and poor psychological wellbeing was demonstrated (see Study 3, Ch. 5). In addition to the immediate detrimental impact of lockdown, it is likely that lockdown will have a significant lifetime impact on children and adolescents. Long-term effects of the pandemic on schoolchildren's wellbeing are predicted, with children and adolescents worldwide at risk of increased poverty and FI, reduced academic attainment and poor physical and mental health (UNICEF, 2020). The potential for these multiple negative long-term consequences following

lockdown indicates that addressing the issues of FI and poor psychological wellbeing in children and adolescents are even more pertinent.

When considering the longer-term implications of the COVID-19 pandemic, useful lessons can be learnt from the 'Great Recession' (Bell & Blanchflower, 2010) in 2008. This is because similar to the COVID-19 pandemic, the 2008 recession had a substantial impact on the UK economy, a detrimental impact on food security (Loopstra, Reeves, McKee, & Stuckler, 2016) and reduced children's psychological wellbeing (Hiilamo, Hiilamo, Ristikari, & Virtanen, 2021). Post-2008 recession, to reduce the country's debt, the English government introduced significant welfare reforms, which resulted in benefit cuts and widened inequalities that disproportionally impacted disadvantaged families. The economic effects of the COVID-19 pandemic have also resulted in substantial levels of government borrowing, much greater than observed during the Great Recession, and it is predicted that the government may implement further policies to reduce the country's debt (Lea, 2020). However, austerity measures implemented post-pandemic are likely to be detrimental for psychological wellbeing based on research which suggests that the post-2008 welfare reforms and austerity may have contributed towards poorer psychological wellbeing (Barr, Kinderman, & Whitehead, 2015). In contrast, good welfare support can reduce the risk of FI (Loopstra et al., 2016). Elevated levels of FI and poor psychological wellbeing in children and adolescents during lockdown were evident in Study 3 and other research (see section 1.8.3 and 1.8.5). Financial protection offered by the increase in Universal Credit and the Job Retention Scheme is due to end in September 2021. Therefore, this research suggests that further support and adequate financial protection for schoolchildren and their families is required post-lockdown. Marmot, Allen, Goldblatt, Herd, and Morrison (2020) have also said that it is crucial that long-term policies that reduce austerity and inequalities are implemented to protect schoolchildren's wellbeing.

When examining the longer-term impact of FI on children and adolescents' wellbeing, childhood obesity is an important factor for consideration. Childhood obesity is increasing rapidly in the UK and it is estimated that one in five UK children are obese (Department for Health and Social Care, 2020). There is a positive relationship between FI and obesity, (Moore & Evans, 2020; Spoede et al., 2020), and children

who are obese are also more likely to be from low SES backgrounds (Aceves-Martins et al., 2018; Leyva et al., 2020). The obesity-FI paradox highlights that both FI and obesity can co-occur. The paradoxical nature of this association is because FI is characterised by lack of food, whereas obesity is related to excessive food intake. Although the cause of this association is unclear, both FI and obesity are related to poor dietary intake (Tester, Rosas, & Leung, 2020). Poor dietary intake can be detrimental to schoolchildren's wellbeing. However, the most recent obesity strategy neglects the role of FI in the obesity epidemic (UK Stakeholders for Sustainable Development, 2018). Thus, FI deserves further attention alongside obesity, and the link between FI and obesity needs to be considered when developing interventions to mitigate the effects of FI and its association with psychological wellbeing.

7.5. Clinical implications

7.5.1. The role of Clinical Psychologists in mental health services

Clinical Psychologists often work in settings such as CAMHS to provide assessment and treatment of mental health difficulties. The levels of psychological distress reported by most children and adolescents in the studies in this thesis would be unlikely to meet the criteria for referral to CAMHS. However, the impact of lockdown on children's psychological wellbeing demonstrated by the increased rates of mental health difficulties in British children and adolescents (Vizard et al., 2020), highlights a greater need for mental health services due to the pandemic. During the first lockdown, CAMHS and associated mental health services reduced support and many moved to remote working. It is estimated that 4 in 10 CAMHS did not provide online support and instead of evidence-based digital interventions, 64% of CAMHS offered only online resources during lockdown (BfB Labs, 2020). The lack of appropriate early intervention and untreated mental health need during lockdown may explain estimates that 1.5 million children and adolescents will need psychological support following the pandemic (O'Shea, 2020). As a result of the pandemic, waiting times to CAMHS have further increased, although referrals reduced, which was likely due to the lack of contact between children and adolescents and potential referrers (e.g. General Practitioners and school teachers) during lockdown (Danese & Smith, 2020; Tromans et al., 2020). After the first lockdown, many mental health services for children and adolescents continued to work remotely with reduced provision. Therefore, it is anticipated that the increased need to support the mental health of

children and adolescents due to the pandemic will be an integral role of Clinical Psychologists for many years post-pandemic.

When considering FI, the assessment of FI by Clinical Psychologists in children and adolescents' mental health is an important neglected factor. The consistent findings across Study 1-3 that FI is associated with poorer psychological wellbeing suggests that it is important for Clinical Psychologists to incorporate FI in case formulations to better understand a child or adolescent's difficulties. Clinical Psychologists could implement the one-item FI measure in the MHMS survey, the CFSSM as a screening tool or some other brief FI questions to capture the food security experiences of children and adolescents in their clinical practice. The beneficial impact of therapy may be compromised if factors such as FI are not considered. By assessing FI, Clinical Psychologists could monitor FI rates in clinical populations. Through recognition of the association between FI and mental health, they could also provide evidence for interventions to support the psychological wellbeing of food insecure individuals. Thus, the need to consider FI alongside mental health by Clinical Psychologists is necessary given the COVID-19 pandemic and lockdown and its association with food security and psychological wellbeing.

7.5.2. The role of schools to support wellbeing

Schools play an important role in addressing inequalities faced by disadvantaged children and mitigating the impact on academic and life outcomes. Children and adolescents who experience FI are more likely to come from low income families (Chang et al., 2014; Tingay et al., 2003) and have poorer academic, social, emotional and behavioural outcomes (Cooper & Stewart, 2017). Disadvantaged English schoolchildren (indicated by FSM eligibility) achieve lower exam results compared to their non-disadvantaged peers (Hutchinson, Reader, & Akhal, 2020). The 'disadvantage gap' highlights the divide between disadvantaged and non-disadvantaged schoolchildren, which worsened during lockdown. The learning loss experienced when schools closed during lockdown suggests that disadvantaged primary schoolchildren are seven months behind in their reading and maths progress compared to their non-disadvantaged peers (Rose et al., 2021). These findings highlight the damaging impact of lockdown on schoolchildren's learning and the need to support schoolchildren to achieve their potential post-lockdown. Besides food provisions to support schoolchildren's wellbeing (see section 7.2), professionals in

schools could identify schoolchildren's FI and poor psychological wellbeing to provide appropriate intervention in order to prevent further deterioration.

7.5.2.1. School teachers

Children and adolescents spend a substantial amount of time at school which means that teachers are well-placed to identify presence of persistent hunger in schoolchildren. Prior to the COVID-19 pandemic, 28% of teachers reported an increase in children arriving to school hungry (Kellogg's, 2013). Teachers' concerns about hungry schoolchildren have increased during lockdown. Prior to the reopening of schools in September 2020, 57% of teachers expected schoolchildren's hunger to increase and 64% of teachers reported hunger would impact children's learning (Magic Breakfast, 2020b). Teachers often buy schoolchildren food to reduce their hunger (Furey, Davidson, & McDowell, 2019), however this does not address the underlying social and economic disadvantage that hungry or food insecure schoolchildren experience. There is a need to increase teachers' awareness of FI as a societal issue, appropriate ways to intervene such as helping families to access support (e.g. means-tested benefits such as FSMs), as well as a whole-school approach to encourage open conversations about poverty (National Education Union, 2021).

This thesis found that FI was associated with poorer psychological wellbeing. Thus, teachers could also support the psychological health of schoolchildren. Some schoolchildren rely on support from their teachers, with 54% of adolescents with mental health needs reporting that they required mental health support from their teachers when they returned to school after lockdown (Young Minds, 2020). In England, 19% of children reported that they wanted their school to provide mental health support post-lockdown (Children's Commissioner, 2020a). Teachers may be the only contact schoolchildren have with professionals, especially during COVID-19 restrictions. Therefore, teachers play an important role to support schoolchildren's wellbeing. However, teachers are pressured with high workloads which impacts their own wellbeing (National Education Union, 2018), and demonstrates that teachers may be underequipped to deal with the impact of FI and poor psychological wellbeing in schoolchildren.

7.5.2.2. Educational Psychologists and Educational Mental Health Practitioners

Teachers could refer schoolchildren who are hungry, and also experiencing academic difficulties or poor psychological wellbeing to Educational Mental Health Practitioners or Educational Psychologists. School-based mental health and wellbeing support was a priority for the government in England pre-lockdown with the development of Educational Mental Health Practitioners (Brown, 2018; Department of Health and Department of Education, 2017). These practitioners support psychological wellbeing in schools and prevent further worsening of mental health in order to reduce the need for CAMHS (Ludlow et al., 2020). The findings that psychological wellbeing reduced and FI increased during lockdown suggests that Educational Mental Health Practitioners could focus on supporting schoolchildren experiencing these difficulties post-lockdown. For example, Educational Mental Health Practitioners could use the M&MF to assess mental health difficulties and the CFSSM to measure FI in order to intervene with appropriate support for schoolchildren. Additionally, the role of Educational Psychologists to support learning or mental health difficulties that may impact schoolchildren's education should be a valuable resource to support schoolchildren who may also be experiencing FI. However, significant changes to the way of working for Educational Psychologists, such as the shift from local authority funding to becoming traded services, have led to a reduction in the number of Educational Psychologists in England, especially for the most vulnerable schoolchildren (Times Educational Supplement, 2019). Therefore, increasing the access to Educational Psychologists and extending the remit of both Educational Psychologists and Educational Mental Health Practitioners, to consider FI and its association with psychological wellbeing could be a valuable resource to improve the academic outcomes of schoolchildren and enhance their wellbeing post-lockdown.

7.6. Future research

There are several avenues of research that are suggested by the findings of this thesis. In order to determine causality of the association between HBC and psychological wellbeing, intervention studies that provide breakfast and measure both psychological wellbeing and FI using validated measures are required. Such research may provide causal evidence for the role of breakfast consumption in increasing psychological wellbeing and reducing FI. It would also be beneficial for future research to consider the influence of breakfast location on the association between HBC, FI and

psychological wellbeing. Evidence from this research could determine whether location of breakfast consumption, for example, at school is associated with better psychological wellbeing and/or lower FI than children who consume breakfast at home or elsewhere. The studies in this thesis demonstrate that the CFSSM is a feasible measure for use in 9–11-year-olds. However, the measure has not been validated in those <12 years, therefore research to validate this measure in 9-11-year-olds in the UK would provide further confidence in the findings and a validated measure for future research. The importance of utilising self-reports of psychological wellbeing and FI in children ≤11 years was also highlighted in this thesis. Most self-reported psychological wellbeing measures are for those >11 years and the CFSSM is typically utilised in those ≥12 years. Therefore, it is recommended that future studies examining the association between HBC, psychological wellbeing and FI continue to utilise child self-reported measures vs. parental proxy reports. The present thesis was only able to demonstrate the negative impact of lockdown on psychological wellbeing and FI in the context of the first lockdown (23rd March-4th July 2020). Longitudinal studies of children and adolescents' wellbeing beyond the first lockdown would be beneficial to understand the longer-term effects of the subsequent lockdowns on schoolchildren's HBC, FI and psychological wellbeing which could support the development and implementation of appropriate interventions.

7.7. Conclusion

Overall, the four studies presented in this thesis have demonstrated a consistent relationship between FI and poorer psychological wellbeing pre, during and post lockdown, and an association between frequent breakfast consumption and better psychological wellbeing pre-lockdown. The wider ramifications of lockdown on children's wellbeing, such as increased FI and reduced psychological wellbeing, highlights the potential for adverse outcomes for schoolchildren's wellbeing. Post-lockdown, there is a clear need for appropriate assessment and intervention via a multi-level approach to support schoolchildren's wellbeing and mitigate the impact of lockdown. This support could be provided through schools, mental health services and government policies (e.g. universal FSMs and SBPs) to help reduce the risk of FI, poor psychological wellbeing and support schoolchildren's learning post pandemic.

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9. Appendices

9.1. Study 1: My Health My School survey 2018-2019

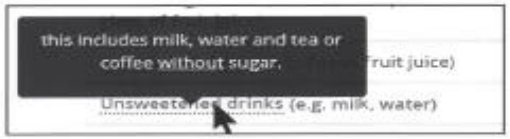
My Health My School 2018-19 (All Years)

Welcome to the My Health, My School Survey 2018/19

This survey asks questions about your health and wellbeing and what you think about your school/college. The answers you give will help your school/college to make things better for you and for others.

The survey will not ask for your name or any other personal details, which means that no one will know which answers you have chosen.

Please answer each question carefully and truthfully. If you do not know what any of the words mean you can ask staff for help or hover the computer arrow (cursor) over the word as shown in the picture below.



Please tick one answer for each question unless it states you can tick more than one, if you are unsure please ask a member of staff for support.

We hope that you enjoy completing this survey and that it does not upset you in any way, however if it does you can stop at any time and your answers will not be saved.

Information Sharing

Your school/college survey results may be used by them, School Nursing Service and Leeds City Council. In addition the survey may also be shared with organisations, such as the University of Leeds and Leeds Beckett University.

We will comply fully with all data protection legislation. This means we will keep your data safe and secure, now and in the future.

I have read and understood the information above and am happy to complete the survey.

✓ I agree

*All pupils/students must tick this agreement before doing the survey

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All About Me – Section A

1. Please select your gender **(A1)**

	Tick
Male **(Includes Year 3 & 4 for P.E Question purposes only)**	
Female **(Includes Year 3 & 4 for P.E Question purposes only)**	
Trans **(Year 7/9/11 & P16 option only)**	
I would describe my gender in some other way	
I would prefer not to say	

2. How would you describe your sexual identity? **(Year 9, 11 & P16 only) (A2)**

	Tick
Heterosexual	
Gay/Lesbian	
Bi-sexual	
I would describe my sexual identity in some other way	

3. Which of these describes you? **(A3)**

	Tick
White (British, Irish, Traveller or Irish Heritage, Gypsy, Roma and any other White background)	
Asian (Asian British, Indian, Pakistani, Bangladeshi, Chinese and any other Asian background)	
Black (Black British, Black Caribbean, Black African and any other Black background)	
Mixed (White and Black Caribbean, White and Black African, White and Asian and any other Mixed background)	
Other Ethnic Group	
Don't know / Prefer not to say	

4. Do you have, or do you consider yourself to have, a disability? **(A4)**

	Tick
No	
Yes	

5. Where do you live? **(A5)**

	Tick
I live with my parent(s)	
I live with other family members	
I am living independently **(P16 only)**	
I live in a children's home	
I live with foster carers	
I live with someone else	

6. Do you have a free school meal? **(Year 7, 9 & 11 only) (A6)**

	Tick
No, I don't have a free school meal	
No, I can have a free school meal, but choose not to have it	
Yes, I have a free school meal	

9.1. Study 1: My Health My School survey 2018-2019

I don't know	

7. Which of these describes you as a student? **(P16 only)** **(A7)**

	Tick
I am a post 16 student at the school I attended in Year 10 & 11	
I am a post 16 student who attended another school in Year 10 & 11	
I am a college student	
Other	

Healthy Eating – Section B

8. In a normal **week**, how often do you have breakfast (this means not just a snack or a drink)? **(B1)**

	Tick
Every day (7 days)	
Most days (4-6 days)	
Some days (2-3 days)	
Rarely (1 day)	
Never (0 days) **(Go to Q10)**	

9. On a normal school/college day, where do you eat breakfast? **(B2)**

	Tick
At home	
At another family members home	
At my friends home	
At my child-minders **(Year 5/6 only)**	
At my school's breakfast club **(Year 5, 6, 7, 9 & 11 only)**	
At school/college but not at breakfast club	
On the way to school/college	
Other	

10. In a normal week, how often do you have the following (this means not just a snack or a drink)? **(B3)**

	Everyday (7 days a week)	Most days (4 to 6 days a week)	Some days (1 to 3 days a week)	Rarely (less than once a week)	Never (0 days a week)
Lunch					
Evening meal/ Dinner					

11. On a normal day, how many portions of the following do you have? **(B4)**

	None	1	2	3	4	5 or more
Snacks (crisps, chocolate bar, packet of sweets, biscuits)						

Fruit & vegetables (can include up to one medium glass of fruit juice)						
Sweetened drinks (e.g. Pepsi, fruit juice)						
Unsweetened drinks (e.g. milk, water)						
High energy drinks (e.g. Red Bull, Monster)						

12. How often do you brush your teeth? **(B5)**

	Tick
After every meal	
Twice a day	
Every day	
Every 2 or 3 days	
Once a week	
Never	

13. How often do you visit the dentist? **(B6)**

	Tick
Twice a year or more	
Once a year for a check up	
Less than once a year for a check up	
Only if something is wrong	
Never	

14. How much do you agree or disagree with the following statements? **(B7)**

	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
Pupils/students behave well in the dining area					
Queuing time is short in the dining area					
I can usually find a place to sit and eat my lunch in the dining area					
I enjoy eating in my school/college dining area					
I like the food provided by my school/college and it tastes nice					
At this school/college I have enough time to eat my lunch					
My school/college encourages me to drink water regularly					

Physical Activity and Sport – Section C

15. How do you usually travel to college? **(P16 only)** **(C1)**

	Tick
Walk	

9.1. Study 1: My Health My School survey 2018-2019

Car/Van	
Taxi	
Cycle	
Bus	
Train	
Park and Ride	
Other	

16. How many **minutes a day**, do you usually spend sitting down watching TV/playing computer games/using the internet/using a mobile phone? **(C2)**

	Tick
None 0 minutes	
1 – 60 minutes	
61 – 120 minutes	
121 – 180 minutes	
181 – 240 minutes	
241 – 300 minutes	
301 – 360 minutes	
361 + minutes	

17. How many **minutes a week** are you physically active for? **(C3)**

	241 + mins	181 – 240 mins	121 – 180 mins	61 – 120 mins)	1 – 60 mins	None 0 mins
In school/college lessons (e.g. P.E lessons)						
At school/college but not in lesson times (e.g. break/lunch times/after school)						
Outside of school/college – organised sports/dance (e.g. football, rugby, cricket, dance, Zumba, gymnastics, cycling, martial arts)						
Outside of school/college – playing out/recreational						

18. In the last four weeks, **not through school/college**, which of the following activities have you done? **(C4)**

	Yes	No
Visited a park or play area		
Been swimming		
Taken part in organised sports/dance (e.g. football, rugby, cricket, dance, Zumba, gymnastics, cycling, martial arts)		
Been to the gym **(Year 9, 11 & P16 only)**		

19. In a normal week how many times a week are you physically active for 30 minutes or more? **(C5)**

	Tick
14 or more	
13	
12	
11	
10	
9	
8	
7	
6	
5	
4	
3	
2	
1	
Never	

20. Does anything stop you from taking part in physical activities? **(Multi response – tick all that apply)** **(C6)**

	Tick
Nothing available in my area	
Nothing available when I want to do it	
Costs too much	
I can't get there	
I have no one to go with	
I don't have the time	
My parents/carers worry about me	
I don't know how to find out what's on offer	
I don't have the confidence	
Activities don't cater for my disability	
Nothing appeals to me	
Too much school/college work	
I have a job **(Year 9, 11 & Post 16)**	
Other	
Nothing stops me, I do take part in physical activity	
Nothing stops me from taking part, I just choose not to	

P.E in School - Section D

21. In the last 12 months, what sports/activities have you done in P.E lessons? **(Year 3, 4, 5 & 6 only)** **(Multi response – tick all that apply)** **(D1)**

9.1. Study 1: My Health My School survey 2018-2019

	Tick
Athletics	
Basketball	
Cricket	
Cycling	
Dance	
Dodgeball	
Football	
Gymnastics	
Hockey	
Judo	
Karate	
Multi-skills	
Netball	
Rounders	
Rugby	
Running	
Skipping	
Swimming	
Tag Rugby	
Tennis	
Volleyball	
Yoga	
Other	
I have not taken part in PE this year due to personal reasons	
I have not taken part in PE this year as it has not been timetabled for my year group	

22. Have you enjoyed P.E this year? **(Year 3, 4, 5 & 6 only)** **(D2)**

	Tick
Yes	
No	

23. In the last 12 months, have you represented school in a sports event? (e.g. Football, Multi skills, Netball, Dance competition) **(Year 3, 4, 5 & 6 only)** **(D3)**

	Tick
Yes	
No	

24. Has P.E encouraged you to do any of the following ….? **(Year 3, 4, 5 & 6 only)** **(D4)**

	Yes	No
Attend an after school club		
Join a sports club outside of school		

7

25. In the last 12 months, have you attended an afterschool club? **(Year 3, 4, 5 & 6 only**

	Tick
Yes	
No	

26. What after school clubs would you like school to offer?
(Year 3, 4, 5 & 6 only) **(Multi response – tick all that apply)** **(D6)**

	Tick
Athletics	
Basketball	
Cricket	
Cycling	
Dance	
Dodgeball	
Football	
Gymnastics	
Hockey	
Judo	
Karate	
Multi-skills	
Netball	
Rounders	
Rugby	
Running	
Skipping	
Tag Rugby	
Tennis	
Volleyball	
Yoga	
Other	
I am not interested in any after school clubs that school might offer	
I am happy with the sports club my school offers	

27. In the last 12 months, what sports clubs have you attended outside of school?
(Year 3, 4, 5 & 6 only) **(Multi response – tick all that apply)** **(D7)**

	Tick
Athletics	
Basketball	
Cricket	
Cycling	
Dance	

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Dodgeball	
Football	
Gymnastics	
Hockey	
Judo	
Karate	
Netball	
Rounders	
Rugby	
Running	
Skipping	
Swimming	
Tag Rugby	
Tennis	
Volleyball	
Other	
I haven't attended any sports clubs outside of school	

Drugs, Alcohol and Tobacco – Section E

28. Which of these describes you? (Multi response – tick all that apply) **(E1)**

	Tick
I do not live with anyone who smokes	
I live with someone that smokes outside the house	
I live with someone that smokes inside the house	

29. How often, if at all, do you travel in a car in which someone is smoking? **(E2)**

	Tick
Never (0 days)	
Rarely (less than once a week)	
Some days (1 to 3 days a week)	
Most days (4 to 6 days a week)	
Every day (7 days a week)	

30. Have you ever smoked a cigarette? **(E3)**

	Tick
No **(Go to Q33)**	
Yes	

31. How many cigarettes do you smoke on your own or share? **(E4)**

	Tick
I have tried a cigarette	
I used to smoke	
I sometimes smoke, but less than once a week	
1 to 6 a week	
1 to 4 a day	
5 to 9 a day	
10 or more a day	

32. Where do you get most of your cigarettes from? **(E5)**

	Tick
My friends provide them	
My parents provide them	
I smoke what I can find at home (without my parents knowing)	
Other family members provide them	
I get someone older to buy them for me	
I buy them from shops	
I buy them from pubs and clubs	
Other	

33. Have you ever heard of electronic cigarettes (e-cigarettes)? **(E6)**

	Tick
No **(Go to Q35)**	
Yes	
Yes and someone who lives in my house uses electronic cigarettes	
Don't know **(Go to Q35)**	

34. Have you ever used an electronic cigarette (e-cigarettes)? **(E7)**

	Tick
No, I have never used an electronic cigarette	
Yes, I have tried an electronic cigarette	
Yes, I use electronic cigarettes weekly	
Yes, I use electronic cigarettes daily	

35. Which of these describes you? **(E8)**

	Tick
I have never had a drink of alcohol **(Go to Q38)**	
I drink only at certain times with my family	
I have tried alcohol once or twice without my family knowing	
I sometimes drink, but less than once a month	
I sometimes drink, but less than once a week	
I drink alcohol once a week	
I drink alcohol 2 to 3 times a week	
I drink alcohol every day	

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36. Which of these describes you? **(Year 7, 9, 11 & P16 only)** **(E9)**

	Tick
I have never been drunk	
I have been drunk once	
I have been drunk a few times	
I am regularly drunk	
I drink to get drunk	

37. Where do you get most of your alcohol from? **(Year 7, 9, 11 & P16 only)** **(E10)**

	Tick
My parents provide it	
My friends provide it	
I drink what I can find at home (without my parents knowing)	
I buy it from shops	
I get someone older to buy it for me	
I buy it in pubs and clubs	
Other	

38. Have you ever been **OFFERED** illegal drugs or glues, gases and solvents as drugs? **(E11)**

	Tick
No	
Yes	

39. Have you ever **USED** illegal drugs or glues, gases and solvents as drugs? **(E12)**
(Year 7, 9, 11 & P16 only)

	Tick
No **(Go to Q41)**	
Yes	

40. How often have you used each of the following drugs? **(Year 7, 9, 11 & P16 only)** **(E13)**

	Never	Once or twice	Sometimes	Every month	Every week	Every day
Cannabis						
Drugs prescribed to someone else e.g. methadone						
Glues, gases or solvents as drugs						
Hallucinogens - LSD, magic mushrooms or ketamine						
Opiate drugs like heroin						
Steroids (not prescribed by a doctor)						
Stimulants - cocaine or crack						
Stimulants - ecstasy/MDMA						
Stimulants - speed/M CAT						
Tranquillisers – Alprazolam (Xanax)						
Other drug(s)						
A mix of drugs at the same time						

41. Have you ever used substances known as **New Psychoactive Substances**?
(These used to be known as legal highs, but are now illegal) **(Year 7, 9, 11 & P16 only)** **(E14)**

	Tick
No **(Go to Q43)**	
Yes	
I don't know what this is **(Go to Q43)**	

42. How often have you used each of the following **'New Psychoactive Substances'?** (These used to be known as legal highs, but are now illegal) **(Year 7, 9, 11 & P16 only)** **(E15)**

	Never	Once or twice	Sometimes	Every month	Every week	Every day
Cannabis like (spice)						
Depressant (has a similar effect to sleeping tablets and pain killers)						
Hallucinogen (has a similar effect to LSD, magic mushrooms)						
Stimulant (has a similar effect to cocaine, amphetamine, ecstasy)						
Other New Psychoactive Substances						
A mix of 'New Psychoactive Substances' at the same time						

Sexual Health – Section F

43. Do you understand what is meant by consent in relation to sexual activity? **(Year 9, 11 & P16 only)** **(F1)**

	Tick
Yes	
No	
I don't know what this is	

44. Have you ever sent a sexual image or video? **(Year 9, 11 & P16 only)** **(F2)**

	Tick
No, I haven't	
No , but I have felt pressured to	

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Yes, I have and it was my own choice	
Yes, I have but felt pressured to do it	

45. Have you ever felt pressured into having sex (sexual contact between individuals involving penetration)? **(Year 9, 11 & P16 only) (F3)**

	Tick
No **(Go to Q47)**	
Yes	

46. If you have felt pressured into having sex (sexual contact between individuals involving penetration), who or what pressured you? **(Year 9, 11 & P16 only) (F4)**
(Multi response - tick all that apply)

	Tick
Boyfriend/girlfriend	
Friend(s)	
Pupils at school	
Family member	
Other young people	
Other adults	
Stranger	
TV/Films	
Online pressure	
Pornography	

47. Have you ever had sex (sexual contact between individuals involving penetration)? **(Year 9, 11 & P16 only) (F5)**

	Tick
No **(Go to Q53)**	
Yes	

48. Who have you had sex (sexual contact between individuals involving penetration) with? **(Year 9, 11 & P16 only) (F6)**

	Tick
The opposite sex	
The same sex	
Both	

49. Which year group were you in when you first had sex (sexual contact between individuals involving penetration)? **(Year 9, 11 & P16 only) (F7)**

	Tick
Year 8 or below	
Year 9	
Year 10 **(Year 11 & P16 only)**	
Year 11 **(Year 11 & P16 only)**	
Year 12 **(P16 only)**	
Year 13 or above **(P16 only)**	

50. The last time you had sex (sexual contact between individuals involving penetration), did you or your partner... **(Year 9, 11 & P16 only) (F8)**

	Tick
Use a condom(s) and another form of contraception/protection (i.e. both) **(Go to 51)**	
Use a condom(s) only **(Go to Q51)**	
Use another form of contraception/protection only **(Go to Q51)**	
Not use anything **(Go to Q52)**	

51. Where did you or your partner get the condoms or contraception from? **(F9)**
(Year 9, 11 & P16 only)

	Tick
Bought it from a shop/vending machine **(Go to Q53)**	
Got it for free from a local condom scheme e.g. C-Card, youth club/project **(Go to Q53)**	
From a friend **(Go to Q53)**	
From a parent or other family member **(Go to Q53)**	
A sexual health clinic **(Go to Q53)**	
The doctors **(Go to Q53)**	
Other **(Go to Q53)**	

52. Why did you or your partner **NOT** use a condom or any other form of contraception/protection? **(Year 9, 11 & P16 only) (Multi response - tick all that apply) (F10)**

	Tick
Didn't know where to get it from	
I didn't have any money to buy condoms	
I was scared/embarrassed to get an appointment at doctors or sexual health clinic	
I was scared/embarrassed to suggest using a condom	
I don't like using condoms	
I'm allergic to latex condoms	
We didn't plan to have sex	
I didn't want to use anything	
My partner didn't want to use anything	
It's against my religion to use condoms or contraception/protection	
Other	

Social, Emotional and Mental Health – Section G

53. How often do you feel the following? **(G1)**

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	Everyday	Most days	Some days	Rarely	Never
Happy					
Confident					
Sad or upset					
Bad tempered or angry					
Stressed or anxious					
Lonely					

54. How well do you think you cope with feeling the following? **(G2)**

	Very well	Well	Ok	Not well	Not well at all
Sad or upset					
Bad tempered or angry					
Stressed or anxious					
Lonely					

55. How happy do you feel about the number of good friends you have? **(G3)**

	Tick
Very happy	
Happy	
Ok	
Unhappy	
Very unhappy	

56. In the last 12 months, how often (if at all) have you been bullied in or around school/college? **(G4)**

	Tick
Not at all **(Go to Q58)**	
A few times this year	
Every month	
Every week	
Most days	
Every day	

57. If you have been bullied in or around school/college in the last 12 months, do you think it was because of any of the following? **(Multi response – tick all that apply) (G5)**

	Tick
Skin colour, race or culture	
Gender (being a boy or girl)	
Age	
A disability or special need	
Religion	
Size (either overweight or underweight)	
Size (height)	
Me or a family member being gay, lesbian or bisexual or being called words like 'gay' as an insult (homophobic) **(Year 5 & 6 only)**	
Me or a family member being gay, lesbian, bisexual or trans or being called words like 'gay' as an insult (homophobic) **(Year 7, 9, 11 & P16 only)**	
Appearance	
Family members	
Because I have a free school meal	
Family income	
Personal hygiene	
Other / don't know	
No reason	

58. Have you ever hurt yourself on purpose? (Often referred to as 'self-harm') **(G6)**
(Year 7, 9, 11 & P16 only)

	Tick
No **(Go to Q61)**	
Yes	

59. If yes, which of the following statements describes you? **(G7)**
(Year 7, 9, 11 & P16 only)

	Tick
I used to hurt myself but no longer do it **(Go to Q60)**	
I have hurt myself once or twice (in the last 12 months) **(Go to Q60)**	
I sometimes (more than once a month) hurt myself **(Go to Q60)**	
I often (more than once a week but not every day) hurt myself **(Go to Q60)**	
I regularly (every day) hurt myself **(Go to Q60)**	

60. If you needed it, were you supported by school/college to help you deal with your self-harming? **(G8)**

	Tick
I did not need any support	
I didn't tell anybody in school/college	
Yes, I had enough support from my school/college	
Yes, but I needed more support from my school/college	
No, but I got support from somewhere else	
No, I had no support from either my school/college or anywhere else	

61. In the last 12 months, have you ever taken part in any of the following activities (gambled), either online or at a venue? **(Year 7, 9, 11 & P16 only) (G9)**

	Never	A few times this year	Every month	Every week	Most days	Every day

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Purchased coins to move up a level during a game or Skin Betting	**(Go to Q63)**					
Fruit machine/Slot machines/other gambling machines	**(Go to Q63)**					
Placing a private bet for money (e.g. with friends)	**(Go to Q63)**					
Purchased a national lottery scratch card	**(Go to Q63)**					
Playing cards for money (e.g. poker, black jack)	**(Go to Q63)**					
Purchased a national lottery lotto	**(Go to Q63)**					
Bingo	**(Go to Q63)**					
Placed a bet on a sporting event	**(Go to Q63)**					
Roulette	**(Go to Q63)**					
Any other betting or gambling activity	**(Go to Q63)**					

62. If you have (gambled) in the last 12 months were your parents/carers aware of this? **(Year 7, 9 11 & P16 only) (G10)**

	Tick
I don't gamble	
Yes	
No	
Don't know	

63. How safe do you feel at home? **(G11)**

	Tick
Very safe	
Safe	
Unsafe	
Very unsafe	

64. On a normal school/college night (Sunday to Thursday) how many hours of sleep do you have? **(G12)**

	Tick
12+hours	
12 hours	
11 hours	
10 hours	

9 hours	
8 hours	
7 hours	
6 hours	
5 hours	
Less than 5 hours	

65. Do you help to look after somebody in your family because they...? **(G13)**

	No	Yes, some days	Yes, most days
are ill			
have a social, emotional or mental health **problem**			
have a disability			
have a problem with drugs or alcohol			
are too young to look after themselves (i.e. a brother or sister)			
are your child **(Year 9, 11 & P16 only)**			
other			

66. Within the last 12 months, has anyone close to you died? **(G14)**

	Tick
No **(Go to Q68)**	
Yes, someone who lives in my house (e.g. parent, brother or sister)	
Yes, someone who is in my family but does not live in the same house as me (e.g. grandparent, aunt or uncle)	
Yes, a friend	

67. If you needed it, were you supported by school/college to help you deal with this death? **(G15)**

	Tick
I did not need any support	
I didn't tell anybody in school/college	
Yes, I had enough support from my school/college	
Yes, but I needed more support from my school/college	
No, but I got support from somewhere else	
No, I had no support from either my school/college or anywhere else	

68. Over the last 12 months have you worried about any of the following ....? **(G16)**
[Multi response – tick all that apply]

	Tick
I do not worry about anything	
The way I look	
My disability	
Health problems (mine/family members)	
My parents or family	

9.1. Study 1: My Health My School survey 2018-2019

Not having enough to eat because my family didn't have enough money for food	
A separation	
A death	
Friendships	
Pressure to do the same as my friends	
Being bullied	
School/college work	
Exams	
Going to college/university **(Year 9, 11 & P16 only)**	
Getting an apprenticeship **(Year 9, 11 & P16 only)**	
Getting a job **(Year 9, 11 & P16 only)**	
Travelling to school/college	
Going places on my own	
Money problems (mine/family members)	
Gambling **(Year 7, 9, 11 & P16 only)**	
Girlfriends / boyfriends **(Year 7, 9, 11 & P16 only)**	
Sex (STIs, pregnancy) **(Year 9, 11 & P16 only)**	
Drugs, alcohol or tobacco	
Other	

69. When I'm worried about something... **(G17)**

	Yes	No	Never needed to
I can talk to my parents/carers/family members			
I can talk to my friends			
I can talk to adults at school/college			
I can talk to other adults			
I can't talk to anyone			

70. How much do you agree or disagree with the following statement ... 'I enjoy my life'? **(G18)**

	Tick
Strongly agree	
Agree	
Not sure	
Disagree	
Strongly disagree	

My School/College – Section H

71. How much do you agree or disagree with the following statements? **(H1)**

	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
My school/college is a welcoming and caring place					
My school/college helps me if I am worried or have a problem					
I get on well with staff in my school/college					
There are good things to do before and after school/college					
There are good things to do at break times/lunch times					
I enjoy going to school/college					
I feel like I belong to my school/college community					

72. How safe do you feel in the following places? **(H2)**

	Very safe	Safe	Unsafe	Very unsafe
During lessons at school/college				
At school/college, not in lessons				
School/college toilets				
Travelling to and from school/college				

73. Have you ever been away from school/college without telling anyone? **(H3)**
(Year 5, 6, 7, 9 & 11 only) **(Multi response – tick all that apply)**

	Tick
No	
Yes, due to lessons I do not like	
Yes, due to teachers	
Yes, due to bullying	
Yes, due to being with family	
Yes, due to being with friends	
Yes, if I can't be bothered	
Yes, for another reason	

74. Do you ever miss lessons at college if you are not ill? **(P16 only)** **(H4)**
(Multi response – tick all that apply)

	Tick
No **(Go to Q76)**	
Yes, due to lessons I do not like	
Yes, due to teachers	
Yes, due to bullying	
Yes, due to being with family	
Yes, due to being with friends	
Yes, if I can't be bothered	
Yes, for another reason	

75. Do your parents/carers know you miss lessons? **(P16 only)** **(H5)**

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	Tick
No	
Yes	

76. In the last 12 months at your school/college, have you ...? **(H6)**

	Yes	No
Had your say about how your school/college is run (e.g. shared ideas through your school/college council, giving feedback to staff, running your own events etc.)		
Made decisions (or voted) in a class, school, college council/student election		
Shared your views on how to make your local area/community better for children and young people (e.g. through surveys, Youth Parliament, referendums, youth summits, Children's Mayor, Youth Council, youth groups)		
Felt that any suggestions/ideas you have shared have been heard by adults and have influenced change in your school/college, local area/community		

77. How much useful information and learning have you had to help you understand the following aspects of British values? (e.g. through lessons at school/college) **(H7)**

	I have had enough useful information	I need better information	I don't know
Democracy and how it works			
Why we have rules and laws			
That we all have rights			
Respect for others			
Understand that other people have different faiths and beliefs.			

78. How much useful information and learning have you had to help you understand the following things? (E.g. through lessons at school/college) **(H8)**

	I have had enough useful information	I need better information	I don't know
The importance of eating healthily			
The importance of cooking healthy meals			
The importance of being physically active			
Litter and recycling			
Drugs			
Alcohol			
Smoking			
Social, Emotional & Mental Health			
Self- harm **(Year 7, 9, 11 & P16 only)**			
How to cope with a separation			
How to cope with a death			
Bullying and ways to stop it happening in school			

Staying safe on the internet			
Radicalisation/extremism **(Year 9, 11 & P16 only)**			
Gangs			
Pressure/encouragement to commit a crime **(Year 7, 9, 11 & P16 only)**			
Knife/weapon awareness			
Gambling **(Year 7, 9, 11 & P16 only)**			
How to manage money			
Leaving home/Living independently **(P16 only)**			
Being a safe driver/passenger **(Year 9, 11 & P16 only)**			

79. How much useful information and learning have you had to help you understand the following things? (e.g. through lessons at school/college) **(H9)**

	I have had enough useful information	I need better information	I don't know
How your feelings will change as you grow up **(Year 5 & 6 only)**			
How your body will change as you grow up **(Year 5 & 6 only)**			
Personal hygiene/ Keeping clean			
Making good relationships			
Safe and unsafe relationships			
Different types of families (single parents, living with grandparents, having step-parents, having two mums or two dads)			
Relationships and Sex			
How babies are made (conception) and born **(Year 5, 6, 7, 9 & 11 only)**			
Using contraception			
Waiting until you are older or ready to have sex **(Year 9, 11 & P16 only)**			
How alcohol and drugs can influence sexual behaviour **(Year 9, 11 & P16 only)**			
Avoiding Sexual Transmitted Infections (e.g. Chlamydia), HIV, AIDS. **(Year 9, 11 & P16 only)**			
How to be a good parent **(Year 9, 11 & P16 only)**			
Homophobic/Biphobic/Transphobic bullying and ways to stop it **(Year 7, 9, 11 & P16 only)**			
Domestic violence and abusive relationships **(Year 9, 11 & P16 only)**			
Child Sexual Exploitation (also known as grooming) **(Year 7, 9, 11 & P16 only)**			

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Female Genital Mutilation (FGM) **(Year 7, 9, 11 & P16 only)**			

80. To make sure you are safe and healthy, would you know where to go to get help or advice for each of these things? **(H10)**

	Yes	No
Eating healthily		
Being more active		
Litter and recycling		
Drugs		
Alcohol		
Smoking		
Social, Emotional and Mental Health		
Self-harm **(Year 7, 9, 11 & P16 only)**		
How to cope with a separation		
How to cope with a death		
Relationships and sex		
Bullying		
Staying safe on the internet		
Someone asking you for your personal details (such as your address) on the internet		
Something you saw on the internet, which upsets you		
Someone sending you upsetting messages, pictures or videos on the internet or on your mobile phone		
Radicalisation/extremism **(Year 9, 11 & P16 only)**		
Pressure to be in a gang		
Pressure/encouragement to commit a crime **(Year 7, 9, 11 & P16 only)**		
Pupils carrying knives/weapons		
Gambling **(Year 7, 9, 11 & P16 only)**		
Managing money/budgeting **(Year 7, 9, 11 & P16 only)**		
Money problems **(P16 only)**		
Housing **(P16 only)**		
Growing up – changes in body and feelings **(Year 5 & 6 only)**		
Relationships		
Contraception/Sexual health advice and treatment **(Year 9, 11 & P16 only)**		
How to use a condom **(Year 9, 11 & P16 only)**		
Homophobic/Biphobic/Transphobic bullying **(Year 7, 9, 11 & P16 only)**		
Domestic violence and abusive relationships **(Year 9, 11 & P16 only)**		
Child Sexual Exploitation (also known as grooming) **(Year 7, 9, 11 & P16 only)**		
Female Genital Mutilation (FGM) **(Year 7, 9, 11& P16 only)**		
Problems in school/college		
Problems out of school/college		

81. How much do you agree or disagree with the following statement 'My school/college has been good at….' **(H11)**

	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
Helping me to keep myself safe from the risks of drugs and alcohol **(Year 7, 9, 11 & P16 only)**					
Helping me to keep myself safe from the risks of having unhealthy relationships **(Year 7, 9, 11 & P16 only)**					
Helping me to keep myself safe from the risks of having sex **(Year 9, 11 & P16 only)**					
Giving me the information to be able to think about the benefits of waiting until I am ready to have sex **(Year 9, 11 & P16 only)**					

82. Do you find your Personal, Social, Health and Economic (PSHE) education lessons useful? **(H12)**

	Tick
Definitely	
Mostly	
In some ways	
Not really	
Definitely not	
We don't have any PSHE lessons	

83. How much do you agree or disagree with the following statement that… 'At this school/college, visitors who support Personal, Social, Health and Economic (PSHE) education in lessons or assemblies are useful and teach me new things.' **(H13)**

	Tick
Strongly agree	
Agree	
Disagree	
Strongly disagree	
We don't have any visitors who support PSHE	

84. How good do you think your school/college are at dealing with the following ……? **(H14)**

	This is not an issue at our school/college	Very good	Good	Ok	Poor	Very poor	Don't know
Behaviour							
Litter and recycling							
Bullying							
Cyber-bullying							
Drugs (including volatile substances e.g. glues, gases or solvents)							
Alcohol							
Smoking							

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Sexism							
Racism							
Homophobia							
Gangs							
People from different backgrounds not getting on well							
Pupils/students carrying knives/weapons							
Pupils/students sharing sexual messages, pictures and videos **(Year 9, 11 & P16 only)**							
Pupils/students with radical or extremist views **(Year 9, 11 & P16 only)**							

85. How good is your school/college at encouraging you to have a healthy lifestyle? **(H15)**

	Tick
Very good	
Good	
Ok	
Poor	
Very poor	

ubmit to finish the survey

Congratulations on finishing the survey. Thank you very much!

he answers you have given will help your school/college, the council and other people who work with hildren and young people to make positive changes.

f you think you need any help, advice or want to talk to someone then you should speak with a teacher r adult in your school/college that you trust.

ou may also find the following websites useful to look at for advice and support:

Topic	Primary	Secondary
althy Eating	www.nhs.uk/Change4Life	
ysical Activity & Sport	www.bbc.co.uk/supermovers	https://www.nhs.uk/live-well/exercise/physical-activity-guidelines-children-and-young-people/
ugs, Alcohol & Tobacco	www.talktofrank.com Phone: 0300 1236600	
xual Health		www.brook.org.uk
cial, Emotional & Mental alth	www.youngminds.org.uk	
line Safety	www.thinkuknow.co.uk	

Anti-bullying	www.anti-bullyingalliance.org.uk
General	www.childline.org.uk Phone: 0800 1111

Logout

Sections

Heading Section	Question Number
All About Me	1, 2, 3, 4, 5, 6, 7
Healthy Eating	8, 9, 10, 11,, 12, 13, 14
Physical Activity and Sport	15, 16, 17, 18, 19, 20
P.E in School	21, 22, 23, 24, 25, 26, 27
Drugs, Alcohol & Tobacco	28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42
Sexual Health	43, 44, 45, 46, 47, 48, 49, 50, 51, 52
Social, Emotional & Mental Health	53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69,70
My School/College	71, 72, 73,74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85

9.2. Study 1: Variables that were recoded/categories combined

	Original variable levels to new variable levels
Variable name	
Ethnicity	White, Asian, Mixed, Black → Remained the same No response, Don't know., Other → Other
FSMs	Yes, I have a FSM, No, I can have a FSM, but choose not to → Eligible for FSMs I don't know, No, I don't have a FSM → Remained the same
HBC	Never, Rarely → Rare Some days → Occasional Most days, Everyday → Frequent
Breakfast location	At home, On the way to school, Other → Remained the same At school but not at breakfast club, At my schools breakfast club → School At my friends home, At another family members home, At my child-minders → At another's home
Bullied frequency	Not at all → Not bullied A few times a year, Every month → Occasionally Every week, Most days, Everyday → Almost always/always
Feelings of home safety	Very safe, Safe → Safe Unsafe, Very unsafe → Not safe
Sleep	Number categorised for primary schoolchildren into: 4-8 hours 9-12 hours 13 hours Number categorised for secondary schoolchildren into: 4-7 hours 8-12 hours 13 hours
Reasons for worrying	Number categorised into: No reasons 1-2 reasons >3 reasons
Reasons for bullying	Number categorised into: No reasons 1-2 reasons >3 reasons

9.3. Study 1: Psychological wellbeing variables and HBC contingency tables with adjusted residuals

Table 9.1: Confidence and HBC for primary and secondary schoolchildren

HBC	**Confidence**	Primary school						Secondary school					
		Never	Rarely	Some days	Most days	Everyday	Total	Never	Rarely	Some days	Most days	Everyday	Total
Rare	Count	65	79	110	93	97	444	232	349	351	254	229	1415
	Expected Count	17.79	42.80	101.53	145.01	136.86	444	103.59	245.52	380.11	382.96	302.82	1415
	Adjusted Residual	11.67	5.95	.98	-5.38	-4.19	-	14.69	8.14	-1.96	-8.65	-5.36	-
Occasional	Count	39	101	155	165	151	611	77	203	322	271	184	1057
	Expected Count	24.48	58.90	139.72	199.56	188.34	611	77.38	183.40	283.94	286.07	226.21	1057
	Adjusted Residual	3.09	5.95	1.52	-3.07	-3.37	-	-.05	1.73	2.87	-1.13	-3.44	-
Frequent	Count	315	828	2126	3157	2975	9401	199	652	1191	1353	1072	4467
	Expected Count	376.72	906.29	2149.75	3070.43	2897.80	9401	327.03	775.08:	1199.96	1208.97	955.97	4467
	Adjusted Residual	-10.22	-8.61	-1.84	5.99	5.43	-	-12.32	-8.15	-.51	8.13	7.09	-
Total	Count	419	1008	2391	3415	3223	10456	508	1204	1864	1878	1485	6939
	Expected Count	419	1008	2391	3415	3223	10456	508	1204	1864	1878	1485	6939

Table 9.2: Happiness and HBC for primary and secondary schoolchildren

HBC	**Happiness**	Primary school						Secondary school					
		Never	Rarely	Some days	Most days	Everyday	Total	Never	Rarely	Some days	Most days	Everyday	Total
Rare	Count	29	50	114	144	107	444.00	89.00	181.00	457.00	437.00	251.00	1415
	Expected Count	5.65	17.24	72.91	188.92	159.28	444.00	35.69	91.15	322.40	561.39	404.37	1415.0
	Adjusted Residual	10.11	8.22	5.38	-4.41	-5.29	-	10.13	10.90	9.56	-7.58	-10.11	-
Occasional	Count	9.00	44.00	164.00	249.00	145.00	611.00	22.00	74.00	312.00	426.00	223.00	1057
	Expected Count	7.77	23.72	100.33	259.98	219.19	611.00	26.66	68.09	240.83	419.36	302.07	1057.0
	Adjusted Residual	.46	4.38	7.16	-.93	-6.45	-	-.99	.80	5.67	.45	-5.85	-
Frequent	Count	95.00	312.00	1439.00	4056.00	3499.00	9401.00	64.00	192.00	812.00	1890.00	1509.00	4467
	Expected Count	119.58	365.04	1543.76	4000.10	3372.53	9401.00	112.66	287.76	1017.77	1772.25	1276.56	4467.0
	Adjusted Residual	-7.12	-8.91	-9.18	3.67	8.56	-	-7.78	-9.78	-12.30	6.03	12.90	-
Total	Count	133	406	1717	4449	3751.00	10456.00	175.00	447.00	1581.00	2753.00	1983.00	6939
	Expected Count	133	406	1717	4449.00	3751.00	10456.00	175.00	447.00	1581.00	2753.00	1983.00	6939.0

Table 9.3:Sadness and HBC for primary and secondary schoolchildren

HBC	Sadness	Primary school						Secondary school					
		Never	Rarely	Some days	Most days	Everyday	Total	Never	Rarely	Some days	Most days	Everyday	Total
Rare	Count	43.00	122.00	149.00	81.00	49.00	444.00	72.00	306.00	477.00	325.00	235.00	1415
	Expected Count	28.32	187.73	164.21	45.78	17.96	444.00	76.88	492.87	514.08	211.26	119.90	1415.0
	Adjusted Residual	2.91	-6.45	-1.53	5.62	7.64	-	-.64	-11.69	-2.30	9.51	12.31	-
Occasional	Count	34.00	221.00	228.00	82.00	46.00	611.00	52.00	316.00	405.00	197.00	87.00	1057
	Expected Count	38.98	258.34	225.97	62.99	24.72	611.00	57.43	368.18	384.02	157.81	89.57	1057.0
	Adjusted Residual	-.85	-3.15	.18	2.61	4.50	-	-.80	-3.66	1.46	3.67	-.31	-
Frequent	Count	590.00	4078.00	3490.00	915.00	328.00	9401.00	253.00	1795.00	1639.00	514.00	266.00	4467
	Expected Count	599.70	3974.93	3476.82	969.23	380.32	9401.00	242.69	1555.95	1622.90	666.93	378.53	4467.0
	Adjusted Residual	-1.29	6.77	.89	-5.79	-8.62	-	1.14	12.58	.84	-10.76	-10.13	-
Total	Count	667.00	4421.00	3867.00	1078.00	423.00	10456.00	377.00	2417.00	2521.00	1036.00	588.00	6939
	Expected Count	667.00	4421.00	3867.00	1078.00	423.00	10456.00	377.00	2417.00	2521.00	1036.00	588.00	6939.0

Table 9.4: Sadness coping and HBC for primary and secondary schoolchildren

HBC	Sadness coping	Primary school						Secondary school					
		Not well at all	Not well	Ok	Well	Very well	Total	Not well at all	Not well	Ok	Well	Very well	Total
Rare	Count	84.00	72.00	178.00	55.00	55.00	444	234.00	251.00	497.00	247.00	186.00	1415
	Expected Count	38.73	58.39	164.56	104.47	77.84	444.0	126.86	199.67	497.23	356.71	234.54	1415.0
	Adjusted Residual	7.78	1.95	1.35	-5.66	-2.91		11.17	4.39	-.01	-7.53	-3.89	-
Occasional	Count	75.00	102.00	237.00	115.00	82.00	611	101.00	188.00	365.00	246.00	157.00	1057
	Expected Count	53.30	80.36	226.46	143.76	107.12	611.0	94.76	149.15	371.43	266.46	175.20	1057.0
	Adjusted Residual	3.21	2.67	.91	-2.83	-2.75		.73	3.73	-.45	-1.57	-1.64	-
Frequent	Count	753.00	1201.00	3460.00	2290.00	1696.00	9400	287.00	540.00	1576.00	1256.00	807.00	4466
	Expected Count	819.97	1236.25	3483.98	2211.76	1648.03	9400.0	400.38	630.18	1569.34	1125.83	740.26	4466.0
	Adjusted Residual	-7.71	-3.39	-1.61	5.99	4.10		-9.95	-6.49	.35	7.52	4.50	-
Total	Count	912.00	1375.00	3875.00	2460.00	1833.00	10455	622.00	979.00	2438.00	1749.00	1150.00	6938
	Expected Count	912.00	1375.00	3875.00	2460.00	1833.00	10455.0	622.00	979.00	2438.00	1749.00	1150.00	6938.0

Table 9.5: Loneliness and HBC for primary and secondary schoolchildren

HBC	Loneliness	Primary school						Secondary school					
		Never	Rarely	Some days	Most days	Everyday	Total	Never	Rarely	Some days	Most days	Everyday	Total
Rare	Count	163.00	109.00	81.00	43.00	48.00	444.00	415.00	364.00	248.00	144.00	244.00	1415
	Expected Count	194.82	137.24	65.27	25.48	21.19	444.00	548.14	431.70	215.14	99.51	120.52	1415.0
	Adjusted Residual	-3.11	-2.96	2.15	3.65	6.10	-	-8.14	-4.38	2.73	5.18	13.18	-
Occasional	Count	239.00	165.00	102.00	51.00	54.00	611.00	389.00	333.00	185.00	73.00	77.00	1057
	Expected Count	268.10	188.86	89.82	35.06	29.16	611.00	409.46	322.48	160.71	74.34	90.03	1057.0
	Adjusted Residual	-2.44	-2.15	1.43	2.86	4.86	-	-1.40	.76	2.26	-.17	-1.56	-
Frequent	Count	4186.00	2958.00	1354.00	506.00	397.00	9401.00	1884.00	1420.00	622.00	271.00	270.00	4467
	Expected Count	4125.08	2905.89	1381.92	539.46	448.65	9401.00	1730.41	1362.82	679.16	314.15	380.46	4467.0
	Adjusted Residual	3.99	3.66	-2.56	-4.67	-7.87	-	7.90	3.11	-3.99	-4.23	-9.92	-
Total	Count	4588.00	3232.00	1537.00	600.00	499.00	10456.00	2688.00	2117.00	1055.00	488.00	591.00	6939
	Expected Count	4588.00	3232.00	1537.00	600.00	499.00	10456.00	2688.00	2117.00	1055.00	488.00	591.00	6939.0

Table 9.6: Loneliness coping and HBC for primary and secondary schoolchildren

HBC	Loneliness coping	Primary school						Secondary school					
		Not well at all	Not well	Ok	Well	Very well	Total	Not well at all	Not well	Ok	Well	Very well	Total
Rare	Count	99.00	58.00	109.00	51.00	127.00	444	229.00	186.00	387.00	226.00	387.00	1415
	Expected Count	56.82	51.51	112.28	76.65	146.73	444.0	142.15	150.31	374.86	276.96	470.71	1415.0
	Adjusted Residual	6.12	.98	-.37	-3.29	-2.03	-	8.61	3.45	.82	-3.83	-5.29	-
Occasional	Count	84.00	75.00	168.00	88.00	196.00	611	108.00	120.00	296.00	192.00	341.00	1057
	Expected Count	78.19	70.89	154.52	105.49	201.91	611.0	106.19	112.28	280.02	206.89	351.62	1057.0
	Adjusted Residual	.72	.54	1.29	-1.93	-.52	-	.20	.84	1.21	-1.25	-.75	-
Frequent	Count	1155.00	1080.00	2367.00	1666.00	3132.00	9400	360.00	431.00	1155.00	940.00	1580.00	4466
	Expected Count	1202.98	1090.60	2377.20	1622.86	3106.36	9400.0	448.66	474.41	1183.12	874.15	1485.66	4466.0
	Adjusted Residual	-4.66	-1.07	-.76	3.71	1.77	-	-7.39	-3.53	-1.60	4.16	5.02	-
Total	Count	1338.00	1213.00	2644.00	1805.00	3455.00	10455	697.00	737.00	1838.00	1358.00	2308.00	6938
	Expected Count	1338.00	1213.00	2644.00	1805.00	3455.00	10455.0	697.00	737.00	1838.00	1358.00	2308.00	6938.0

Table 9.7: Stress/anxiety and HBC for primary and secondary schoolchildren

HBC	Stress/anxiety	Primary school						Secondary school					
		Never	Rarely	Some days	Most days	Everyday	Total	Never	Rarely	Some days	Most days	Everyday	Total
Rare	Count	84.00	88.00	107.00	83.00	82.00	444.00	127.00	226.00	327.00	327.00	408.00	1415
	Expected Count	88.83	160.34	114.78	49.94	30.11	444.00	182.51	369.09	380.11	261.63	221.66	1415.0
	Adjusted Residual	-.59	-7.30	-.86	5.08	10.01	-	-4.93	-9.71	-3.57	5.02	15.27	-
Occasional	Count	121.00	186.00	143.00	90.00	71.00	611.00	111.00	245.00	273.00	239.00	189.00	1057
	Expected Count	122.25	220.65	157.95	68.72	41.43	611.00	136.33	275.71	283.94	195.44	165.58	1057.0
	Adjusted Residual	-.13	-3.01	-1.42	2.81	4.90	-	-2.52	-2.34	-.82	3.75	2.15	-
Frequent	Count	1887.00	3502.00	2453.00	1003.00	556.00	9401.00	657.00	1339.00	1264.00	717.00	490.00	4467
	Expected Count	1880.92	3395.01	2430.27	1057.34	637.46	9401.00	576.16	1165.19	1199.96	825.93	699.76	4467.0
	Adjusted Residual	.49	7.23	1.69	-5.58	-10.52	-	6.05	9.92	3.62	-7.03	-14.47	-
Total	Count	2092.00	3776.00	2703.00	1176.00	709.00	10456.00	895.00	1810.00	1864.00	1283.00	1087.00	6939
	Expected Count	2092.00	3776.00	2703.00	1176.00	709.00	10456.00	895.00	1810.00	1864.00	1283.00	1087.00	6939.0

Table 9.8: Stress/anxiety coping and HBC for primary and secondary schoolchildren

HBC	Stress/anxiety coping	Primary school						Secondary school					
		Not well at all	Not well	Ok	Well	Very well	Total	Not well at all	Not well	Ok	Well	Very well	Total
Rare	Count	101.00	97.00	123.00	54.00	69.00	444	350.00	335.00	389.00	160.00	181.00	1415
	Expected Count	52.87	76.57	134.16	86.72	93.68	444.0	198.24	275.54	448.28	257.18	235.77	1415.0
	Adjusted Residual	7.21	2.62	-1.18	-4.00	-2.93	-	13.03	4.47	-3.80	-7.51	-4.38	-
Occasional	Count	100.00	116.00	178.00	104.00	113.00	611	159.00	216.00	347.00	176.00	159.00	1057
	Expected Count	72.76	105.37	184.61	119.34	128.92	611.0	148.08	205.82	334.86	192.11	176.12	1057.0
	Adjusted Residual	3.51	1.17	-.60	-1.61	-1.63	-	1.05	.86	.87	-1.40	-1.53	-
Frequent	Count	1044.00	1590.00	2858.00	1884.00	2024.00	9400	463.00	800.00	1462.00	925.00	816.00	4466
	Expected Count	1119.37	1621.06	2840.23	1835.94	1983.40	9400.0	625.68	869.64	1414.86	811.71	744.12	4466.0
	Adjusted Residual	-7.56	-2.67	1.26	3.94	3.23	-	-11.75	-4.41	2.54	7.36	4.84	-
Total	Count	1245.00	1803.00	3159.00	2042.00	2206.00	10455	972.00	1351.00	2198.00	1261.00	1156.00	6938
	Expected Count	1245.00	1803.00	3159.00	2042.00	2206.00	10455.0	972.00	1351.00	2198.00	1261.00	1156.00	6938.0

Table 9.9: Anger and HBC for primary and secondary schoolchildren

HBC	Anger	Primary school						Secondary school					
		Never	Rarely	Some days	Most days	Everyday	Total	Never	Rarely	Some days	Most days	Everyday	Total
Rare	Count	53.00	94.00	127.00	84.00	86.00	444	67.00	233.00	429.00	330.00	356.00	1415
	Expected Count	58.68	166.54	134.52	53.59	30.66	444.0	96.45	389.49	489.20	255.10	184.75	1415.0
	Adjusted Residual	-.81	-7.27	-.79	4.53	10.59	-	-3.48	-10.44	-3.77	5.80	15.14	-
Occasional	Count	73.00	182.00	184.00	113.00	59.00	611	59.00	224.00	381.00	245.00	148.00	1057
	Expected Count	80.76	229.18	185.12	73.75	42.19	611.0	72.05	290.95	365.43	190.56	138.01	1057.0
	Adjusted Residual	-.95	-4.06	-.10	5.02	2.76	-	-1.73	-5.01	1.09	4.73	.99	-
Frequent	Count	1256.00	3646.00	2857.00	1065.00	577.00	9401	347.00	1453.00	1589.00	676.00	402.00	4467
	Expected Count	1242.56	3526.27	2848.35	1134.67	649.15	9401.0	304.50	1229.57	1544.36	805.33	583.24	4467.0
	Adjusted Residual	1.29	8.03	.61	-6.94	-9.24	-	4.23	12.54	2.35	-8.43	-13.48	-
Total	Count	1382.00	3922.00	3168.00	1262.00	722.00	10456	473.00	1910.00	2399.00	1251.00	906.00	6939
	Expected Count	1382.00	3922.00	3168.00	1262.00	722.00	10456.0	473.00	1910.00	2399.00	1251.00	906.00	6939.0

Table 9.10: Anger coping and HBC for primary and secondary schoolchildren

HBC	Anger coping	Primary school						Secondary school					
		Not well at all	Not well	Ok	Well	Very well	Total	Not well at all	Not well	Ok	Well	Very well	Total
Rare	Count	137.00	88.00	113.00	42.00	64.00	444	398.00	342.00	337.00	174.00	164.00	1415
	Expected Count	70.75	90.58	129.82	80.18	72.66	444.0	244.74	308.78	408.92	260.65	191.92	1415.0
	Adjusted Residual	8.78	-.31	-1.79	-4.81	-1.14	-	12.07	2.40	-4.73	-6.66	-2.43	-
Occasional	Count	151.00	113.00	182.00	99.00	66.00	611	214.00	247.00	291.00	180.00	125.00	1057
	Expected Count	97.36	124.65	178.65	110.34	99.99	611.0	182.82	230.66	305.46	194.70	143.36	1057.0
	Adjusted Residual	6.11	-1.21	.31	-1.23	-3.83	-	2.75	1.32	-1.07	-1.27	-1.79	-
Frequent	Count	1378.00	1932.00	2762.00	1747.00	1581.00	9400	588.00	925.00	1377.00	924.00	652.00	4466
	Expected Count	1497.89	1917.76	2748.52	1697.48	1538.35	9400.0	772.44	974.56	1290.62	822.65	605.72	4466.0
	Adjusted Residual	-10.64	1.15	.96	4.18	3.74	-	-12.23	-3.01	4.78	6.55	3.39	-
Total	Count	1666.00	2133.00	3057.00	1888.00	1711.00	10455	1200.00	1514.00	2005.00	1278.00	941.00	6938
	Expected Count	1666.00	2133.00	3057.00	1888.00	1711.00	10455.0	1200.00	1514.00	2005.00	1278.00	941.00	6938.0

Table 9.11: Number of worry reasons and HBC for primary and secondary schoolchildren

HBC	Number of worry reasons	Primary school				Secondary school			
		No reasons	1-2 reasons	3+ reasons	Total	No reasons	1-2 reasons	3+ reasons	Total
Rare	Count	91.00	184.00	169.00	444	166.00	357.00	892.00	1415
	Expected Count	121.32	193.00	129.68	444.0	244.09	417.42	753.48	1415.0
	Adjusted Residual	-3.30	-.88	4.19	-	-6.16	-3.95	8.27	-
Occasional	Count	133.00	259.00	219.00	611	125.00	299.00	633.00	1057
	Expected Count	166.95	265.59	178.46	611.0	182.34	311.81	562.85	1057.0
	Adjusted Residual	-3.18	-.55	3.72	-	-5.07	-.94	4.70	-
Frequent	Count	2633.00	4102.00	2666.00	9401	906.00	1391.00	2170.00	4467
	Expected Count	2568.73	4086.41	2745.85	9401.0	770.57	1317.76	2378.67	4467.0
	Adjusted Residual	4.68	1.02	-5.70	-	8.99	4.03	-10.48	-
Total	Count	2857.00	4545.00	3054.00	10456	1197.00	2047.00	3695.00	6939
	Expected Count	2857.00	4545.00	3054.00	10456.0	1197.00	2047.00	3695.00	6939.0

Table 9.12: Friendship satisfaction and HBC for primary and secondary schoolchildren

HBC	Friendship satisfaction	Primary school						Secondary school					
		Very unhappy	Unhappy	Ok	Happy	Very happy	Total	Very unhappy	Unhappy	Ok	Happy	Very happy	Total
Rare	Count	22.00	22.00	89.00	61.00	250.00	444	103.00	53.00	220.00	373.00	666.00	1415
	Expected Count	7.90	10.53	49.98	80.47	295.12	444.0	41.60	42.62	170.48	376.64	783.66	1415.0
	Adjusted Residual	5.17	3.66	5.99	-2.45	-4.64	-	10.83	1.81	4.53	-.25	-7.05	-
Occasional	Count	21.00	24.00	93.00	114.00	359.00	611	22.00	33.00	141.00	281.00	580.00	1057
	Expected Count	10.87	14.49	68.78	110.73	406.13	611.0	31.07	31.84	127.35	281.35	585.39	1057.0
	Adjusted Residual	3.20	2.61	3.20	.35	-4.16	-	-1.79	.23	1.40	-.03	-.36	-
Frequent	Count	143.00	202.00	995.00	1720.00	6341.00	9401	79.00	123.00	475.00	1193.00	2597.00	4467
	Expected Count	167.23	222.98	1058.24	1703.80	6248.75	9401.0	131.33	134.54	538.18	1189.01	2473.94	4467.0
	Adjusted Residual	-5.95	-4.48	-6.50	1.37	6.34	-	-7.77	-1.69	-4.87	.23	6.21	-
Total	Count	186.00	248.00	1177.00	1895.00	6950.00	10456	204.00	209.00	836.00	1847.00	3843.00	6939
	Expected Count	186.00	248.00	1177.00	1895.00	6950.00	10456.0	204.00	209.00	836.00	1847.00	3843.00	6939.0

Table 9.13: Chi-square association between HBC and each worrying reason for primary and secondary schoolchildren

	Primary school			Secondary school		
Reason for worrying	χ^{2*}	Φ_c	p	χ^{2**}	Φ_c	p
Money problems (self/family)	24.66	.05	<.001	90.07	.11	<.001
Drugs, alcohol or tobacco	13.73	.04	.001	95.98	.12	<.001
Travelling to school	22.56	.05	<.001	46.11	.08	<.001
My disability	10.31	.03	.01	49.62	.09	<.001
Health problems (self/family)	51.95	.07	<.001	89.35	.11	<.001
Going places on my own	9.29	.03	.01	53.97	.09	<.001
A separation	17.19	.04	<.001	84.58	.11	<.001
My parents/family	35.50	.06	<.001	99.79	.12	<.001
Pressure to do the same as friends	10.04	.03	.01	23.76	.06	<.001
Being bullied	21.27	.05	<.001	29.12	.07	<.001
Death	17.18	.04	<.001	62.83	.10	<.001
School work	16.02	.04	<.001	14.95	.05	<.001
Friendships	15.82	.04	<.001	54.90	.09	<.001
Exams	4.49	.02	.11	1.41	.01	.50
Appearance	66.28	.08	<.001	180.31	.16	<.001
Other	5.07	.02	.08	10.38	.04	.01
Going university[a]	-	-	-	46.24	.08	<.001
Getting an apprenticeship[a]	-	-	-	43.37	.08	<.001
Getting a job[a]	-	-	-	48.16	.08	<.001
Girlfriends/boyfriends[a]	-	-	-	137.78	.14	<.001
Sex/pregnancy[a]	-	-	-	92.63	.12	<.001
Gambling[a]	-	-	-	33.16	.07	<.001

*df=2, N=10456
**df=2, N=6939
[a]question asked to secondary schoolchildren only

Table 9.14: Home safety and HBC for primary and secondary schoolchildren

HBC	**Home safety**	Primary school			Secondary school		
		Safe	Not safe	Total	Safe	Not safe	Total
Rare	Count	413.00	31.00	444	1284.00	131.00	1415
	Expected Count	432.92	11.08	444.0	1360.15	54.85	1415.0
	Adjusted Residual	-6.19	6.19	-	-11.75	11.75	-
Occasional	Count	582.00	29.00	611	1020.00	37.00	1057
	Expected Count	595.75	15.25	611.0	1016.02	40.98	1057.0
	Adjusted Residual	-3.67	3.67	-	.69	-.69	-
Frequent	Count	9200.00	201.00	9401	4366.00	101.00	4467
	Expected Count	9166.33	234.67	9401.0	4293.83	173.17	4467.0
	Adjusted Residual	7.01	-7.01	-	9.37	-9.37	-
Total	Count	10195.00	261.00	10456	6670.00	269.00	6939
	Expected Count	10195.00	261.00	10456.0	6670.00	269.00	6939.0

Table 9.15: Bullied frequency and HBC for primary and secondary schoolchildren

HBC	**Bullied frequency**	Primary school				Secondary school			
		Not bullied	Occasionally	Almost always/always	Total	Not bullied	Occasionally	Almost always/always	Total
Rare	Count	231.00	151.00	62.00	444	835.00	389.00	191.00	1415
	Expected Count	284.00	131.55	28.45	444.0	934.77	375.01	105.22	1415.0
	Adjusted Residual	-5.35	2.07	6.64	-	-6.28	.94	9.74	-
Occasional	Count	335.00	210.00	66.00	611	687.00	296.00	74.00	1057
	Expected Count	390.82	181.03	39.15	611.0	698.27	280.13	78.60	1057.0
	Adjusted Residual	-4.85	2.64	4.57	-	-.80	1.20	-.59	-
Frequent	Count	6122.00	2737.00	542.00	9401	3062.00	1154.00	251.00	4467
	Expected Count	6013.19	2785.41	602.40	9401.0	2950.96	1183.86	332.18	4467.0
	Adjusted Residual	7.36	-3.44	-8.01	-	5.88	-1.70	-7.76	-
Total	Count	6688.00	3098.00	670.00	10456	4584.00	1839.00	516.00	6939
	Expected Count	6688.00	3098.00	670.00	10456.0	4584.00	1839.00	516.00	6939.0

Table 9.16: Number of bullied reasons and HBC for primary and secondary schoolchildren

HBC	**Number of bullied reasons**	Primary school				Secondary school			
		No reasons	1-2 reasons	3+ reasons	Total	No reasons	1-2 reasons	3+ reasons	Total
Rare	Count	231.00	170.00	43.00	444	836.00	398.00	181.00	1415
	Expected Count	283.91	140.47	19.62	444.0	935.18	370.11	109.71	1415.0
	Adjusted Residual	-5.34	3.08	5.52	-	-6.24	1.89	7.94	-
Occasional	Count	335.00	230.00	46.00	611	687.00	290.00	80.00	1057
	Expected Count	390.70	193.30	27.00	611.0	698.57	276.47	81.95	1057.0
	Adjusted Residual	-4.84	3.29	3.86	-	-.82	1.03	-.24	-
Frequent	Count	6120.00	2908.00	373.00	9401	3063.00	1127.00	277.00	4467
	Expected Count	6011.39	2974.23	415.38	9401.0	2952.25	1168.41	346.34	4467.0
	Adjusted Residual	7.34	-4.62	-6.70	-	5.86	-2.36	-6.50	-
Total	Count	6686.00	3308.00	462.00	10456	4586.00	1815.00	538.00	6939
	Expected Count	6686.00	3308.00	462.00	10456.0	4586.00	1815.00	538.00	6939.0

Table 9.17: Chi-square association between HBC and each bullying reason for primary and secondary schoolchildren

	Primary school			Secondary school		
Bullying reason	χ^{2*}	Φ_c	p	χ^{2**}	Φ_c	p
Family income	13.46	.04	.001	40.07	.08	<.001
FSMs	30.62	.05	<.001	39.85	.08	<.001
Personal hygiene	9.45	.03	.009	45.95	.08	<.001
A disability/special need	18.74	.04	<.001	21.26	.06	<.001
Gender	21.55	.05	<.001	40.20	.08	<.001
Age	9.18	.03	.010	15.51	.05	<.001
Family members	33.12	.06	<.001	29.23	.07	<.001
Gay (self/family)	46.72	.07	<.001	62.25	.10	<.001
Religion	.842	.01	.66	9.14	.04	.01
Height	27.07	<.001	.05	13.65	.04	.001
Appearance	16.14	.04	<.001	57.06	.09	<.001
Size (overweight/underweight)	64.37	.08	<.001	88.67	.11	<.001
Skin colour, race, culture	11.74	.03	.003	8.42	.04	.02
Other	5.13	.02	.08	4.72	.03	.09
No reason	.50	.01	.78	1.69	.02	.43
*df=2, N=10456 **df=2, N=6939						

Table 9.18: Sleep and HBC for primary and secondary schoolchildren

HBC	**Sleep**	Primary school				Secondary school			
		4-8hours	9-12 hours	13 hours	Total	4-7 hours	8-12 hours	13 hours	Total
Rare	Count	215.00	188.00	41.00	444	932.00	445.00	38.00	1415
	Expected Count	114.65	281.87	47.47	444.0	551.40	802.42	61.18	1415.0
	Adjusted Residual	11.12	-9.46	-1.02	-	23.25	-21.49	-3.40	-
Occasional	Count	254.00	299.00	58.00	611	481.00	540.00	36.00	1057
	Expected Count	157.78	387.89	65.33	611.0	411.89	599.41	45.70	1057.0
	Adjusted Residual	9.17	-7.70	-.99	-	4.73	-4.01	-1.59	-
Frequent	Count	2231.00	6151.00	1019.00	9401	1291.00	2950.00	226.00	4467
	Expected Count	2427.57	5968.23	1005.19	9401.0	1740.71	2533.17	193.13	4467.0
	Adjusted Residual	-14.58	12.33	1.45	-	-23.12	21.09	4.05	-
Total	Count	2700.00	6638.00	1118.00	10456	2704.00	3935.00	300.00	6939
	Expected Count	2700.00	6638.00	1118.00	10456.0	2704.00	3935.00	300.00	6939.0

Table 9.19: Life enjoyment and HBC for primary and secondary schoolchildren

HBC	Life enjoyment	Primary school				Secondary school			
		Enjoy	Unsure	Do not enjoy	Total	Enjoy	Unsure	Do not enjoy	Total
Rare	Count	262.00	107.00	74.00	443	718.00	379.00	318.00	1415
	Expected Count	357.10	60.51	25.38	443.0	993.91	268.77	152.33	1415.0
	Adjusted Residual	-11.68	6.57	10.16	-	-17.98	8.37	15.93	-
Occasional	Count	423.00	113.00	75.00	611	681.00	250.00	126.00	1057
	Expected Count	492.53	83.46	35.01	611.0	742.44	200.77	113.79	1057.0
	Adjusted Residual	-7.33	3.59	7.17	-	-4.49	4.19	1.32	-
Frequent	Count	7742.00	1208.00	450.00	9400	3475.00	689.00	303.00	4467
	Expected Count	7577.37	1284.03	538.61	9400.0	3137.65	848.47	480.88	4467.0
	Adjusted Residual	13.53	-7.19	-12.38	-	18.50	-10.19	-14.39	-
Total	Count	8427.00	1428.00	599.00	10454	4874.00	1318.00	747.00	6939
	Expected Count	8427.00	1428.00	599.00	10454.0	4874.00	1318.00	747.00	6939.0

Table 9.20: Self-harm and HBC for secondary schoolchildren

HBC	Self-harm	Secondary school		
		No	Yes	Total
Rare	Count	924.00	491.00	1415
	Expected Count	1117.48	297.52	1415.0
	Adjusted Residual	-14.15	14.15	-
Occasional	Count	809.00	248.00	1057
	Expected Count	834.75	222.25	1057.0
	Adjusted Residual	-2.11	2.11	
Frequent	Count	3747.00	720.00	4467
	Expected Count	3527.76	939.24	4467.0
	Adjusted Residual	13.49	-13.49	-
Total	Count	5480.00	1459.00	6939
	Expected Count	5480.00	1459.00	6939.0

9.4. Study 1: Psychological wellbeing variables and FI contingency tables with adjusted residuals for primary and secondary schoolchildren

Table 9.21: Confidence and FI for primary and secondary schoolchildren

FI	Confidence	Primary school						Secondary school					
		Never	Rarely	Some days	Most days	Everyday	Total	Never	Rarely	Some days	Most days	Everyday	Total
Food secure	Count	402.00	986.00	2341.00	3379.00	3185.00	10293	448.00	1156.00	1815.00	1844.00	1457.00	6720
	Expected Count	412.47	992.29	2353.73	3361.76	3172.76	10293.0	491.97	1166.00	1805.17	1818.73	1438.13	6720.0
	Adjusted Residual	-4.21	-1.68	-2.39	2.90	2.09	-	-11.59	-1.81	1.52	3.91	3.16	-
Food insecure	Count	17.00	22.00	50.00	36.00	38.00	163	60.00	48.00	49.00	34.00	28.00	219
	Expected Count	6.53	15.71	37.27	53.24	50.24	163.0	16.03	38.00	58.83	59.27	46.87	219.0
	Adjusted Residual	4.21	1.68	2.39	-2.90	-2.09	-	11.59	1.81	-1.52	-3.91	-3.16	-
Total	Count	419.00	1008.00	2391.00	3415.00	3223.00	10456	508.00	1204.00	1864.00	1878.00	1485.00	6939
	Expected Count	419.00	1008.00	2391.00	3415.00	3223.00	10456.0	508.00	1204.00	1864.00	1878.00	1485.00	6939.0

Table 9.22: Happiness and FI for primary and secondary schoolchildren

FI	Happiness	Primary school						Secondary school					
		Never	Rarely	Some days	Most days	Everyday	Total	Never	Rarely	Some days	Most days	Everyday	Total
Food secure	Count	123.00	386.00	1681.00	4398.00	3705.00	10293	137.00	408.00	1516.00	2708.00	1951.00	6720
	Expected Count	130.93	399.67	1690.23	4379.64	3692.53	10293.0	169.48	432.89	1531.10	2666.11	1920.42	6720.0
	Adjusted Residual	-5.58	-5.59	-1.97	2.93	2.05	-	-14.22	-6.96	-2.47	5.88	4.65	-
Food insecure	Count	10.00	20.00	36.00	51.00	46.00	163	38.00	39.00	65.00	45.00	32.00	219
	Expected Count	2.07	6.33	26.77	69.36	58.47	163.0	5.52	14.11	49.90	86.89	62.58	219.0
	Adjusted Residual	5.58	5.59	1.97	-2.93	-2.05	-	14.22	6.96	2.47	-5.88	-4.65	-
Total	Count	133.00	406.00	1717.00	4449.00	3751.00	10456	175.00	447.00	1581.00	2753.00	1983.00	6939

Table 9.23: Sadness and FI for primary and secondary schoolchildren

FI	Sadness	Primary school						Secondary school					
		Never	Rarely	Some days	Most days	Everyday	Total	Never	Rarely	Some days	Most days	Everyday	Total
Food secure	Count	656.00	4377.00	3815.00	1045.00	400.00	10293	369.00	2380.00	2466.00	984.00	521.00	6720
	Expected Count	656.60	4352.08	3806.72	1061.19	416.41	10293.0	365.10	2340.72	2441.44	1003.30	569.44	6720.0
	Adjusted Residual	-.19	3.98	1.35	-4.20	-6.57	-	1.18	5.66	3.51	-3.72	-11.94	-
Food insecure	Count	11.00	44.00	52.00	33.00	23.00	163	8.00	37.00	55.00	52.00	67.00	219
	Expected Count	10.40	68.92	60.28	16.81	6.59	163.0	11.90	76.28	79.56	32.70	18.56	219.0
	Adjusted Residual	.19	-3.98	-1.35	4.20	6.57	-	-1.18	-5.66	-3.51	3.72	11.94	-
Total	Count	667.00	4421.00	3867.00	1078.00	423.00	10456	377.00	2417.00	2521.00	1036.00	588.00	6939
	Expected Count	667.00	4421.00	3867.00	1078.00	423.00	10456.0	377.00	2417.00	2521.00	1036.00	588.00	6939.0

Table 9.24: Sadness coping and FI for primary and secondary schoolchildren

FI	Sadness coping	Primary school						Secondary school					
		Not well at all	Not well	Ok	Well	Very well	Total	Not well at all	Not well	Ok	Well	Very well	Total
Food secure	Count	878.00	1350.00	3817.00	2437.00	1810.00	10292	563	937	2379	1716	1124	6719
	Expected Count	897.78	1353.56	3814.59	2421.65	1804.42	10292.0	602.37	948.10	2361.04	1693.79	1113.70	6719.0
	Adjusted Residual	-5.53	-.83	.39	2.86	1.16		-9.46	-2.19	2.58	3.51	1.90	
Food insecure	Count	34.00	25.00	58.00	23.00	23.00	163	59.00	42.00	59.00	33.00	26.00	219
	Expected Count	14.22	21.44	60.41	38.35	28.58	163.0	19.63	30.90	76.96	55.21	36.30	219.0
	Adjusted Residual	5.53	.83	-.39	-2.86	-1.16		9.46	2.19	-2.58	-3.51	-1.90	
Total	Count	912.00	1375.00	3875.00	2460.00	1833.00	10455	622.00	979.00	2438.00	1749.00	1150.00	6938
	Expected Count	912.00	1375.00	3875.00	2460.00	1833.00	10455.0	622.00	979.00	2438.00	1749.00	1150.00	6938.0

Table 9.25: Loneliness and FI for primary and secondary schoolchildren

FI	Loneliness	Primary school						Secondary school					
		Never	Rarely	Some days	Most days	Everyday	Total	Never	Rarely	Some days	Most days	Everyday	Total
Food secure	Count	4553.00	3194.00	1498.00	581.00	467.00	10293	2645.00	2083.00	1020.00	458.00	514.00	6720
	Expected Count	4516.48	3181.62	1513.04	590.65	491.22	10293.0	2603.16	2050.19	1021.70	472.60	572.35	6720.0
	Adjusted Residual	5.81	2.12	-3.35	-3.27	-8.97		5.90	4.89	-.33	-3.92	-14.35	
Food insecure	Count	35.00	38.00	39.00	19.00	32.00	163	43.00	34.00	35.00	30.00	77.00	219
	Expected Count	71.52	50.38	23.96	9.35	7.78	163.0	84.84	66.81	33.30	15.40	18.65	219.0
	Adjusted Residual	-5.81	-2.12	3.35	3.27	8.97		-5.90	-4.89	.33	3.92	14.35	
Total	Count	4588.00	3232.00	1537.00	600.00	499.00	10456	2688.00	2117.00	1055.00	488.00	591.00	6939
	Expected Count	4588.00	3232.00	1537.00	600.00	499.00	10456.0	2688.00	2117.00	1055.00	488.00	591.00	6939.0

Table 9.26: Loneliness coping and FI for primary and secondary schoolchildren

FI	Loneliness coping	Primary school						Secondary school					
		Not well at all	Not well	Ok	Well	Very well	Total	Not well at all	Not well	Ok	Well	Very well	Total
Food secure	Count	1300.00	1192.00	2609.00	1780.00	3411.00	10292	627.00	703.00	1792.00	1335.00	2262.00	6719
	Expected Count	1317.14	1194.09	2602.78	1776.86	3401.13	10292.0	675.00	713.74	1779.98	1315.13	2235.15	6719.0
	Adjusted Residual	-4.05	-.51	1.13	.66	1.66	-	-10.96	-2.39	1.87	3.44	3.91	-
Food insecure	Count	38.00	21.00	35.00	25.00	44.00	163	70.00	34.00	46.00	23.00	46.00	219
	Expected Count	20.86	18.91	41.22	28.14	53.87	163.0	22.00	23.26	58.02	42.87	72.85	219.0
	Adjusted Residual	4.05	.51	-1.13	-.66	-1.66	-	10.96	2.39	-1.87	-3.44	-3.91	-
Total	Count	1338.00	1213.00	2644.00	1805.00	3455.00	10455	697.00	737.00	1838.00	1358.00	2308.00	6938
	Expected Count	1338.00	1213.00	2644.00	1805.00	3455.00	10455.0	697.00	737.00	1838.00	1358.00	2308.00	6938.0

Table 9.27: Stress/anxiety and FI for primary and secondary schoolchildren

FI	Stress/anxiety	Primary school						Secondary school					
		Never	Rarely	Some days	Most days	Everyday	Total	Never	Rarely	Some days	Most days	Everyday	Total
Food secure	Count	2072.00	3738.00	2666.00	1144.00	673.00	10293	880.00	1789.00	1827.00	1225.00	999.00	6720
	Expected Count	2059.39	3717.14	2660.86	1157.67	697.95	10293.0	866.75	1752.88	1805.17	1242.51	1052.69	6720.0
	Adjusted Residual	2.49	3.43	.93	-3.41	-7.83	-	2.71	5.65	3.38	-3.10	-10.14	-
Food insecure	Count	20.00	38.00	37.00	32.00	36.00	163	15.00	21.00	37.00	58.00	88.00	219
	Expected Count	32.61	58.86	42.14	18.33	11.05	163.0	28.25	57.12	58.83	40.49	34.31	219.0
	Adjusted Residual	-2.49	-3.43	-.93	3.41	7.83	-	-2.71	-5.65	-3.38	3.10	10.14	-
Total	Count	2092.00	3776.00	2703.00	1176.00	709.00	10456	895.00	1810.00	1864.00	1283.00	1087.00	6939
	Expected Count	2092.00	3776.00	2703.00	1176.00	709.00	10456.0	895.00	1810.00	1864.00	1283.00	1087.00	6939.0

Table 9.28: Stress/anxiety coping and FI for primary and secondary schoolchildren

FI	Stress/anxiety coping	Primary school						Secondary school					
		Not well at all	Not well	Ok	Well	Very well	Total	Not well at all	Not well	Ok	Well	Very well	Total
Food secure	Count	1209.00	1777.00	3108.00	2026.00	2172.00	10292	899.00	1301.00	2144.00	1242.00	1133.00	6719
	Expected Count	1225.59	1774.89	3109.75	2010.16	2171.61	10292.0	941.32	1308.36	2128.62	1221.20	1119.51	6719.0
	Adjusted Residual	-4.04	.44	-.30	3.15	.08	-	-8.37	-1.28	2.27	3.70	2.49	-
Food insecure	Count	36.00	26.00	51.00	16.00	34.00	163	73.00	50.00	54.00	19.00	23.00	219
	Expected Count	19.41	28.11	49.25	31.84	34.39	163.0	30.68	42.64	69.38	39.80	36.49	219.0
	Adjusted Residual	4.04	-.44	.30	-3.15	-.08	-	8.37	1.28	-2.27	-3.70	-2.49	-
Total	Count	1245.00	1803.00	3159.00	2042.00	2206.00	10455	972.00	1351.00	2198.00	1261.00	1156.00	6938
	Expected Count	1245.00	1803.00	3159.00	2042.00	2206.00	10455.0	972.00	1351.00	2198.00	1261.00	1156.00	6938.0

Table 9.29: Anger and FI for primary and secondary schoolchildren

FI	Anger	Primary school						Secondary school					
		Never	Rarely	Some days	Most days	Everyday	Total	Never	Rarely	Some days	Most days	Everyday	Total
Food secure	Count	1367.00	3885.00	3124.00	1228.00	689.00	10293	462.00	1881.00	2341.00	1200.00	836.00	6720
	Expected Count	1360.46	3860.86	3118.61	1242.33	710.74	10293.0	458.07	1849.72	2323.29	1211.52	877.41	6720.0
	Adjusted Residual	1.53	3.94	.93	-3.47	-6.77	-	1.07	4.81	2.56	-2.06	-8.44	-
Food insecure	Count	15.00	37.00	44.00	34.00	33.00	163	11.00	29.00	58.00	51.00	70.00	219
	Expected Count	21.54	61.14	49.39	19.67	11.26	163.0	14.93	60.28	75.71	39.48	28.59	219.0
	Adjusted Residual	-1.53	-3.94	-.93	3.47	6.77	-	-1.07	-4.81	-2.56	2.06	8.44	-
Total	Count	1382.00	3922.00	3168.00	1262.00	722.00	10456	473.00	1910.00	2399.00	1251.00	906.00	6939
	Expected Count	1382.00	3922.00	3168.00	1262.00	722.00	10456.0	473.00	1910.00	2399.00	1251.00	906.00	6939.0

Table 9.30: Anger coping and FI for primary and secondary schoolchildren

FI	Anger coping	Primary school						Secondary school					
		Not well at all	Not well	Ok	Well	Very well	Total	Not well at all	Not well	Ok	Well	Very well	Total
Food secure	Count	1622.00	2096.00	3024.00	1868.00	1682.00	10292	1121.00	1466.00	1961.00	1251.00	920.00	6719
	Expected Count	1640.03	2099.75	3009.34	1858.56	1684.32	10292.0	1162.12	1466.21	1941.71	1237.66	911.30	6719.0
	Adjusted Residual	-3.89	-.73	2.54	1.94	-.50	-	-7.47	-.03	2.92	2.36	1.75	-
Food insecure	Count	44.00	37.00	33.00	20.00	29.00	163	79.00	48.00	44.00	27.00	21.00	219
	Expected Count	25.97	33.25	47.66	29.44	26.68	163.0	37.88	47.79	63.29	40.34	29.70	219.0
	Adjusted Residual	3.89	.73	-2.54	-1.94	.50	-	7.47	.03	-2.92	-2.36	-1.75	-
Total	Count	1666.00	2133.00	3057.00	1888.00	1711.00	10455	1200.00	1514.00	2005.00	1278.00	941.00	6938
	Expected Count	1666.00	2133.00	3057.00	1888.00	1711.00	10455.0	1200.00	1514.00	2005.00	1278.00	941.00	6938.0

Table 9.31: Friendship satisfaction and FI for primary and secondary schoolchildren

FI	Friendship satisfaction	Primary school						Secondary school					
		Very unhappy	Unhappy	Ok	Happy	Very happy	Total	Very unhappy	Unhappy	Ok	Happy	Very happy	Total
Food secure	Count	173.00	244.00	1146.00	1863.00	6867.00	10293	153.00	198.00	795.00	1810.00	3764.00	6720
	Expected Count	183.10	244.13	1158.65	1865.46	6841.66	10293.0	197.56	202.40	809.62	1788.71	3721.71	6720.0
	Adjusted Residual	-6.03	-.07	-3.16	-.50	4.24	-	-18.11	-1.77	-3.08	3.31	5.84	-
Food insecure	Count	13.00	4.00	31.00	32.00	83.00	163	51.00	11.00	41.00	37.00	79.00	219
	Expected Count	2.90	3.87	18.35	29.54	108.34	163.0	6.44	6.60	26.38	58.29	121.29	219.0
	Adjusted Residual	6.03	.07	3.16	.50	-4.24	-	18.11	1.77	3.08	-3.31	-5.84	-
Total	Count	186.00	248.00	1177.00	1895.00	6950.00	10456	204.00	209.00	836.00	1847.00	3843.00	6939
	Expected Count	186.00	248.00	1177.00	1895.00	6950.00	10456.0	204.00	209.00	836.00	1847.00	3843.00	6939.0

Table 9.32: Feelings of home safety and FI for primary and secondary schoolchildren

FI	Feelings of home safety	Primary school			Secondary school		
		Safe	Not safe	Total	Safe	Not safe	Total
Food secure	Count	10056.00	237.00	10293	6509.00	211.00	6720
	Expected Count	10036.07	256.93	10293.0	6459.49	260.51	6720.0
	Adjusted Residual	10.09	-10.09	-	17.61	-17.61	-
Food insecure	Count	139.00	24.00	163	161.00	58.00	219
	Expected Count	158.93	4.07	163.0	210.51	8.49	219.0
	Adjusted Residual	-10.09	10.09	-	-17.61	17.61	-

Table 9.33: Bullied frequency and FI for primary and secondary schoolchildren

FI	Bullied frequency	Primary school				Secondary school			
		No	Occasionally	Almost always/always	Total	No	Occasionally	Almost always/always	Total
Food secure	Count	6617.00	3042.00	634.00	10293	4497.00	1772.00	451.00	6720
	Expected Count	6583.74	3049.70	659.56	10293.0	4439.33	1780.96	499.71	6720.0
	Adjusted Residual	5.47	-1.33	-8.24	-	8.36	-1.39	-12.75	-
Food insecure	Count	71.00	56.00	36.00	163	87.00	67.00	65.00	219
	Expected Count	104.26	48.30	10.44	163.0	144.67	58.04	16.29	219.0
	Adjusted Residual	-5.47	1.33	8.24	-	-8.36	1.39	12.75	-
Total	Count	6688.00	3098.00	670.00	10456	4584.00	1839.00	516.00	6939
	Expected Count	6688.00	3098.00	670.00	10456.0	4584.00	1839.00	516.00	6939.0

Table 9.34: Number of worry reasons and FI for primary and secondary schoolchildren

FI	Number of worry reasons	Primary school				Secondary school			
		No reasons	1-2 reasons	3+ reasons	Total	No reasons	1-2 reasons	3+ reasons	Total
Food secure	Count	2846.00	4524.00	2923.00	10293	1190.00	2042.00	3488.00	6720
	Expected Count	2812.46	4474.15	3006.39	10293.0	1159.22	1982.40	3578.38	6720.0
	Adjusted Residual	5.94	7.94	-14.48	-	5.59	8.97	-12.44	-
Food insecure	Count	11.00	21.00	131.00	163	7.00	5.00	207.00	219
	Expected Count	44.54	70.85	47.61	163.0	37.78	64.60	116.62	219.0
	Adjusted Residual	-5.94	-7.94	14.48	-	-5.59	-8.97	12.44	-
Total	Count	2857.00	4545.00	3054.00	10456	1197.00	2047.00	3695.00	6939
	Expected Count	2857.00	4545.00	3054.00	10456.0	1197.00	2047.00	3695.00	6939.0

Table 9.35: Number of bullying reasons and FI for primary and secondary schoolchildren

FI	**Number of bullying reasons**	Primary school				Secondary school			
		No reasons	1-2 reasons	3+ reasons	Total	No reasons	1-2 reasons	3+ reasons	Total
Food secure	Count	6615.00	3253.00	425.00	10293	4500.00	1754.00	466.00	6720
	Expected Count	6581.77	3256.43	454.80	10293.0	4441.26	1757.72	521.02	6720.0
	Adjusted Residual	5.46	-.58	-11.45	-	8.52	-.58	-14.13	-
Food insecure	Count	71.00	55.00	37.00	163	86.00	61.00	72.00	219
	Expected Count	104.23	51.57	7.20	163.0	144.74	57.28	16.98	219.0
	Adjusted Residual	-5.46	.58	11.45	-	-8.52	.58	14.13	-
Total	Count	6686.00	3308.00	462.00	10456	4586.00	1815.00	538.00	6939
	Expected Count	6686.00	3308.00	462.00	10456.0	4586.00	1815.00	538.00	6939.0

Table 9.36: Sleep and FI for primary and secondary schoolchildren

FI	**Sleep**	Primary school				Secondary school			
		4-8hours	9-12 hours	13 hours	Total	4-7 hours	8-12 hours	13 hours	Total
Food secure	Count	2635.00	6555.00	1103.00	10293	2563.00	3870.00	287.00	6720
	Expected Count	2657.91	6534.52	1100.57	10293.0	2618.66	3810.81	290.53	6720.0
	Adjusted Residual	-4.13	3.36	.62	-	-7.84	8.20	-1.19	-
Food insecure	Count	65.00	83.00	15.00	163	141.00	65.00	13.00	219
	Expected Count	42.09	103.48	17.43	163.0	85.34	124.19	9.47	219.0
	Adjusted Residual	4.13	-3.36	-.62	-	7.84	-8.20	1.19	-
Total	Count	2700.00	6638.00	1118.00	10456	2704.00	3935.00	300.00	6939
	Expected Count	2700.00	6638.00	1118.00	10456.0	2704.00	3935.00	300.00	6939.0

Table 9.37: Life enjoyment and FI for primary and secondary schoolchildren

FI	**Life enjoyment**	Primary school				Secondary school			
		Enjoy	Unsure	Do not enjoy	Total	Enjoy	Unsure	Do not enjoy	Total
Food secure	Count	8339.00	1388.00	564.00	10291	4805.00	1274.00	641.00	6720
	Expected Count	8295.61	1405.73	589.66	10291.0	4720.17	1276.40	723.42	6720.0
	Adjusted Residual	8.67	-4.08	-8.72	-	12.74	-.42	-18.26	-
Food insecure	Count	88.00	40.00	35.00	163	69.00	44.00	106.00	219
	Expected Count	131.39	22.27	9.34	163.0	153.83	41.60	23.58	219.0
	Adjusted Residual	-8.67	4.08	8.72	-	-12.74	.42	18.26	-
Total	Count	8427.00	1428.00	599.00	10454	4874.00	1318.00	747.00	6939
	Expected Count	8427.00	1428.00	599.00	10454.0	4874.00	1318.00	747.00	6939.0

Table 9.38: Self-harm and FI for primary and secondary schoolchildren

FI	**Self-harm**	Secondary school		
		No	Yes	Total
Food secure	Count	5380.00	1340.00	6720
	Expected Count	5307.05	1412.95	6720.0
	Adjusted Residual	12.29	-12.29	-
Food insecure	Count	100.00	119.00	219
	Expected Count	172.95	46.05	219.0
	Adjusted Residual	-12.29	12.29	-
Total	Count	5480.00	1459.00	6939
	Expected Count	5480.00	1459.00	6939.0

9.5. Study 1: HBC and FI contingency tables with adjusted residuals for primary and secondary schoolchildren

Table 9.39: HBC and FI for primary and secondary schoolchildren

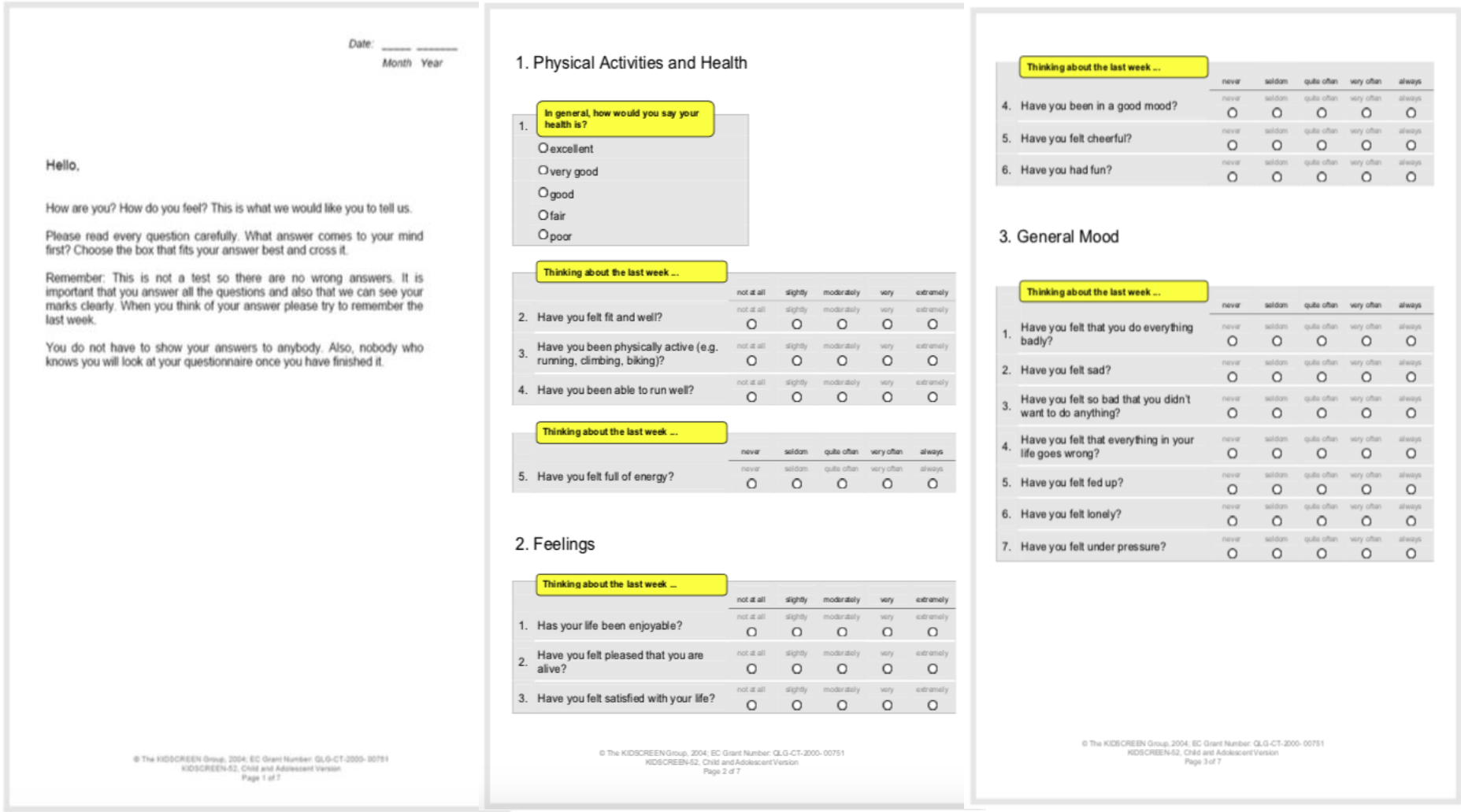
HBC	FI	Primary school			Secondary school		
		Food secure	Food insecure	Total	Food secure	Food insecure	Total
Rare	Count	426.00	18.00	444	1320.00	95.00	1415
	Expected Count	437.08	6.92	444.0	1370.34	44.66	1415.0
	Adjusted Residual	-4.34	4.34	-	-8.58	8.58	-
Occasional	Count	597.00	14.00	611	1020.00	37.00	1057
	Expected Count	601.48	9.52	611.0	1023.64	33.36	1057.0
	Adjusted Residual	-1.51	1.51	-	-.70	.70	-
Frequent	Count	9270.00	131.00	9401	4380.00	87.00	4467
	Expected Count	9254.45	146.55	9401.0	4326.02	140.98	4467.0
	Adjusted Residual	4.08	-4.08	-	7.74	-7.74	-
Total	Count	10293.00	163.00	10456	6720.00	219.00	6939
	Expected Count	10293.00	163.00	10456.0	6720.00	219.00	6939.0

9.6. Study 1: HBC, FI and self-harm contigency tables with adjusted residuals for secondary schoolchildren

Table 9.40: HBC and FI by self-harming for secondary schoolchildren

Self-harm				FI		Total
				Food secure	Food insecure	
No	HBC	Rare	Count	896.00	28.00	924
			Expected Count	907.14	16.86	924.0
			Adjusted Residual	-3.00	3.00	
		Occasional	Count	788.00	21.00	809
			Expected Count	794.24	14.76	809.0
			Adjusted Residual	-1.77	1.77	
		Frequent	Count	3696.00	51.00	3747
			Expected Count	3678.62	68.38	3747.0
			Adjusted Residual	3.77	-3.77	
	Total		Count	5380.00	100.00	5480
			Expected Count	5380.00	100.00	5480.0
Yes	HBC	Rare	Count	424.00	67.00	491
			Expected Count	450.95	40.05	491.0
			Adjusted Residual	-5.46	5.46	
		Occasional	Count	232.00	16.00	248
			Expected Count	227.77	20.23	248.0
			Adjusted Residual	1.08	-1.08	
		Frequent	Count	684.00	36.00	720
			Expected Count	661.27	58.73	720.0
			Adjusted Residual	4.35	-4.35	
	Total		Count	1340.00	119.00	1459
			Expected Count	1340.00	119.00	1459.0

9.7. Study 2: KIDSCREEN-52



Date: ____ ____
Month Year

Hello,

How are you? How do you feel? This is what we would like you to tell us.

Please read every question carefully. What answer comes to your mind first? Choose the box that fits your answer best and cross it.

Remember: This is not a test so there are no wrong answers. It is important that you answer all the questions and also that we can see your marks clearly. When you think of your answer please try to remember the last week.

You do not have to show your answers to anybody. Also, nobody who knows you will look at your questionnaire once you have finished it.

1. Physical Activities and Health

1. In general, how would you say your health is?
- O excellent
- O very good
- O good
- O fair
- O poor

Thinking about the last week ...

	not at all	slightly	moderately	very	extremely
2. Have you felt fit and well?	O	O	O	O	O
3. Have you been physically active (e.g. running, climbing, biking)?	O	O	O	O	O
4. Have you been able to run well?	O	O	O	O	O

Thinking about the last week ...

	never	seldom	quite often	very often	always
5. Have you felt full of energy?	O	O	O	O	O

2. Feelings

Thinking about the last week ...

	not at all	slightly	moderately	very	extremely
1. Has your life been enjoyable?	O	O	O	O	O
2. Have you felt pleased that you are alive?	O	O	O	O	O
3. Have you felt satisfied with your life?	O	O	O	O	O

Thinking about the last week ...

	never	seldom	quite often	very often	always
4. Have you been in a good mood?	O	O	O	O	O
5. Have you felt cheerful?	O	O	O	O	O
6. Have you had fun?	O	O	O	O	O

3. General Mood

Thinking about the last week ...

	never	seldom	quite often	very often	always
1. Have you felt that you do everything badly?	O	O	O	O	O
2. Have you felt sad?	O	O	O	O	O
3. Have you felt so bad that you didn't want to do anything?	O	O	O	O	O
4. Have you felt that everything in your life goes wrong?	O	O	O	O	O
5. Have you felt fed up?	O	O	O	O	O
6. Have you felt lonely?	O	O	O	O	O
7. Have you felt under pressure?	O	O	O	O	O

9.7 Study 2: KIDSCREEN-52

4. About Yourself

Thinking about the last week ...	never	seldom	quite often	very often	always
1. Have you been happy with the way you are?	O	O	O	O	O
2. Have you been happy with your clothes?	O	O	O	O	O
3. Have you been worried about the way you look?	O	O	O	O	O
4. Have you felt jealous of the way other girls and boys look?	O	O	O	O	O
5. Would you like to change something about your body?	O	O	O	O	O

5. Free Time

Thinking about the last week ...	never	seldom	quite often	very often	always
1. Have you had enough time for yourself?	O	O	O	O	O
2. Have you been able to do the things that you want to do in your free time?	O	O	O	O	O
3. Have you had enough opportunity to be outside?	O	O	O	O	O
4. Have you had enough time to meet friends?	O	O	O	O	O
5. Have you been able to choose what to do in your free time?	O	O	O	O	O

6. Family and Home Life

Thinking about the last week ...	not at all	slightly	moderately	very	extremely
1. Have your parent(s) understood you?	O	O	O	O	O
2. Have you felt loved by your parent(s)?	O	O	O	O	O

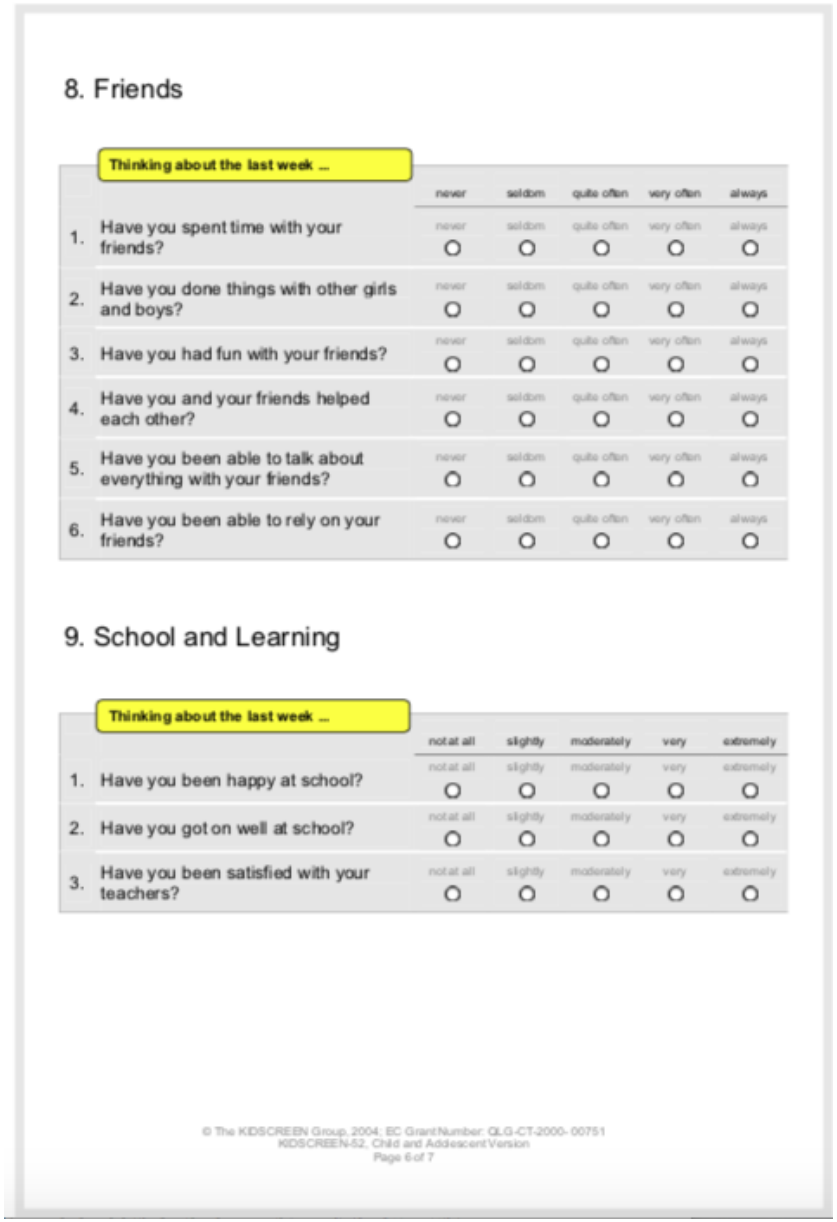
Thinking about the last week ...	never	seldom	quite often	very often	always
3. Have you been happy at home?	O	O	O	O	O
4. Have your parent(s) had enough time for you?	O	O	O	O	O
5. Have your parent(s) treated you fairly?	O	O	O	O	O
6. Have you been able talk to your parent(s) when you wanted to?	O	O	O	O	O

7. Money Matters

Thinking about the last week ...	never	seldom	quite often	very often	always
1. Have you had enough money to do the same things as your friends?	O	O	O	O	O
2. Have you had enough money for your expenses?	O	O	O	O	O

Thinking about the last week ...	not at all	slightly	moderately	very	extremely
3. Do you have enough money to do things with your friends?	O	O	O	O	O

9.7 Study 2: KIDSCREEN-52

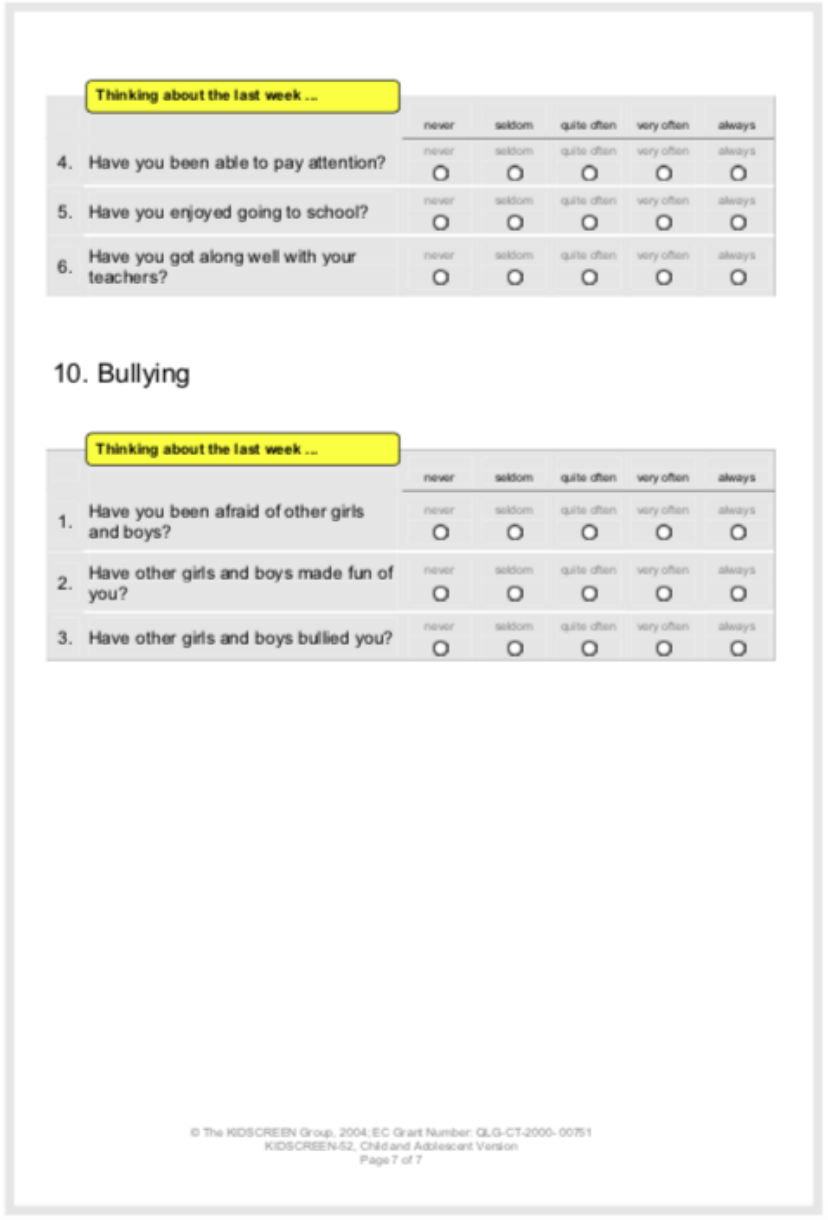


8. Friends

Thinking about the last week ...	never	seldom	quite often	very often	always
1. Have you spent time with your friends?	O	O	O	O	O
2. Have you done things with other girls and boys?	O	O	O	O	O
3. Have you had fun with your friends?	O	O	O	O	O
4. Have you and your friends helped each other?	O	O	O	O	O
5. Have you been able to talk about everything with your friends?	O	O	O	O	O
6. Have you been able to rely on your friends?	O	O	O	O	O

9. School and Learning

Thinking about the last week ...	not at all	slightly	moderately	very	extremely
1. Have you been happy at school?	O	O	O	O	O
2. Have you got on well at school?	O	O	O	O	O
3. Have you been satisfied with your teachers?	O	O	O	O	O



Thinking about the last week ...	never	seldom	quite often	very often	always
4. Have you been able to pay attention?	O	O	O	O	O
5. Have you enjoyed going to school?	O	O	O	O	O
6. Have you got along well with your teachers?	O	O	O	O	O

10. Bullying

Thinking about the last week ...	never	seldom	quite often	very often	always
1. Have you been afraid of other girls and boys?	O	O	O	O	O
2. Have other girls and boys made fun of you?	O	O	O	O	O
3. Have other girls and boys bullied you?	O	O	O	O	O

9.8. Study 2: Socio-demographics and breakfast intake questionnaire

Demographics

What is the name of your school?

.....

What is your date of birth? (This means the day, month and year you were born. So, for example, 22nd August 2011, or 22/08/11)

.....

Please select your gender:

- ☐ Male
- ☐ Female
- ☐ I would describe my gender in some other way
- ☐ I would prefer not to say

Which of these describes you?

- ☐ White (British, Irish, Traveller or Irish Heritage, Gypsy, Roma or any other White Background)
- ☐ Asian (Asian British, Indian, Pakistani, Bangladeshi, Chinese and any other Asian background)
- ☐ Black (Black British, Black Caribbean, Black African and any other Black background)
- ☐ Mixed (White and Black Caribbean, White and Black African, White and Asian and any other Mixed background)
- ☐ Other Ethnic group
- ☐ Don't know / Prefer not to say

Free School Meal status

Do you have a free school meal?

- ☐ No, I don't have a free school meal
- ☐ No, I can have a free school meal, but choose not to have it
- ☐ Yes, I have a free school meal
- ☐ I don't know

Habitual breakfast intake

In a normal week, how often do you have breakfast (this means not just a snack or drink)?

- ☐ Every day (7 days)
- ☐ Most days (4-6 days)
- ☐ Some days (2-3 days)
- ☐ Rarely (1 day)
- ☐ Never (0 days)

On a normal school day where do you eat breakfast?

- ☐ At home
- ☐ At another family members home
- ☐ At my friends home
- ☐ At my child-minders
- ☐ At my schools breakfast club
- ☐ At school but not at breakfast club
- ☐ On the way to school
- ☐ Other

Did you eat breakfast **this morning**?

Response options:

- ☐ Yes
- ☐ No

If the answer to the above question is *yes*, answer the following:

Where did you eat breakfast **this morning**?

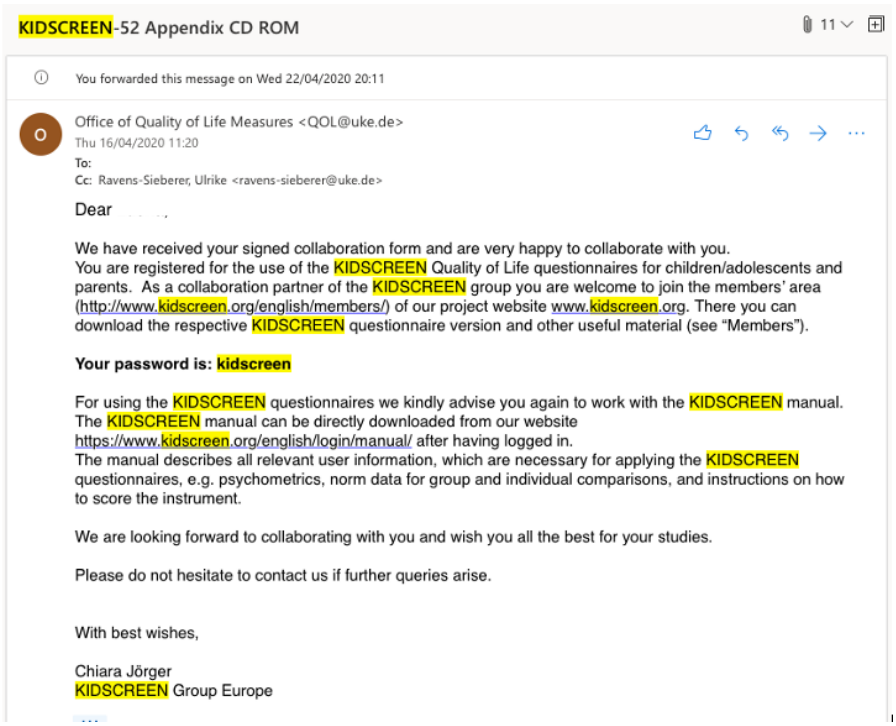
- ☐ At home
- ☐ At another family members home
- ☐ At my friends home
- ☐ At my child-minders
- ☐ At my schools breakfast club
- ☐ At school but not at breakfast club
- ☐ On the way to school
- ☐ Other

What did you eat and/or drink for breakfast this morning?

To eat:_____

To drink:_____

9.9. Study 2: KIDSCREEN-52 registration



KIDSCREEN-52 Appendix CD ROM

You forwarded this message on Wed 22/04/2020 20:11

Office of Quality of Life Measures <QOL@uke.de>
Thu 16/04/2020 11:20
To:
Cc: Ravens-Sieberer, Ulrike <ravens-sieberer@uke.de>

Dear

We have received your signed collaboration form and are very happy to collaborate with you.
You are registered for the use of the KIDSCREEN Quality of Life questionnaires for children/adolescents and parents. As a collaboration partner of the KIDSCREEN group you are welcome to join the members' area (http://www.kidscreen.org/english/members/) of our project website www.kidscreen.org. There you can download the respective KIDSCREEN questionnaire version and other useful material (see "Members").

Your password is: kidscreen

For using the KIDSCREEN questionnaires we kindly advise you again to work with the KIDSCREEN manual. The KIDSCREEN manual can be directly downloaded from our website https://www.kidscreen.org/english/login/manual/ after having logged in.
The manual describes all relevant user information, which are necessary for applying the KIDSCREEN questionnaires, e.g. psychometrics, norm data for group and individual comparisons, and instructions on how to score the instrument.

We are looking forward to collaborating with you and wish you all the best for your studies.

Please do not hesitate to contact us if further queries arise.

With best wishes,

Chiara Jörger
KIDSCREEN Group Europe

9.10. Study 2: Me and My Feelings questionnaire

EBPU
Evidence Based Practice Unit
UCL Anna Freud National Centre for Children and Families

ME AND MY FEELINGS QUESTIONNAIRE

Name/Participant ID .....

Gender.....

Age.....

Below is a questionnaire which is going to ask you how you feel. There are no right or wrong answers. You should just pick the answer which is best for you.

	Never	Sometimes	Always
I feel lonely	☐	☐	☐
I cry a lot	☐	☐	☐
I am unhappy	☐	☐	☐
Nobody likes me	☐	☐	☐
I worry a lot	☐	☐	☐
I have problems sleeping	☐	☐	☐
I wake up in the night	☐	☐	☐
I am shy	☐	☐	☐
I feel scared	☐	☐	☐
I worry when I am at school	☐	☐	☐
I get very angry	☐	☐	☐
I lose my temper	☐	☐	☐
I hit out when I am angry	☐	☐	☐
I do things to hurt people	☐	☐	☐
I am calm	☐	☐	☐
I break things on purpose	☐	☐	☐

Thank you!

9.11. Study 2: Child Food Security Survey Module

The following questions are about the food situation in your home during the last month. Please circle the answer that best describes you. Do not put your name on the paper. Your answers will remain a secret.

1. Did you **worry** that food at home would run out before your family got money to buy more?

   _____ A LOT

   _____ SOMETIMES

   _____ NEVER

2. Did the food that your family bought **run out**, and you didn't have money to get more?

   _____ A LOT

   _____ SOMETIMES

   _____ NEVER

3. Did your meals only include a few kinds of **cheap foods** because your family was running out of money to buy food?

   _____ A LOT

   _____ SOMETIMES

   _____ NEVER

4. How often were you not able to eat a **balanced meal** because your family didn't have enough money?

   _____ A LOT

   _____ SOMETIMES

   _____ NEVER

5. Did you have to **eat less** because your family didn't have enough money to buy food?

   _____ A LOT

   _____ SOMETIMES

   _____ NEVER

6. Has the size of your meals **been cut** because your family didn't have enough money for food?

   _____ A LOT

   _____ SOMETIMES

   _____ NEVER

7. Did you have to **skip a meal** because your family didn't have enough money for food?

   _____ A LOT

   _____ SOMETIMES

   _____ NEVER

8. Were you **hungry** but didn't eat because your family didn't have enough food?

   _____ A LOT

   _____ SOMETIMES

   _____ NEVER

9. Did you not eat for a **whole day** because your family didn't have enough money for food?

   _____ A LOT

   _____ SOMETIMES

   _____ NEVER

9.12. Study 2: Invitation letter to parents, parent information sheet, children information sheet, and consent form

School of Psychology
University of Leeds
Leeds
LS2 9JT

UNIVERSITY OF LEEDS

Dear Parent/Guardian,

Professor Louise Dye and Dr Clare Lawton, from the University of Leeds are currently leading a team who are conducting a study in your child's school. The study is looking at the effect of breakfast on children's psychological wellbeing and access to nutritious food. This letter is to invite your child to participate. The study will take place at your child's school.

Enclosed are two information sheets providing detailed explanations of what the study involves. One is for you and one is for your child. They are designed to provide you and your child with enough information so that you can decide whether you would like to take part in the study.

This study has received ethical approval from the School of Psychology Research Ethics Committee (reference number: PSC-873; date of approval: 16.12.19).All of the information collected from your child during the study will be kept strictly confidential and will only be used for the purposes of this research.

If you are happy for your child to take part, please sign the consent form slip below and return it to the school with you child. Please ask your child to give the completed consent form to their teacher. You will receive a £5 gift voucher to thank you and your child for taking part in the study.

If you do not wish for your child to take part in the study, you do not need to do anything.

If you have any questions, please do not hesitate to contact me, or my colleagues by the emails or telephone numbers below.

Contact details:
Primary researcher: Lubna Kudsia, email: umlk@leeds.ac.uk
Research Supervisor: Professor Louise Dye, email: l.dye@leeds.ac.uk; 0113 343 5707
Research Supervisor: Dr Clare L Lawton, email: c.l.lawton@leeds.ac.uk; 0113 343 5743
Research Fellow:Dr Katie Adolphus, email: k.adolphus@leeds.ac.uk; 07963784188

Yours Faithfully,
Miss Lubna Kudsia
Principal Researcher

Research title: Impact of breakfast consumption on psychological wellbeing and food insecurity

Information for parents

What is the purpose of the study?
The aim of the study is to examine the effect of breakfast on children's psychological wellbeing (such as emotions, behaviour, feelings) as well as their experiences of food insecurity (not having access to enough or adequately nutritious food).

Why has my child been chosen?
Your child has been chosen because they attend a school in Leeds and surrounding areas. Your child's school has also supported this study to take place.

What will my child have to do?
Children will be asked to complete an online questionnaire on psychological wellbeing. Children will also be asked to complete an online questionnaire on food insecurity. Children will also be asked to complete an online questionnaire on their breakfast eating habits. If you decide you are happy for your child to take part, they will be asked to complete the questionnaires online on one occasion during the school day with the help of their teachers. The questionnaires will take approximately 45 minutes to complete. Your child will be supported by their usual class teachers if they require their assistance to complete the questionnaires.

What will my child do during testing if I do not want them to take part or if they can't take part?
If your child does not wish to take part in the study, they will stay in their normal timetabled classes.

What will my child get for taking part?
You will be provided with a £5 gift voucher to thank you and your child for taking part in the study. Your child will receive a certificate for taking part in the research.

Do I have to do anything?
If you provide consent for your child to take part, please complete the attached consent form and return it to the school with you child. Please ask your child to give the completed consent form to their teacher. Your child will also be asked for verbal consent at the start of the research.

Will anybody know my child has taken part?
Participation in the study is completely voluntary. If you decide to allow your child to take part they are free to withdraw at any time without providing a reason. All results from the study will be kept strictly anonymous and at no point will any identifiable personal information be linked with the results. Even if your child participates in the study, you can still request the withdrawal of their information up until completion of work for publication (03/04/2020). If you wish to remove your child's data from the study at a later date please contact one of the research team (details on the enclosed letter) or let your child's teacher know.

Does my child have to take part?
No. Research participation is completely voluntary and deciding not to take part will not affect your child in any way.

What are the possible benefits of taking part?
Being part of an exciting research project on breakfast consumption and psychological wellbeing in school aged children. Through this research we hope to better understand the benefits of breakfast consumption on psychological wellbeing and food security. This study may also help raise yours and your child's awareness of the importance of consuming breakfast.

What are the possible disadvantages of taking part?
It is possible that your child may find sharing their experiences of their psychological wellbeing and food insecurity emotional or uncomfortable. If at any point they feel emotional or uncomfortable, they will be

9.12: Study 2: Invitation letter to parents, parent information sheet, children information sheet, and consent form

supported by their class teachers accordingly. Your child can also decide to withdraw from the study at any point before or during the study, if they want to.

What happens if I do not want my child to continue taking part in the study?
You are able to withdraw your child from the study at any time and all data will be destroyed.

What will happen to the results of the study?
The findings will be used to produce a report and may also be published, however all data will remain anonymous. The findings will also be shared with your child's school, however all data will remain anonymous. Some results from the study will be used towards an educational qualification by members of the research team and published in international scientific journals.

Who has reviewed the study?
The study has been reviewed and gained ethical approval by the University of Leeds, School of Psychology, Research Ethics Committee.

Consent form

1. I confirm that I have read the information sheet and understand that the information sheet for the above study and have had the opportunity to ask questions. I understand participation for my child is voluntary, and that I am free to withdraw my child at any time without anything being affected. I agree for my child to take part in the study.

2. I consent to the storage of data, including electronic and anonymised personal information for the purpose of the study. Data will be kept in accordance with General Data Protection Regulation (2016). I understand that any information that could identify my child will be kept confidential and that no personal information will be included in the write up or any other publication.

Name of child _____

Name of parent _____

Signature of parent _____

PLEASE RETURN TO THE SCHOOL NO LATER THAN [INSERT DATE]

Pupil information sheet – Breakfast study

You are invited to take part in an experiment carried out by the University of Leeds.

What is the experiment trying to find out?
The experiment is trying to find out if eating breakfast helps the way you feel and behave. The experiment is also trying to find out if eating breakfast at school helps people get access to enough healthy food.

Who else will be asked to take part in the project?
We are asking the children in your class and other schools in and around Leeds. You will take part with your classmates.

Do I have to take part?
You do not have to take part in the study if you don't want to, and you do not have to give a reason as to why you don't want to take part. If you do decide to take part, you can still decide to leave the study at any time.

What will I have to do if I agree to take part?
You will be asked to complete some questionnaires online that asks questions about whether you eat breakfast or not, your feelings, your behavior, and your relationships. Your class teachers will be there to help support you to complete these questions if you need their help. You will complete the questionnaires once during your lesson. The questionnaires will take about 45 minutes to complete.

What do I do If I cannot or do not want to take part in the study
If you do not take part in the study, you will attend your lessons like on a normal school day.

Will anyone else know that I have taken part?
Any information we collect from you will be kept secret. If the results of the study are published, this information will be kept anonymous. This means that your results will not be linked to your name and no one will know (except your teacher and the researchers) you have taken part.

9.13. Adverse events form

Study:

Participant number:

Date of report: Name of reporter:

Source of information:

Description of event:

Dates of event: Start: End:

Still on-going: Yes No

Any medication taken for this AE? Yes No

If YES, please specify: -

_____

_____

9.14. Study 2: ANCOVA models including the interaction between HBC*FI, and covariate FI

Table 9.41: ANCOVA models for the M&MF scales

	M&MF Behavioural	M&MF Emotional	M&MF Total
Main effect terms HBC	$F(2,41) = .56$, $p = .58$, $\eta^2 = .03$	$F(2,41) = 1.99$, $p = .15$, $\eta^2 = .09$	$F(2,41) = 1.70$, $p = .20$, $\eta^2 = .08$
Covariate Food insecurity	$F(1,41) = .27$, $p = .05$, $\eta^2 = .01$	$F(1,41) = 4.11$, $p = .05$, $\eta^2 = .09$	$F(1,41) = 2.66$, $p = .11$, $\eta^2 = .06$
Interaction terms HBC*FI	$F(2,41) = .27$, $p = .77$, $\eta^2 = .01$	$F(2,41) = .47$, $p = .63$, $\eta^2 = .02$	$F(2,41) = .06$, $p = .94$, $\eta^2 = .003$
Adjusted R^2	-.031	.137	.085

Table 9.42: ANCOVA models for the KIDSCREEN-52 domains

	Physical wellbeing	Psychological wellbeing	Moods & emotions	Self-perception	Autonomy
Main effect terms HBC	$F(2,41)=.51$, $p=.61$, $\eta^2=.11$	$F(2,41)=1.79$, $p=.18$, $\eta^2=.08$	$F(2,41)=1.16$, $p=.32$, $\eta^2=.05$	$F(2,41)=5.75$, $p=.01$, $\eta^2=.22$	$F(2,41)=1.67$, $p=.20$, $\eta^2=.08$
Covariate Food insecurity	$F(1,41)=.22$, $p=.64$, $\eta^2=.005$	$F(1,41)=1.12$, $p=.30$, $\eta^2=.03$	$F(1,43)=6.59$, $p=.01$, $\eta^2=.14$	$F(1,43)=4.98$, $p=.03$, $\eta^2=.11$	$F(1,43)=2.06$, $p=.16$, $\eta^2=.05$
Interaction terms HBC*FI	$F(2,41)=2.45$, $p=.10$, $\eta^2=.11$	$F(2,41)=.85$, $p=.44$, $\eta^2=.04$	$F(2,41)=.85$, $p=.44$, $\eta^2=.04$	$F(2,41)=.25$, $p=.78$, $\eta^2=.01$	$F(2,41)=.13$, $p=.88$, $\eta^2=.01$
Adjusted R^2	.109	.155	.158	.325	.050
	Parents/home	**Finances**	**Social support & peers**	**School**	**Bullying**
Main effect terms HBC	$F(2,41)=1.72$, $p=.19$, $\eta^2=.08$	$F(2,41)=.43$, $p=.65$, $\eta^2=.02$	$F(2,41)=1.47$, $p=.24$, $\eta^2=.07$	$F(2,41)=.25$, $p=.78$, $\eta^2=.01$	$F(2,41)=.93$, $p=.40$, $\eta^2=.04$
Covariate Food insecurity	$F(1,41)=4.84$, $p=.03$, $\eta^2=.11$	$F(1,41)=11.53$, $p=.002$, $\eta^2=.22$	$F(1,41)=1.67$, $p=.20$, $\eta^2=.04$	$F(1,41)=2.39$, $p=.13$, $\eta^2=.06$	$F(1,41)=6.06$, $p=.02$, $\eta^2=.13$
Interaction terms HBC*FI	$F(2,41)=2.11$, $p=.13$, $\eta^2=.09$	$F(2,41)=1.65$, $p=.20$, $\eta^2=.08$	$F(2,41)=.04$, $p=.96$, $\eta^2=.002$	$F(2,41)=1.58$, $p=.22$, $\eta^2=.07$	$F(2,41)=.18$, $p=.84$, $\eta^2=.009$
Adjusted R^2	.238	.155	.022	.078	.132

9.15. Study 2: ANCOVA model for psychological wellbeing and HBC, with covariate FI

Table 9.43: ANCOVA models for the M&MF scales

	M&MF Behavioural	M&MF Emotional	M&MF Total
Main effect terms HBC	$F(2,43) = .89$, $p = .42$, $\eta^2 = .04$	$F(2,43) = 2.76$, $p = .08$, $\eta^2 = .12$	$F(2,43) = 2.25$, $p = .12$, $\eta^2 = .10$
Covariate Food insecurity	$F(1,43) = .92$, $p = .34$, $\eta^2 = .02$	$F(1,43) = 3.80$, $p = .06$, $\eta^2 = .08$	$F(1,43) = 3.19$, $p = .08$, $\eta^2 = .07$
Adjusted R^2	.005	.158	.125

Table 9.44: ANCOVA models for the KIDSCREEN-52 domains

	Physical wellbeing	Psychological wellbeing	Moods & emotions	Self-perception	Autonomy
Main effect terms HBC	$F(2,43)=2.61$, $p=.09$, $\eta^2=.11$	$F(2,43) = 5.21$, $p = .01$, $\eta^2=.20$	$F(2,43)=2.04$, $p=.14$, $\eta^2=.09$	$F(2,43)=8.41$, $p<.001$, $\eta^2=.28$	$F(2,43)=1.99$, $p=.15$, $\eta^2=.09$
Covariate Food insecurity	$F(1,43)=.01$, $p=.94$, $\eta^2=.00$	$F(1,43) = .30$, $p = .59$, $\eta^2=.01$	$F(1,43)=5.60$, $p=.02$, $\eta^2=.12$	$F(1,43)=8.06$, $p=.007$, $\eta^2=.16$	$F(1,43)=2.11$, $p=.15$, $\eta^2=.05$
Adjusted R^2	.049	.161	.164	.348	.089
	Parents/home	**Finances**	**Social support & peers**	**School**	**Bullying**
Main effect terms HBC	$F(2,43)=5.04$, $p=.01$, $\eta^2=.19$	$F(2,43)=.33$, $p=.72$, $\eta^2=.02$	$F(2,43) = 1.67$, $p = .20$, $\eta^2=.07$	$F(2,43)=1.87$, $p=.17$, $\eta^2=.08$	$F(2,43)=1.41$, $p=.26$, $\eta^2=.06$
Covariate Food insecurity	$F(1,43)=1.94$, $p=.17$, $\eta^2=.04$	$F(1,43)=9.62$, $p=.003$, $\eta^2=.18$	$F(1,43) = 1.97$, $p = .17$, $\eta^2=.04$	$F(1,43)=.92$, $p=.34$, $\eta^2=.02$	$F(1,43)=7.00$, $p=.01$, $\eta^2=.14$
Adjusted R^2	.198	.130	.066	.054	.165

9.16. Study 2: Final ANCOVA models for M&MF and KIDSCREEN-52 domains

	M&MF Behavioural	M&MF Emotional	M&MF Total		
Main effect terms HBC	$F(2,43) = .89$, $p = .42$, $\eta^2 = .04$	$F(2,43) = 2.76$, $p = .08$, $\eta^2 = .12$	$F(2,43) = 2.25$, $p = .12$, $\eta^2 = .10$		
Covariate Food insecurity	$F(1,43) = .92$, $p = .34$, $\eta^2 = .02$	$F(1,43) = 3.80$, $p = .06$, $\eta^2 = .08$	$F(1,43) = 3.19$, $p = .08$, $\eta^2 = .07$		
Interaction terms HBC*FI	Not retained	Not retained	Not retained		
Adjusted R^2	.005	.158	.125		
	Physical wellbeing	**Psychological wellbeing**	**Moods & emotions**	**Self-perception**	**Autonomy**
Main effect terms HBC	$F(2,41) = .51$, $p = .61$, $\eta^2 = .11$	$F(2,43) = 5.21$, $p = .01$, $\eta^2 = .20$	$F(2,43) = 2.04$, $p = .14$, $\eta^2 = .09$	$F(2,43) = 8.41$, $p < .001$, $\eta^2 = .28$	$F(2,43) = 1.99$, $p = .15$, $\eta^2 = .09$
Covariate Food insecurity	$F(1,41) = .22$, $p = .64$, $\eta^2 = .005$	$F(1,43) = .30$, $p = .59$, $\eta^2 = .01$	$F(1,43) = 5.60$, $p = .02$, $\eta^2 = .12$	$F(1,43) = 8.06$, $p = .007$, $\eta^2 = .16$	$F(1,43) = 2.11$, $p = .15$, $\eta^2 = .05$
Interaction terms HBC*FI	Not retained	Not retained	Not retained	Not retained	Not retained
Adjusted R^2	.109	.161	.164	.348	.089
	Parents/home	**Finances**	**Social support & peers**	**School**	**Bullying**
Main effect terms HBC	$F(2,41) = 1.72$, $p = .19$, $\eta^2 = .08$	$F(2,41) = .43$, $p = .65$, $\eta^2 = .02$	$F(2,43) = 1.67$, $p = .20$, $\eta^2 = .07$	$F(2,41) = .25$, $p = .78$, $\eta^2 = .01$	$F(2,43) = 1.41$, $p = .26$, $\eta^2 = .06$
Covariate Food insecurity	$F(1,41) = 4.84$, $p = .03$, $\eta^2 = .11$	$F(1,41) = 11.53$, $p = .002$, $\eta^2 = .22$	$F(1,43) = 1.97$, $p = .17$, $\eta^2 = .04$	$F(1,41) = 2.39$, $p = .13$, $\eta^2 = .06$	$F(1,43) = 7.00$, $p = .01$, $\eta^2 = .14$
Interaction terms HBC*FI	$F(2,41) = 2.11$, $p = .13$, $\eta^2 = .09$	$F(2,41) = 1.65$, $p = .20$, $\eta^2 = .08$	Not retained	$F(2,41) = 1.58$, $p = .22$, $\eta^2 = .07$	Not retained
Adjusted R^2	.238	.155	.066	.078	.165

9.17. Study 2: FSM eligiblity with FI status

Table 9.45: FSM eligibility according to FI status

		FI status		
		Food insecure	Food secure	Total
FSMs eligibility	Not eligible	4	18	22
	Eligible	5	9	14
	Do not know	1	10	11
Total		10	37	47

9.18. Study 2: Independent samples t-tests examining the difference between psychological wellbeing and FSM eligibility

Table 9.46: The difference between psychological wellbeing domain scores and FSM eligibility

	FSMs eligibility
KIDSCREEN-52 domain	
Physical	$t(34) = -.71$, $p = .48$
Psychological wellbeing	$t(34) = -.78$, $p = .44$
Moods and emotions	$t(34) = .22$, $p = .83$
Self-perception	$t(34) = -.25$, $p = .88$
Autonomy	$t(34) = -.86$, $p = .40$
Parents/home	$t(34) = -.41$, $p = .68$
Financial	$t(34) = 1.42$, $p = .16$
Peers/social support	$t(34) = -.75$, $p = .46$
School	$t(34) = -.21$, $p = .83$
Bullying	$t(34) = -1.25$, $p = .22$
M&MF domain	
Emotional subscale	$t(34) = .47$, $p = .64$
Behavioural subscale	$t(34) = .19$, $p = .85$
Total subscale	$t(34) = .43$, $p = .67$

9.19. Study 3: Socio-demographics, HBC and lockdown questionnaire

Demographics
What is the name of your school?
.....

What is your date of birth? (This means the day, month and year you were born. So, for example, 22nd August 2011, or 22/08/11)
.....

Please select your gender:
- ☐ Male
- ☐ Female
- ☐ I would describe my gender in some other way
- ☐ I would prefer not to say

Which of these describes you?
- ☐ White (British, Irish, Traveller or Irish Heritage, Gypsy, Roma or any other White Background)
- ☐ Asian (Asian British, Indian, Pakistani, Bangladeshi, Chinese and any other Asian background)
- ☐ Black (Black British, Black Caribbean, Black African and any other Black background)
- ☐ Mixed (White and Black Caribbean, White and Black African, White and Asian and any other Mixed background)
- ☐ Other Ethnic group
- ☐ Don't know / Prefer not to say

Free School Meal status

Do you have a free school meal?
- ☐ No, I don't have a free school meal
- ☐ No, I can have a free school meal, but choose not to have it
- ☐ Yes, I have a free school meal
- ☐ I don't know

Habitual breakfast intake

During **lockdown**, how often did you have breakfast (this means not just a snack or a drink)?
- ☐ Every day (7 days)
- ☐ Most days (4-6 days)
- ☐ Some days (2-3 days)
- ☐ Rarely (1 day)
- ☐ Never (0 days)

During a **normal week,** how often do you have breakfast (this means not just a snack or a drink)?
- ☐ Every day (7 days)
- ☐ Most days (4-6 days)
- ☐ Some days (2-3 days)
- ☐ Rarely (1 day)
- ☐ Never (0 days)

During **lockdown**, where did you eat breakfast?
- ☐ At home
- ☐ At another family members home
- ☐ At my friends home
- ☐ At my child-minders
- ☐ At my schools breakfast club
- ☐ At school but not at breakfast club
- ☐ On the way to school
- ☐ Other

On a **normal school day**, where do you eat breakfast?
- ☐ At home
- ☐ At another family members home
- ☐ At my friends home
- ☐ At my child-minders
- ☐ At my schools breakfast club
- ☐ At school but not at breakfast club
- ☐ On the way to school
- ☐ Other

Did you eat breakfast **this morning**?
Response options:
- ☐ Yes
- ☐ No

If the answer to the above question is *yes*, answer the following:

Where did you eat breakfast **this morning**?
- ☐ At home
- ☐ At another family members home
- ☐ At my friends home
- ☐ At my child-minders
- ☐ At my schools breakfast club
- ☐ On the way to school
- ☐ Other

What did you eat and/or drink for breakfast this morning?
To eat:_____
To drink:_____

Have you completed this questionnaire before?
- ☐ Yes
- ☐ No

Lockdown related questions

Did you attend school during **lockdown**? (define lockdown – when we were told by the government that because of the coronavirus we had to stay indoors and not go out unless we really had to)
- ☐ Yes
- ☐ No

Is your parent/carer a **key worker**? (define keyworker – a person who works in an important job which meant they had to keep working during lockdown)
- ☐ Yes
- ☐ No

Did you or any of your family members at home have to **shield** during lockdown? (define shield – because of their health, someone who the government asked because of the coronavirus to stay at home as much as possible and not see/meet others who are not living in their house)
- ☐ Yes
- ☐ No

9.20. Study 3: Me and My Feelings questionnaire during and post lockdown

Below is a questionnaire which is going to ask how you felt **DURING LOCKDOWN**. There are no right or wrong answers. You should just pick the answer which is best for you.

	Never	Sometimes	Always
I felt lonely			
I cried a lot			
I was unhappy			
Nobody liked me			
I worried a lot			
I had problems sleeping			
I woke up in the night			
I was shy			
I felt scared			
I worried when I was at school			
I got very angry			
I lost my temper			
I hit out when I was angry			
I did things to hurt people			
I was calm			
I broke things on purpose			

Below is a questionnaire which is going to ask how you feel **NOW**. There are no right or wrong answers. You should just pick the answer which is best for you.

	Never	Sometimes	Always
I feel lonely			
I cry a lot			
I am unhappy			
Nobody likes me			
I worry a lot			
I have problems sleeping			
I wake up in the night			
I am shy			
I feel scared			
I worry when I am at school			
I get very angry			
I lose my temper			
I hit out when I am angry			
I do things to hurt people			
I am calm			
I break things on purpose			

9.21. Study 3: Child Food Security Survey Module during and post lockdown

The following questions are about the food situation in your home. Please circle the answer that best describes you. Your answers will remain a secret.

1. Did you **worry** that food at home would run out before your family got money to buy more?

During lockdown	**In the last month**
A lot	A lot
Sometimes	Sometimes
Never	Never

2. Did the food that your family bought **run out**, and you didn't have money to get more?

During lockdown	**In the last month**
A lot	A lot
Sometimes	Sometimes
Never	Never

3. Did your meals only include a few kinds of **cheap foods** because your family was running out of money to buy food?

During lockdown	**In the last month**
A lot	A lot
Sometimes	Sometimes
Never	Never

4. How often were you not able to eat a **balanced meal** because your family didn't have enough money?

During lockdown	**In the last month**
A lot	A lot
Sometimes	Sometimes
Never	Never

5. Did you have to **eat less** because your family didn't have enough money to buy food?

During lockdown	**In the last month**
A lot	A lot
Sometimes	Sometimes
Never	Never

6. Has the size of your meals **been cut** because your family didn't have enough money for food?

During lockdown	**In the last month**
A lot	A lot
Sometimes	Sometimes
Never	Never

7. Did you have to **skip a meal** because your family didn't have enough money for food?

During lockdown	**In the last month**
A lot	A lot
Sometimes	Sometimes
Never	Never

8. Were you **hungry** but didn't eat because your family didn't have enough food?

During lockdown	**In the last month**
A lot	A lot
Sometimes	Sometimes
Never	Never

9. Did you not eat for a **whole day** because your family didn't have enough money for food?

During lockdown	**In the last month**
A lot	A lot
Sometimes	Sometimes
Never	Never

10. I didn't go hungry but I think my parent/carer did miss meals because there wasn't enough money for food

During lockdown	**In the last month**
A lot	A lot
Sometimes	Sometimes
Never	Never

9.22. Study 3 and Study 4: Invitation letter to parents, parent information sheet, children information sheet, and consent form

School of Psychology
University of Leeds
Leeds
LS2 9JT

UNIVERSITY OF LEEDS

Dear Parent/Guardian,

Professor Louise Dye and Dr Katie Adolphus from the University of Leeds are currently conducting a study in your child's school. The study is looking at the effect of COVID-19 lockdown on breakfast consumption, children's psychological wellbeing and access to nutritious food. This letter is to invite your child to participate. The study will take place at your child's school.

Enclosed are two information sheets providing detailed explanations of what the study involves. One is for you and one is for your child. They are designed to provide you and your child with enough information so that you can decide whether you would like to take part in the study.

This study has received ethical approval from the School of Psychology Research Ethics Committee (Ref PSYC-88, date of approval 09.09.20). All of the information collected from your child during the study will be kept strictly confidential and will only be used for the purposes of this research.

If you are happy for your child to take part, please continue to the online link [INSERT ONLINE LINK] and complete the consent form with your child's details. There are 20 £10 gift vouchers that will be available to win for children who take part in the study.

If you do not wish for your child to take part in the study, you do not need to do anything.

If you have any questions, please do not hesitate to contact me, or my colleagues by the emails or telephone numbers below.

Contact details:
Primary researcher: Lubna Kudsia, email: umlk@leeds.ac.uk ; 07530998036
Research Supervisor: Professor Louise Dye, email: l.dye@leeds.ac.uk; 0113 343 5707
Research Fellow: Dr Katie Adolphus, email: k.adolphus@leeds.ac.uk; 07963784188

Yours Faithfully,
Miss Lubna Kudsia
Principal Researcher

Research title: The association between breakfast consumption, psychological wellbeing and food insecurity - assessing the impact of the COVID-19 lockdown

Information for parents

What is the purpose of the study?
The aim of the study is to examine the effect of COVID-19 lockdown on breakfast consumption, children's psychological wellbeing (such as emotions, behaviour, feelings) as well as their experiences of food insecurity (not having access to enough or adequately nutritious food).

Why has my child been chosen?
Your child has been chosen because they attend a school in Leeds or surrounding areas. Your child's school has also supported this study to take place.

What will my child have to do?
Children will be asked to complete an online questionnaire on their experience of COVID-19 lockdown, their psychological wellbeing, food insecurity and breakfast eating habits. If you decide you are happy for your child to take part, they will be asked to complete the questionnaires online on one occasion during the school day with the help of their teachers. The questionnaires will take approximately 30 minutes to complete. Your child will be supported by their usual class teachers if they require their assistance to complete the questionnaires.

What will my child do during testing if I do not want them to take part or if they can't take part?
If your child does not wish to take part in the study they will stay in their normal timetabled classes.

What will my child get for taking part?
There are 20 £10 gift vouchers that will be available to win for those children who take part in the study. The names of children who take part in the study will go into a prize draw and the winners will be randomly allocated.

Do I have to do anything?
If you provide consent for your child to take part, please complete the consent form on the online link [INSERT ONLINE LINK]. Your child will also be asked for verbal consent at the start of the research.

Will anybody know my child has taken part?
Participation in the study is completely voluntary. If you decide to allow your child to take part they are free to withdraw at any time without providing a reason. All results from the study will be kept strictly anonymous and at no point will any identifiable personal information be linked with the results. Even if your child participates in the study, you can still request the withdrawal of their information up until completion of work for analysis (30/03/2021). If you wish to remove your child's data from the study at a later date please contact one of the research team (details on the letter) or let your child's teacher know.

Does my child have to take part?
No. Research participation is completely voluntary and deciding not to take part will not affect your child in any way.

9.22. Study 3 and Study 4: Invitation letter to parents, parent information sheet, children information sheet, and consent form

What are the possible benefits of taking part?
Being part of an exciting research project on exploring the effects of COVID-19 lockdown restrictions on breakfast consumption, psychological wellbeing and food insecurity in school aged children. Through this research we hope to better understand the benefits of breakfast on psychological wellbeing and food security, whilst understanding the potential impact that lockdown has had on these.

What are the possible disadvantages of taking part?
It is possible that your child may find sharing their experiences of lockdown, their psychological wellbeing and food insecurity emotional or uncomfortable. If at any point they feel emotional or uncomfortable, they will be supported by their class teachers accordingly. Your child can also decide to withdraw from the study at any point before or during the study, if they want to.

What happens if I do not want my child to continue taking part in the study?
You are able to withdraw your child from the study at any time and all data will be destroyed.

What will happen to the results of the study?
The findings will be used to produce a report and may also be published; however all data will remain anonymous. The findings will also be shared with your child's school; however all data will remain anonymous. Some results from the study will be used towards an educational qualification by members of the research team and published in international scientific journals.

Who has reviewed the study?
The study has been reviewed and gained ethical approval by the University of Leeds, School of Psychology, Research Ethics Committee.

Consent form (ONLINE)

1. I confirm that I have read and understand the information sheet for the above study and have had the opportunity to ask questions.
2. I understand participation for my child is voluntary, and that I am free to withdraw my child at any time without anything being affected. I agree for my child to take part in the study.
3. I consent to the storage of data, including electronic and anonymised personal information for the purpose of the study. Data will be kept in accordance with General Data Protection Regulation (2016). I understand that any information that could identify my child will be kept confidential and that no personal information will be included in the write up or any other publication.

Tick box to agree with the above ☐

Name of child ______________________________

School child attends ___________________________

Name of parent/guardian ______________________________

Pupil information sheet – Breakfast, feelings and lockdown study

You are invited to take part in an experiment carried out by the University of Leeds.

What is the experiment trying to find out?
The experiment is trying to find out if eating breakfast helps the way you feel and behave. The experiment is also trying to find out if lockdown has changed any of this for children.

Who else will be asked to take part in the project?
We are asking the children in your class and other schools in and around Leeds. You will take part with your classmates.

Do I have to take part?
You do not have to take part in the study if you don't want to, and you do not have to give a reason as to why you don't want to take part. If you do decide to take part, you can still decide to leave the study at any time.

What will I have to do if I agree to take part?
You will be asked to complete some questionnaires online that asks questions about normally and during lockdown, whether you eat breakfast or not, your feelings and your behavior. Your class teachers will be there to help support you to complete these questions if you need their help. You will complete the questionnaires once during your lesson. The questionnaires will take about 30 minutes to complete.

What do I do If I cannot or do not want to take part in the study?
If you do not take part in the study, you will attend your lessons like on a normal school day.

Will anyone else know that I have taken part?
Any information we collect from you will be kept confidential. If the results of the study are published, this information will be kept anonymous. This means that your results will not be linked to your name and no one will know (except your teacher and the researchers) you have taken part.

9.23. Study 3: HBC frequencies for study sample before combining categories

Table 9.52: HBC frequencies for during and post lockdown

	During lockdown	Post-lockdown
HBC	**n (%)**	**n (%)**
Everyday	45 (77.59)	51 (87.93)
Most day	10 (17.24)	4 (6.90)
Some day	2 (3.45)	2 (3.45)
Rarely	1 (1.72)	1 (1.72)
Total	58 (100)	

9.24. Study 3: ANCOVA models for M&MF including the interaction between HBC*FI

Table 9.53: ANCOVA models for M&MF subscales with covariate and interaction

	M&MF Behavioural		M&MF Emotional		M&MF Total	
	During lockdown	**Post-lockdown**	**During lockdown**	**Post-lockdown**	**During lockdown**	**Post-lockdown**
Main effect terms HBC	$F(1,55)=.74$, $p=.39$, $\eta^2=.01$	$F(1,54)=.21$, $p=.65$, $\eta^2=.004$	$F(1,54)=.01$, $p=.93$, $\eta^2=.000$	$F(1,54)=.19$, $p=.66$, $\eta^2=.004$	$F(1,54)=.30$, $p=.56$, $\eta^2=.01$	$F(1,54)=.29$, $p=.59$, $\eta^2=.01$
Covariate Food insecurity	$F(1,55)=1.21$, $p=.28$, $\eta^2=.02$	$F(1,54)=12.18$, $p<.001$, $\eta^2=.18$	$F(1,54)=8.86$, $p=.004$, $\eta^2=.14$	$F(1,54)=2.51$, $p=.12$, $\eta^2=.04$	$F(1,54)=6.73$, $p=.01$, $\eta^2=.11$	$F(1,54)=7.80$, $p=.01$, $\eta^2=.13$
Interaction terms HBC*FI	$F(1,55)=.36$, $p=.55$, $\eta^2=.01$	$F(1,54)=5.46$, $p=.02$, $\eta^2=.09$	$F(1,54)=.67$, $p=.41$, $\eta^2=.01$	$F(1,54)=.01$, $p=.92$, $\eta^2=.000$	$F(1,54)=.05$, $p=.83$, $\eta^2=.001$	$F(1,54)=1.30$, $p=.26$, $\eta^2=.02$
Adjusted R^2	.025	.169	.137	.067	.129	.136

9.25. Study 3: ANCOVA models for psychological wellbeing and HBC, with covariate FI

Table 9.54: ANCOVA models for M&MF subscales with covariate

	M&MF Behavioural		M&MF Emotional		M&MF Total	
	During lockdown	**Post-lockdown**	**During lockdown**	**Post-lockdown**	**During lockdown**	**Post-lockdown**
Main effect terms HBC	$F(1,55)=.20$, $p=.66$, $\eta^2=.004$	$F(1,55)=1.26$, $p=.27$, $\eta^2=.02$	$F(1,55)=.95$, $p=.334$, $\eta^2=.02$	$F(1,55)=.23$, $p=.63$, $\eta^2=.004$	$F(1,55)=.09$, $p=.76$, $\eta^2=.002$	$F(1,55)=.03$, $p=.86$, $\eta^2=.001$
Covariate Food insecurity	$F(1,55)=3.79$, $p=.06$, $\eta^2=.06$	$F(1,55)=7.02$, $p=.01$, $\eta^2=.11$	$F(1,55)=9.83$, $p=.003$, $\eta^2=.15$	$F(1,55)=7.10$, $p=.01$, $\eta^2=.11$	$F(1,55)=8.01$, $p=.006$, $\eta^2=.13$	$F(1,55)=10.52$, $p=.002$, $\eta^2=.16$
Adjusted R^2	.032	.102	.142	.084	. 100	.131

9.26. Study 3: Final ANCOVA models for M&MF

Table 9.55: Final ANCOVA models for M&MF subscales

	M&MF Behavioural		M&MF Emotional		M&MF Total	
	During lockdown	Post-lockdown	During lockdown	Post-lockdown	During lockdown	Post-lockdown
Main effect terms HBC	$F(1,55)=.20$, $p=.66$, $\eta^2=.004$	$F(1,54)=.21$, $p=.65$, $\eta^2=.004$	$F(1,55)=.95$, $p=.334$, $\eta^2=.02$	$F(1,55)=.23$, $p=.63$, $\eta^2=.004$	$F(1,54)=.30$, $p=.56$, $\eta^2=.01$	$F(1,54)=.29$, $p=.59$, $\eta^2=.01$
Covariate Food insecurity	$F(1,55)=3.79$, $p=.06$, $\eta^2=.06$	$F(1,54)=12.18$, $p<.001$, $\eta^2=.18$	$F(1,55)=9.83$, $p=.003$, $\eta^2=.15$	$F(1,55)=7.10$, $p=.01$, $\eta^2=.11$	$F(1,54)=6.73$, $p=.01$, $\eta^2=.11$	$F(1,54)=7.80$, $p=.01$, $\eta^2=.13$
Interaction terms HBC*FI	Not retained	$F(1,54)=5.46$, $p=.02$, $\eta^2=.09$	Not retained	Not retained	$F(1,54)=.05$, $p=.83$, $\eta^2=.001$	$F(1,54)=1.30$, $p=.26$, $\eta^2=.02$
Adjusted R^2	.032	.169	.142	.084	.129	.136

9.27. Study 3: Independent samples t-tests comparing the difference between psychological wellbeing and FSM eligibility

Table 9.63: The difference between psychological wellbeing scores and FSM eligibility

	FSMs eligibility
During lockdown M&MF domain	
Emotional subscale	t (50) =-1.30, p=.20
Behavioural subscale	t (50) =-.41, p=.68
Total subscale	t (50) =-1.10, p=.28
Post lockdown M&MF domain	
Emotional subscale	t (50) =-1.82, p=.08
Behavioural subscale	t (50) =-1.37, p=.18
Total subscale	t (50) =-1.95, p=.06

9.28. Study 3: FSM eligibility with FI status during and post lockdown

Table 5.2: FSM eligibility and FI status for during and post lockdown

	During lockdown		**Post lockdown**	
	Food insecure	Food secure	Food insecure	Food secure
FSMs eligibility				
Not eligible	16	19	5	30
Eligible	6	11	6	11
Do not know	2	4	1	5

9.29. Study 3: Independent samples t-tests for M&MF domains and FI according to lockdown status

Table 9.53:Difference in M&MF subscales scores and FI according to lockdown characteristics

	During lockdown			Post lockdown		
	School attendance	Shielding	Keyworker status	School attendance	Shielding	Keyworker status
M&MF subscale						
Emotional	t (56) =-.26, *p*=.80	t (56) =2.06, *p*=.04	t (56) =-.89, *p*=.38	t (56) =-1.20, *p*=.24	t (56) =1.79, *p*=.08	t (56) =-1.35, *p*=.18
Behavioural	t (56) =-1.81, *p*=.08	t (56) =1.53, *p*=.13	t (56) =-1.90, *p*=.06	t (56) =-.59, *p*=.56	t (56) =1.44, *p*=.16	t (56) =-1.78, *p*=.08
Total	t (56) =-1.13, *p*=.26	t (56) =2.22, *p*=.03	t (56) =-1.61, *p*=.11	t (56) =-1.15, *p*=.26	t (56) =2.00, *p*=.05	t (56) =-1.83, *p*=.07
FI	t (56) =.66, *p*=.51	t (56) =.66, *p*=.52	t (56) =-.19, *p*=.85	t (56) =.29, *p*=.77	t (56) =.37 *p*=.72	t (56) =-.81, *p*=.42