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A recipe for success: exploratory studies of the predictors of cultivated meat provision by parents of children 6-10 and 11-15 years of age

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ABSTRACT

Background: Novel and potentially sustainable alternative proteins, such as cultivated meat, face many barriers when entering the consumer market, yet these are less well explored with children and their parents.
Aims: Across two exploratory online cross-sectional studies, we aimed to investigate the factors influencing the likelihood of trying and regularly consuming cultivated meat, with a focus on parents, their children, and the family.
Methods: Study 1 recruited UK parents of children 6-10 years of age (n = 475) and Study 2 recruited UK parents of children 11-15 years of age (n = 453). Studies included questionnaires relating to parents and children, including measures of eating behaviour, neophobia, and child temperament.
Results: Using a backward stepwise regression approach, across both studies, familiarity with cultivated meat, acceptance of new technologies and processes, and attitudes towards cultivated meat positively predicted how likely parents were to provide, try and regularly consume cultivated meat, for themselves, their children, and their family. Acceptance of cultivated meat, and attitudes towards conventional beef, generally predicted these outcomes also, whereas eating behaviour and temperament were selective predictors. Of note, child neophobia and child food fussiness were not significant predictors of provision.
Conclusion: Together, these exploratory findings are useful for theory development, and speculatively suggest that familiarity with cultivated meat, acceptance of new technologies and processes, and attitudes towards cultivated meat could be used to enhance the acceptance of cultivated meat, e.g., communicating key benefits of cultivated meat to the consumer, to enhance positive attitudes.

1. Introduction

From floods and landslides to droughts and famine, climate change presents significant challenges to food production, food security, and undernutrition (Myers et al., 2017). These are further intensified by the increasing size of the global populace. For instance, demand for animal-based foods is projected to increase nearly 70% by the year 2050, to meet the growth in global population to 9.8 billion people (Searchinger et al., 2018). Meeting this demand using traditional farming methods is not viable, with current meat production accounting for 57% of all greenhouse gases generated by food production (Xu et al., 2021), however, it is essential to generate more dietary protein for consumption. One possible solution is the creation of sustainable alternative proteins, including plant-based, insect-based in the broadest sense (e.g., edible insects and protein powders made from insects), and through cell cultivation (e.g., cultivated meat), with the latter currently presenting the greatest potential to replicate the taste and texture of conventional meat (UNEP, 2023).

A relatively recent innovation, cultivated meat is a slaughter-free method of meat production, involving the collection of stem cells from

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selected animals (e.g., chickens, cows, and pigs), which are then cultivated and grown in a laboratory environment under controlled conditions (Post, 2012; Reiss et al., 2021). This process could substantially reduce the environmental impact, when compared to conventional meat production (Balasubramanian et al., 2021; Zhang et al., 2020), with estimates suggesting that cultivated meat could require 7–45% less energy, produce 78–96% less greenhouse gas emissions, require 99% less land, and 82–96% less water (Tuomisto & Teixeira de Mattos, 2011; Tuomisto et al., 2022). However, it is important to note that a more recent critical review of the sustainability of cultivated meat, revealed that some of the claims are over ambitious and not supported by evidence (Tavan et al., 2025). The review also noted that the associated environmental footprint of cultivated meat production requires the use of renewable energy sources, and that there are gaps in knowledge regarding the nutritional quality of cultivated meat (Tavan et al., 2025). More recent guidelines for the environmental life cycle assessment (LCA) of cultivated meat were released this year (Blackstone et al., 2025), which should help to enhance the consistency and reliability of these evaluations for emerging cultivated meat products.

Despite having entered the commercial market - albeit in a limited manner - in certain parts of the world (e.g., Singapore and the United States of America; GFI, 2025; FDA, 2025), and regulatory bodies reviewing submissions towards the sale of cultivated meat products in Europe, Asia, and Australia/New Zealand (GFI, 2025), one of the major remaining challenges is the acceptance of cultivated meat by the consumer. Indeed, although producing cultivated meat is likely to be less problematic for our environment, slaughter-free, cleaner than traditional meat production, yield benefits to animals, and potentially deliver health benefits for individuals (Jahir et al., 2023), consumer appetite for cultivated meat is variable. For instance, an early study in this field showed that when presented with the idea of cultivated meat, only 24% of participants were willing, in principle, to try it (Verbeke et al., 2015). More recently, a rapid evidence review by the Food Standards Agency (FSA, 2025) reported that 16-41% of people are willing to consume cultivated meat in the UK. Acceptance can also vary depending on the country and context. In a study comparing the USA, China and India, participants from China and India were significantly more likely to report being willing to purchase cultivated meat, compared to the USA (Bryant et al., 2020), and in a recent examination by Escobar and colleagues (2025), consumers in China were most open to consuming cultivated meat, followed by consumer from Chile and Belgium. GFI research (GFI, 2025) also reported that 28% of Americans would be likely to try a free sample of cultivated meat if offered, whereas more than 50% of consumers across a range of European countries would be willing to try cultivated meat (Belgium, Czechia, Denmark, the Netherlands, Poland, Portugal, Spain, and Sweden).

A wide range of factors are associated with willingness to try cultivated meat, including: the benefits to animals and the environment, the perceived health benefits and the safety of cultivated meat, price and taste, demographics of the consumer, perceived unnaturalness of cultivated meat, trust (or distrust) of food companies and regulatory bodies, disgust sensitivity and food neophobia (for reviews, see: Bryant & Barnett, 2020, Pakseresht et al., 2022; To et al., 2024; FSA, 2025). The latter two are particularly interesting from a psychological perspective; food neophobia (a fear of new foods) and food disgust sensitivity (how sensitive one is to finding certain foods disgusting) are both psychological predictors of broader food acceptance (Egolf et al., 2018; Falciglia et al., 2000).

More recently, a meta-analysis (Yu et al., 2025) of 48 articles indicated two groups of predictors of the willingness to consume cultivated meat. For the first group – perceptions of cultured meat - the strongest predictors were ethicality, disgust and taste, whereas for the second – people's characteristics – they were food technology neophobia, food neophobia and food disgust sensitivity. This type of approach helps to provide a focus on the factors that might be the most important for acceptance. However, there is a relative paucity of research examining the wider suite of psychological predictors (e.g., eating behaviour, temperament, attitudes) that have been shown to predict the acceptance of novel foods (Onwezen & Dagevos, 2024), and even where such factors have been examined with cultivated meat (e.g., van Dijk et al., 2023; Wilks et al., 2019), there is still a lack of consideration of more general eating behaviour-based predictors, including broader dietary habits (e.g., typical consumption of fruit and vegetables). Also, even where there is a good deal of research examining key predictors, such as familiarity with cultivated meat, it has been shown that such research mostly recruits non-representative samples, and that there are further issues with data recency, and the operationalisation of familiarity (Raverta et al., 2025).

Reflecting on the wider literature on the acceptance of cultivated meat, it is also notable that much of the research focusses on adults (e.g., see studies included in Yu et al., 2025). However, eating behaviour in childhood and adolescence influences diet during adulthood (Dubois et al., 2022; Wu et al., 2023), through a combination of learning, exposure to, and positive associations with certain foods (Ventura & Worobey, 2013). A quantitative study with German children and adolescents showed that attitudes towards cultivated meat burgers was the strongest predictor of the willingness to consume these burgers. Food neophobia and food disgust were negative predictors, however, the latter was not a significant predictor when nutritional-psychological elements were entered into the statistical model, highlighting the importance of measuring such variables (Dupont & Fiebelkorn, 2020). More recently, a qualitative study, examined the facilitators and barriers to the consumption of alternative proteins, including cultivated meat, using semi-structured focus groups with child and parent pairs in Singapore (e.g., Anant et al., 2025). The study showed that children exhibited a general curiosity towards alternative proteins, and that while parents saw the value in added dietary variety from alternative proteins, they were concerned with their naturalness and the novel technologies involved in their production. Thus, understanding and quantifying the strength of a broad range of factors, including psychological factors that predict whether children and adolescents would consume cultivated meat, could help to support greater acceptance across the lifespan. Relatedly, it is likely that by the time the technology has developed to make cultivated meat widely available and affordable, current generations of children and adolescents will be the future adult consumers. Hence, focussing on children and adolescents now, could help to support the willingness of future generations of adults to consume this food.

In terms of psychological predictors of food intake in children, child temperament (individual differences that determine how children react to stimuli and behave across a range of situations) has been linked to willingness to try food and to food neophobia (Haycraft et al., 2011; Pliner & Loewen, 1997). In addition, children's appetite traits, conceptualised as their degree of food approach or avoidance, also predict acceptance of novel foods; for example, the degree of a child's food responsiveness predicts the effectiveness of parental feeding practices encouraging the ingestion of new fruits (Blissett et al., 2016). Temperament and appetite may also interact to determine food acceptance; for example, children's sociability and food fussiness (a tendency to be very selective about which foods a child is willing to eat; Smith et al., 2017) predicts the effectiveness of parent-led interventions designed to improve vegetable acceptance (Holley et al., 2016). However, much of this literature has focused on the acceptance of fruit and/or vegetables; there has been no study of how temperament or appetite traits might impact willingness to try cultivated meat.

Another point of consideration is parents; both children and adolescents are usually provided food by their parents, who are the gateway to what food is available through the home setting. Given that parental food preferences and eating behaviours shape children's food preferences and eating behaviours, the role of parents and caregivers is paramount; for instance, parent eating behaviour has been shown to directly predict child and adolescent eating behaviour (Braune et al.,

2024; Pickard et al., 2024). However, children also have a significant influence on food purchases made by their parents (Wilson & Wood, 2004), with parental food purchase being influenced by child food fussiness (Screti et al., 2024), and children themselves able to deploy a range of strategies to nudge their parents towards purchasing and/or providing foods that they want to consume (Marshall et al., 2007). Further, considering that 43% of families living in households in the United Kingdom have dependent children (ONS, 2024), and that food neophobia and food fussiness are common (Hazley et al., 2022), children's food preferences have substantial potential to influence the food purchased by a family, and thus, the food consumed by a significant percentage of the populace. Hence, it is important to understand the potential barriers for parents providing cultivated meat to their child and to themselves, and how these apply to the family overall, where there may be more complex dynamics at play (e.g., with multiple individuals with different food preferences and dietary requirements).

It is also important to consider the outcomes that are measured. Reflecting on the existing literature, many studies examine hypothetical *'willingness to try'* cultivated meat (e.g., see studies included in Pakseresht et al., 2022), however, this is only the first step, i.e., if cultivated meat is to become part of our diets, then it would need to move beyond the status of something that one merely tries, to something that one consumes regularly. Indeed, recent work by Astrini and colleagues (2025), provides a dynamic staged model for novel product adoption, which better reflects the multi-stage journey of the adoption of novel food products. Hence, it seems sensible, even with survey-based studies, to investigate the likelihood of *regular consumption* as a proxy of longer-term intake, in addition to *willingness to try*. While it would be desirable to examine actual intake, cultivated meat is not widely available for consumption, however, intentions to consume are reasonable predictors of actual intake (McDermott et al., 2015). Linked to the consideration of measurement, much of the existing literature tends to examine potential predictors in isolation, or in small numbers, and so, it is still relatively unclear which factors might be the strongest predictors of acceptance, and or, potential targets to enhance acceptance. Accordingly, examining a large suite of predictors within a single model, would be useful for developing theoretical models that explain the acceptance of cultivated meat, and for identifying promising targets for interventions to enhance acceptance.

Thus, the aim was to examine a broad suite of parent and child psychological factors, including eating behaviour and temperament, to identify and quantify the strength of those that predict how likely a parent is to try and to regularly consume cultivated meat themselves, but also, to provide it to their child, and to their family more broadly. Articulated as a research question: do parent and child psychological factors, including eating behaviour and temperament, predict how likely a parent is to try and to regularly consume cultivated meat themselves, but also, to provide it to their child, and to their family more broadly? The following core hypotheses were tested: (H_1) parent and child food disgust and food neophobia would negatively predict outcomes; (H_2) parent and child approach-style eating behaviour would positively predict outcomes (e.g. food enjoyment), whereas avoidance-style eating behaviour would negatively predict outcomes (e.g., food fussiness), and; (H_3) child temperament would predict outcomes (specific hypotheses for each individual facet of temperament were not generated a priori). The following additional hypotheses were also tested: (H_4) parent and child consumption of fruit and vegetables would positively predict outcomes, and (H_5) parental positive attitudes towards cultivated meat would positively predict outcomes, whereas positive attitudes towards conventional meat would negatively predict outcomes. Explicit and precise hypotheses were not generated with regard to whether *'trying'* and *'regularly consuming'* would be differentially predicted by variables, though it was anticipated that the predictors would vary, as the outcome measures examine different types of provision. These hypotheses were examined across two separate studies (please see Fig. 1 for a graphical representation of these). Study 1 focussed on parents of children 6-10 years of age, during which, food fussiness peaks (Nas et al., 2025). Study 2 broadly replicated the design of study 1, but with parents of children 11-15 years of age (also referred to as adolescents), at which point, food fussiness typically declines (Nas et al., 2025).

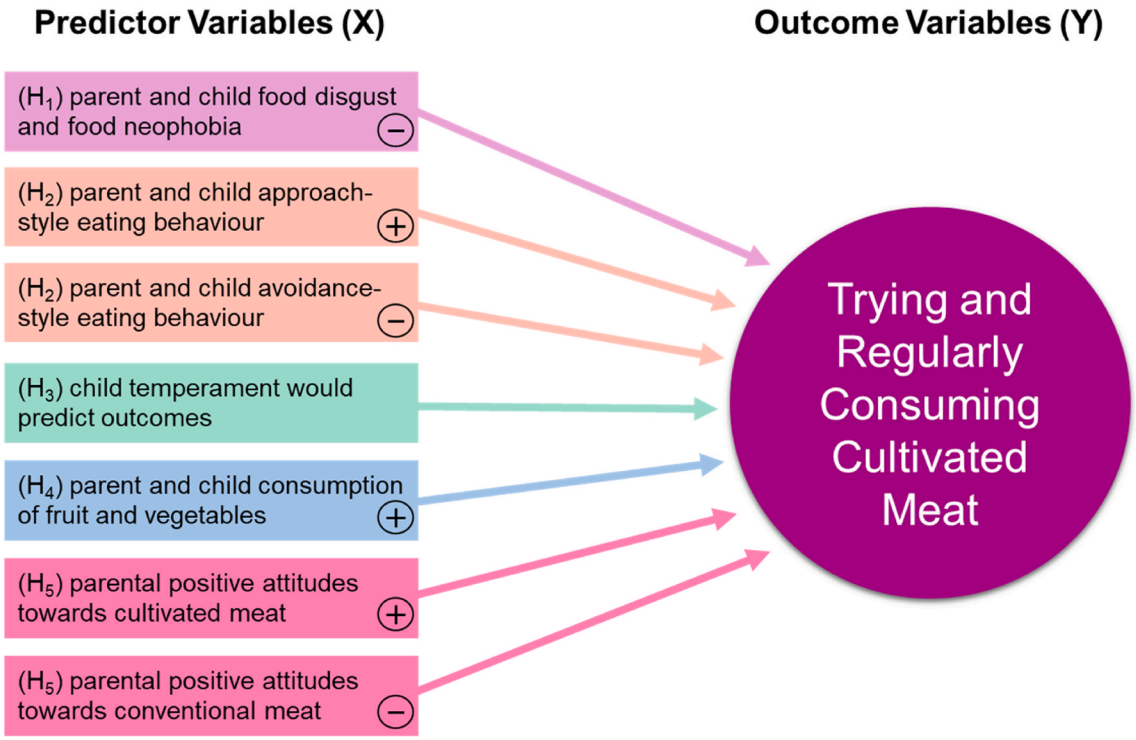

Fig. 1. Graphical hypotheses indicating one-tailed (positive or negative) and two-tailed (neither positive nor negative) hypotheses.

2. Study 1 - methods

2.1. Design

A quantitative cross-sectional study was conducted online. Participants were recruited using an opportunity sample of those signed up to the online participant platform Prolific (www.prolific.com) between October and November 2023. Outcomes included whether parents would be likely to provide cultivated meat, to be tried and/or regularly consumed, by themselves, their child, and their family. Predictors mainly comprised psychological variables, and in particular, those related to eating behaviour and temperament (see analysis plan below where all outcomes and predictors are fully specified). The online survey was designed and stored on Qualtrics XM platform (2023).

2.2. Participants

Participants were UK residents, who were parents of children aged 6-10 years. Parents completed the questionnaires answering for both themselves, and about their youngest child that fell into the age brackets of 6-10 years. Participants were excluded from participation on the following grounds: (1) those who were not currently eating meat due to any reason, such as a vegetarian diet; (2) medically diagnosed food allergies in the participant or their child; (3) current or previously diagnosed eating disorders in either the parent or their child, or; (4) not being fluent in English. Data were withdrawn from analysis where the survey was not completed in full (i.e., <100% completion). Informed consent was obtained from each parent prior to starting the survey (all participants were parents, and only parents answered the questionnaires). Aston University Research Ethics Committee approved the study prior to commencement (HLS21120) and all work was carried out in accordance with the Declaration of Helsinki. GPower 3.1.9.2 (Faul et al., 2009) was used to calculated sample size; assuming a small-medium effect size ($f^2 = 0.085$), with alpha set at 0.05 and power at 80%, and based on the maximum number of predictors (32), a minimum of 321 parents of 6-10-year-olds were required to complete the study in full.

2.3. Measures

2.3.1. Demographics and dietary intake

Demographic information was collected to characterise the sample and comprised 10 questions examining: parental sex, age, ethnic origin, education level, religion followed, total household income, how many children in the desired age group lived in the household, the age of the youngest child within the age group, child's school attended, and the person that made decisions regarding household food shopping. Dietary habits were recorded using the Short Form Food Frequency Questionnaire (SF-FFQ; Cleghorn et al., 2016). This 20-item questionnaire asked about foods and drinks that the respondent might have consumed within a typical week. Responses were recorded using an 8-point Likert scale ranging from rarely or never, to 5+ times a day. Participants completed this once for themselves, and then again for their child. From this the number of portions of fruit and vegetables consumed within a day was recorded for both parent and child (including both fresh and dried fruits); where participants reported consuming 20 or more servings of fruit or vegetables, these were classed as outliers, and removed from analyses (as per Rippin et al., 2023).

2.3.2. Food neophobia

Measures of food neophobia were completed by the parents for both themselves, and their child. The shortened 6-item Food Neophobia Scale (FNS-C) was completed for the child (Cooke et al., 2006) and the longer 10-item Food Neophobia Scale (FNS-A) was completed for the adults (Pliner & Hobden, 1992). The FNS-C consists of items such as *"My child does not trust new foods"*, and the FNS-A, involved similar items with 4 additional items. The FNS-C was responded to using a 4-point Likert scale, with options ranging from *"strongly disagree"* to *"strongly agree"*, while the FNS-A used a 7-point Likert scale, ranging from *"agree extremely"* to *"extremely disagree"*. A total score for food neophobia was generated for each of the adult and child versions of this scale, with higher scores representing higher levels of food neophobia.

2.3.3. Eating behaviour

To examine individual facets of eating behaviour as potential predictors, participants completed the short form of the Child Eating Behaviour Questionnaire (CEBQ; Wardle et al., 2001), and the Adult Eating Behaviour Questionnaire (AEBQ; Hunot et al., 2016). The CEBQ contains 35 items, to be completed by parents, and comprises eight subscales: Food Responsiveness, Emotional Over-Eating, Enjoyment of Food, Desire to Drink, Satiety Responsiveness, Slowness in Eating, Emotional Under-Eating, and Food Fussiness. The first four reflect food approach behaviours, while the latter four reflect food avoidance behaviours. The AEBQ also contains 35 items, completed as self-report, comprising eight subscales, as above, except that the Desire to Drink subscale is substituted with a Hunger subscale. In this study, each of the AEBQ and CEBQ subscales were used, except for Emotional Over-Eating and Emotional Under-Eating for the CEBQ. Scores were generated for each subscale, with higher scores indicating a higher level of the behaviour. Both questionnaires have been validated in multiple languages and populations (Bjørklund et al., 2024; Jacob et al., 2022; Jimeno-Martínez et al., 2022; Malczyk et al., 2022), including in low-, and middle-income countries (Purwaningrum et al., 2020), and sub-populations in high income countries (Domoff et al., 2015).

2.3.4. Child temperament

This was measured using the Emotionality, Activity and Sociability (EAS) Temperament questionnaire (Buss & Plomin, 1984), a well-established and validated questionnaire that has been used worldwide and translated into numerous languages (Gasman et al., 2002). This is a 20-item questionnaire that was used to generate a score for the four subscales of: Shyness, Activity, Emotionality, and Sociability. Scores were generated for each subscale, with higher scores indicating a higher level of the behaviour. Parent temperament was not measured in this study.

2.3.5. Attitude measures and parental food disgust

To understand the influence that parental attitudes towards conventionally produced meat may exert upon willingness to try, or to regularly adopt cultivated meat, a short 5-item questionnaire which examined attitudes towards the healthiness of beef (Almli et al., 2013), was adapted here to look at meat more generally. This included items such as *'Eating meat is necessary for obtaining beneficial nutrients'*. Participants responded to these statements with a modified Likert scale (1 = strongly disagree to 5 = strongly agree), such that higher scores indicated a more positive attitude. A total score for attitudes towards the healthiness of meat was then created. Alongside this, a custom set of Visual Analogue Scales (VAS) were created to measure a wider range of attitudes towards hypothetical burgers produced with either cultivated meat, plant-based alternatives, or conventionally produced meat (i.e., a conventionally produced beef burger). Burgers were selected, as it was rationalised that these might be viewed as a more universal product (i.e., acceptable to children, adolescents and parents), versus other products that might be viewed as more appropriate/desirable to a specific age group. Each type of burger was rated on a scale from 0 to 100 (where 0 = not at all, and 100 = very much), for the items: *'Harmful to animals'*, *'Harmful to the Environment'*, *'Healthy to eat'*, *'Artificial'*, *'Disgusting'*, *'Unhygienic'*, *'Tasty'*, and *'Expensive'*. Scores for the negative items (n = 6) were inverted and added to scores for the positive items (n = 2; *'Healthy to eat'* and *'Tasty'*), thereby producing a total score ranging from −600 to +200. Hence, higher scores represent more positive attitudes.

Parental food disgust was measured using the Food Disgust Scale (Hartmann & Siegrist, 2018); food disgust sensitivity has previously

been shown to predict the acceptance of cultivated meat directly, and also, indirectly, via the disgust evoked by cultivated meat (see Siegrist & Hartmann, 2020). A total of 32 situations were presented to participants and they were asked to rate how disgusted they were by these (e.g. *'to see raw meat'*) using a 5-point Likert scale that ranged from *'not at all disgusted'* to *'extremely disgusted'*. A total score for parental food disgust was created, with higher scores indicating greater disgust.

2.3.6. Familiarity and acceptance

To gauge familiarity with cultivated meat, participants were asked *'How familiar are you with cultivated meat (also known as clean, cell-based, or lab-grown)?'* based on a question used by Wilks and colleagues (2021). This was measured using a 5-point Likert scale, ranging from *'not at all familiar'* to *'I am very familiar'*. This was a single-item, non-validated scale, and has certain limitations (see Raverta et al., 2025 for consideration of measures of familiarity). Immediately following this question, a comprehensive explanation of cultivated meat was provided (adapted from Wilks et al., 2021), and participants were asked to confirm that they had read and understood it: *'Cultivated meat is meat made from cells instead of from a farmed animal. A small number of cells are extracted from a living animal and grown using a growth medium. Cultivated meat is also referred to as cultured meat, clean meat, cell-based meat, or lab-grown meat. It is different to plant-based meat, such as the Beyond Burger, which is made from plants. In August 2013, researchers unveiled the world's first cultivated meat hamburger. Since then, many companies worldwide are developing cultivated meat, though it is not yet commercially available because of high production costs.'*

To look at overall levels of acceptance of new technologies and processes (more broadly), participants were asked to indicate the acceptability of 17 statements (e.g., *'Growing an animal then slaughtering it for meat'*), using a 5-point Likert scale ranging from *'not at all acceptable'*, to *'completely acceptable'* (Wilks et al., 2021). To investigate acceptance of cultivated meat specifically, 12 statements were presented to participants (e.g., *'Cultured meat is real meat'*) to which they responded using a 5-point Likert scale ranging from *'strongly disagree'*, to *'strongly agree'* (Wilks et al., 2021). Scores for the negative items (n = 8) were inverted and added to scores for the positive items (n = 4), thereby producing a total score ranging from −36 to +12. Hence, higher scores represent greater acceptance.

2.3.7. Likely to try or to regularly consume cultivated meat

In total, 6 VAS questions were presented regarding how likely the parent was to provide cultivated meat to be tried, or to be regularly consumed, for the parent themself, their child (the youngest child within the age group), and as part of a family meal (e.g., *'How likely are you to provide cultivated meat for your child to try?'*). These questions were rated from 0 to 100, ranging from *'Not at all Likely'* to *'Very Likely'*. These were then used as the outcome variables. VAS were chosen here, as they produce a continuous variable, and provide a fine level of measurement (Aitken, 1969).

2.3.8. Data quality checks

To ensure data quality, a three-factor system was adopted in Qualtrics, comprising: (1) a reCAPTCHA check (this is a Turing test designed to discriminate between humans and bots, whereby participants were required to tick a box to indicate that they were not a robot, and on some occasions, were also asked to solve a challenge; e.g., indicating which images, from a set of nine, include an orange; Google, 2025); (2) a commitment check (a tick box option), whereby each participant agreed to provide thoughtful answers, and; (3) a factual attention check, in the form of an easy to answer question, which was designed to identify those answering at random.

2.4. Procedure

The survey was designed and deployed to include the above-mentioned measures. Following recruitment to the survey, participants were presented with a Participant Information Sheet, followed by a consent form. The items/questionnaires were then presented immediately in the following order: commitment check; demographic questions; SF-FFQ; CEBQ; FNS-C; EAS; AEBQ; Food Disgust Scale; FNS-A; attitudes towards the healthiness of meat; familiarity with cultivated meat; definition of cultivated meat; factual attention check; questions regarding likelihood to try or regularly consume cultivated meat; VAS-based attitudes to cultivated meat, plant-based alternatives, and conventionally produced meat; acceptance of new technologies and processes; acceptance of cultivated meat. The questions within each of the separate measures were randomised to control for order of presentation. Participants who completed the surveys in full were debriefed, thanked for their time, and compensated through Prolific at a rate of £10/hr.

2.5. Analysis plan

Survey data were processed to remove data that were incomplete or inadmissible (e.g., that met exclusion criteria), and to generate appropriate scores (e.g., where subscales/total scores needed to be calculated). After this, data were analysed using IBM SPSS version 29. To determine whether potential covariates should be included in the main analyses, the following were correlated with outcome variables and included if they correlated significantly ($p < 0.05$) with each of the outcome variables, with an r value $=> 0.2$ (we rationalised a priori that we would not control for very weak correlations as this would risk reducing our statistical power): parent age, sex, ethnic origin, education, religion, annual household income, and child age. As this was not the case for any of these variables, they were not included as covariates.

For the main analyses, to examine the factors that predicted trying or regularly consuming cultivated meat, a stepwise linear regression approach was used in a backward direction. This method was selected, as many potential predictors were to be explored, and it facilitates the removal of predictors to produce a parsimonious model comprising significant predictors. Further, the backward method was selected over the forward method to minimise suppressor effects and to provide an initial model that could be further tested in future research. Six separate models were used, one per outcome, based on the parent being likely to provide cultivated meat to: (1) self to try; (2) self to consume regularly; (3) child to try; (4) child to consume regularly; (5) family to try; and (6) family to consume regularly (for a reminder of the hypotheses, please refer back to Fig. 1).

When parental consumption of cultivated meat was the outcome variable (i.e., models 1 and 2 above), only predictor variables relating to themselves were incorporated into the model: (1) Adult daily fruit consumption; (2) Adult daily vegetable consumption; (3) each of the AEBQ subscales; (4) total score of the Food Disgust Scale; (5) total score of the FNS-A; (6) total score of attitudes towards the healthiness of meat; (7) familiarity with cultivated meat; (8) acceptance of new technologies and processes; (9) acceptance of cultivated meat; (10) VAS-based attitudes to cultivated meats, (11) attitudes to plant-based alternatives, and (12) attitudes to conventionally produced meat. However, when the child or family consumption of cultivated meat were the outcome variables, all of the predictor variables were included, i.e., the variables above, but also: (1) Child daily fruit consumption; (2) Child daily vegetable consumption; (3) each of the CEBQ subscales; (4) total score of the FNS-C; and (5) EAS.

2.6. Study 1 – results

2.6.1. Sample characteristics, predictors, and outcome variables

After exclusions and quality checks, 475 participants successfully completed the study (mean age = 37.9 years; SD = 8.9). The median completion time was 22 min. Table 1 presents demographic characteristics for parents. With regard to the children: mean child age was 7.6

years (SD = 1.5); 87.2% of parents had only one child in the 6-10 years age range, 12.8% had two or three; and 96% of children attended primary school, whereas 4% attended secondary school or "other". For context, the means and SD for each of the predictors are presented in Table 2 below. For the outcome variables, means scores for whether parents were likely to provide cultivated meat to try were as follows: parent (self) = 48.3 (SD = 35.1); child = 38.7 (SD = 33.0), and family = 39.9 (SD = 32.7). For whether parents were likely to provide cultivated meat to consume regularly: parent (self) = 35.7 (SD = 30.9); child = 32.1 (SD = 30.1), and family = 33.9 (SD = 30.1). Hence, mean scores are below 50%, and with the lowest likelihood to provide cultivated meat to children to consume regularly, though SDs indicate large variation in response for each outcome measure. See Fig. 2 for a graphical representation of the outcome measures. For unadjusted bivariate correlations between predictor and outcome variables, see Supplementary Materials – Correlations (Tables 1–6).

2.6.2. Main analyses

Parental Consumption: parents were significantly more likely to *try cultivated meat themselves,* if they showed higher levels of emotional overeating, greater familiarity with cultivated meat, greater acceptance of new technologies and processes, and more positive attitudes towards cultivated meat burgers. Conversely, they were significantly less likely to do so, if they showed higher levels of food disgust, and more positive attitudes towards conventional beef burgers ($R^2 = 0.480$, F (7, 470) = 60.981, $p < 0.001$ – see Table 3). Parents were significantly more likely to *regularly consume cultivated meat themselves* if they showed higher levels of emotional overeating, greater familiarity with cultivated meat, greater acceptance of new technologies and processes, greater acceptance of cultivated meat, and more positive attitudes towards cultivated meat burgers ($R^2 = 0.468$, F (7, 470) = 58.256, $p < 0.001$).

Child Consumption: parents were significantly more likely to provide cultivated meat to their *child to try,* if their child was a slower eater, and if the parent showed greater familiarity with cultivated meat, greater acceptance of new technologies and processes, greater acceptance of cultivated meat, and more positive attitudes towards cultivated meat burgers. Conversely, they were significantly less likely to do so, if the parent showed higher levels of satiety responsiveness, and more positive attitudes towards conventional beef burgers ($R^2 = 0.499$, F (9, 469) = 50.913, $p < 0.001$). Parents were significantly more likely to provide cultivated meat to their *child to consume regularly,* if their child was a slower eater and more responsive to food, and if the parent showed higher levels of emotional over and undereating, greater familiarity with cultivated meat, greater acceptance of new technologies and processes, greater acceptance of cultivated meat, and more positive attitudes towards cultivated meat burgers. Conversely, they were significantly less likely to do so, if the child was more shy and more sociable, and the parent held more positive attitudes towards the healthiness of meat ($R^2 = 0.459$, F (11, 469) = 35.371, $p < 0.001$).

Family Consumption: parents were significantly more likely to provide cultivated meat to their *family to try* if their child showed a higher enjoyment of food and was a slower eater, and if the parent showed greater familiarity with cultivated meat, greater acceptance of new technologies and processes, greater acceptance of cultivated meat, and more positive attitudes towards cultivated meat burgers ($R^2 = 0.492$, F (7, 469) = 63.936, $p < 0.001$). Conversely, they were significantly less likely to do so, if parents showed more positive attitudes towards conventional beef burgers. Parents were significantly more likely to provide cultivated meat to their *family to consume regularly,* if their child was a slower eater and more responsive to food, and if the parent showed higher levels of emotional overeating, greater familiarity with cultivated meat, greater acceptance of new technologies and processes, greater acceptance of cultivated meat, and more positive attitudes towards cultivated meat burgers. Conversely, they were significantly less likely to do so, if the child was more sociable, and if the parent showed more positive attitudes towards conventional beef burgers ($R^2 = 0.462$, F (11, 469) = 35.781, $p < 0.001$).

2.6.3. Variables that were not significant predictors

For all of the analyses above (i.e., for all outcomes) it is notable that the following were not significant predictors in any of the models (all *ps* > 0.05): daily fruit or vegetable consumption for adults or children; AEBQ subscales, hunger, food responsiveness, enjoyment of food, food fussiness, and slowness in eating; CEBQ subscales, food fussiness, satiety responsiveness and desire to drink; food neophobia score for adults and children; EAS subscales, activity and emotionality; and VAS-based attitudes to plant-based alternatives. For more information on the regression models, and the order of exclusion of variables in the stepwise models, please see Supplementary Materials – Regressions (Regressions 1-6).

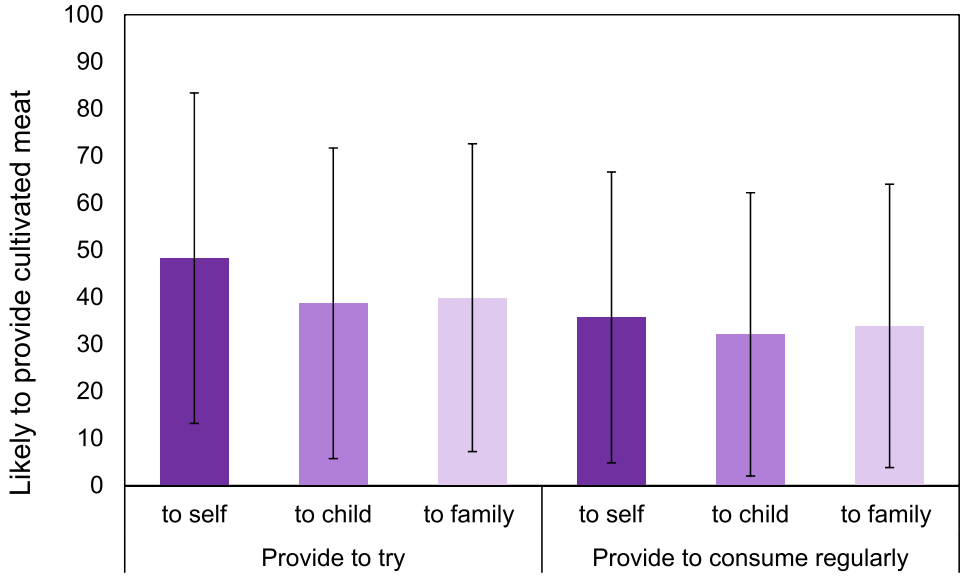

Fig. 2. Graphical representation of the mean scores and standard deviations for each of the outcome measures.

Table 1
Characteristics of parents (Study 1).

Characteristic	Response Option	Number of respondents (percentage)
Parent Sex	Male	237 (49.9%)
	Female	233 (49.1%)
	Non-binary/third gender	2 (0.4%)
	Prefer not to say	3 (0.6%)
UK Ethnic Origin	White	390 (82.1%)
	Asian (Indian, Pakistani, Chinese, any other Asian background)	43 (9.1%)
	Black/African/Caribbean	22 (4.6%)
	Other (Arab or any others)	3 (0.6%)
	Mixed two or more ethnic groups	12 (2.5%)
	Prefer not to say	4 (0.8%)
	Did not answer	1 (0.2%)
Parent Education	Completed Primary School	5 (1.1%)
	Completed Secondary School	68 (14.3%)
	Some University but no Degree	34 (7.2%)
	University Bachelor's Degree	179 (37.7%)
	Graduate or Professional Degree (MA, MS, MBA, PhD, JD, MD, DDS)	89 (18.7%)
	Vocational or Similar	96 (20.2%)
	Prefer not to say	3 (0.6%)
	Did not Respond	1 (0.2%)
	Some Primary	0 (0.0%)
	Some Secondary	0 (0.0%)
Religion	No religion	351 (73.9%)
	Christianity	87 (18.3%)
	Islam	30 (6.3%)
	Hinduism	4 (0.8%)
	Buddhism	1 (0.2%)
	Sikhism	2 (0.4%)
	Judaism	0 (0.0%)
	Other	0 (0.0%)
Gross annual household income in Great Britain Pound (GBP)	Less than 20,000	46 (9.7%)
	20,000 - 39,999	135 (28.4%)
	40,000 - 59,999	130 (27.4%)
	60,000 - 99,999	126 (26.5%)
	More than 100,000	38 (8.0%)
	Did not answer	0 (0.0%)
Who currently makes decisions about the weekly shop	Myself	418 (88.0%)
	My Significant Other	48 (10.1%)
	Other	8 (1.7%)
	No answer	1 (0.2%)

2.6.4. Exploratory analysis of outcomes based on parent sex

Based on the position that sex should be directly tested with regard to outcome measures in appetite research (Geary et al., 2025), a 2 X 3 mixed ANOVA comprising parent sex (female vs. male) and consumer (parent vs. child vs. family) was applied to the likelihood of (1) providing cultivated meat to try, and (2) providing cultivated meat for regular consumption. The full suite of analyses are reported in Supplementary Materials – Parent Sex, but in summary, male parents were significantly more likely to provide cultivated meat, to try, and to regularly consume, for themselves, their child and their family, compared to female parents.

3. Study 2 - methods

3.1. Design

Study 2 used the same study design as study 1; participants were recruited from Prolific between October and November 2023. Study 2 ran at the same time as Study 1, but participants were only allowed to participate in one study, not both.

Table 2
Means and standard deviations (SDs) for Eating Behaviour, Temperament, and or, Belief/Attitude-related Predictors (Study 1).

Characteristic	Response Option/ Focus	Mean (SD)
Typical Daily Vegetables Consumed	Parent (self)	2.4 (1.5)
	Child	2.1 (1.2)
Typical Daily Fruit Consumed	Parent (self)	2.1 (1.2)
	Child	2.3 (1.3)
Adult Eating Behaviour Questionnaire (AEBQ; Parent - self)	Hunger	5.1 (1.4)
	Food Responsiveness	3.1 (0.8)
	Emotional Overeating	2.5 (1.1)
	Enjoyment of Food	4.0 (0.8)
	Satiety Responsiveness	2.6 (0.8)
	Emotional Undereating	2.8 (1.0)
	Food Fussiness	2.5 (0.6)
	Slowness in Eating	2.6 (0.6)
Child Eating Behaviour Questionnaire (CEBQ)	Food Fussiness	2.9 (0.8)
	Enjoyment of Food	3.6 (0.7)
	Satiety Responsiveness	2.9 (0.6)
	Desire to Drink	2.7 (1.0)
	Slowness in Eating	2.8 (0.8)
	Food Responsiveness	2.8 (0.8)
Food Neophobia Scale (FNS-A/C)	Parent (self)	28.3 (11.8)
	Child	14.8 (2.7)
Parental Food Disgust	Parent (self)	108.1 (20.0)
Emotionality, Activity and Sociability (EAS) Temperament Questionnaire (Child)	Shyness	2.6 (0.8)
	Activity	3.6 (0.6)
	Emotionality	2.8 (0.9)
	Sociability	3.5 (0.6)
Health Beliefs Towards Meat	Parent (self)	20.8 (4.0)
Attitudes towards hypothetical burgers (VAS – Visual Analogue Scales) [a]	Cultivated meat; Parent (self)	−166.3 (110.9)
	Plant-based meat; Parent (self)	−104.4 (122.0)
	Conventional beef; Parent (self)	−107.1 (107.7)
Familiarity with Cultivated Meat	Parent (self)	2.4 (1.0)
Acceptance of New Technologies and Processes	Parent (self)	61.4 (9.5)
Acceptance of Cultivated Meat [b]	Parent (self)	−14.6 (3.7)

[a] Scores range between −600 and −200, with higher scores indicating more positive attitudes.
[b] Scores range between −36 and −12, with higher scores indicating more acceptance.

3.2. Participants

Participants were UK residents, who were parents of children aged 11-15 years old. Parents completed the questionnaires answering for both themselves, and about their youngest child that fell into the age brackets of 11-15 years. The same exclusion criteria from study 1 were applied to study 2. Data were also withdrawn from analysis where the survey was not completed in full (i.e., <100% completion). Informed consent was obtained from each participant prior to starting the survey (all participants were parents, and only parents answered the questionnaires). Aston University Research Ethics Committee approved the study prior to commencement (HLS21120) and all work was carried out in accordance with the Declaration of Helsinki. GPower 3.1.9.2 (Faul et al., 2009) was used to calculated sample size; assuming a small-medium effect size ($f^2 = 0.085$), with alpha set at 0.05 and power at 80%, and based on the maximum number of predictors (38), a minimum of 346 parents of 11-15-year-olds were required to complete the study in full.

3.3. Measures

Study 2 used the same measures as study 1, except for using an

Table 3
Significant predictors of key outcomes for parents, and children aged 6-10 years of age (standardised beta values presented; Study 1).

Predictors	Outcome Variables					
	Parent (Self)	Child	Family	Parent (Self)	Child	Family
	Parent likely to provide to **self** to **try**	Parent likely to provide to **self** to **consume regularly**	Parent likely to provide to **child** to **try**	Parent likely to provide to **child** to consume **regularly**	Parent likely to provide to **family** to **try**	Parent likely to provide to **family** to **consume regularly**
Child-focussed Predictors						
CEBQ - Enjoyment of Food					0.074*	
CEBQ - Slowness in Eating			0.149***	0.112**	0.149***	0.076*
CEBQ - Food Responsiveness				0.082*		0.080*
EAS - Shyness				−0.104*		
EAS - Sociability				−0.086*		−0.089*
Parent-focussed Predictors						
AEBQ - Emotional Overeating	0.126***	0.147***		0.106**		0.097*
AEBQ - Satiety Responsiveness			−0.083*			
AEBQ - Emotional Undereating				0.082*		
Parental Food Disgust	−0.078*					
Attitudes Towards the Healthiness of Meat				−0.090*		
Familiarity with Cultivated Meat	0.193***	0.207***	0.174***	0.182***	0.166***	0.167***
Acceptance of New Technologies & Processes	0.234***	0.196***	0.193***	0.152***	0.224***	0.192***
Acceptance of Cultivated Meat		0.080*	0.083*	0.107**	0.071*	0.089*
VAS Attitudes - Cultivated Meat burgers	0.456***	0.462***	0.475***	0.460***	0.476***	0.473***
VAS Attitudes - Conventional Beef Burgers	−0.088*		−0.101**		−0.130***	−0.103**

Note: CEBQ = Child Eating Behaviour Questionnaire; EAS = Emotionality, Activity and Sociability (EAS) Temperament questionnaire; AEBQ = Adult Eating Behaviour Questionnaire; VAS = Visual Analogue Scales. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

adolescent measure of temperament. For this, the Early Adolescent Temperament Questionnaire Revised Parent Report (EATQR) was used. The EATQR is a validated (Kiuru et al., 2019; Muris & Meesters, 2009), 62-item questionnaire generating the subscales of: Activation control (the capacity to do something, when there is a tendency to avoid doing so), Affiliation, Attention, Fear, Frustration, High Intensity Pleasure, Inhibitory Control, Shyness, Aggression, and Depressive mood (Ellis & Rothbart, 1999). Scores were generated for each subscale, with higher scores indicating a higher level of the behaviour. Parent temperament was not measured in this study either.

3.4. Procedure

Participants followed the same procedure as per Study 1, with the exception that they completed the EATQR in lieu of the EAS.

3.5. Analysis plan

Data were processed and analysed using the same approach as per Study 1, with the exception that data were analysed for the EATQR in lieu of the EAS.

3.6. Study 2 – results

3.6.1. Sample characteristics

After exclusions and quality checks, 453 participants successfully completed the study (mean age = 41.1 years; SD = 9.2). The median completion time was 26 min. Table 4 presents demographic characteristics for parents. With regard to the children: mean age was 12.6 years (SD = 1.5); 87.6% of parents had only one child in the 11-15 years age range, 11.9% had two to four, and 0.4% did not answer the question; and 84.3% of children attended secondary school, whereas 13.5% attended primary school, 1.8% responded “other”, and 0.4% did not answer the question. The means and SD for each of the predictors are presented in Table 5 below. For the outcome variables, mean scores for whether parents were likely to provide cultivated meat to try were as follows: parent (self) = 45.0 (SD = 34.4); child = 38.1 (SD = 32.6), and family = 39.1 (SD = 32.4). For whether parents were likely to provide cultivated meat to consume regularly: parent (self) = 31.9 (SD = 28.5); child = 29.5 (SD = 27.8), and family = 30.9 (SD = 28.5). Hence, mean scores are below 50%, and with the lowest likelihood to provide cultivated meat to children to consume regularly, though SDs indicate large variation in response for each outcome measure. See Fig. 3 for a graphical representation of the outcome measures. For unadjusted bivariate correlations between predictor and outcome variables, see Supplementary Materials – Correlations (Tables 7–12).

3.6.2. Main analyses

Parental Consumption: parents were significantly more like to *try cultivated meat themselves,* if they showed greater familiarity with cultivated meat, greater acceptance of new technologies and processes, greater acceptance of cultivated meat, and more positive attitudes towards cultivated meat burgers. Conversely, they were significantly less likely to do so, if they showed higher levels of food neophobia and more positive attitudes towards conventional beef burgers ($R^2 = 0.438$, F (7, 449) = 49.117, $p < 0.001$ – see Table 6).

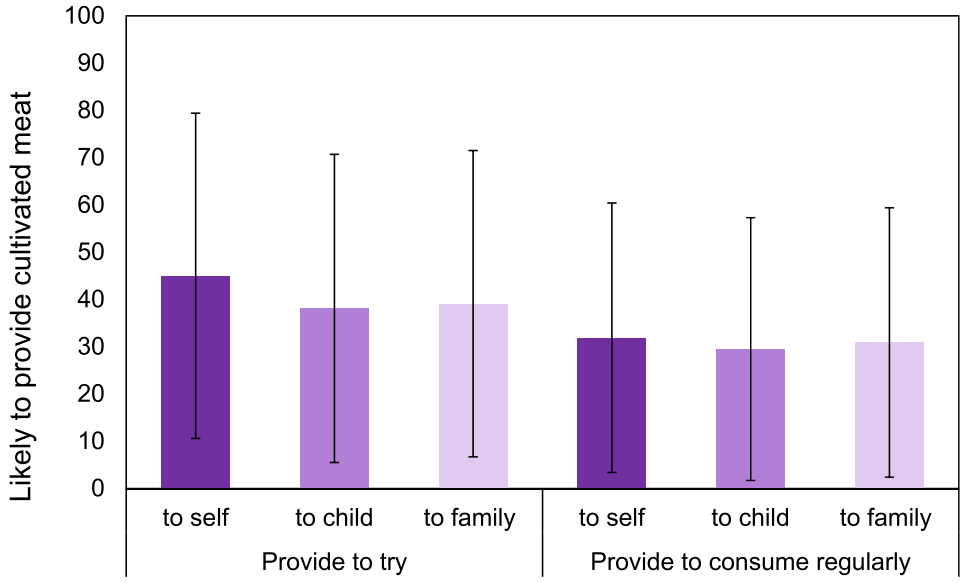

Fig. 3. Graphical representation of the mean scores and standard deviations for each of the outcome measures.

Parents were significantly more likely to *regularly consume cultivated meat themselves* if they showed greater familiarity with cultivated meat, greater acceptance of new technologies and processes, greater acceptance of cultivated meat, and more positive attitudes towards cultivated meat burgers. Conversely, they were significantly less likely to do so, if they showed higher levels of food fussiness and more positive attitudes towards conventional beef burgers ($R^2 = 0.402$, F (6, 449) = 49.696, $p < 0.001$).

Child Consumption: parents were significantly more likely to provide cultivated meat to their *child to try,* if their child was more responsive to food and showed higher levels of aggression, and if the parent showed greater familiarity with cultivated meat, greater acceptance of new technologies and processes, greater acceptance of cultivated meat, and more positive attitudes towards cultivated meat burgers. Conversely, they were significantly less likely to do so, if parents showed higher levels of food fussiness and more positive attitudes towards conventional beef burgers ($R^2 = 0.443$, F (9, 448) = 38.751, $p < 0.001$). Parents were significantly more likely to provide cultivated meat to their *child to consume regularly*, if their child was more responsive to food and showed higher levels of activation control and aggression, and if the parent showed greater familiarity with cultivated meat, greater acceptance of new technologies and processes, greater acceptance of cultivated meat, and more positive attitudes towards cultivated meat burgers. Conversely, they were significantly less likely to do so, if the child showed higher levels of frustration and inhibitory control, and if the parent showed higher levels of food fussiness and more positive attitudes towards conventional beef burgers ($R^2 = 0.456$, F (12, 448) = 30.489, $p < 0.001$).

Family Consumption: parents were significantly more likely to provide cultivated meat to their *family to try,* if their child showed a higher enjoyment of food and higher levels of aggression, and if the parent showed greater familiarity with cultivated meat, greater acceptance of new technologies and processes, greater acceptance of cultivated meat, and more positive attitudes towards cultivated meat burgers. Conversely, they were significantly less likely to do so, if their child showed higher levels of frustration, and if the parent showed higher levels of food fussiness and more positive attitudes towards conventional beef burgers ($R^2 = 0.427$, F (11, 448) = 29.620, $p < 0.001$). Parents were significantly more likely to provide cultivated meat to their *family to consume regularly,* if their child was more responsive to food and showed higher levels of activation control, and if the parent showed greater familiarity with cultivated meat, greater acceptance of new technologies and processes, greater acceptance of cultivated meat, and more positive attitudes towards cultivated meat burgers. Conversely, they were significantly less likely to do so, if their child showed higher levels of frustration and inhibitory control, and if parents showed higher levels of food fussiness and more positive attitudes towards conventional beef burgers ($R^2 = 0.452$, F (12, 448) = 29.944, $p < 0.001$).

3.6.3. Variables that were not significant predictors

For all of the analyses above (i.e., for all outcomes) it is notable that the following were not significant predictors in any of the models (all *p*s > 0.05): daily fruit or vegetable consumption for adults or children; AEBQ subscales, hunger, food responsiveness, emotional over-eating, enjoyment of food, satiety responsiveness, emotional under-eating, and slowness in eating; CEBQ subscales, food fussiness, satiety responsiveness, desire to drink, and slowness in eating; food neophobia score for children; parental food disgust; attitudes towards the healthiness of meat; EATQR subscales, affiliation, attention, fear, shyness, and depressive mood; and VAS-based attitudes to plant-based alternatives. For more information on the regression models, and the order of exclusion of variables in the stepwise models, please see Supplementary Materials – Regressions (Regressions 7-12).

3.6.4. Exploratory analysis of outcomes based on parent sex

As per study 1, the same 2 X 3 mixed ANOVA comprising parent sex (female vs. male) and consumer (parent vs. child vs. family) was applied to the likelihood of (1) providing cultivated meat to try, and (2) providing cultivated meat for regular consumption. Again, the full suite of analyses are reported in Supplementary Materials – Parent Sex, but in summary, and as per study 1, male parents were significantly more likely to provide cultivated meat, to try, and to regularly consume, for themselves, their child and their family, compared to female parents.

4. Discussion

These exploratory studies aimed to examine a broad suite of psychological factors, including eating behaviour and child temperament, to identify and quantify the strength of those that predicted the likelihood of parents of 6-10-year-olds and 11-15-year-olds, trying and regularly consuming cultivated meat themselves, but also, to provide it to their child, and to their family more broadly. The backward stepwise

Table 4
Characteristics of parents (Study 2).

Characteristic	Response Option	Number of respondents (percentage)
Parent Sex	Male	208 (45.9%)
	Female	243 (53.6%)
	Non-binary/third gender	2 (0.4%)
	Prefer not to say	0 (0.0%)
UK Ethnic Origin	White	379 (83.7%)
	Asian (Indian, Pakistani, Chinese, any other Asian background)	26 (5.7%)
	Black/African/Caribbean	28 (6.2%)
	Other (Arab or any others)	8 (1.8%)
	Mixed two or more ethnic groups	6 (1.3%)
	Prefer not to say	5 (1.1%)
	Did not answer	1 (0.2%)
Parent Education	Completed Primary School	1 (0.2%)
	Completed Secondary School	64 (14.1%)
	Some University but no Degree	41 (9.1%)
	University Bachelor's Degree	180 (39.7%)
	Graduate or Professional Degree (MA, MS, MBA, PhD, JD, MD, DDS)	87 (19.2%)
	Vocational or Similar	71 (15.7%)
	Prefer not to say	2 (0.4%)
	Did not Respond	3 (0.7%)
	Some Primary	1 (0.2%)
	Some Secondary	3 (0.7%
Religion	No religion	333 (73.5%)
	Christianity	83 (18.3%)
	Islam	24 (5.3%)
	Hinduism	4 (0.9%)
	Buddhism	4 (0.9%)
	Sikhism	1 (0.2%)
	Judaism	3 (0.7%)
	Other	1 (0.2%)
Gross annual household income in Great Britain Pound (GBP)	Less than 20,000	36 (7.9%)
	20,000 - 39,999	150 (33.1%)
	40,000 - 59,999	111 (24.5%)
	60,000 - 99,999	131 (28.9%)
	More than 100,000	24 (5.3%)
	Did not answer	1 (0.2%)
Who currently makes decisions about the weekly shop	Myself	412 (90.9%)
	My Significant Other	34 (7.5%)
	Other	7 (1.5%)
	No answer	0 (0.0%)

Table 5
Means and standard deviations (SDs) for Eating Behaviour, Temperament, and or, Belief/Attitude-related Predictors (Study 2).

Characteristic	Response Option/ Focus	Mean (SD)
Typical Daily Vegetables Consumed	Parent (self)	2.1 (1.2)
	Child	2.1 (1.2)
Typical Daily Fruit Consumed	Parent (self)	2.0 (0.2)
	Child	2.4 (1.3)
Adult Eating Behaviour Questionnaire (AEBQ; Parent - self)	Hunger	2.9 (0.7)
	Food Responsiveness	2.9 (0.7)
	Emotional Overeating	2.6 (1.0)
	Enjoyment of Food	4.1 (0.8)
	Satiety Responsiveness	2.6 (0.8)
	Emotional Undereating	2.7 (1.1)
	Food Fussiness	2.1 (0.8)
	Slowness in Eating	2.5 (0.8)
Child Eating Behaviour Questionnaire (CEBQ)	Food Fussiness	2.6 (0.9)
	Enjoyment of Food	3.8 (0.7)
	Satiety Responsiveness	2.6 (0.7)
	Desire to Drink	2.7 (1.0)
	Slowness in Eating	2.6 (0.8)
	Food Responsiveness	2.8 (0.9)
Food Neophobia Scale (FNS-A/C)	Parent (self)	28.0 (12.0)
	Child	15.3 (3.0)
Parental Food Disgust	Parent (self)	107.4 (19.9)
Early Adolescent Temperament Questionnaire Revised Parent Report (EATQR - Child)	Activation control	3.0 (0.7)
	Affiliation	3.4 (0.6)
	Attention	3.2 (0.7)
	Fear	2.7 (0.7)
	Frustration	3.0 (0.8)
	High Intensity Pleasure	3.2 (0.7)
	Inhibitory Control	3.4 (0.6)
	Shyness	2.8 (0.9)
	Aggression	2.3 (0.7)
	Depressive Mood	2.4 (0.7)
Health Beliefs Towards Meat	Parent (self)	20.7 (3.6)
Attitudes towards hypothetical burgers (VAS – Visual Analogue Scales) [a]	Cultivated meat; Parent (self)	−177.8 (115.1)
	Plant-based meat; Parent (self)	−101.8 (118.4)
	Conventional beef; Parent (self)	−110.0 (102.2)
Familiarity with Cultivated Meat	Parent (self)	2.5 (1.0)
Acceptance of New Technologies and Processes	Parent (self)	61.1 (10.5)
Acceptance of Cultivated Meat [b]	Parent (self)	−12.8 (3.3)

[a] Scores range between −600 and −200, with higher scores indicating more positive attitudes.
[b] Scores range between −36 and −12, with higher scores indicating more acceptance.

regression models explained 40-50% of the variance in the outcome measures, indicating that the predictors account for a good share of the variance. The findings show that there are three generic predictors of whether parents are likely to provide cultivated meat across all of the outcome measures. Specifically, parents were found to be more likely to provide cultivated meat if they were more familiar with it, more accepting of new technologies and processes, or held more positive attitudes towards cultivated meat. Two additional factors also predicted most of these outcomes; parents were more likely to provide cultivated meat if they were more accepting of cultivated meat, but less likely to provide it if they held more positive attitudes towards conventional beef. In addition, selective predictors were also identified, including multiple elements of child and adult eating behaviour, and child and adolescent temperament. However, these varied considerably across outcomes, suggesting that they may be highly dependent upon context (e.g., whether cultivated meat is being provided to a 6-year-old or an 11-year-old, to try, or to consume regularly). Support for our hypotheses is graphically represented in Fig. 4. Taken together, these exploratory data provide a useful – though speculative - starting point for developing theoretical models of the acceptance of cultivated meat and also provide potential targets for enhancing acceptance.

Focussing on predictors of all outcomes, greater familiarity with cultivated meat was associated with an increased likelihood to try or regularly consume, for parents, children, and the family, in both samples. This is consistent with previous research that familiarity positively predicts more favourable attitudes towards cultivated meat (Wilks et al., 2019), and that familiarity and learned exposure predict general dietary intake (Aldrige et al., 2009). It also aligns with a scoping review by Raverta and colleagues (2025) on familiarity in consumer acceptance of cultivated meat, which noted that the majority of studies reviewed reported that familiarity with cultivated meat played a facilitating role in the acceptance of cultivated meat. Indeed, it seems reasonable that parents who are unfamiliar with a product, would be less willing to try it for themselves, and be less likely to provide it to their children and family. It should be noted that there are concerns regarding the potential conflation of familiarity with awareness and knowledge, and further work is required to standardise the measurement of these constructs as they pertain to cultivated meat (see Raverta et al., 2025), however,

Table 6
Significant predictors of key outcomes for parents, and children aged 11-15 years of age (standardised beta values presented).

Predictor	Outcome Variables					
	Parent (Self)	Child	Family	Parent (Self)	Child	Family
	Parent likely to provide to **self** to **try**	Parent likely to provide to **self** to **consume regularly**	Parent likely to provide to **child** to **try**	Parent likely to provide to **child** to consume **regularly**	Parent likely to provide to **family** to **try**	Parent likely to provide to **family** to **consume regularly**
Child-focussed Predictors						
CEBQ - Food Responsiveness			0.078*	0.099**		0.079*
CEBQ - Enjoyment of Food					0.092*	
EATQR - Activation Control				0.105*		0.116**
EATQR - Frustration				−0.191***	−0.115*	−0.139**
EATQR - Inhibitory Control				−0.100*		−0.140**
EATQR - Aggression			0.097*	0.119*	0.129**	
Parent-focussed Predictors						
AEBQ - Food Fussiness		−0.076*	−0.144***	−0.101**	−0.156***	−0.112**
Food Neophobia Scale - Adult	−0.155***					
Familiarity with Cultivated Meat	0.171***	0.175***	0.135***	0.192***	0.159***	0.166***
Acceptance of New Technologies & Processes	0.124**	0.095*	0.121**	0.130**	0.094*	0.105*
Acceptance of Cultivated Meat	0.106**	0.132***	0.137***	0.160***	0.132***	0.127**
VAS Attitudes - Cultivated Meat burgers	0.446***	0.449***	0.462***	0.431***	0.450***	0.473***
VAS Attitudes - Conventional Beef Burgers	−0.104**	−0.143***	−0.096**	−0.132***	−0.086*	−0.125***

Note: CEBQ = Child Eating Behaviour Questionnaire; EATQR = Early Adolescent Temperament Questionnaire Revised Parent Report; AEBQ = Adult Eating Behaviour Questionnaire; VAS = Visual Analogue Scales.
*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

through education and transparent marketing, it may be possible to increase familiarity and overcome this barrier, and this is worth exploring in future experimental studies with parents and children.

Acceptance of new technologies and processes was also a positive predictor of all outcomes, and again, this is a logical association; that parents who are more open to new ways of doing things would be more open to providing cultivated meat, and aligns with the finding from the meta-analysis by Yu and colleagues (2025), that food technology neophobia (i.e., the inverse of acceptance) was identified as a predictor of the willingness to consume cultivated meat, and the findings from the qualitative study by Anant and colleagues (2025), that parents were concerned with the novel technologies use in the production process. Finally, attitudes towards a hypothetical cultivated meat burger (a test of H_5 - see Fig. 4) were also a predictor, and the strongest predictor in every regression across both studies, highlighting the promotion of positive attitudes towards cultivated meat as a key target for further investigation. These findings also align well with quantitative findings with German children and adolescents, showing that attitudes towards cultivated meat burgers were the strongest predictors of willingness to consume these burgers (Dupont & Fiebelkorn, 2020).

Predicting most, but not all outcomes, the specific acceptance of cultivated meat was a generic positive predictor of whether parents would provide it, whereas attitudes towards conventional beef burgers negatively predicted provision (both tests of H_5 - see Fig. 4). Taken together with the generic predictors above, these findings support our hypotheses, and identifying these predictors is a useful first step in theory development and in suggesting where academia and industry should invest resource, if they are to enhance the likelihood of parents purchasing and providing cultivated meat. Research which directly manipulates these variables in experimental laboratory studies is now needed to help determine causality, and whether these are useful targets to enhance acceptance (Yu et al., 2025, also call for work that prioritises real-world consumer behaviour and tasting experiments).

Reflecting on the selective predictors, children's eating behaviour was predictive of provision (a test of H_2 - see Fig. 4). Specifically, parents were more likely to provide cultivated meat if their child was more responsive to food, showed a greater enjoyment of food, or was a slower eater. These predictors varied across the outcome measures, however, they suggest that children's eating behaviour – particularly related to food approach - may contribute to whether parents provide cultivated meat to children and adolescents. This is supported by research linking greater food enjoyment and responsiveness to the acceptance of novel foods (Blissett et al., 2016). Slowness in eating was positively associated with provision to younger children and their families, and appears counterintuitive at first glance, as it is typically associated with an avoidant eating profile (see Pickard et al., 2023). However, it is possible that these children are not actually slow eaters per se, but simply slower relative to fast eaters, which may indicate a more healthy relationship with food. Hence, further research is required to establish whether this is a robust association, and if so, what the nature of the association is. It is also particularly salient that neither food fussiness nor food neophobia of the child predicted provision (a test of H_1 - see Fig. 4), which is a common finding for novel foods (Dovey et al., 2008). Food neophobia was identified as a predictor of willingness to consume cultivated meat, in the meta-analysis by Yu et al., (2025), though it should be noted that it had a much smaller effect size than food technophobia. Hence, our hypotheses were not fully supported here. However, these findings may suggest that parent decision-making about offering cultivated meat to younger children is associated with different predictors to that of offering other novel foods. Whilst this requires further research, it may be because cultivated meat is an unusual type of novel food, in that it is currently *conceptually* novel to most, and yet its physical format is

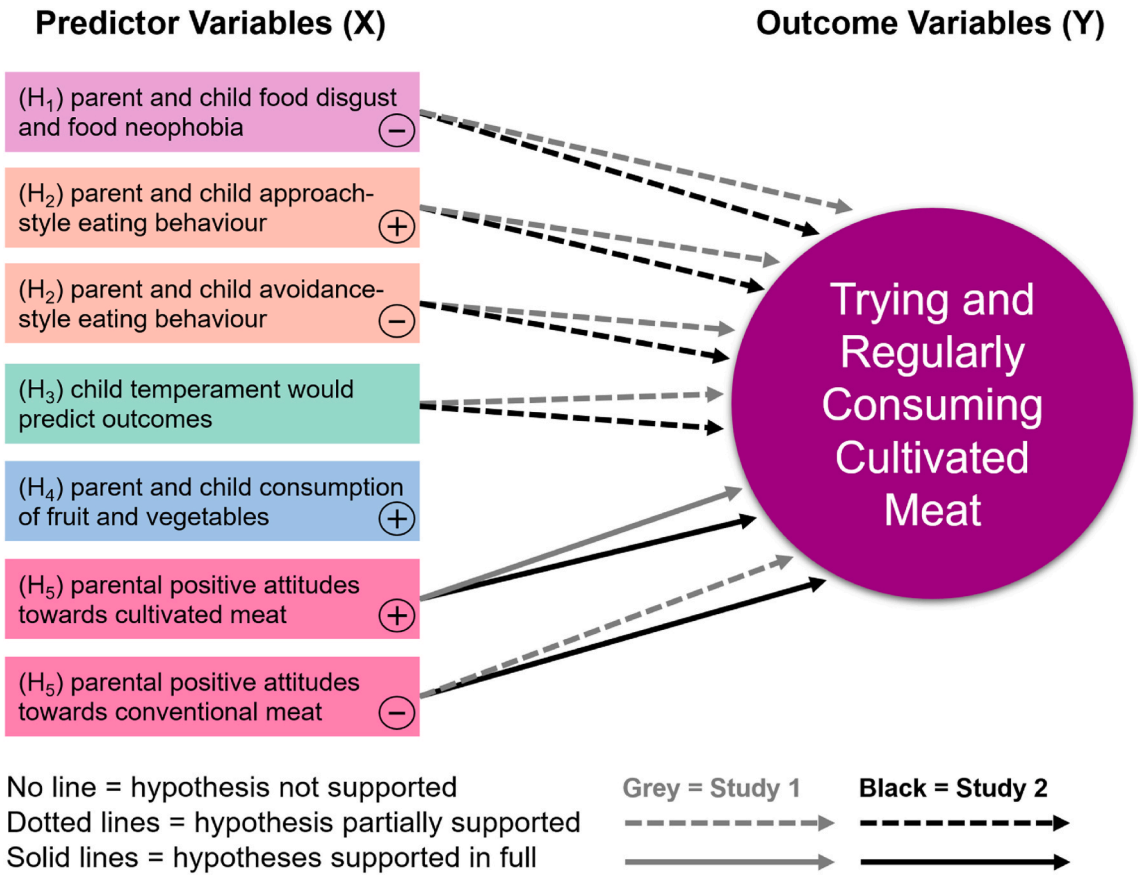

Fig. 4. Support for hypotheses across the two studies.

familiar to people who consume meat products. Thus, the typical effects of neophobia and selectivity that we observe for novel food acceptance in younger children may not be a primary barrier to cultivated meat offering by parents of children in this age group. For example, if parents chose not to tell their child that the product had different origins from a farmed meat, the child would likely perceive it as a familiar food, thus their degree of neophobia is unlikely to influence their willingness to eat it, and therefore, parents would not need to consider child neophobia or food fussiness in their decisions of whether or not to offer cultivated meat to this age group.

Focussing on parents, those who engaged in more emotional eating (over or under) were more likely to provide cultivated meat, whereas parents who were more responsive to their own satiety, showed greater food disgust, food fussiness or food neophobia, were less likely to provide it (a test of H_2 - see Fig. 4). Both food disgust and food neophobia have been shown to be predictors of willingness to consume cultivated meat; it is also important to note that for willingness to consume cultivated meat, larger effect sizes have been observed for disgust compared to disgust sensitivity (see Yu et al., 2025). Again, these predictors varied across the outcome measures and samples, though it is particularly noteworthy that food fussiness of the parents of 11–15-year-olds predicted provision, but that this was not the case for the parents of 6–10-year-olds, and occurred in the absence of adolescent food fussiness predicting provision (again, providing only partial support for our hypotheses). It is possible that child/adolescent food fussiness does not affect the parental provision of cultivated meat, in the same way that a parent might persist in offering vegetables to their child even if the child does not like them. Relatedly, it is also plausible that parents do not allow their own food fussiness to determine provision when their children are young, but that this might change when their children transition to adolescence. Thus, any attempts to enhance familiarity or acceptance should consider that the eating behaviour of parents may also need to be considered and catered to accordingly (e.g., the marketing of cultivated meat might need to better accommodate parents with more selective eating behaviour who are purchasing the food for their adolescent children).

Another selective predictor was temperament, whereby parents of children aged 6-10 years old were less likely to provide cultivated meat to their child to consume regularly, if their child was more shy or more sociable, and less likely to provide to the family regularly, if their child was more shy (a test of H_3 - see Fig. 4). The findings for shyness align with previous research reporting a positive association between shyness and neophobia, however, the reverse is often observed for sociability (e.g. Pliner & Loewen, 1997). Further, temperament was only a predictor when providing cultivated meat to young children on a regular basis; it did not predict providing cultivated meat for them to try, suggesting that whilst it is not likely to be a barrier to initial exposure to the product, parents may perceive that their young child's temperament is linked to longer term dietary acceptance. Parents of young children who show more extremes of temperament may therefore need some tailored guidance on how to maximise acceptance of cultivated meat in the longer term.

For children aged 11-15 years old, the pattern of relationships between temperament and cultivated meat provision is more complex. Parents of adolescents were more likely to provide cultivated meat for their child to try, and consume regularly, and for their family to try, if their child was more aggressive (again, a test of H_3 - see Fig. 4). Parents were also more likely to provide cultivated meat for their child to try, and to consume regularly, if they showed a higher level of activation control (the capacity to do something, when there is a tendency to avoid doing so). Conversely, they were less likely to provide cultivated meat to their child to consume regularly, and for the family to try and to

consume regularly, when the adolescent showed higher levels of frustration. They were also less likely to provide cultivated meat to their child and to their family to consume regularly, when they showed higher levels of inhibitory control. Whilst these patterns require replication and further investigation, together, they provide support for our hypothesis, that temperament predicts provision, and again, it is noteworthy that more elements of temperament predicted 'regular consumption' versus 'trying'. Moreover, these findings suggest that moving from trying cultivated meat, to providing it for regular consumption, could elicit additional temperament-based barriers that may need to be considered. This aligns with research suggesting that other factors – social and interpersonal – become increasingly important as adolescents become more independent (Biazzi Leal et al., 2017; Story et al., 2002) and, given that temperament can predict the success of healthy eating interventions (Holley et al., 2016), reinforces the value of further research in this area.

It is also worthwhile considering some of the other variables that did not predict provision. Firstly, fruit and vegetable consumption by parent and child were not significant predictors of provision, and so our hypothesis (H_4 - see Fig. 4) was not supported. While different interpretations might apply, a positive interpretation is that current dietary intake need not be a barrier (e.g., those consuming less of these foods are no less likely to provide cultivated meat). Secondly, multiple subscales of the AEBQ and CEBQ did not predict provision (relating to H_2 - see Fig. 4). To an extent this is useful; the utility of these subscales might have been reduced had they all been significant predictors. However, it is noteworthy that food responsiveness and enjoyment of food by the parent did not predict their choices for themselves (i.e., their own intake of cultivated meat did not appear to be related to food reward), and that for their children, food fussiness was not a significant predictor. Finally, it was surprising that VAS-based attitudes to plant-based alternatives was not a significant predictor, as one might hypothesise that those who hold more positive views to such alternatives, might be more accepting of cultivated meat. However, it might be the case that such individuals might be less accepting of meat-based alternatives (Wilks & Phillips, 2017).

Taking the results together, three generic predictors predicted all outcomes, and were the strongest predictors overall; familiarity with cultivated meat (standardised beta values up to 0.21); acceptance of new technologies & processes (standardised beta values up to 0.23); and VAS attitudes towards cultivated meat burgers (standardised beta values up to 0.48) – see Fig. 5. It is likely that each of these could be enhanced by marketing or public health campaigns. In particular, a focus on promoting positive attitudes to cultivated meat (which is the strongest predictor here) in a format with which people are already familiar (e.g., a burger) looks to hold particular power and promise for further work. This aligns well with the Theory of Planned Behaviour, in which attitudes influence intentions (essentially measured here in these studies), which in turn translate into behaviour (Ajzen, 1991). Though of course, it should be noted that while attitudes *may* predict intentions, these may not always predict actual behaviour (Fishbein & Ajzen, 2010). Indeed, interpreting these findings and applying them via contemporary effective models of behaviour change (e.g., the COM-B model; Michie et al., 2011; as applied by Anant et al., 2025 to their data) could enhance the likelihood of provision, though generating and testing a more complex theoretical model that overarches the full range of predictors (see Bryant & Barnett, 2020; Yu et al., 2025) is still required. It should also be noted that although likelihood of provision did not exceed 50% on average across any of the outcome measures, there was considerable variability across participants. Relatedly, our exploratory analyses revealed a consistent greater likelihood of male parents being willing to provide cultivated meat, compared to female parents, though it should be noted that while gender is often evaluated in similar studies, it does not tend to correlate with willingness to consume cultivated meat (Yu et al., 2025). Thus, focussing on those who are already willing to provide cultivated meat, and targeting these generic predictors to further increase likelihood of provision, may be a sensible place to start.

Although specific acceptance of cultivated meat and attitudes towards conventional beef burgers, both predicted most outcomes, their

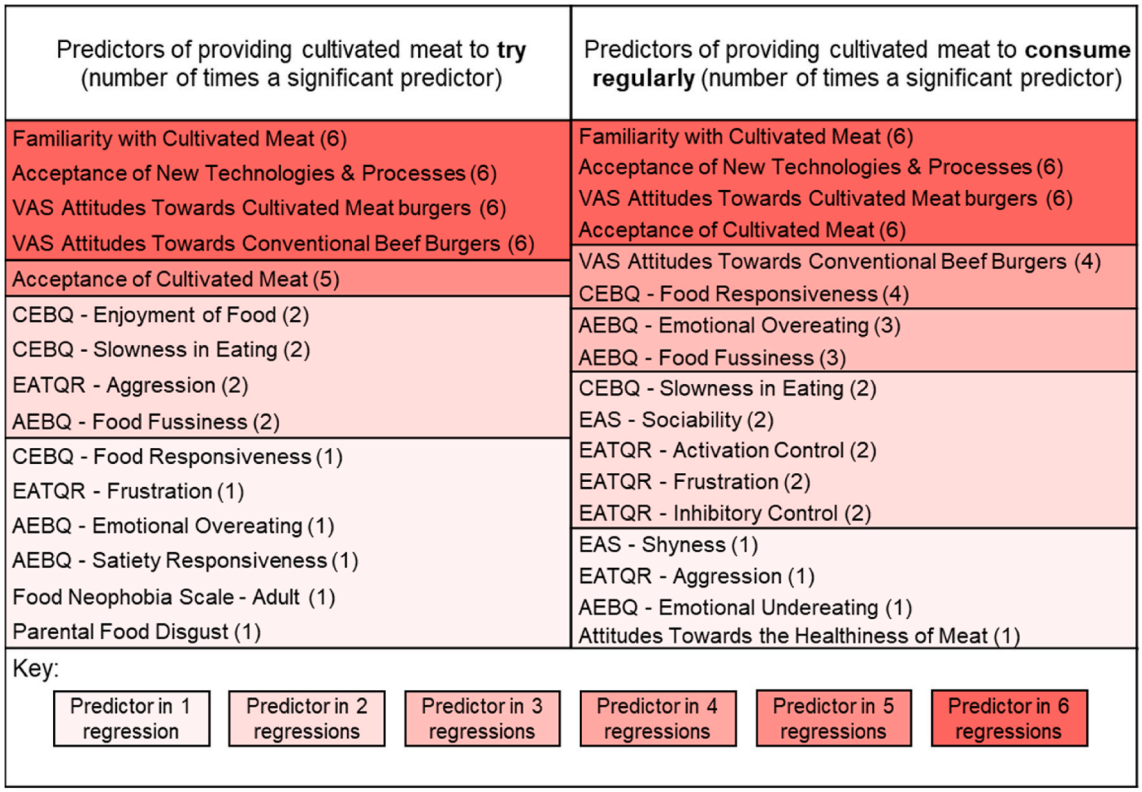

Fig. 5. Heatmap of predictors of providing cultivated meat to try or to consume regularly, across studies 1 and 2, and across parents (self), child and family.

standardised betas did not exceed 0.16. Similarly, child and adult eating behaviour selectively predicted outcomes, but standardised betas did not exceed 0.16, with a similar profile for temperament (standardised betas did not exceed 0.19). Hence, while there is certainly some evidence of individual differences here, overall, these are highly selective and explain less of the variance, than the three generic predictors above. This is a particularly useful finding, as it suggests that much of the immediate public reticence to cultivated meat could be overcome by addressing these more general effects, and then, in the longer term, there may need to be more targeted campaigns for specific groups based on some of the more individual predictors (e.g., a greater role of temperament in long-term offering of cultivated meat, for example).

Reflecting on both studies, there are several strengths to consider. Firstly, through the recruitment of a fairly even split of male and female parents of children across a wide range of ages, the use of age-appropriate validated questionnaires, and questions focussed on parents, children, and the family, it has been possible to develop a more comprehensive insight into the factors predicting the acceptability of cultivated meat within the parent-child-family dynamic. Secondly, using stepwise linear regression techniques, it was possible to examine a relatively large number of potential predictors, and to reduce these to demonstrate those which were the most important in these studies. This is important both for theory development and for identifying predictors that may be modulated to enhance acceptance of cultivated meat. Thirdly, focussing on the likelihood of providing cultivated meat to try, and for regular consumption, has revealed different patterns of predictors, reinforcing the suggestion that outcome measures that look beyond the initial trying of a novel food may provide further insight into the longer-term acceptance and consumption of such food.

4.1. Limitations

In terms of limitations, the use of online platforms does not allow for completion in households with poor connection to the internet, and therefore, there may be some bias in the sample. It is also plausible that artificial intelligence-based bots that fraudulently complete online surveys provided some of the data collected here (Höhne et al., 2025; Lebrun et al., 2024; Rodriguez & Oppenheimer, 2024). Hence, the results of these studies should be viewed as preliminary, until supplemented with in-person studies to confirm these findings. It is also important to note that these studies were not pre-registered, and thus, do not fully conform to Open Science principles.

Focussing on the measures used, a potential limitation of these studies is the use of parental completion for all questionnaires. For instance, there is the question of whether parental completion introduces bias (i.e., do parental accounts of their child, accurately reflect the child, or merely reflect the parent's perspective of the child, or both?). Many of the measures used are highly validated, reducing such concerns, though it should be noted that readability, validity, and reliability checks were not conducted in these studies. In terms of the precise constructs measured, it should also be noted that a specific product – a burger - was referenced for some of the predictors, however, the outcome measures focussed on cultivated meat more generally. Given that there is evidence that products are not all equally well received (Herziger & Tesler, 2025), and that general attitudes towards cultivated meat are completely mediated by specific attitudes (e.g., towards a cultivated meat burger; Dupont et al., 2022), then it is reasonable to suggest that the outcome measures should have mentioned a particular product (e.g., a cultivated meat burger, or another product, based on consumer data regarding more general product preference). Indeed, the misalignment may have influenced the results observed here. It is also reasonable to reflect on whether the outcome variables used in these studies are precisely calibrated for their purpose (i.e., do they adequately distinguish between the different targets and behaviours?), and there is legitimate discussion regarding the heterogeneous measurement of familiarity (Raverta et al., 2025), and this is something to be carefully considered in future research. It would also have been useful to have measured current consumption of a range of meat-based products, as potential covariates, and to have examined parental temperament (alongside child/adolescent temperament), and food technophobia, as additional predictors of acceptance. It is also likely that children's pubertal status varied greatly; this was not measured here either, but should be considered in future studies. It is also important to note that further work is needed to replicate and better understand these findings, and to explore causality, and that these results should not be generalised beyond the participants sampled in these studies. Hence, and considering the analytic approach, these findings should be seen as exploratory, and to an extent, speculative, and weighted as such.

5. Conclusion

These novel studies identified factors that predicted the likelihood of parents of 6–10-year-olds and 11-15-year-olds, trying and regularly consuming cultivated meat themselves, and also, providing it to their child, and to their family. While these studies are exploratory in nature, several generic predictors were identified, but positive attitudes towards cultivated meat burgers was the strongest predictor of general cultivated meat provision. Hence, it would be sensible to explore methods for cultivating positive attitudes, which could include effective communication of key benefits for the consumer and the planet; leveraging positive emotions and experiences when eating cultivated meat such as pleasure, happiness and satisfaction, and; highlighting other consumers positive experiences with cultivated meat, when the product is available. Familiarity with cultivated meat was also a generic predictor (though some limitations apply to this measure), and through mere exposure to cultivated meat, familiarity could be enhanced, and with positive experiences, could further enhance positive attitudes towards cultivated meat. Finally, acceptance of new technologies and processes could also be enhanced, through demystification and myth-busting, and demonstrating their value, to further drive positive attitudes. Though these findings are speculative, an approach that combined all three elements could be particularly powerful and should be examined in future experimental psychology studies.

CRediT authorship contribution statement

Jason M. Thomas: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Resources, Project administration, Methodology, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Emma Alving-Jessep:** Writing – review & editing, Writing – original draft, Visualization, Validation, Resources, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Claire V. Farrow:** Writing – review & editing, Supervision, Resources, Project administration, Methodology, Funding acquisition, Conceptualization. **Eirini Theodosiou:** Writing – review & editing, Conceptualization. **Nicola-Jayne Tuck:** Writing – review & editing, Methodology, Conceptualization. **Katie L. Edwards:** Writing – review & editing, Conceptualization. **Jean-Baptiste Souppez:** Writing – review & editing, Conceptualization. **Jacqueline M. Blissett:** Writing – review & editing, Visualization, Supervision, Resources, Project administration, Methodology, Funding acquisition, Conceptualization.

Ethical statement extracted from manuscript

"Informed consent was obtained from each participant prior to starting the survey. Aston University Research Ethics Committee approved the study prior to commencement (HLS21120) and all work was carried out in accordance with the Declaration of Helsinki."

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.appet.2026.108532.

Data availability

Consent was not obtained to share participant data.

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