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1 **Conversations about food allergy risk with restaurant staff when eating out: A customer**
2 **perspective**

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21 **Abstract**

22 A significant proportion of food-induced allergic reactions occur whilst dining outside the home,
23 often due to failures in communication. This study aimed to examine the nature of conversations
24 about risk that customers with food allergies have with restaurant staff when eating out. A
25 secondary analysis of qualitative data, generated through interviewing 39 consumers with severe
26 food allergies across three primary studies, was conducted. Thematic analysis was used to process
27 the data. Conversations with staff about risk were commonly initiated under circumstances of
28 uncertainty, unfamiliarity and lack of knowledge and information. Re-establishing a 'contract of care'
29 with familiar food venues and perceived shortcomings in early interactions with staff were further
30 drivers of initiating risk conversations. Two major constraints to risk conversations were identified:
31 being seen as 'fussy' or as a 'nuisance'. To avoid them being perceived as 'fussy' by asking questions
32 about food, consumers framed their conversations with staff in terms of risk, revealing their allergy
33 and its possible impact on health to validate their enquiries. Paradoxically, declaring the allergy and
34 seeking staff acknowledgment of the severity of the condition could make participants feel that they
35 were perceived by staff as a nuisance. These dilemmas sometimes limited conversations and
36 constrained customers' risk management. Experiencing trustworthy interactions with staff was not
37 only contingent on evidence of their knowledge about the food contents and understanding of food
38 allergies but was also based on manifestations of genuine customer care. When managing a food
39 allergy outside the home, establishing risk and safety are products of, and are embedded within,
40 relations and interactions with others. Risk conversations seek to establish trustworthy interactions
41 as the basis on which safety can be maximised and risks – both health and social – minimised.

42 **Keywords**

43 food allergy, conversations about risk, eating out, secondary analysis, qualitative research

44

45 **1. Introduction**

46 Food allergy (FA) is an abnormal immune reaction to a food (National Institute of Allergy and
47 Infectious Diseases, 2012). Although the true prevalence rate is difficult to estimate and varies
48 between countries (National Academies of Sciences, 2017), FAs are not uncommon. They have been
49 found to affect up to 10% of the general population (i.e., the reported rate from population-based
50 study of challenge-confirmed food allergy among infants in Australia; Osborne et al., 2011), with
51 increasing prevalence in the last 2 to 3 decades (Sicherer & Sampson, 2018). In the US nearly 11% of
52 adults (Gupta et al., 2019) and 8% of children (Gupta et al., 2018) are estimated to have FAs based
53 on clinical assessment of self-reports, though prevalence studies based on medically supervised oral
54 food challenges suggest much lower rates (Nwaru et al., 2014). As there is no cure, management of
55 the condition consists of strict avoidance of allergen exposure and prompt treatment with
56 epinephrine in the event of an allergic reaction (Sicherer & Sampson, 2018). Although individuals
57 with FAs enjoy good health in the absence of allergen exposure, their quality of life is adversely
58 affected by anxiety and uncertainty (Antolín-Amérigo et al., 2016).

59 Provision of information about the presence of an allergen in a food is an important tool for risk
60 management as consumers with FAs often rely on labelling (i.e., ingredients list; advisory and
61 precautionary labelling) to assess the safety of pre-packed foods. This information is deployed and
62 interpreted in complex ways (Barnett et al., 2011a; Barnett et al., 2011b) and used in conjunction
63 with other risk management strategies, such as reliance on past experience of consuming a food
64 product, sensory appreciation of risk, and assessment of product qualities – for example, the
65 product category or the country of origin – that are perceived to signify risk (Barnett, Vasileiou,
66 Gowland, Raats, & Lucas, 2013). Written allergen information provision for pre-packed foods is
67 legally mandated in both the US (Food Allergen Labelling and Consumer Protection Act of 2004
68 [FALCPA]) and the UK (EU Food Information for Consumers Regulation No 1169/2011 [EU FIC]).
69 Where foods are not pre-packed, customers are also dependent on oral communication. In the UK,

70 EU legislation (EU Food Information for Consumers Regulation No. 1169/2011 [EU FIC]) was
71 introduced in December 2014. This requires food businesses such as restaurants to make allergen
72 information available to the customer. Allergen information can be provided either in written or
73 verbal form at the discretion of food businesses.

74 Despite this legal provision, eating outside the home where other parties are responsible for food
75 preparation and provision presents a greater risk than in the home setting. Evidence shows that a
76 significant percentage of fatal anaphylactic reactions occur in eating out situations. Of the 63 fatal
77 anaphylactic cases (32 cases in 1994-1999; 31 cases in 2001-2006) reported in a national registry in
78 the US, the majority of lethal reactions (i.e., 48; 76%) occurred away from home, for example, at a
79 restaurant, at a friends' home, or in work, school or college. Sixteen (25%) of these fatalities
80 happened in eating out establishments (Bock, Muñoz-Furlong, & Sampson, 2001; 2007). Similarly, in
81 England and Wales, of the 124 deaths attributed to ingestion of a food allergen between 1992 and
82 2012, 25 fatalities (20%) occurred in restaurants (Turner et al., 2015).

83 Fatal food-induced anaphylaxis is clearly a rare event (rates range from 0.03 to 0.3 deaths per million
84 inhabitants per year; Pouessel et al., 2018). However, an increased incidence in non-fatal acute
85 reactions has been observed (Turner et al., 2015; Turner, Jerschow, Umasunthar, Lin, Campbell, &
86 Boyle, 2017). In the US just over 200,000 emergency department visits annually were estimated to
87 result from food-induced acute allergic reactions, of which 90,000 were classified as anaphylactic
88 reactions (Clark, Espinola, Rudders, Banerji, & Camargo, 2011). Similarly, a considerable proportion
89 of non-fatal allergic reactions happen away from home. In a prospective study of patients with
90 confirmed food allergies (Michelsen-Huisman et al., 2018) that collected data about the frequency,
91 causes, severity, and medical treatment of accidental allergic reactions, 24% of reported reactions (n
92 = 153) were during a meal outside the home, with 68% of these reactions occurring in restaurants.

93 Poor communication about the FA risk is commonly implicated in allergic reactions that occur while
94 eating out. Examining such reactions, research shows that 62% of these episodes were the result of

95 failures in communication about risk, with consumers, acting on the assumption that the food was
96 safe, not notifying food establishment staff of their allergy (Furlong, DeSimonea, & Sicherer, 2001).
97 Similarly, in Michelsen-Huisman et al.'s (2018) prospective study, 20% of the sample reported that
98 they never communicated their special dietary requirements when eating out. Perhaps more
99 concerning is that 70% of eating-out reactions in this study occurred despite consumers having
100 called the restaurant before visiting or having informed the cook, chef or waiter (Michelsen-Huisman
101 et al., 2018).

102 Prior research demonstrates that provision of clear allergen information in written form is a clear
103 preference for consumers with food hypersensitivity¹ when dining out (Begen, Barnett, Payne, Roy,
104 Gowland, & Lucas, 2016). Nevertheless, knowledgeable and reliable oral provision of information is
105 greatly appreciated and enhances the quality of the eating out experience (Begen, Barnett, Payne,
106 Roy, Gowland, & Lucas, 2016). Consequently, conversations about the FA risk is a primary strategy
107 that consumers use to manage risk when eating out (Leftwich, Barnett, Muncer, Shepherd, Raats,
108 Gowland, & Lucas, 2011) and equipping children with self-assertion skills so that they can declare
109 their FA and clearly communicate dietary needs is a priority for caregivers (Begen, Barnett, Barber,
110 Payne, Gowland, & Lucas, 2018a).

111 Research conducted after the implementation of the EU-FIC legislation in the UK showed that,
112 despite still favouring written allergen information, consumers with FAs felt more confident and
113 empowered to ask staff about allergens; their anticipation that staff would be a useful source of
114 information also increased (Begen, Barnett, Payne, Gowland, DunnGalvin, & Lucas, 2018b).

115 However, this increased sense of confidence and entitlement to initiate risk conversations with staff
116 post-legislation varied between consumers with different FAs or food intolerances. Reactions to
117 some allergens were considered to be less recognised and understood (e.g., milk) and those seeking
118 to avoid these allergens expressed greater reluctance to start risk conversations with staff,
119 perceiving an absence of, or little improvement in, relevant allergen information provision (Barnett,

120 Begen, Gowland, & Lucas, 2018). Additional, language barriers, feelings of social embarrassment
121 deriving from uneasiness about interrogating staff about allergen content of dishes, and
122 unwillingness to disclose the allergy for fear of food venues refusing to serve them are major
123 challenges that impede risk conversations at the expense of effective risk management (Leftwich,
124 Barnett, Muncer, Shepherd, Raats, Gowland, & Lucas, 2011).

125 A number of studies have examined food service staff knowledge of FAs and allergens, their
126 attitudes towards accommodating the needs of consumers with FAs and their risk management
127 practices (Ajala, Cruz, Faria, Walter, Granato, & Sant, 2010; Common, Corrigan, Smith, Bailey, Harris,
128 & Holloway, 2013; Dupuis et al., 2016; Lee & Sozen, 2018; Soon, 2018; Wen & Kwon, 2016; 2017;
129 2019; Young & Thaivalappil, 2018). Although food service staff often exhibit high levels of confidence
130 and trust in their ability to provide safe meals to consumers with FAs, significant knowledge gaps
131 and inadequate FA management practices have been documented. Common misconceptions include
132 a belief that cooking the food would prevent the allergen from causing a reaction; that it is safe for
133 food allergic consumers to eat a small amount of the allergen; that removing an allergen (such as
134 nuts after the meal was cooked) would render it safe; equating lactose intolerance with milk allergy;
135 and a lack of awareness that allergens can be transferred by food handling practices (Common,
136 Corrigan, Smith, Bailey, Harris, & Holloway, 2013; Lee & Sozen, 2018; Soon, 2018). A US survey of
137 187 restaurants indicated that although staff demonstrated good levels of awareness of food
138 allergens as a hazard and a commitment to reducing the risk of adverse events, there were clear
139 gaps in workers' knowledge of safe food allergy management practices (Dupuis et al., 2016).

140 According to current research, staff rarely proactively ask customers about potential FAs, therefore
141 leaving consumers to initiate communication with staff regarding their allergy (Wen & Kwon, 2016;
142 2019). These findings suggest that it remains vital to emphasise the importance of consumers
143 remaining vigilant and clearly communicating their dietary requirements to staff particularly given
144 that evidence indicates that initiating risk conversations is considered by food service staff as

145 primarily the responsibility of the consumer (Lee & Sozen, 2018; Soon, 2018; Wen & Kwon, 2016;
146 2017; 2019).

147 Acknowledging the important role that the communication about FA risk plays in preventing allergic
148 reactions, a growing body of literature is beginning to examine food establishments' written and oral
149 communication as part of their FA risk management practices (Wen & Kwon, 2016; 2017; 2019).

150 Although research with consumers has highlighted the significance of communicating about FAs as a
151 risk management tool and pinpointed challenges that are experienced by consumers (Begen et al.,
152 2016; Leftwich et al. 2011), little attention has been given to the nature of risk conversations
153 consumers with FAs have with staff when eating out (Janković, Rajjić, & Đorđević, 2017). The present
154 article reports findings from a secondary analysis of qualitative data collected across three primary
155 studies with severely allergic individuals and aims to explicate (a) the circumstances under which
156 customers are more likely to initiate conversations with staff about FA risk, (b) the perceived
157 constraints to communication about FA risk and (c) how the trustworthiness of communicative acts
158 is constituted.

159 **2. Materials and Methods**

160 **2.1 Design**

161 A secondary analysis of qualitative data was carried out re-using interview data from three different
162 primary research projects examining the risk assessment and risk management practices of people
163 with food allergies. According to the typology proposed by Heaton (2000, 2008), the present
164 secondary analysis can be characterised as *supplementary*, in that "a more in-depth analysis of an
165 emergent issue or aspect of the data is undertaken" (Heaton, 2008, p. 39) and *amplified* as it
166 "combines data from two or more primary studies for purposes of enlarging sample" (Heaton, 2000,
167 p. 10) in order to examine common themes across datasets. JB and JSL were members of the
168 research teams in all three primary studies and they shared the anonymised data with KV² for the
169 purposes of the present secondary analysis.

170 **2.2 The primary studies and participants**

171 All three primary studies were conducted in the UK and approved by institutional research ethics
172 committees (Appendix A provides information about each primary study and lists the publications³
173 produced from each study). Primary study 1 (PS1) was cross-sectional qualitative research
174 conducted in 2010. Semi-structured interviews were carried out with 15 adults who had been
175 prescribed epinephrine auto-injectors. The study investigated the barriers to adhering to the
176 management best practice recommendation to carry the epinephrine auto-injector at all times and
177 to its deployment when needed. Primary study 2 (PS2), conducted in 2009-2010, was a cross-
178 sectional multi-method qualitative research study with 32 adults who were allergic to peanut and/or
179 tree nuts. Using participant observation (i.e., participants were accompanied whilst shopping and
180 were asked to 'think aloud' about their food purchases), qualitative interviews, and a product choice
181 reasoning task, this study aimed to understand the risk assessment decisions made by these adults
182 when purchasing food and the challenges they face when they eat outside the home. Finally,
183 primary study 3 (PS3) was a longitudinal, mixed-method research programme that employed
184 qualitative interviews and surveys and took place pre-legislation in 2014 and post-legislation in 2016.
185 PS3 aimed to investigate the preferences of consumers with FA or food intolerance for written and
186 verbal allergen information when eating out. This study further examined the impact of the EU-FIC
187 legislation on the behaviours, experiences, and attitudes of consumers.

188 The level of severity of participants' FA across the three primary studies was assessed by JSL (an
189 allergy specialist) based on the nature and speed of onset of participants' self-reported worst ever
190 reaction. Participants' FA was, in this way, classified as mild, moderate or severe. For the purposes of
191 the present secondary analysis, we deliberately chose to revisit data generated from the interviews
192 with *severely allergic consumers* because verbal communication about FA risk is likely to be an
193 important risk management tool for this population due to potentially fatal outcomes from failures
194 in communication (i.e., anaphylaxis). Moreover, previous research shows that consumers with

195 severe FA are more likely to adhere to self-care and risk management practices, including
196 communication of their allergy and dietary requirements when dining out (Jones et al., 2014, 2015);
197 as a result, verbal risk exchanges with restaurant staff might be initiated more frequently by these
198 consumers and subsequently narrated as part of their eating out experiences.

199 In total, interview transcripts from 39 adults with severe FA were re-used in the present secondary
200 analysis. Eleven participants were male and 28 were female with an average age of 35 years (min
201 age = 16; max age = 72). Out of the 15 participants in PS1, 7 were selected for the current study; out
202 of the 32 participants in PS2, 18 were selected; and out of the 39 participants in PS3, 14 were chosen
203 for the purposes of the present study. Most participants (n = 34) had a peanut and/or tree nut
204 allergy with the other five participants reacting to other allergens (e.g., crustaceans, eggs). Seven
205 participants in our sample were allergic to multiple allergens.

206 ***2.3 Analytic approach***

207 The principles of thematic analysis (Braun & Clarke, 2006) were employed to analyse the interview
208 transcripts that were examined from a realist standpoint, that is, participants' reported experiences
209 and views are seen to reflect their empirical world. Assisted by computer software (NVivo 10), KV
210 conducted initial processing of the data and themes and subthemes were developed in regular
211 meetings with JB. Initial reading of the transcripts helped to familiarise the researcher with the data,
212 after which accounts of eating out experiences, narrated by participants either spontaneously or
213 after interviewer prompt (Appendix A provides the interview questions relating to managing a FA
214 when eating out), were separated for analytic processing. The content of eating out accounts was
215 then coded focusing on the circumstances that elicited risk conversations, the challenges consumers
216 face and the characteristics of communication that seemed to be experienced as trustworthy. A
217 preliminary analytic report was then produced which was discussed among the researchers with a
218 view to refining the developing themes and subthemes. The final analytic report is presented below,
219 and interview extracts are used to illustrate the analytic points (Tong, Sainsbury, & Craig, 2007).

220 Extracts are identified by participants' unique code, gender, age, allergy and the primary study they
221 participated in.

222 **3. Results and Discussion**

223 The analysis is divided into three thematic domains: (a) drivers of initiating conversations about FA
224 risk; (b) constraints to communication about FA risk; and (c) trustworthy communicative acts. *Figure*
225 *1* presents the analytic themes and subthemes that fall within each thematic domain.

226 *- Insert Figure 1 here -*

227 *Figure 1.* Analytic themes and subthemes

228 **3.1 Drivers of initiating conversations about risk**

229 Three sets of drivers of initiating conversations with restaurant staff about risk were identified in the
230 analysis. The first set concerned (a) missing or insufficient written information and (b) uncertainty
231 about the contents of the food. These drivers can be considered as being situated within the food
232 establishment. The second set of drivers stemmed from the consumer and concerned (a) the lack of
233 prior experience of a restaurant or a dish and (b) recent experiences of allergic reactions. The third
234 set of drivers of instigating risk conversations was located within the quality of relationship or
235 interaction that consumers experienced with food venues and concerned (a) the re-establishment of
236 a 'contract of care' and (b) protecting communication about risk from perceived or anticipated
237 failures.

238 *3.1.1 Drivers situated within the food establishment*

239 Lack of or inadequate written information about the ingredients of a food, primarily on the menu,
240 but occasionally on the food venue's website, was unsurprisingly a major trigger for initiating risk
241 exchanges, often in the form of interrogating staff about what the food contains. In line with existing
242 evidence (Begen et al., 2018b) detailed written allergen information was appreciated by consumers
243 with FAs as they felt this enabled them to readily assess the risk and make their decision whilst

244 obviating the need to initiate risk conversations with staff. Presenting food options on chalkboards
245 or specials' boards was most commonly identified as the type of menu that was lacking sufficient
246 information which then needed to be sought through verbal communication. Certain food venues,
247 such as coffee shops or sandwich bars, were also pinpointed as establishments whereby consumers
248 had to start conversations with staff due to lack of information about foods. Occasionally, and as
249 illustrated by participant's narrative below, absence of any written reference to FAs or other special
250 dietary requirements on the menu was interpreted as a potential lack of awareness and
251 understanding of the problem and signalled the need to speak to staff.

252 *P: But in terms of the actual...how the organisation are dealing with allergy, em...I don't*
253 *know, like if there's no reference to allergy at all, in any of their menu, I would worry a bit*
254 *then, because usually it will say something.*

255 *I: And what would that mean, that you'd leave?*

256 *P: No, I'd just ask. I'd just say "I've got an allergy – what should I avoid?" (P36, female, 34,*
257 *tree nuts, PS3)*

258 Uncertainty about the nature of the contents of a dish also motivated consumers to initiate risk
259 conversations with staff. Categories of food that were perceived to be of high risk, such as sauces or
260 desserts, lack of knowledge of a particular ingredient, or when language barriers impaired the ability
261 to understand risk information (e.g., menu in a foreign language) were all circumstances that
262 triggered enquiries to staff about the food. Reflecting upon a problematic food category (i.e.,
263 dessert), the participant below said:

264 *Pudding comes along, have a look at it...Often, I'll ask with a pudding, because you just can't*
265 *tell. You know, it could be ground almond or something not obvious. (P25, female, 38,*
266 *peanut & tree nuts, PS2)*

267 Although the presence of written allergen information was valued and acted reassuringly, it should
268 be noted that the reduced inclination to start conversations with staff may be problematic insofar as

269 it does not enable consideration of the risks of cross-contact during the preparation of the meal or
270 to exclude the possibility of a potential change in ingredients. Indeed, the EU-FIC legislation
271 introduced in the UK concerns allergens that are intentionally included in foods and does not cover
272 the issue of cross-contact.

273 *3.1.2 Drivers situated within the consumer with FA*

274 Lacking prior experience of an eating out venue or of a dish was a further driver of initiating risk
275 conversations with staff. As illustrated in the extract below, consumers with FAs were more likely to
276 start enquiring about the food and reveal their allergy in food establishments they were not familiar
277 with. This was sometimes done in spite of sufficient information on the menu, or when they wanted
278 to try a new dish. A few participants noted that they would contact a restaurant they had never
279 been to before in advance of their visit to ensure that the establishment would be able to cater for
280 their FA.

281 *I do still try things, but I always tell the waiter that I do have a severe nut allergy – “Is there*
282 *anything that I should stay away from?” if it’s a restaurant I don’t know or if it’s a dish I don’t*
283 *know that I would quite like to try. (P18, female, 48, peanut & tree nuts, PS2)*

284 Recent experience of allergic reactions also triggered or intensified communication about risk as part
285 of participants' effort to implement, or revert to, a stricter risk management behavioural pattern.
286 After describing his latest episode of an allergic reaction, a participant noted:

287 *I’d say I’ve been a lot more vigilant and asked questions more about when I go into*
288 *restaurants and stuff like that, make them aware that I am...I do have a nut allergy. (P13,*
289 *male, 44, peanut & tree nuts, PS2)*

290 *3.1.3 Drivers situated within the quality of relationship or interaction between consumers and food*
291 *venues.*

292 Although risk conversations were most commonly initiated in circumstances of uncertainty, lack of
293 knowledge and unfamiliarity, a few participants still held these conversations in eating out venues
294 they frequently visited and where their allergy was known to staff. Risk conversations in this
295 instance functioned as an attempt to re-establish a 'contract of care' with the food venue in order to
296 remind staff and re-iterate the importance of considering the customer's needs. This re-iteration of
297 the allergy and of the foods that must be avoided appeared to have a reassuring effect by lessening
298 the risk of unsafe food provision through inadvertent neglect.

299 *With some places, like [name of restaurant], the waiters know us, and they're like, right – I*
300 *still say I've got the allergies, you know, and they're like, yeah, okay, you know, no problem.*
301 *(P38, female, 34, peanut & celery, PS3)*

302 Participants typically directed initial risk enquires to the serving staff. Nevertheless, when there was
303 not a satisfactory resolution in this initial conversation – or it was anticipated that there would not
304 be – participants escalated their communication, suggesting that consumers with FAs did not only
305 envisage potential failures in risk exchanges but they were also strategic in targeting communication
306 as much as possible. For instance, participants sought to speak directly to the restaurant manager
307 and/or chef when they felt that the serving staff were not very knowledgeable about the food, did
308 not provide satisfactory answers, when they appeared unaware of the seriousness of allergies or
309 when staff were so busy that it raised concerns that they might inadvertently fail to effectively
310 convey the special dietary requirements to other staff. Participant decisions to direct communication
311 about risk to senior staff invoked accountability and sought to commit the establishment to ensuring
312 suitable food provision. A participant recounted the following instance:

313 *Well, I went into a restaurant and the girl was so vague there, I just said, "You know, well,*
314 *can I speak to the manager or the chef?" (P28, female, 72, peanuts, PS3)*

315 Ordering food on the phone from takeaway establishments was also seen to pose threats to
316 effective communication about FA risk. Some thought that the lack of their physical presence might

317 make takeaway establishments less attentive to special dietary requests or that the various roles
318 staff involved in the operation of a takeaway establishment increased the chances for
319 miscommunication. On these occasions, participants intensified their communication about risk by
320 double checking with the venue about the safety of the food. Expressing worry about ordering food
321 from takeaways, a participant reasoned:

322 *You're not seeing the people preparing it, they could just say anything over the phone to you,*
323 *like it's a different person that picks up the phone and a different person that cooks and*
324 *different person that brings it, and so therefore there could be a lot of miscommunication, all*
325 *over the board really. (P34, female, 20, peanut, tree nuts, milk & egg, PS3)*

326 **3.2 Constraints to communication about FA risk**

327 Adopting a pragmatic approach towards the need to initiate conversations with staff about the risk
328 of FA when dining out in order to ensure health safety, several participants clearly felt confident to
329 initiate discussions with staff and reported taking an assertive approach to finding out about the
330 safety of the foods and to making specific requests (e.g., speak to the manager; possible
331 modification of a food choice; seeking to eliminate the risk of cross-contact). Participants sometimes
332 explicitly narrated that failing to initiate risk conversations with staff rendered them culpable of any
333 problems that followed. This was evident in narrations of past episodes of allergic reactions – as
334 illustrated by the quote below – with participants attributing them to their own failure to enquire
335 about the safety of the food. Developing confidence and assertiveness in instigating risk
336 conversations was seen by some as the result of managing a FA for many years. These participants
337 noted that they were more reluctant to have these conversations in the early years of managing the
338 condition.

339 *I'd had a couple of drinks as well, so I didn't read the menu properly, so...and I should ask,*
340 *and it is my responsibility to ask, em, so fair enough, that [allergic reaction] was my fault.*
341 *(P06, male, 36, all nuts, PS1)*

342 3.2.1 'Fussy customer'

343 Despite some participants' confidence and assertiveness, initiating risk conversations with staff
344 when dining out presented threats of a social nature for many; feelings of embarrassment,
345 uneasiness, and awkwardness were spontaneously mentioned as participants were describing their
346 verbal risk exchanges with staff. This discomfort often resulted from participants' expectations (or
347 actual prior experience for some) of how they will be perceived by both staff and those they were
348 with who might be unaware of their FA. For example, some narrated that instigating a conversation
349 about the food would be seen as 'making a fuss', particularly when dining with people they did not
350 know. Moreover, conversations about the food often meant that the condition was revealed, which
351 could provoke discussions around allergy that were not necessarily welcome. One participant
352 characteristically said:

353 *Like, for example, if I go out with a group of friends for dinner, and I know some of them and*
354 *not all of them, that's my kind of worst situation, because I have to make a fuss – I have to*
355 *say to the waiter, "Excuse me, I've got a nut allergy – would you mind letting the chef know*
356 *and can you tell me if this has got nuts in?" People hear and they say, "Oh, so you've got a*
357 *nut allergy?" I really...I just...want to clam up and not really talk about it. (P21, female, 24,*
358 *tree nuts, PS2)*

359 Being seen as a 'fussy', 'awkward' or 'difficult' customer were thus characterisations consumers
360 anticipated (and some had experienced), upon starting to enquire about the food. The possibility
361 that they may be perceived in such pejorative terms suggested that others might not appreciate the
362 reasons behind questioning and/or understand the severity of the allergy. To legitimise questioning
363 about food and resist the attribution of negative character traits, as exemplified by the participant's
364 quote below, participants felt that they had to reveal their allergy and explain the importance of
365 allergen avoidance. Several expressed frustration around the delicate communicative negotiations

366 required; others resisted being positioned as 'fussy' as this characterisation invalidated their health
367 status and downplayed the severity of their condition.

368 *You always have to be that awkward dinner guest, that awkward customer, giving somebody*
369 *20 questions about what's in it or what's not in it [...] I sometimes feel like I'm being a bit*
370 *difficult or being a pain, and I always feel like I've got to explain myself, say...basically explain*
371 *I'm allergic and I need to check. (P05, female, 30, peanut & stoned fruits, PS1)*

372 3.2.2 'Nuisance'

373 The social threat of being seen as a 'fussy customer' was perceived to entail a risk of the condition
374 potentially being underestimated, thus leading to a disclosure of the allergy and explanation of its
375 severity. Paradoxically on other occasions participants anticipated that to disclose the allergy would
376 provoke anxiety in staff and result in poor service which made some participants feel more inclined
377 to conceal it. Participants described several incidents whereby the food venue either refused to
378 serve them altogether or provided them with very few food options as a result of taking an
379 overcautious approach to risk management citing their inability to exclude the risk of cross-contact.
380 To avoid causing others (e.g., staff, social companions) inconvenience and potentially being denied
381 the service, a few participants deliberately downplayed or did not mention their allergy in risk
382 conversations and chose to ignore or minimise the risks of cross-contact. To circumvent scenarios of
383 worry and anxiety, others intentionally limited the extent of their risk exchanges with staff and
384 opted for food options they were more confident about (e.g., because of prior experience) or
385 avoided eating altogether. In these instances – and despite the fact that the food allergy was
386 acknowledged and understood (unlike the scenario of being seen as a 'fussy customer') –
387 participants' experience of eating out was again unfavourably affected; this was because they felt
388 that they were inconveniencing restaurant staff, by placing unreasonable and excessive demands.
389 The quote below illustrates how prior experience of causing anxiety and inconvenience upon

390 declaration of the allergy has led this participant to become more restrained about disclosing his
391 allergy.

392 *When I was a bit younger, say in my mid-twenties, I would always – I would say to the*
393 *waiter, “I’m nut-allergic,” and blah, blah, blah, but then that just seems to panic everyone!*
394 *It’s not...it’s not embarrassing, but it’s more...you don’t want to be a pain in the neck really.*
395 *And then you feel bad for everyone at your table because everyone’s “Oh, there’s a nut*
396 *allergy, nut allergy, table seven, nut allergy, table seven – you’ve got to look out!” and you*
397 *just think...oh no! So now, I just tend to double-check when I go to a restaurant what I’m*
398 *going to have, and then, if I don’t know something that’s in that – like for instance, if it’s all*
399 *in French, I would say, “Okay, what’s in that?” I would ask what was in it. If I don’t recognise*
400 *an ingredient, I would say...at that point, that’s when I say “I’m allergic to nuts – is there any*
401 *nuts in that?” It’s more something, I think, for me to be aware of than them really. (P24,*
402 *male, 34, peanut & tree nuts, PS2)*

403 Whilst previous research has identified these challenges when food allergic consumers resort to
404 verbal communication to manage the risk of an allergic reaction (Leftwich et al., 2011), the present
405 analysis stresses the relational nature of both the social (i.e., negative characterisations) and health
406 risks (i.e., potential risk-taking by obscuring or downplaying the condition). As consumers anticipate
407 how they will be seen or treated by food venues, health and social risks are produced which need to
408 be negotiated and managed. Conceiving FA risk in relational terms helps to counter an overly
409 individualistic approach to FA risk management. Decisions and behaviours around managing a food
410 allergy are not solely located within the individual but are produced by, and embedded within, social
411 interaction. Moreover, such an approach draws attention to the dynamics and content of inter-
412 personal exchanges, highlighting the sensitivities that people bring into social situations. In this way,
413 not only do social risks (e.g., attribution of pejorative character traits) acquire visibility and

414 recognition but the synergies and interplay between health and social risks are brought to the
415 forefront.

416 **3.3 Trustworthy communicative acts**

417 *3.3.1 Knowledge about the contents of foods*

418 Showing knowledge and answering confidently and with certainty about what ingredients foods
419 contained and which foods could be safely consumed or avoided were highly valued qualities of the
420 food venue's FA-related communication because this enabled participants to assess the risk and
421 make safe choices whilst enjoying the eating out experience. On the contrary, vague or uncertain
422 responses about food ingredients impeded the process of risk assessment, leading consumers to
423 typically opt for food choices they were certain would be safe. Easy access to the chef was also
424 valued as participants believed this would maximise the likelihood of receiving accurate information
425 about the food and avoided troubling the serving staff and 'making a fuss'. Food suggestions by the
426 establishment that were suitable for the needs of the consumer further contributed to building trust
427 and functioned to reassure, since they signified that the allergy issue had been considered. The
428 importance of confident communication is exemplified in the extract below:

429 *Generally, you can tell by the way they reply. If they seem confident about it, it makes you*
430 *feel more confident. (P35, male, 18, peanut & tree nuts, PS3)*

431 Minimal communication on the part of serving staff, even if confidently delivered, sometimes raised
432 suspicion in unfamiliar venues or where people had limited prior experience of them. Consumers
433 with FAs thus did not always take responses at face value and often sought to discern whether the
434 establishments were honest and truthful in their communication. Non-verbal communication was
435 also considered in efforts to determine the sincerity of responses whilst the mistrust that was
436 expressed by some seemed to be founded on prior experiences of deceitful communication, as
437 demonstrated by the following quote.

438 *I mean that was really, really bad, because they could have so easily just said, "We're not*
439 *sure," or "Cross-contamination is an issue," and that's fine. So that's one example where*
440 *people have blatantly lied. (P23, female, 37, peanut & tree nuts, PS2)*

441 3.3.2 Awareness and understanding of food allergies

442 Indications of awareness and understanding of FAs on the part of food establishments were
443 important components of their communication about risk that helped people feel reassured and
444 confident to eat at those venues. Serving staff's awareness of allergies was sometimes inferred by
445 their ability to answer more extensively than was warranted by the question. The availability of
446 written information about FAs and other special dietary requirements (e.g., on menu) was also a
447 strong signal of organisational awareness. Lack of it sometimes caused concern and motivated
448 participants to verbally explore with staff whether the venue would be able to accommodate their
449 needs. Talking about a certain restaurant chain, one participant stated:

450 *They seem to be aware of it and you know they are as soon as you go in, that they've dealt*
451 *with all of people's intolerances and proper allergies. (P36, female, 34, tree nuts, PS3)*

452 Moreover, showing an understanding of the seriousness of FAs in terms of the consequences an
453 allergic reaction could cause, of the different types of FAs and of the difference of FAs from food
454 intolerances and food preferences were all important indications of the depth of knowledge and
455 awareness. A participant described how he would refrain from further enquiring about the food if he
456 felt that the eating out establishment did not really understand the problem of allergy. This suggests
457 that a generic awareness of the health condition acted as an important foundation upon which the
458 specifics of verbal risk exchanges could then be developed. However, current evidence suggests that
459 there are significant gaps in food establishment staff's knowledge about allergies, allergens and the
460 risk of cross-contact (Common et al., 2013; Lee & Sozen, 2018; Soon, 2018) highlighting the need for
461 training. Proactive reference to any potential allergies by the serving staff was a powerful
462 manifestation of organisational awareness and by extension of venue's capability to safely cater for

463 these consumers, as illustrated in the participant's narrative below. Nevertheless, research indicates
464 that serving staff seldom proactively ask consumers about potential FAs (Wen & Kwon, 2019).

465 *They...like, when we had the children, they brought out these pizzas, and everything was in*
466 *bowls and he said, oh, this is this, this is that. He asked if any of the children had any*
467 *allergies. They were just much more aware. (P30, female, 61, Cereals, gluten & milk, PS3)*

468 3.3.3 Manifestations of extra care

469 Beyond knowledge of the contents of foods and understanding of FAs, manifestations of extra care
470 on the part of food establishments were characteristics of, and underlying qualities in,
471 communication about risk that cultivated further reassurance and significantly enhanced
472 participants' eating out experience. Genuinely listening to the allergy issue through taking the time
473 to speak to the person and paying attention to what they say; prompt responsiveness to requests for
474 information and elimination of the risk of cross-contact; willingness to modify a plate in order to
475 accommodate consumers' needs; and being discreet and delicate whilst holding risk conversations
476 were powerful signs of extra care and respect. Given the significant restrictions for consumers with
477 severe FAs, the readiness of food establishments to adapt the dishes whilst respecting consumers'
478 food preferences and desire to try out different foods was also highly valued. Reflecting on why they
479 frequent a specific restaurant, a participant reported:

480 *Why do we go there? Because they listen, again, because of allergies. They're very, very good*
481 *there. You can haul the chef out of the kitchen and explain exactly what the allergy is, and*
482 *they'll do it. They'll cook everything with separate utensils, and they'll even change the menu*
483 *to accommodate you. (P13, male, 44, peanut & tree nuts, PS2)*

484 4. Conclusions

485 FA is unique in that it is a chronic and episodic health condition that is largely asymptomatic unless a
486 reaction occurs (Jones et al., 2014, 2015). Constant vigilance and adherence to risk management

487 practices is required, so that individuals with FAs minimise the risk of an allergic reaction.
488 Communicating the health condition and special dietary requirements to others when eating out has
489 been conceptualised in literature as one important behavioural manifestation of self-care (Jones et
490 al., 2014, 2015), yet little attention has been paid to the nature of these communicative exchanges
491 (Janković, Raljić, & Đorđević, 2017). Although the responsibility for revealing the allergy and
492 communicating dietary requirements is currently seen to lie primarily with the consumer (Lee &
493 Sozen, 2018; Soon, 2018; Wen & Kwon, 2016; 2017; 2019), the present analysis, in line with previous
494 research (Stjerna 2015; Stjerna et al., 2017), demonstrates that notions of risk and safety in the
495 context of managing a FA emerge from, and are embedded in, interactions with others. This
496 relational view of risk and safety is exemplified particularly well in eating out situations where
497 consumers have no control over the food preparation and where – unlike pre-packed food where
498 ingredient labelling is mandatory – conversations about risk are required to discern the ingredients
499 and where food preparation practices make the possibilities of cross-contact more salient (Barnett
500 et al., 2011a; Barnett et al., 2011b).

501 This paper has sought to show that managing a FA outside the home involves dilemmas of managing
502 health and social risks, and the visibility of these management strategies. Through risk conversations
503 with restaurant staff, consumers clearly tried to negotiate a fine balance between the need to
504 receive care in relation to their allergy, without being labelled as a 'fussy' or 'awkward' customer
505 and being denied the service as a result of an overcautious approach to risk management. Verbal risk
506 exchanges also – implicitly at least – entail a negotiation about the assumption and division of
507 responsibility between customers and food establishments for managing the risk. Accordingly, signs
508 and signals that meaningfully convey that customers are invited and welcome to declare and discuss
509 FAs – for example, proactive exploration of relevant dietary requirements by serving staff – would
510 help consumers feel that such conversations are welcome and valid, would alleviate potential
511 anxieties, and indicate that businesses are both knowledgeable and inclined to accommodate the
512 needs of these customers.

513 Given that the risk of consuming a food they are allergic to, as well as social risks (e.g., being
514 attributed undesirable traits) are generated in relation to and in interaction with others, the risk
515 conversations with restaurant staff essentially embody consumers' effort to negotiate and establish
516 a trustworthy relationship with others from which safety will be maximised and risks minimised. This
517 suggests the need to shift the focus of analysis from the behaviours of individuals with FAs to the
518 social interactions, relationships and situations within which they find themselves and from which
519 risk and safety are constructed, negotiated and managed (Rhodes, 1997). Furthermore, our results
520 showed that establishing a trustworthy relationship was not limited to staff exhibiting competence,
521 that is, knowledge of allergenic foods and awareness of FAs, but it extended to qualities of
522 communication that expressed honesty, genuine care and respect. This resonates with literature on
523 trust development proposing that in transactional interactions a party is perceived to be trustworthy
524 based on the attributes of ability, benevolence and integrity (Mayer, Davis, & Schoorman, 1995).

525 ***4.1 Strengths and limitations of the present study***

526 We chose to focus this secondary analysis on the accounts of adults whose worst ever reaction was
527 classified as severe. Although the conditions under which communication about FA risk is likely to be
528 initiated and the qualities identified as conducive to trustworthy communication are expected to be
529 reflective of consumers with less severe FAs (i.e., moderate, mild), it is possible they might be
530 different. For example, consumers with moderate or mild FAs might be more inclined to prioritise
531 social risks, potentially leading to reducing attention to the health risk. Second, although qualitative
532 interviews provide useful insights about people's perspectives on events or experiences, greater
533 insight about the interactions between consumers and staff would have been gained through
534 observation of naturally occurring exchanges. Despite the challenges such methods would pose from
535 an ethical and practical point of view, they would enable study of more subtle forms of
536 communication (e.g., non-linguistic communication) implicated in inferences of trustworthiness.

537 ***4.2 Implications of the present study***

538 Understanding the drivers of, and constraints to, initiating risk conversations as well as the qualities
539 of communication that inspire trustworthiness when eating out has important practical implications
540 for the food industry. Food businesses that aim to develop appropriate FA risk communication
541 would benefit from the insights of the present study about what constitutes trustworthy
542 communication acts. For example, whilst knowledge of allergens/dish contents and understanding of
543 allergies are prerequisites, food venues should also convey care and respect not only for the health
544 needs of these customers but also for their social needs and sensitivities that are made salient in
545 eating out situations. Particularly in eating out contexts whereby the display of written allergen
546 information provision is not mandatory, verbal communication about risk is crucial in managing the
547 risks pertaining to food allergens. For example in the US consumers are advised to request allergen
548 information when eating out (Food and Drug Administration, 2018) and thus far, only a few states
549 (i.e. Illinois, Virginia, Massachusetts, Maryland, Michigan, and Rhode Island) have laws requiring
550 food establishments to display a FA awareness poster and to provide mandatory FA training to
551 employees (Food Allergy Research and Education, n.d.). Where the provision of comprehensive
552 written allergen information is at the discretion of food businesses, as is the case in the UK, verbal
553 communication about FA risk remains not only an important tool for managing the risk of an allergic
554 reaction but also the means through which trustworthy interactions and relationships between
555 customers and food venues can be built. Finally, those who have a role in supporting people with
556 FAs, such as healthcare professionals and patient advocacy groups, should continue stress the
557 importance of verbal communication with staff when eating out. Communication should not only be
558 about the intentional inclusion of allergens in the dishes they are serving, but also about the risk of
559 cross-contact. Consumers should be informed, and kept updated, about their legal rights (where
560 applicable) and receive advice about how to feel confident and entitled to initiate and hold risk
561 conversations.

562

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574 **Declaration of interests**

575 The authors have no competing interests to declare

576

577 **References**

578 Ajala, A. R., Cruz, A. G., Faria, J. A., Walter, E. H., Granato, D., & Sant, A. S. (2010). Food allergens:
579 Knowledge and practices of food handlers in restaurants. *Food Control*, *21*, 1318-1321.

580 <https://doi.org/10.1016/j.foodcont.2010.04.002>

581 Antolín-Amérigo, D., Manso, L., Caminati, M., de la Hoz Caballer, B., Cerecedo, I., Muriel, A., ... &
582 Alvarez-Mon, M. (2016). Quality of life in patients with food allergy. *Clinical and Molecular Allergy*,

583 *14*, 4. <https://doi.org/10.1186/s12948-016-0041-4>

584 Barnett, J., Leftwich, J., Muncer, K., Grimshaw, K., Shepherd, R., Raats, M. M., ... & Lucas, J. S.

585 (2011a). How do peanut and nut-allergic consumers use information on the packaging to avoid

586 allergens?. *Allergy*, *66*, 969-978. <https://doi.org/10.1111/j.1398-9995.2011.02563.x>

- 587 Barnett, J., Muncer, K., Leftwich, J., Shepherd, R., Raats, M. M., Gowland, M. H., ... & Lucas, J. S.
588 (2011b). Using 'may contain' labelling to inform food choice: a qualitative study of nut allergic
589 consumers. *BMC public health*, *11*, 734. <https://doi.org/10.1186/1471-2458-11-734>
- 590 Barnett, J., Vasileiou, K., Gowland, M. H., Raats, M. M., & Lucas, J. S. (2013). Beyond labelling: what
591 strategies do nut allergic individuals employ to make food choices? A qualitative study. *PLoS one*, *8*,
592 e55293. <https://doi.org/10.1371/journal.pone.0055293>
- 593 Barnett, J., Begen, F. M., Gowland, M. H., & Lucas, J. S. (2018). Comparing the eating out experiences
594 of consumers seeking to avoid different food allergens. *BMC public health*, *18*, 1263.
595 <https://doi.org/10.1186/s12889-018-6117-y>
- 596 Begen, F. M., Barnett, J., Payne, R., Roy, D., Gowland, M. H., & Lucas, J. S. (2016). Consumer
597 preferences for written and oral information about allergens when eating out. *PLoS one*, *11*,
598 e0156073. <https://doi.org/10.1371/journal.pone.0156073>
- 599 Begen, F. M., Barnett, J., Barber, M., Payne, R., Gowland, M. H., & Lucas, J. S. (2018a). Parents' and
600 caregivers' experiences and behaviours when eating out with children with a food hypersensitivity.
601 *BMC public health*, *18*, 38. <https://doi.org/10.1186/s12889-017-4594-z>
- 602 Begen, F. M., Barnett, J., Payne, R., Gowland, M. H., DunnGalvin, A., & Lucas, J. S. (2018b). Eating out
603 with a food allergy in the UK: Change in the eating out practices of consumers with food allergy
604 following introduction of allergen information legislation. *Clinical & Experimental Allergy*, *48*, 317-
605 324. <https://doi.org/10.1111/cea.13072>
- 606 Bock, S. A., Muñoz-Furlong, A., & Sampson, H. A. (2001). Fatalities due to anaphylactic reactions to
607 foods. *Journal of Allergy and Clinical Immunology*, *107*, 191-193. doi: 10.1067/mai.2001.112031
- 608 Bock, S. A., Muñoz-Furlong, A., & Sampson, H. A. (2007). Further fatalities caused by anaphylactic
609 reactions to food, 2001-2006. *Journal of Allergy and Clinical Immunology*, *119*, 1016.
610 <https://doi.org/10.1016/j.jaci.2006.12.622>

- 611 Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in*
612 *psychology*, 3, 77-101. <http://dx.doi.org/10.1191/1478088706qp063oa>
- 613 Clark, S., Espinola, J., Rudders, S. A., Banerji, A., & Camargo, C. A. (2011). Frequency of US emergency
614 department visits for food-related acute allergic reactions. *Journal of Allergy and Clinical*
615 *Immunology*, 127, 682. <https://doi.org/10.1016/j.jaci.2010.10.040>
- 616 Common, L. A., Corrigan, C. J., Smith, H., Bailey, S., Harris, S., & Holloway, J. A. (2013). How safe is
617 your curry? Food allergy awareness of restaurant staff. *Journal of Allergy and Therapy*, 4, 140.
618 <http://dx.doi.org/10.4172/2155-6121.1000140>
- 619 Dupuis, R., Meisel, Z., Grande, D., Strupp, E., Kounaves, S., Graves, A., ... & Cannuscio, C. C. (2016).
620 Food allergy management among restaurant workers in a large US city. *Food Control*, 63, 147-157.
621 <https://doi.org/10.1016/j.foodcont.2015.11.026>
- 622 Food Allergy Research & Education (n.d.). *Food allergies and restaurants*. Retrieved from
623 [https://www.foodallergy.org/education-awareness/advocacy-resources/advocacy-priorities/food-](https://www.foodallergy.org/education-awareness/advocacy-resources/advocacy-priorities/food-allergies-and-restaurants)
624 [allergies-and-restaurants](https://www.foodallergy.org/education-awareness/advocacy-resources/advocacy-priorities/food-allergies-and-restaurants) (last accessed 5 June 2019)
- 625 Food and Drug Administration (2018). *Food Allergen Labeling And Consumer Protection Act of 2004*
626 *Questions and Answers*. Retrieved from [https://www.fda.gov/food/food-allergens-and-gluten-free-](https://www.fda.gov/food/food-allergens-and-gluten-free-guidance-documents-and-regulatory-information/food-allergen-labeling-and-consumer-protection-act-2004-questions-and-answers#q26)
627 [guidance-documents-and-regulatory-information/food-allergen-labeling-and-consumer-protection-](https://www.fda.gov/food/food-allergens-and-gluten-free-guidance-documents-and-regulatory-information/food-allergen-labeling-and-consumer-protection-act-2004-questions-and-answers#q26)
628 [act-2004-questions-and-answers#q26](https://www.fda.gov/food/food-allergens-and-gluten-free-guidance-documents-and-regulatory-information/food-allergen-labeling-and-consumer-protection-act-2004-questions-and-answers#q26) (last accessed 5 June 2019)
- 629 Furlong, T. J., DeSimone, J., & Sicherer, S. H. (2001). Peanut and tree nut allergic reactions in
630 restaurants and other food establishments. *Journal of Allergy and Clinical Immunology*, 108, 867-
631 870. doi: 10.1067/mai.2001.119157
- 632 Gupta, R. S., Warren, C. M., Smith, B. M., Blumenstock, J. A., Jiang, J., Davis, M. M., & Nadeau, K. C.
633 (2018). The public health impact of parent-reported childhood food allergies in the United States.
634 *Pediatrics*, 142, e20181235. doi: 10.1542/peds.2018-1235

- 635 Gupta, R. S., Warren, C. M., Smith, B. M., Jiang, J., Blumenstock, J. A., Davis, M. M., ... & Nadeau, K. C.
636 (2019). Prevalence and severity of food allergies among US adults. *JAMA network open*, 2, e185630-
637 e185630. doi:10.1001/jamanetworkopen.2018.5630
- 638 Heaton, J. (2000). *Secondary analysis of qualitative data: A review of the literature*. Retrieved from:
639 https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=2ah_UKEwjQkP_q_NHiAhUFCuwKHfVCCQ0QFjAAegQIABAC&url=https%3A%2F%2Fs3-eu-west-1.amazonaws.com%2Fesrc-files%2Foutputs%2Fk7fxpLJE7E6XaRGsUgTWqg%2Fb_X-cCOEIE2Wniz5W8l_Uw.pdf&usg=AOvVaw17vjnw_MJHjrzsdk8nCKra (last accessed 5 June 2019)
- 643 Heaton, J. (2008). Secondary analysis of qualitative data: An overview. *Historical Social*
644 *Research/Historische Sozialforschung*, 33, 33-45. <https://www.jstor.org/stable/20762299>
- 645 Janković, V., Raljić, J. P., & Đorđević, V. (2017). Public protection—reliable allergen risk management.
646 *IOP Conference Series: Earth and Environmental Science*, 85, 012009. <https://doi.org/10.1088/1755-1315/85/1/012009>
- 648 Jones, C. J., Smith, H. E., Frew, A. J., Toit, G. D., Mukhopadhyay, S., & Llewellyn, C. D. (2014).
649 Explaining adherence to self-care behaviours amongst adolescents with food allergy: a comparison
650 of the health belief model and the common sense self-regulation model. *British journal of health*
651 *psychology*, 19, 65-82. <https://doi.org/10.1111/bjhp.12033>
- 652 Jones, C. J., Llewellyn, C. D., Frew, A. J., Du Toit, G., Mukhopadhyay, S., & Smith, H. (2015). Factors
653 associated with good adherence to self-care behaviours amongst adolescents with food allergy.
654 *Pediatric Allergy and Immunology*, 26, 111-118. <https://doi.org/10.1111/pai.12333>
- 655 Lee, Y. M., & Sozen, E. (2018). Who knows more about food allergies—restaurant managerial staff or
656 employees?. *British Food Journal*, 120, 876-890. <https://doi.org/10.1108/BFJ-07-2017-0387>

- 657 Leftwich, J., Barnett, J., Muncer, K., Shepherd, R., Raats, M. M., Gowland, M. H., & Lucas, J. S. (2011).
658 The challenges for nut-allergic consumers of eating out. *Clinical & Experimental Allergy*, *41*, 243-249.
659 <https://doi.org/10.1111/j.1365-2222.2010.03649.x>
- 660 Mayer, R. C., Davis, J. H., & Schoorman, F. D. (1995). An integrative model of organizational trust.
661 *Academy of management review*, *20*, 709-734. <https://www.jstor.org/stable/258792>
- 662 Michelsen-Huisman, A. D., van Os-Medendorp, H., Blom, W. M., Versluis, A., Castenmiller, J. J.,
663 Noteborn, H. P., ... & Knulst, A. C. (2018). Accidental allergic reactions in food allergy: Causes related
664 to products and patient's management. *Allergy*, *73*, 2377. doi: 10.1111/all.13560
- 665 National Academies of Sciences, Engineering, and Medicine (2017). *Finding a Path to Safety in Food*
666 *Allergy: Assessment of the Global Burden, Causes, Prevention, Management, and Public Policy*.
667 Washington, DC: The National Academies Press. <https://doi.org/10.17226/23658>.
- 668 National Institute of Allergy and Infectious Diseases (2012). *Food allergy: An overview*. NIH
669 Publication No. 12-5518. Retrieved from [https://www.iddba.org/training-](https://www.iddba.org/training-materials/pdfs/foodallergy.aspx?ext=.pdf)
670 [materials/pdfs/foodallergy.aspx?ext=.pdf](https://www.iddba.org/training-materials/pdfs/foodallergy.aspx?ext=.pdf) (last accessed 5 June 2019)
- 671 Nwaru, B. I., Hickstein, L., Panesar, S. S., Roberts, G., Muraro, A., Sheikh, A., & EAACI Food Allergy
672 and Anaphylaxis Guidelines Group. (2014). Prevalence of common food allergies in Europe: a
673 systematic review and meta-analysis. *Allergy*, *69*, 992-1007. <https://doi.org/10.1111/all.12423>
- 674 Osborne, N. J., Koplin, J. J., Martin, P. E., Gurrin, L. C., Lowe, A. J., Matheson, M. C., ... & Allen, K. J.
675 (2011). Prevalence of challenge-proven IgE-mediated food allergy using population-based sampling
676 and predetermined challenge criteria in infants. *Journal of Allergy and Clinical Immunology*, *127*,
677 668-676. doi: 10.1016/j.jaci.2011.01.039
- 678 Pouessel, G., Turner, P. J., Worm, M., Cardona, V., Deschildre, A., Beaudouin, E., ... & Tanno, L. K.
679 (2018). Food-induced fatal anaphylaxis: from epidemiological data to general prevention strategies.
680 *Clinical & Experimental Allergy*, *48*, 1584-1593. <https://doi.org/10.1111/cea.13287>

- 681 Rhodes, T. (1997). Risk theory in epidemic times: sex, drugs and the social organisation of 'risk
682 behaviour'. *Sociology of Health & Illness*, 19, 208-227. [https://doi.org/10.1111/1467-](https://doi.org/10.1111/1467-9566.ep10934410)
683 [9566.ep10934410](https://doi.org/10.1111/1467-9566.ep10934410)
- 684 Sicherer, S. H., & Sampson, H. A. (2018). Food allergy: a review and update on epidemiology,
685 pathogenesis, diagnosis, prevention, and management. *Journal of Allergy and Clinical Immunology*,
686 141, 41-58. doi: 10.1016/j.jaci.2017.11.003
- 687 Soon, J. M. (2018). 'No nuts please': Food allergen management in takeaways. *Food Control*, 91, 349-
688 356. <https://doi.org/10.1016/j.foodcont.2018.04.024>
- 689 Stjerna, M. L. (2015). Food, risk and place: agency and negotiations of young people with food
690 allergy. *Sociology of health & illness*, 37, 284-297. <https://doi.org/10.1111/1467-9566.12215>
- 691 Stjerna, M. L., Worth, A., Harden, J., & Olin Lauritzen, S. (2017). Risk as a relational phenomenon: a
692 cross-cultural analysis of parents' understandings of child food allergy and risk management. *Health,*
693 *Risk & Society*, 19, 351-368. <https://doi.org/10.1080/13698575.2017.1409887>
- 694 Tong, A., Sainsbury, P., & Craig, J. (2007). Consolidated criteria for reporting qualitative research
695 (COREQ): a 32-item checklist for interviews and focus groups. *International journal for quality in*
696 *health care*, 19, 349-357. <https://doi.org/10.1093/intqhc/mzm042>
- 697 Turner, P. J., Gowland, M. H., Sharma, V., Ierodiakonou, D., Harper, N., Garcez, T., ... & Boyle, R. J.
698 (2015). Increase in anaphylaxis-related hospitalizations but no increase in fatalities: an analysis of
699 United Kingdom national anaphylaxis data, 1992-2012. *Journal of Allergy and Clinical Immunology*,
700 135, 956-963. <https://doi.org/10.1016/j.jaci.2014.10.021>
- 701 Turner, P. J., Jerschow, E., Umasunthar, T., Lin, R., Campbell, D. E., & Boyle, R. J. (2017). Fatal
702 anaphylaxis: mortality rate and risk factors. *The Journal of Allergy and Clinical Immunology: In*
703 *Practice*, 5, 1169-1178. <https://doi.org/10.1016/j.jaip.2017.06.031>

704 Wen, H., & Kwon, J. (2016). Food allergy risk communication in restaurants. *Food Protection Trends*,
705 36, 372-383.

706 Wen, H., & Kwon, J. (2017). Restaurant servers' risk perceptions and risk communication-related
707 behaviors when serving customers with food allergies in the US. *International Journal of Hospitality*
708 *Management*, 64, 11-20. <https://doi.org/10.1016/j.ijhm.2017.03.009>

709 Wen, H., & Kwon, J. (2019). Food allergy information sharing and communication strategies in full-
710 service restaurants in the US. *Journal of Foodservice Business Research*, 22, 50-65.
711 <https://doi.org/10.1080/15378020.2018.1546074>

712 Young, I., & Thaivalappil, A. (2018). A systematic review and meta-regression of the knowledge,
713 practices, and training of restaurant and food service personnel toward food allergies and Celiac
714 disease. *PLoS one*, 13, e0203496. <https://doi.org/10.1371/journal.pone.0203496>

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716 **Footnotes**

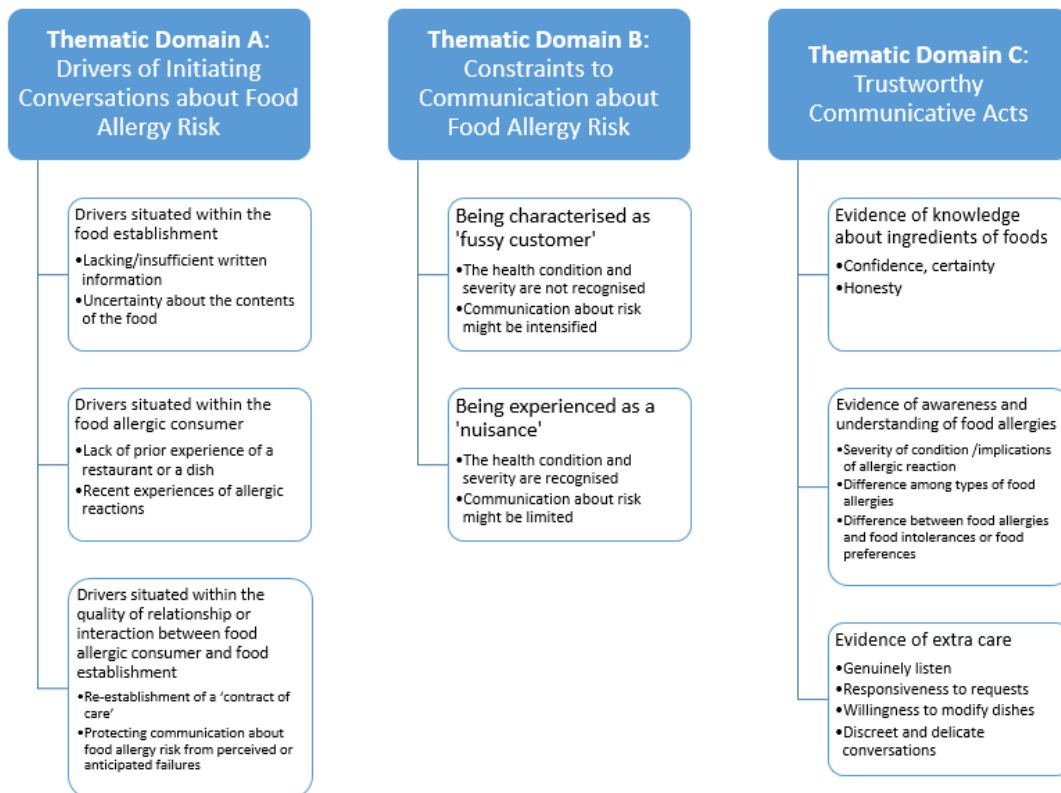
717 ¹The term *food hypersensitivity* is used to denote food allergy and food intolerance.

718 ²The researcher who conducted the initial stages of the secondary analysis (KV) was already familiar
719 with the dataset from primary study 2 as part of her involvement in another publication (i.e. Barnett,
720 J., Vasileiou, K., Gowland, M. H., Raats, M. M., & Lucas, J. S. (2013). Beyond labelling: what strategies
721 do nut allergic individuals employ to make food choices? A qualitative study. *PLoS one*, 8(1), e55293.)

722 ³For further details about each primary study, the following publications are suggested (for PS2 and
723 PS3, the publications suggested are the most relevant to the contents of the present manuscript):

- 724 • PS1: Money, A. G., Barnett, J., Kuljis, J., & Lucas, J. (2013). Patient perceptions of epinephrine
725 auto-injectors: exploring barriers to use. *Scandinavian Journal of Caring Sciences*, 27, 335-
726 344.

- 727 • PS2: Leftwich, J., Barnett, J., Muncer, K., Shepherd, R., Raats, M. M., Gowland, M. H., &
 728 Lucas, J. S. (2011). The challenges for nut-allergic consumers of eating out. *Clinical &*
 729 *Experimental Allergy*, 41, 243-249.
- 730 • PS3: Begen, F. M., Barnett, J., Payne, R., Roy, D., Gowland, M. H., & Lucas, J. S. (2016).
 731 Consumer preferences for written and oral information about allergens when eating out.
 732 *PloS one*, 11, e0156073.
- 733
- 734



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