

1 **Exploring the Representation of Seafood Species and Parts in the**
2 **Online Landscape**

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17 **Abstract**

18 This study aims to explore the representation of seafood species and cuts in the UK's most
19 visited food recipe websites, providing a snapshot of how seafood is presented to consumers
20 and the species and cuts made available to them online. Using a novel web scraping
21 methodology, 8,114 seafood recipes were analysed to examine species representation, fillet
22 dominance, and recipe complexity. The findings of the study suggest that while the "Big
23 Five" species (cod, haddock, salmon, prawns, tuna) appear in 55% of recipes, there is a
24 notable increase in the diversity of species (45%) featured. Fillets and whole fish dominate
25 (92%), while bones, roe, and skin are underrepresented. Cod recipes were the most complex,
26 while tuna and salmon were simpler in comparison. These findings suggest that online food
27 content can promote more diverse seafood consumption, thereby enhancing nutrition and
28 sustainability by encouraging the use of a broader range of species and fish parts.
29 Furthermore, this study seeks to address the gap in understanding how diverse seafood
30 choices are portrayed in online recipes, and how increasing this diversity can contribute to
31 more sustainable and nutritionally balanced consumption.

32 **Keywords**

33 Seafood, Behaviour, Cooking, Market

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35

36 **Main Text**

37 **1. Introduction**

38 Seafood is valuable source of essential micronutrients and plays a fundamental role in both
39 home cooking and eating-out culture. A growing body of literature notes the importance of
40 seafood as a source of essential vitamins, minerals, protein, and fatty acids (Golden et al.,
41 2021; Koehn et al., 2022; Sanders, 2024; Tacon, 2023; Tacon & Metian, 2018; Watts, 2024;
42 Willer et al., 2021a, 2022, 2024a; Willer & Aldridge, 2020a). As such, the UK's National
43 Health Service (NHS) recommends eating two portions per week, equivalent to 280 grams,
44 with one portion being an oily fish. The nutritional value and adaptability of seafood in
45 various cuisines – in-home and eating out – fosters an understanding of “food sense”, which
46 encourages individuals to understand and appreciate the cultural and societal impacts of their
47 dietary choices (Janhonen et al., 2018; Musarskaya et al., 2018).

48 Despite the availability of a wide variety of seafood types and cuts, many of these remain
49 underutilised by consumers. Cod, haddock, salmon, prawns and shrimp and tuna, collectively
50 known as the “Big Five” – dominate the UK seafood market, making up 80% of consumption
51 in 2021 (Harrison et al., 2022; MMO, 2021). Meanwhile, 124 types of seafood are produced
52 domestically, many of which are seldom consumed inside the UK (Seafish, 2021; Willer &
53 Aldridge, 2023a; WWF-UK, 2022). However, ensuring a diverse and inclusive diet that
54 incorporates a broad range of locally sourced seafood is essential for achieving and
55 maintaining optimal health (UN Nutrition, 2021) while promoting environmental
56 sustainability by consuming a diverse range of nutrients alongside reducing demand for
57 overfished species (Kelling et al., 2023). Thus, embracing a diverse range of seafood
58 consumption can help strengthen food systems and safeguard marine biodiversity (Gephart et
59 al., 2020).

60 Online media plays a significant role in influencing consumption and is a key point for
61 intervention and leverage, including in the realm of seafood (S. Govzman et al., 2021;
62 Shipway et al., 2024; Simeone & Scarpato, 2020). Over the last two decades, the internet has
63 seen a growing trend towards becoming an indispensable influence in shaping consumer
64 preferences in everyday food with an increasing number of people relying extensively on
65 websites and online resources to access diverse information (Dwivedi et al., 2021, 2024).
66 These platforms which include recipe websites, food blogs, and social media, are now key
67 sources for culinary trends and nutritional guidance (Trattner et al., 2019) and will likely have
68 an enduring significance in that role (Larson & Story, 2009). By focusing on diverse seafood
69 types and parts, recipe websites can shift consumer preferences, increase awareness of
70 sustainable seafood options, and ultimately encourage a more inclusive and environmentally
71 conscious food system (Crona et al., 2023a).

72 This study offers a snapshot of the seafood recipes featured on the UK's most popular food
73 websites. Using a web scraping tool, we analyse 8,114 seafood recipes, exploring the types of
74 species and cuts that dominate, and examining factors such as recipe complexity. The study
75 aims to answer three key questions: 1) Do the Big Five species dominate the online recipe
76 landscape, as they do in consumption patterns? 2) Are fish fillets the most commonly used
77 cut, with other parts like belly cuts, heads, and tails underrepresented? 3) Are recipes
78 featuring the Big Five or fillets generally less complex, potentially limiting the engagement
79 with other seafood types? By examining these questions, this study aims to provide a glimpse
80 into the current representation of seafood types and cuts in online recipe contents. Ultimately,
81 the study seeks to contribute to the broader discussion on enhancing the diversity of seafood
82 featured in these enduring platforms, as well as identifying opportunities to promote more
83 sustainable and inclusive food practices.

84 **2. Literature Review**

85 ***2.1 Challenges of the global food system***

86 Our global population – projected to hit 10 billion by 2050 (Gu et al., 2021) – faces twin
87 challenges of climate change and decline in human health. These issues are heavily
88 influenced by current trends in food production and consumption (Willett et al., 2019) .
89 Furthermore, it has been reported that the food system is responsible for 20–30% of global
90 greenhouse gas emissions, while 10% of the world's population is grappling with hunger and
91 malnourishment (Monteiro 2018, Golden 2021). Solving these challenges is critical to
92 ensuring planetary health (Whitmee et al., 2015a), and dietary diversity can play a crucial
93 role in making our food supply chains more sustainable and healthier (Zhao et al., 2024).

94 In addition, evidence leads to the reliance of the global food system today on a very limited
95 number of species. For example, in the context of terrestrial resources, just three plant crops –
96 rice, wheat and maize – make up over 50% of all calories consumed globally, while only five
97 additional crops (of over 6000 domesticated crop plants) account to the further 25%
98 (Dimbledy, 2021; Saladino, 2022). This heavy reliance on a limited and narrow range of
99 crops results in monoculture farming systems and the widespread production of ultra-
100 processed foods, both of which do little to secure planetary health, or rather, actively
101 undermine it (Hanley-Cook et al., 2021; Jacques & Jacques, 2012; Prescott & Logan, 2019).
102 As a result, promoting a more diverse diet can lead to greater food security and a more
103 resilient food system that benefits individuals and communities, economies and the
104 environment (DEFRA, 2021; FAO et al., 2023; A. K. Farmery et al., 2022). In this context,
105 seafood represents a vital opportunity to help promote a more balanced and sustainable food
106 system.

107 ***2.2 The role of seafood in human health and sustainable food systems***

108 Seafood is widely recognised as an essential food for humans (OECD & FAO, 2010) and a
109 key component of more diverse diets (Ferraro 2022). The term “seafood” is used to define
110 any type of marine or aquatic life that is edible and requires seawater for at least part of its
111 life cycle (Golden 2021). This includes marine finfish, molluscs, crustaceans, and all other
112 forms of marine plants and animals, including those produced through marine aquaculture
113 techniques (OECD 2022, FAO 2021). According to a report published by the Food and
114 Agriculture Organization of the United Nations, global seafood production amounted to 214
115 million metric tons in 2020 owing to the growth of aquaculture (FAO 2022).

116 Beyond its nutritional benefits, seafood also supports economic and social well-being (A. K.
117 Farmery et al., 2022; Marwaha et al., 2022; Tacon, 2023). In 2020, approximately 58.5
118 million people worked in fisheries and aquaculture, whether full-time, part-time, and
119 occasional roles. Notably, about 21% of these workers were women (FAO, 2022). Thus,
120 seafood production is not only vital to human health, but also supports the livelihoods of
121 millions worldwide.

122 Extensive research confirms the crucial and unique role of seafood to human health. On an
123 edible fresh weight basis, seafood typically has higher protein content than terrestrial meat
124 and is generally leaner and in lower saturated fat than terrestrial animal meat (Golden et al.,
125 2021; Koehn et al., 2022). Furthermore, multiple studies have confirmed the role of seafood
126 as a source of essential vitamins, minerals, protein, and fatty acids, which play a significant
127 role in child development and adult disease prevention (Golden et al., 2021; Koehn et al.,
128 2022; Sanders, 2024; Tacon, 2023; Tacon & Metian, 2018; Watts, 2024; Willer et al., 2024b;
129 Willer & Aldridge, 2020b). In particular, the long-chain omega-3 fatty acids found in seafood
130 support cardiovascular health and are recognised as essential for early cognitive development
131 and adult memory (Young 2022).

132 *2.3 A focus on seafood consumption and its potential impacts*

133 Despite seafood's potential as a lever for increased dietary diversity and nutrient delivery,
134 seafood consumption patterns are often narrow, wasteful, and unsustainable (Costello et al.,
135 2020; Olsen et al., 2021; WWF-UK, 2022). For instance, in the UK, 63% of the seafood eaten
136 comprises just five species: cod, haddock, salmon, tuna, and prawns, collectively known as
137 the 'Big Five' (McCann et al., 2023; Seafish, 2021). Yet the UK has a thriving and diverse
138 fishing and aquaculture industry, producing over 124 species domestically, with a total landed
139 volume of 411, 000 tonnes and value of £ 757 million (FAO, 2022, 2023). Despite the latter,
140 much of what it catches is exported, while a significant proportion of what it consumes is
141 imported (Harrison et al., 2023). Most of these imports come from Norway, Iceland, Vietnam,
142 China, and Sweden (Cantillo & Caillie, 2023), with 70% of fish landed exports destined for
143 the EU, the US and China (Harrison et al., 2022). Salmon is the UK's most valuable food
144 export by value, followed by other significant species such as herring, mackerel and nephrops
145 (FAO, 2023; Harrison et al., 2022). Consequently, this has led to annual UK seafood
146 consumption of around 887,000 tonnes (2019) – equivalent to 5.2 billion portions of fish and
147 chips by weight – with over 80% of this seafood being sourced from outside of UK waters
148 (WWF-UK, 2022).

149 The UK's narrow focus on the 'Big Five' places significant pressure on the stocks of these
150 species and the ecosystems they depend on. Reports reveal that over 500 endangered,
151 threatened, or protected species have been found to be potentially at risk due to the fisheries
152 that supply these products. On a global scale, studies note that only 64% of all fish stocks are
153 currently being fished sustainably (DEFRA, 2021; FAO, 2023; WWF-UK, 2022).

154 Fish consumption is often narrowly focused on a very small selection of cuts, primarily fillets
155 which drives inefficiency and loss of valuable nutrients in the food chain (Cardinaals et al.,

156 2022; McAuley et al., 2018). During the processing of fish fillets, by-products such as tail
157 cuts, skins, scales, viscera, belly cuts, head, roe and bones are generated, and these can
158 account for up to 60% of the total fish weight (Archer & Jacklin, 2022). These by-products
159 are typically some of the most nutrient-dense components of the fish, containing valuable
160 lipids, proteins, and functional components (Malcorps et al., 2019; Willer et al., 2024b).

161 However, majority of these by-products are typically used for fishmeal and fish oil
162 production, or for fertilisers, bioenergy, or pharmaceuticals (Al-Tamimi et al., 2023; Lopes et
163 al., 2015; Roy et al., 2022; Tacon & Metian, 2013, 2015). In some instances, by-products are
164 even discarded as waste from fishing vessels (Malaweera & Wijesundara, 2013) or in
165 processing plants (Gilman et al., 2020; Islam et al., 2021; Jayathilakan et al., 2012; Neff et
166 al., 2021), thereby contribution to the already growing global issue of food waste (Moračanin
167 et al., 2023; You et al., 2022).

168 Even when these by-products are fed to other animals and eventually processed into products
169 for human consumption, up to 80% of the key micronutrients such as calcium and iodine can
170 be lost compared to if the by-products had been eaten directly by humans (Muscat et al.,
171 2020; Willer et al., 2024b). This inefficiency highlights the potential for more sustainable
172 practices that may offer a better utilisation of the full nutritional value of seafood species and
173 reduce food waste.

174 Initiatives that encourage the consumption of a wider variety of seafood species and parts
175 could offer tremendous benefits for both human health and sustainable food systems. Beyond
176 the commonly consumed 'Big Five', there exists a vast array of locally abundant species,
177 each offering unique flavours, textures, and nutritional benefits (Nicolini et al., 2024;
178 Steenson & Creedon, 2022a). One notable example is the blue mussel (*Mytilus edulis*), which
179 the UK already produces enough of to meet 11% of its seafood demand. These species are

180 among the richest of all food types in key micronutrients such as iron, selenium, and zinc,
181 and are highly affordable. Yet, the UK exports 86% of what it produces (Gawel et al., 2023a;
182 Willer et al., 2021b).

183 In addition to species diversity in seafood consumption, the utilisation of other seafood cuts
184 could also offer great nutritional benefits. Heads, frames, fillet cut-offs, belly flaps and parts
185 of the viscera (e.g. liver and roe) are excellent sources of nutrients such as long-chain omega-
186 3 fatty acids, vitamins A, D and B12, and minerals such as iron, zinc, calcium, phosphorus,
187 and selenium (Willer et al., 2024c). By applying processing technologies to these parts of the
188 fish traditionally not eaten in the UK, they can be converted into highly nutritious products at
189 a low cost such as fish sausages, pâté, cakes, snacks, soups, sauces, and other products for
190 human consumption (FAO, 2022; Li et al., 2020). Such an approach is already widely
191 practised in Asia, where over two-thirds of the world's seafood are consumed (FAO, 2022;
192 Nicolini et al., 2024). In these regions, fermented fish sauces are made from the entire fish,
193 noodles are made from mince and crisps from skins are made for snacks (Hajeb & Jinap,
194 2015; Shikha et al., 2020; Venugopal et al., 1995).

195 Creating a broader range of tasty and domestically acceptable seafood products, as well as
196 inspiration for recipes made from less-conventional species and cuts could help support
197 national health objectives (Graziano et al., 2018; Harrison et al., 2022; Willer & Aldridge,
198 2023b). Despite multiple campaigns to increase seafood consumption and highlight its
199 benefits, the UK population continues to fall short in meeting their recommended intake of
200 two portions or 280g per week (NHS, 2023; Steenson & Creedon, 2022a; Utri-Khodadady et
201 al., 2024) with many individuals consuming only around half of this recommended amount.
202 Regarding protein sources, fish and shellfish remain less popular than meat, and some dairy
203 products (Cuparencu et al., 2019).

204 The low fish consumption can be attributed to various factors beyond personal preference,
205 including cost, limited access to stores that sell fish, and uncertainty about cooking and
206 preparation (Carlucci et al., 2015; Donati et al., 2016; Harrison et al., 2023; Shamshak et al.,
207 2019) and concern about toxins (Liu 2021). A shift towards a more diverse range of appealing
208 seafood products, encompassing a full range of seafood types and parts, could help drive
209 greater consumption and offer support towards a sustainable and resilient food system.
210 Ultimately, the very definition of what is classified as 'edible yield' in fish processing may
211 also need redefining – we need a future where edible yield values sit near 100%, rather than
212 the current levels at around 40% (Archer & Jacklin, 2022).

213 ***2.4 The role of online recipes in shaping seafood consumption***

214 Online recipe websites have become integral to food culture, serving as a common source of
215 culinary inspiration for consumers (Trattner et al., 2017) . As the internet continues to shape
216 dietary habits of individuals and communities, these platforms significantly influence food
217 choices by actively supplementing meal ideas, minimising food waste and improving the
218 nutritional quality of recipes especially for the younger audiences (Birch et al., 2018;
219 Nestorowicz et al., 2024; Spaccarotella & Gido, 2022; Tsibizova et al., 2023). The range of
220 recipe creators on these websites – from celebrity chefs, food writers to industry salespersons
221 – provides an opportunity to engage various audiences and introduce culinary trends
222 (Lengyel, 2023; Smith, 2023; Spaccarotella & Gido, 2022). As research suggests, this
223 medium is a highly effective tool for engaging consumers with different food products and
224 can have a lasting impact on viewers or readers (Lee et al., 2024; Lehner et al., 2016; Serafini
225 & Reid, 2019; Zhang et al., 2018).

226 This evolving landscape highlights an opportunity for recipe websites to promote a broader
227 appreciation and consumption of diverse seafood in the UK (Harrison et al., 2023; Steenson

228 & Creedon, 2022a). By emphasising sustainable seafood options, these platforms can play a
229 crucial role in diversifying the UK's seafood intake while promoting more sustainable
230 consumption practices (Rafiq & Fulford, 2005; Voldnes et al., 2021; Gunjal et al., 2024).
231 Several studies further note that by increasing the visibility of underutilised species, recipe
232 websites can support the shift towards a broader appreciation for sustainable seafood, thereby
233 contributing to a more inclusive and environmentally conscious food system (Cerqueira et al.,
234 2024; Mizuta, 2024).

235 Following this review, the section that follows describes the methodology used to analyse
236 seafood recipes from UK's most visited food recipe websites through web scraping. The
237 results section then presents the key trends observed, with a focus on the species and cuts that
238 were mostly featured. The implications of these findings are then discussed, particularly in
239 terms of how the study can contribute to diversifying seafood consumption. Finally, a
240 summary is provided along with recommendations for future research directions.

241 **3. Materials and Methods**

242 ***3.1. Website and search term identification***

243 Website and search term selection made up the first component of the analysis. BuzzSumo
244 (www.buzzsumo.com) was used to identify the most frequently visited recipe websites in the
245 United Kingdom over the period September 2021 to September 2023. BuzzSumo is an online
246 tool that helps identify trending keywords, popular content, and top-performing websites
247 across various social media platforms (Rohr, 2024) . A two-year period ensured that seasonal
248 fluctuations in website visitation were accounted for (Spence, 2021; Trattner et al., 2018), and
249 avoided complications caused by the large spike in online recipe publications that occurred
250 over 2020 and early 2021 (Eftimov et al., 2020; Gligorić et al., 2022). The following 10

251 websites were selected for analysis in this study, as they were most frequently visited: (1)
252 BBC Co UK, (2) BBC Good Food, (3) Delicious Magazine, (4) Food52, (5) Great British
253 Chefs, (6) Happy Foodie Co UK, (7) Jamie Oliver, (8) Taste, (9) Tasty and (10) Tesco Real
254 Foods. Upon visiting these identified websites, an examination was conducted to understand
255 how the recipes were organised within their website navigation tabs. All the websites
256 included specific tabs dedicated to seafood-related content, which were used to identify
257 keywords that would facilitate a comprehensive extraction of all the seafood recipes. The
258 common search terms identified across these websites were: (1) Seafood, (2) Fish, and (3)
259 Shellfish.

260 ***3.2. Data collection via web scraping***

261 Web scraping was used to harvest data from the websites selected for analysis. Octoparse
262 (www.octoparse.com) was used to perform the web scraping, following guidance from (Matta
263 et al., 2020) . The Uniform Resource Locators (URLs) of the ten websites and keywords were
264 inputted into Octoparse to enable searching and scraping of the websites for all recipes that
265 included the corresponding keywords. A summary table showing the number of seafood
266 recipes scraped and the number of seafood recipe site visits is shown in Table 1.

267 (Table 1 here)

268 ***3.3. Recipe categorisation***

269 Recipes were categorised according to seafood type and part. For seafood type recipes were
270 categorised into ‘Big Five’ and ‘Non-Big Five’. The ‘Big Five’ comprised of Cod, Haddock,
271 Prawn and shrimp, Salmon, and Tuna. The ‘Non-Big Five’ comprised of Other-White Fish,
272 Any-White Fish, Other-Oily Fish, Any-Oily Fish, Other-Shellfish, and Any-Shellfish. It is
273 important to note that the Other-White Fish category does not include cod and haddock, as

274 they are already part of the Big Five group. For seafood part, recipes were grouped into the
275 following parts (1) Whole, (2) Head, (3) Trim, (4) Steak, (5) Collar, (6) Cheek, (7) Tongue,
276 (8) Viscera, (9) Belly, (10) Scales, (11) Fillet, (12) Tail, (13) Skin, (14) Frames and fins, and
277 (15) Bones (FOA and WEF, 2022). The number of seafood recipes in each type and part
278 category were tallied and are shown in Appendix 1.

279 ***3.4. Data weighting***

280 To determine the level of user engagement with seafood recipes on some of the UK's most
281 frequently visited food content websites, BuzzSumo was used to count the number of visits to
282 recipes on each website. This metric was used as a weighting factor to measure the popularity
283 seafood recipes on each website, independent of the overall website traffic. This was
284 important because to provide a more accurate analysis of the visitor interest in seafood
285 recipes by separating visitor interest in seafood from the general popularity of the websites.

286 ***3.5. Recipe complexity analysis***

287 The typical complexity of recipes was assessed during the analysis. To perform this analysis,
288 a random subset of 5% of both the 'Big Five' and 'Non-Big Five' recipes was used, resulting
289 in a total of just over 10% of the recipes, which were selected using a random number
290 generator. This resulted in a sample of 860 of the total 8114 recipes. For each recipe in the
291 sample, the total word count, the number of steps, and the number of ingredients were
292 recorded. A comprehensive list of these recipes and their associated complexity data can be
293 found in Appendix 2. ANOVA (Analysis of Variance) with Tukey's Honestly Significant
294 Difference post-hoc test was used to test for statistical differences, and the outputs are
295 available in Appendix 3.

296 4. Results

297 4.1. Distribution of seafood types across websites

298 The distribution of recipes for Big Five and Non-Big Five species was not homogenous
299 across websites, but there were general commonalities (Figure 1). Across all websites, the Big
300 Five species – Cod, Haddock, Prawn & Shrimp, Salmon, and Tuna made up 55% of all
301 recipes. There were three key websites where Non-Big Five species made up the majority of
302 recipes – BBC Co UK, Great British Chefs and Tesco Real Foods.

303 Within Big Five recipes, salmon, followed by prawn & shrimp, were the most featured
304 recipes, making up 21% and 18% respectively of all the weighted recipes across all sites and
305 constituting 39% and 35% respectively of the Big Five seafood recipes (Figure 1). Both
306 salmon and prawn & shrimp were dominant at BBC Good Food, Delicious Magazine, Happy
307 Foodie Co UK and Tasty. Cod also had prominence, at 6% of the entire weighted dataset and
308 12% of all the Big Five recipes, and featured strongly at BBC Co UK, Great British Chefs
309 and Tesco Real Foods. There were comparably few cod recipes at Food52, Happy Foodie Co
310 UK and Jamie Oliver. Tuna only constituted 5% of the total recipes and 8% within the Big
311 Five category. Tuna was absent from Happy Foodie Co UK and had the lowest presence
312 across all recipe types at BBC Co UK, Tesco Real Foods and Great British Chefs. Of all Big
313 Five species haddock had the lowest number of recipes, with just 3% of the entire recipe set
314 and 6% of the Big Five category, and absent from Food52, Happy Foodie Co UK and Taste.

315 In the case of non-Big Five seafood types, the category was dominated by recipes with white
316 fish and shellfish (Figure 1). White fish and shellfish constituted 20% and 17% respectively
317 of all weighted recipes collected, and 44% and 37% respectively non-Big Five recipes. White
318 fish was particularly prominent on BBC Co UK, where it occupied almost half of the recipes,
319 and there were also many white fish recipes at Great British Chefs, Taste and Tesco Real

320 Foods. Shellfish recipes were particularly abundant at Delicious Magazine, Food52, Great
321 British Chefs and Tasty. Oily fish had just 18% and 8% of recipes across all species and
322 within the non-Big Five respectively, and there was little presence of this type in Tasty and
323 Happy Foodie Co UK.

324 (Figure 1 here)

325 ***4.2. Distribution of seafood parts across websites***

326 Recipes consisting of fish fillets and whole fish dominated across both the Big Five and Non-
327 Big Five categories (Figure 2). Of all the recipes with seafood parts specified in their titles,
328 92% were comprised of fillets and whole fish, at 47% and 45%, respectively. The remaining
329 8% were classified as other fish parts. Among these, over half were fish skin, while bones and
330 roe constituted 25% and 12.5%, respectively.

331 (Figure 2 here)

332 ***4.3. Recipe complexity***

333 Our analysis revealed significant differences in recipe complexity across seafood types,
334 although within each seafood recipe type there was a large range in complexity and outliers
335 (Figure 3). Overall, considering all three indices of recipe word count, number of ingredients,
336 and number of steps, cod recipes were the most complex, with salmon, tuna and oily fish
337 typically being less complex.

338 ***4.3.1. Recipe word count***

339 Analysis of recipe word counts revealed cod recipes to be most complex, with a mean recipe
340 word count of 329 words (Figure 3a). This was significantly higher than the word count for
341 other recipes (ANOVA, $F(7, 852) = 3.373, p = 0.00148$), specifically oily fish (218 words)

342 (post-hoc Tukey's HSD, $p = 0.0035$) and salmon (243 words) (post-hoc Tukey's HSD, $p =$
343 0.0274). Cod recipes did however also have the greatest range in complexity of all seafood
344 types, with an interquartile range of 250, and range of 55 to 767 words. Shellfish recipes were
345 also typically more complex than other recipes, and with a mean word count of 287 were
346 significantly more complex than oily fish recipes (post-hoc Tukey's HSD, $p = 0.0189$). The
347 range for shellfish recipes was also high, an interquartile range of 202, and overall range of
348 49 to 1283 words. Salmon and haddock recipes had the lowest range in word count
349 complexity, with interquartile ranges of 127 and 111 respectively.

350 *4.3.2. Number of ingredients*

351 When assessing the number of ingredients, cod recipes again came up as the most complex
352 across recipe types (Figure 3b). Cod recipes, with a mean number of ingredients of 15.0, had
353 a significantly greater number of ingredients (ANOVA, $F(7, 852) = 3.992$, $p < 0.001$) than
354 oily fish (11.2) (post-hoc Tukey's HSD, $p = 0.0030$), salmon (13.13.01) (post-hoc Tukey's
355 HSD, $p = 0.0064$) or tuna (10.93) (post-hoc Tukey's HSD, $p = 0.0098$). Compared to recipe
356 word count, the interquartile range regarding number of ingredients was similar across recipe
357 types. There were however a relatively large number of outlying recipes with high numbers
358 of ingredients for prawns & shrimp, salmon, white fish, and shellfish, with ingredient counts
359 exceeding 40 in some places.

360 *4.3.3. Number of steps*

361 Regarding the number of steps in the recipes, cod again emerged as the most complex with
362 the highest mean number of steps at 6.96 (Figure 3c). This was significantly higher (ANOVA,
363 $F(7, 852) = 2.943$, $p = 0.00473$) than the mean number of steps for prawns & shrimp (5.0
364 steps) (post-hoc Tukey's HSD, $p = 0.0056$), tuna (4.4 steps) (post hoc Tukey's HSD, $p =$

365 0.0031), and oily fish (4.9 steps) (post-hoc Tukey's HSD, $p = 0.0088$). Cod, salmon, and
366 shellfish recipes had the widest interquartile range in number of recipe steps at 6.96, 4.4, and
367 4.9 steps respectively, whilst tuna recipes had the narrowest range in complexity of just 2
368 steps. As for recipe word count, cod again emerges with the widest overall range in steps,
369 between 2 and 16 steps.

370 (Figure 3 here)

371 **5. Discussion**

372 ***5.1. Big Five fish recipes take a majority in online food-content websites, but other seafood*** 373 ***types come close.***

374 The findings indicate that the Big Five category holds a prominent position in the UK online
375 culinary landscape, accounting for over 55% of the recipes analysed. This dominance is
376 reflective of the market presence of Big Five species in the country, particularly across the
377 fresh, frozen, and processed segments, accounting for around 80% of seafood sales (Seafish,
378 2023). This predominance also mirrors the established consumption trends within the country,
379 where these five species have long been staples on British plates (Birch et al., 2018; Harrison
380 et al., 2022; Steenson & Creedon, 2022b). The enduring preference for these species is likely
381 rooted in a combination of factors, including familiarity, availability, and traditional dietary
382 habits (Garrett & Hatton, 2020; Tetley, 2016; WWF-UK, 2022). Furthermore, these species
383 are also featured in nutritional recommendations (Crona et al., 2023b; Golden et al., 2021;
384 Koehn et al., 2022), which may contribute to their online presence.

385 The choice to feature Big Five species recipes on websites is a double-sided coin. On one
386 hand, it offers tangible benefits including convenience and widespread availability. It also
387 aligns with the consumer's managed expectations regarding taste, preparation, and overall

388 culinary experience. On the other hand, it may also contribute to the already high demand for
389 these specific species, posing risks to fisheries and marine environments (Willer et al.,
390 2024c). Furthermore, such a concentrated focus could overshadow the potential of other
391 species, neglecting the nutritional and environmental advantages of less familiar,
392 underutilised seafood (Gawel et al., 2023b; Klein et al., 2021; Robinson et al., 2022; Steenson
393 & Creedon, 2022b; Willer et al., 2023; Willer & Aldridge, 2020a). Expanding the discourse to
394 include a broader range outside the Big Five may relieve pressure on over-exploited species
395 and habitats and further enrich the culinary landscape (Tao, 2023).

396 The considerable representation of the non-Big Five species, at 45% of recipes, especially
397 those clustered as white fish and shellfish, is promising. It may indicate emerging trends in
398 culinary diversity and sustainability, although longer-term investigations would be required to
399 establish this. Campaigns and education efforts (Birch et al., 2018; Jacobs et al., 2018;
400 Murillo et al., 2023; Ward et al., 2024; Yamauchi, 2024) underscore the benefits of a broader
401 seafood palate, likely motivating online content creators to diversify their recipes (Tao,
402 2023). Moreover, such species also offer unique nutritional benefits: for example, oily fish,
403 though less represented in the findings, are rich in omega-3 fats and are a vital part of health
404 recommendations from authorities like the NHS (NHS, 2023). The drive for culinary
405 innovation and fluctuating market dynamics potentially further the inclusion of recipes
406 outside the Big Five category. Indications of such a transition are observed in shifting
407 consumer preferences and an increase in sustainable seafood initiatives (Bilali et al., 2019;
408 Gutierrez et al., 2016; Kumar et al., 2023). Critical evidence of this trend can be found in the
409 rising campaigns to demand for responsibly sourced seafood and the wider campaign towards
410 utilisation of animal by-products for human consumption (Blasiak et al., 2017; Cancellieri et
411 al., 2022; Malcorps et al., 2021; Sabbagh et al., 2023; Swartz et al., 2017; Travaille et al.,
412 2019). Such a shift underscores a growing commitment to sustainability, nutrition, and

413 culinary exploration, which can serve as a blueprint for future efforts to diversify diets and
414 lessen the impact on ecosystems.

415 ***5.2. Fillets and whole fish dominate cut type equally.***

416 Fish fillets and whole fish both dominate cut types equally, taking up 47% and 45%
417 respectively, despite distinct characteristics and culinary implications. Fillets are widely
418 recognised for their convenience and accessibility, ease of preparation and cooking and
419 appeal to the practical needs of home cooks seeking quick and straightforward meals (Thong
420 & Solgaard, 2017). Their boneless nature, uniformity in texture, and appearance streamline
421 the cooking process and align with the current appetite for simplicity and minimal
422 presentations (McAuley et al., 2018; Pounds et al., 2022). Cod has a long-standing
423 relationship with the UK going back to its prominence as a staple food source for centuries
424 (Garrett & Hatton, 2020). And, of all the Big Five species, cod fillets have held the distinction
425 for being the foremost imported fish and seafood commodity in the UK (Seafish, 2023).
426 Therefore, implicit in the culinary discourse is the assumption that, unless specified
427 otherwise, fish fillets are the default choice in recipes—a norm that mirrors broader culinary
428 conventions (Garrett & Hatton, 2020; OECD & FAO, 2022). This presumption is evidenced
429 in dishes like the iconic British fish and chips, where the fillet’s use is implied rather than
430 explicitly mentioned, underscoring the deep-rooted acceptance and preference for this fish cut
431 (Kurlansky, 2011). Meanwhile, the utilisation of whole fish may signal a diverging trend
432 toward culinary authenticity or a drive for freshness, possibly echoing traditions from outside
433 the UK or an inclination towards a more exploratory approach (Niland, 2019, 2023).
434 However, it is important to note that this observation does not stem from long-term trend
435 data. Therefore, while this could hint at influences from culinary customs outside the UK or
436 an inclination towards a more exploratory approach to seafood, further research and

437 substantiation are required to draw definitive conclusions. Existing literature does, however,
438 indicate a preference for whole fish consumption in various cultures, particularly in Asian
439 cuisines, where it is associated with the authenticity and integrity of the seafood and often
440 considered auspicious for servings and celebrations (Beveridge et al., 2013; Fabinyi & Liu,
441 2014; Shipway et al., 2024).

442 The limited appearance of roe, skin, and bones within the recipe dataset, at just 8%, likely
443 reflects consumer attitudes towards these parts which are often discarded or undervalued
444 (Desai et al., 2022; WEF, 2023). Unfortunately, the contemporary food landscape is riddled
445 with ultra-processed foods that lack these components, and they are typically deemed as
446 inconvenient and unappealing, particularly to younger demographics (Egolf et al., 2018;
447 Rhys-Taylor, 2013; Schifferstein et al., 2023; Spence, 2018; Sukkhown et al., 2019).

448 However, there is a growing trend towards utilising these parts to prevent food waste and
449 promote ingredients that are fit for human consumption (Cardinaals et al., 2022; WEF, 2023).

450 Our study also suggests that products including fish skin may have the most potential to be
451 included in new products which use these less desired parts, given fish skin recipes made up
452 over 60% of the non-fillet or whole fish recipes. There are still challenges to overcome, such
453 as unfamiliarity with preparation methods, cultural biases, and perceived issues with taste or
454 texture issues (Carlucci et al., 2015; Egolf et al., 2018; Sophie Govzman et al., 2020).

455 Educational campaigns and programmes, alongside recipe innovations, can play a pivotal role
456 in overcoming these hurdles and promote a more positive perception and understanding of
457 under-loved seafood parts (Dreger-Smylie, 2021; Karnad et al., 2021; Musarskaya et al.,
458 2018; Warner et al., 2019).

459 ***5.3. Cod is popular despite typically more complex recipes.***

460 Despite initial assumptions that recipes with the Big Five species would be simple and thus
461 broadly appealing, the findings reveal an unexpected result. Notably, cod recipes are some of
462 the most intricate in terms of ingredient count, recipe length, and preparation steps.
463 Nevertheless, the founded complexity does not deter its consumption. Instead, the UK's long-
464 standing familiarity with cod seemingly encourages individuals to engage with more intricate
465 recipes, signifying a level of comfort with complexity when it involves a well-known seafood
466 (Garrett & Hatton, 2020). Cod has deep cultural roots in British cuisine, often featured in
467 tradition dishes like fish and chips. Its rooted position in culinary traditions presents an
468 appealing challenge to those interested in more sophisticated techniques, attracting practiced
469 home-cooks and those eager to try traditional cooking (Garrett & Hatton, 2020; Kurlansky,
470 2011). It can be suggested that the familiarity and accessibility of cod temper the perceived
471 complexity. Meanwhile, a combination of a Big Five species and Non-Big Five species -
472 Tuna and Oily Fish - share simplicity in terms of recipes, albeit both are categorised as oily
473 fish types known for their omega-3 content, among many other nutritional benefits. Such
474 simplicity presents an excellent opportunity for potential educational campaigns to diversify
475 seafood consumption. Furthermore, the latter would align with health advisories, such as
476 those from the NHS, which highly recommend including oily fish in meals due to its high
477 omega-3 content. Introducing the simplicity of preparing such seafood into public health
478 campaigns could effectively boost consumption, leveraging the established trust in various
479 national guidelines to transition the dietary habit that is more diverse (Madsen, 2020;
480 Monteiro et al., 2018; NHS, 2023; Prescott & Logan, 2019; Whitmee et al., 2015b).

481 **4. Implications**

482 This research offers new insights into the representation of seafood species and cuts in online
483 food content. It indicates that while the Big Five species remain predominant in the UK

484 recipe landscape, accounting for more than half of the recipes analysed, the growing presence
485 of non-Big Five species—making up 45% of recipes—is nonetheless noteworthy. This
486 suggests that there may be viable options for diversifying seafood consumption, providing
487 opportunities for consumers to explore alternative species. The study further contributes to a
488 broader understanding of how media, particularly recipe websites, can influence food choices
489 and dietary behaviours in the digital age. It highlights the enduring role of these platforms,
490 which offer abundant and accessible recipes, and, thus shaping consumer expectations and
491 expanding knowledge about seafood options. By focusing on where the representation of
492 non-Big Five species lies, this research also underscores the potential for recipe websites to
493 foster culinary diversity and promote sustainability, suggesting that they could be a powerful
494 tool in driving change and encouraging consumers to try alternative seafood options.

495 The outcomes of the study emphasise the potential need to showcase a broader selection of
496 species. Online recipe websites, along with other mediums such as social media platforms
497 (not part of the study but an area to be explored in future), could help raise consumer
498 awareness about the nutritional and environmental benefits of less commonly consumed
499 seafood, encouraging more sustainable and inclusive food choices. Furthermore, the findings
500 suggest that by increasing the visibility of these underutilised species and parts, recipe
501 websites could help address the challenges associated with overfishing and over-reliance on a
502 narrow selection of species. This shift towards diversifying seafood consumption may also
503 enhance the culinary experience by introducing new flavours and textures, potentially
504 supporting consumer health and environmental sustainability.

505 This study raises several questions that call for further investigation, such as how the
506 increased representation of non-Big Five species in online recipes might influence consumer
507 habits and whether factors beyond recipe complexity, such as social media trends or

508 influencer-driven content, play a role in encouraging the adoption of more diverse seafood
509 options. Furthermore, exploring how demographic factors, including age, income, age, and
510 geography, affect consumer engagement with sustainable seafood choices could provide
511 valuable insights. Finally, future research could also examine the effectiveness of educational
512 campaigns or collaborations with popular social media platforms towards shifting consumer
513 preferences, effectively fostering a more sustainable and diverse seafood culture.

514 **6. Conclusion**

515 This study explored the dynamic and ever-expanding digital culinary landscape (Herrera,
516 2021), exploring the diversity and complexity of online seafood recipes (Kāle & Agbozo,
517 2021; Natali et al., 2022). By aligning recipe representation with prevailing consumption
518 patterns, it stressed the important influence of online platforms and cultural preferences on
519 dietary choices. We highlight that there is a risk of marginalising a broad spectrum of seafood
520 options, particularly those less known yet nutritionally valuable and with lesser
521 environmental impact (Willer & Aldridge, 2023b). This emphasises the necessity for a more
522 deliberate and inclusive approach in curating digital culinary content, aiming to broaden the
523 culinary dialogue to include underrepresented seafood varieties and promote a richer, more
524 sustainable dietary culture (Greenberg, 2010, 2019, 2021).

525 Online resources and social media can be a crucial platform for education and the
526 encouragement of diversifying seafood consumption (Dreger-Smylie, 2021; Holt et al., 2018;
527 Power, 2021). This study underscored the capacity of digital content to influence sustainable
528 and diverse consumption practices (Dale et al., 2021; Anna K Farmery et al., 2020; Rokicki et
529 al., 2018). By further leveraging the power of online platforms and social media, we present a
530 new opportunity to foster educational initiatives that inspire curiosity and experimentation
531 with new seafood varieties, ultimately guiding public dietary trends towards sustainability

532 and greater appreciation of the rich array of seafood available, particularly those from UK
533 waters (Abbate et al., 2023; Marvin et al., 2022; Rosário & Dias, 2022).

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539 **7. Declaration of Interest Statement**

540 The authors declare no conflict of interest.

541 **8. References**

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1059 **8. Appendices**

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1061 **Appendix 1. Seafood recipe categorisation for determining distribution of seafood types**

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Website	Cod	Haddock	Shrimp & Prawn	Salmon	Tuna
BBC Co UK	11.53%	6.50%	6.75%	12.15%	2.21%
BBC Good Food	5.47%	7.20%	17.14%	25.34%	7.95%
Delicious Magazine	5.98%	6.64%	18.31%	19.64%	4.55%
Food52	3.00%	0.43%	23.50%	19.34%	7.56%
Great British Chefs	13.14%	3.02%	8.14%	16.74%	2.21%
Happy Foodie Co UK	0.93%	0.47%	37.38%	38.79%	0.47%
Jamie Oliver	2.81%	3.37%	12.36%	25.00%	8.43%
Taste	0.25%	0.00%	31.02%	20.84%	4.09%
Tasty	7.61%	1.09%	28.26%	19.57%	5.43%
Tesco Real Foods	13.04%	5.51%	11.30%	15.65%	2.32%
BBC Good Food		15.03%	10.43%		11.43%
Delicious Magazine		15.65%	12.33%		16.89%
Food52		14.57%	6.87%		24.73%
Great British Chefs		23.14%	10.12%		23.49%
Happy Foodie Co UK		4.67%	0.93%		16.36%
Jamie Oliver		19.10%	10.67%		18.26%
Taste		25.81%	5.21%		12.78%
Tasty		10.87%		0.00%	27.17%
Tesco Real Foods		25.80%		18.84%	7.54%
BBC Co UK	6.2	5.1	0	0	0
BBC Good Food	1.6	1.6	0	0.5	0
Delicious Magazine	3.5	5.5	0	1	0
Food52	0	0	0	0	0
Great British Chefs	0.1	0.3	0.2	0	0
Happy Foodie Co UK	0	0	0	0	0
Jamie Oliver	0.8	0.1	0	0	0
Taste	0.2	0.1	0	0	0
Tasty	0	0	0	0	0
Tesco Real Foods	0	0	0	0	0
Total Count	12.40	12.70	0.20	1.50	0.50
Percentage	45%	47%	1%	5%	2%

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1079 **Appendix II. Comprehensive list of recipes and their associated complexity data**

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Website	Seafood ingredient	Ingredient s	Total Recipe Word Count	Steps Count
Great British Chefs	Salmon	26	448	8
Food52	Tuna	21	408	7
BBC Good Food	Prawn & Shrimp	14	118	2
Taste	Prawn & Shrimp	10	201	4
Jamie Oliver	Salmon	11	166	6
BBC Good Food	Cod	12	187	4
Food52	Prawn & Shrimp	10	201	4
Food52	Salmon	10	290	6
Food52	Salmon	12	173	9
Jamie Oliver	Prawn & Shrimp	25	405	10
Taste	Prawn & Shrimp	18	164	4
Delicious Magazine	Prawn & Shrimp	10	222	4
Jamie Oliver	Prawn & Shrimp	17	255	7
Jamie Oliver	Salmon	8	204	6
Food52	Prawn & Shrimp	7	194	4
BBC Good Food	Salmon	6	133	3
BBC Co UK	Haddock	18	502	12
BBC Co UK	Prawn & Shrimp	22	165	6
BBC Good Food	Salmon	4	123	1
BBC Co UK	Salmon	16	306	7
Food52	Prawn & Shrimp	19	243	6
BBC Good Food	Salmon	9	300	4
Food52	Prawn & Shrimp	15	333	8
Food52	Tuna	11	54	1
Food52	Tuna	16	395	6
BBC Co UK	Salmon	20	234	5
Food52	Cod	9	103	2
BBC Co UK	Haddock	13	320	11
BBC Co UK	Cod	10	131	5
Food52	Prawn & Shrimp	18	876	11
Food52	Salmon	8	148	2
Food52	Prawn & Shrimp	24	314	7
Great British Chefs	Prawn & Shrimp	45	941	17
Food52	Prawn & Shrimp	11	156	3
Food52	Prawn & Shrimp	24	651	6
Food52	Cod	17	369	6
Jamie Oliver	Salmon	16	412	10
BBC Good Food	Cod	14	336	5

Food52	Prawn & Shrimp	15	604	6
Happy Foodie Co UK	Salmon	12	423	5
Food52	Tuna	6	221	5
Food52	Tuna	7	137	2
BBC Good Food	Prawn & Shrimp	15	170	3
Food52	Prawn & Shrimp	7	75	3
Food52	Prawn & Shrimp	10	129	6
Delicious Magazine	Salmon	10	248	4
Food52	Prawn & Shrimp	13	584	8
Great British Chefs	Salmon	14	480	9
Food52	Salmon	12	206	7
Great British Chefs	Salmon	21	418	6
Delicious Magazine	Prawn & Shrimp	18	403	6
Delicious Magazine	Prawn & Shrimp	10	92	4
Food52	Cod	17	531	12
Delicious Magazine	Salmon	13	248	4
Happy Foodie Co UK	Salmon	8	176	3
Food52	Prawn & Shrimp	11	189	6
Delicious Magazine	Salmon	8	200	3
Delicious Magazine	Prawn & Shrimp	12	136	3
BBC Good Food	Salmon	8	185	4
Food52	Prawn & Shrimp	13	296	5
BBC Good Food	Tuna	7	64	2
Food52	Haddock	7	286	3
Food52	Prawn & Shrimp	8	312	3
BBC Good Food	Prawn & Shrimp	11	333	5
BBC Good Food	Tuna	7	137	2
Great British Chefs	Salmon	14	256	6
Food52	Prawn & Shrimp	8	277	7
Delicious Magazine	Haddock	17	186	5
Food52	Tuna	8	68	2
Happy Foodie Co UK	Prawn & Shrimp	20	277	4
BBC Good Food	Prawn & Shrimp	11	155	3
BBC Good Food	Tuna	15	250	5
Happy Foodie Co UK	Prawn & Shrimp	10	195	5
Happy Foodie Co UK	Tuna	12	373	2
Food52	Prawn & Shrimp	28	417	8
Taste	Salmon	11	130	4
Food52	Prawn & Shrimp	14	276	4
Delicious Magazine	Cod	9	206	4

Food52	Salmon	13	354	7
Taste	Prawn & Shrimp	10	125	4
Great British Chefs	Cod	24	510	10
Great British Chefs	Cod	18	349	9
Food52	Salmon	22	160	4
BBC Good Food	Prawn & Shrimp	14	175	3
Delicious Magazine	Haddock	12	201	5
Food52	Prawn & Shrimp	18	303	6
BBC Co UK	Haddock	16	251	5
Jamie Oliver	Salmon	10	220	8
Taste	Salmon	13	125	7
Food52	Salmon	11	331	6
Food52	Prawn & Shrimp	11	272	5
Food52	Cod	4	459	4
Happy Foodie Co				
UK	Salmon	20	375	7
Food52	Salmon	15	214	3
Food52	Salmon	9	145	3
Delicious Magazine	Salmon	6	127	3
Delicious Magazine	Salmon	13	293	7
Taste	Prawn & Shrimp	12	149	3
Delicious Magazine	Tuna	7	119	4
BBC Good Food	Tuna	8	152	3
Food52	Salmon	14	258	9
BBC Good Food	Prawn & Shrimp	3	94	1
Food52	Tuna	9	322	2
BBC Co UK	Cod	12	220	5
Food52	Tuna	11	108	5
Food52	Prawn & Shrimp	12	160	3
Delicious Magazine	Salmon	13	358	5
Happy Foodie Co				
UK	Prawn & Shrimp	6	260	2
BBC Good Food	Tuna	9	141	3
Great British Chefs	Salmon	14	280	6
Great British Chefs	Salmon	45	856	17
Food52	Prawn & Shrimp	13	125	7
Jamie Oliver	Prawn & Shrimp	16	346	7
Taste	Prawn & Shrimp	17	208	4
Delicious Magazine	Salmon	11	162	4
Delicious Magazine	Salmon	10	306	4
BBC Co UK	Prawn & Shrimp	13	328	3
Food52	Salmon	12	401	8
BBC Co UK	Cod	11	265	4
Happy Foodie Co	Salmon	10	323	7

UK

Great British Chefs	Cod	27	767	14
Food52	Salmon	9	199	4
Food52	Prawn & Shrimp	23	618	4
Food52	Salmon	10	175	8
Food52	Tuna	20	449	7
BBC Good Food	Salmon	15	136	3
Food52	Prawn & Shrimp	13	392	7
BBC Good Food	Haddock	16	282	5
Delicious Magazine	Tuna	12	189	3
Delicious Magazine	Tuna	5	148	3
Taste	Salmon	8	214	4
BBC Co UK	Haddock	13	108	7
Delicious Magazine	Salmon	10	149	5
Delicious Magazine	Prawn & Shrimp	8	153	4
Great British Chefs	Tuna	12	592	10
Jamie Oliver	Prawn & Shrimp	12	193	8
BBC Co UK	Salmon	11	137	4
Food52	Prawn & Shrimp	11	93	3
BBC Good Food	Tuna	7	83	2
Jamie Oliver	Salmon	22	316	11
Food52	Salmon	10	264	3
Food52	Salmon	10	387	8
Delicious Magazine	Salmon	11	181	3
BBC Good Food	Salmon	9	155	3
Delicious Magazine	Haddock	9	159	3
Food52	Tuna	7	179	3
Food52	Prawn & Shrimp	12	571	8
Great British Chefs	Salmon	13	254	4
Food52	Prawn & Shrimp	14	275	7
Food52	Haddock	11	395	10
Happy Foodie Co				
UK	Prawn & Shrimp	13	212	5
BBC Good Food	Salmon	7	151	2
BBC Co UK	Salmon	10	188	6
Food52	Prawn & Shrimp	24	257	8
BBC Good Food	Salmon	8	106	3
BBC Co UK	Cod	17	402	8
Delicious Magazine	Tuna	9	244	4
Food52	Prawn & Shrimp	10	269	4
BBC Good Food	Tuna	12	255	4
Food52	Cod	8	55	4
Food52	Salmon	9	217	4
Delicious Magazine	Salmon	10	172	4

Food52	Salmon	14	261	9
BBC Co UK	Cod	17	417	10
Delicious Magazine	Prawn & Shrimp	11	221	5
Food52	Salmon	16	263	7
Food52	Prawn & Shrimp	10	53	1
Happy Foodie Co UK	Salmon	14	186	3
BBC Good Food	Cod	8	182	2
BBC Co UK	Haddock	10	195	5
BBC Good Food	Prawn & Shrimp	10	107	2
Food52	Salmon	5	256	6
Delicious Magazine	Cod	12	219	4
Food52	Tuna	13	139	4
Food52	Prawn & Shrimp	18	138	4
Taste	Salmon	7	105	3
Food52	Salmon	12	299	13
Great British Chefs	Salmon	12	512	12
Jamie Oliver	Salmon	10	495	18
Food52	Prawn & Shrimp	14	257	10
Delicious Magazine	Prawn & Shrimp	14	316	6
BBC Good Food	Salmon	8	134	2
BBC Co UK	Haddock	15	359	8
Jamie Oliver	Tuna	15	250	9
Food52	Prawn & Shrimp	11	165	4
Jamie Oliver	Salmon	9	221	2
Food52	Prawn & Shrimp	10	140	6
Jamie Oliver	Salmon	9	200	5
Jamie Oliver	Salmon	8	188	8
BBC Good Food	Tuna	12	332	7
Food52	Salmon	10	233	12
Food52	Prawn & Shrimp	15	359	5
Jamie Oliver	Cod	13	574	12
BBC Co UK	Cod	17	485	16
Happy Foodie Co UK	Prawn & Shrimp	10	219	4
Food52	Prawn & Shrimp	13	292	6
Food52	Salmon	9	200	2
BBC Good Food	Salmon	10	184	3
BBC Co UK	Haddock	13	234	6
Great British Chefs	Cod	16	297	6
Food52	Prawn & Shrimp	21	493	3
Delicious Magazine	Salmon	6	97	4
BBC Co UK	Salmon	18	283	8
BBC Good Food	Salmon	14	317	4

Food52	Tuna	7	126	5
Food52	Salmon	15	672	17
Jamie Oliver	Salmon	8	166	6
Food52	Prawn & Shrimp	14	227	1
Food52	Salmon	6	37	1
Food52	Prawn & Shrimp	14	273	3
Food52	Prawn & Shrimp	14	345	8
Delicious Magazine	Haddock	12	149	3
BBC Good Food	Prawn & Shrimp	14	150	2
BBC Co UK	Salmon	17	262	6
Food52	Prawn & Shrimp	16	128	4
Happy Foodie Co UK	Prawn & Shrimp	15	628	9
Delicious Magazine	Prawn & Shrimp	12	241	4
Happy Foodie Co UK	Prawn & Shrimp	20	217	7
Food52	Prawn & Shrimp	14	452	6
BBC Co UK	Cod	13	156	8
Taste	Prawn & Shrimp	11	92	3
Food52	Salmon	6	137	2
Great British Chefs	Salmon	19	258	6
Delicious Magazine	Prawn & Shrimp	6	96	3
Great British Chefs	Cod	27	665	13
Great British Chefs	Tuna	10	132	4
Food52	Prawn & Shrimp	11	96	2
BBC Co UK	Cod	9	168	4
Food52	Prawn & Shrimp	11	410	3
Taste	Prawn & Shrimp	9	118	5
Great British Chefs	Cod	16	523	11
Taste	Salmon	12	112	4
Delicious Magazine	Tuna	20	286	6
BBC Co UK	Salmon	18	603	11
Happy Foodie Co UK	Salmon	10	389	7
Food52	Salmon	12	159	5
Food52	Salmon	5	181	3
Food52	Prawn & Shrimp	10	398	6
Food52	Prawn & Shrimp	5	54	1
Happy Foodie Co UK	Salmon	15	362	5
Taste	Prawn & Shrimp	5	51	2
Food52	Prawn & Shrimp	11	410	4
Food52	Prawn & Shrimp	17	446	9
Food52	Salmon	8	234	6
Food52	Tuna	16	99	5

Food52	Prawn & Shrimp	12	299	13
Great British Chefs	Cod	15	356	10
Delicious Magazine	Prawn & Shrimp	10	143	2
Great British Chefs	Prawn & Shrimp	13	202	4
Great British Chefs	Cod	13	199	5
Food52	Salmon	6	211	3
Jamie Oliver	Salmon	5	181	7
Jamie Oliver	Tuna	11	265	4
Food52	Salmon	20	118	4
Food52	Salmon	9	145	3
BBC Good Food	Prawn & Shrimp	11	136	2
Great British Chefs	Salmon	11	518	9
Food52	Prawn & Shrimp	9	185	5
Jamie Oliver	Salmon	5	162	4
Taste	Salmon	7	168	4
BBC Good Food	Prawn & Shrimp	9	94	2
Food52	Prawn & Shrimp	14	174	4
Food52	Salmon	7	68	1
Food52	Prawn & Shrimp	17	127	5
Delicious Magazine	Salmon	9	106	2
Food52	Tuna	9	195	5
Food52	Prawn & Shrimp	12	101	6
BBC Co UK	Cod	13	204	4
Delicious Magazine	Salmon	9	81	3
Food52	Salmon	8	134	1
Taste	Prawn & Shrimp	6	134	5
Jamie Oliver	Salmon	13	200	6
Food52	Tuna	7	302	4
Food52	Prawn & Shrimp	5	135	1
BBC Co UK	Salmon	24	231	4
BBC Co UK	Prawn & Shrimp	16	345	8
Food52	Prawn & Shrimp	14	126	4
Food52	Salmon	9	124	2
BBC Good Food	Haddock	8	214	4
BBC Co UK	Prawn & Shrimp	18	162	6
BBC Good Food	Prawn & Shrimp	15	154	2
BBC Co UK	Cod	23	177	6
Food52	Prawn & Shrimp	7	106	2
Delicious Magazine	Prawn & Shrimp	11	175	3
BBC Co UK	Salmon	13	231	4
Taste	Prawn & Shrimp	12	137	3
BBC Co UK	Prawn & Shrimp	10	249	6
Food52	Salmon	10	83	5
Delicious Magazine	Prawn & Shrimp	11	165	4

Food52	Salmon	12	439	12
Food52	Salmon	6	170	4
Food52	Prawn & Shrimp	11	295	9
Food52	Cod	16	290	8
Food52	Tuna	12	116	4
Great British Chefs	Salmon	23	528	12
Happy Foodie Co UK	Prawn & Shrimp	19	384	6
Happy Foodie Co UK	Salmon	8	190	2
Food52	Prawn & Shrimp	7	291	8
Food52	Prawn & Shrimp	18	210	7
Taste	Salmon	11	174	4
Delicious Magazine	Salmon	13	313	5
BBC Good Food	Salmon	8	280	4
Food52	Prawn & Shrimp	4	404	3
BBC Good Food	Haddock	13	448	4
BBC Co UK	Salmon	17	226	3
Food52	Prawn & Shrimp	13	159	6
BBC Good Food	Salmon	13	456	8
Taste	Prawn & Shrimp	11	145	4
BBC Co UK	Haddock	10	119	6
Jamie Oliver	Prawn & Shrimp	10	245	9
Food52	Salmon	12	245	4
BBC Good Food	Salmon	15	461	5
BBC Good Food	Prawn & Shrimp	13	164	2
Happy Foodie Co UK	Salmon	16	331	8
Delicious Magazine	Haddock	7	283	4
Delicious Magazine	Salmon	10	172	3
Taste	Prawn & Shrimp	8	104	4
Delicious Magazine	Salmon	9	205	5
Great British Chefs	Salmon	18	390	8
Delicious Magazine	Prawn & Shrimp	6	90	3
Delicious Magazine	Prawn & Shrimp	14	322	4
Food52	Prawn & Shrimp	13	379	7
BBC Co UK	Haddock	9	143	6
BBC Good Food	Haddock	8	161	2
Great British Chefs	Prawn & Shrimp	20	144	6
Great British Chefs	Cod	11	269	4
Happy Foodie Co UK	Salmon	5	154	5
BBC Co UK	Salmon	10	127	5
Delicious Magazine	Haddock	12	148	3
Food52	Salmon	20	250	4

Food52	Salmon	9	182	3
BBC Co UK	Cod	22	308	9
Food52	Prawn & Shrimp	16	233	7
Food52	Prawn & Shrimp	21	710	19
Delicious Magazine	Cod	10	208	4
Food52	Haddock	19	249	6
Delicious Magazine	Haddock	13	205	3
Delicious Magazine	Prawn & Shrimp	8	117	4
Great British Chefs	Salmon	9	200	6
Food52	Salmon	9	164	4
Food52	Salmon	8	244	5
BBC Good Food	Salmon	9	158	2
Food52	Prawn & Shrimp	7	407	11
Food52	Salmon	14	204	4
Taste	Prawn & Shrimp	12	169	5
Happy Foodie Co UK	Salmon	13	159	5
Food52	Prawn & Shrimp	23	652	15
Delicious Magazine	Prawn & Shrimp	14	246	5
Food52	Tuna	11	662	14
Delicious Magazine	Salmon	9	222	6
Food52	Prawn & Shrimp	8	209	5
Great British Chefs	Prawn & Shrimp	15	326	5
Jamie Oliver	Prawn & Shrimp	4	65	3
Delicious Magazine	Prawn & Shrimp	7	115	2
Food52	Prawn & Shrimp	15	322	4
BBC Good Food	Tuna	7	108	2
BBC Co UK	Salmon	12	175	8
Food52	Prawn & Shrimp	10	1495	7
BBC Good Food	Prawn & Shrimp	12	150	3
Jamie Oliver	Salmon	10	402	11
BBC Good Food	Prawn & Shrimp	5	84	2
Taste	Salmon	10	122	3
BBC Co UK	Cod	16	222	6
BBC Co UK	Salmon	18	393	7
Food52	Cod	10	156	4
Food52	Tuna	7	170	3
Taste	Prawn & Shrimp	8	68	2
Food52	Salmon	8	113	5
BBC Good Food	Salmon	9	89	1
Delicious Magazine	Cod	12	227	4
BBC Good Food	Haddock	16	257	3
Food52	Prawn & Shrimp	14	282	4
Food52	Salmon	10	240	2

BBC Good Food	Tuna	10	182	3
Delicious Magazine	Prawn & Shrimp	9	139	2
Food52	Prawn & Shrimp	20	250	6
Jamie Oliver	Salmon	15	342	7
Food52	Salmon	10	179	4
Great British Chefs	Cod	17	432	8
Taste	Prawn & Shrimp	9	109	3
Delicious Magazine	Salmon	7	139	4
Great British Chefs	Salmon	23	909	20
Taste	Salmon	14	233	5
Food52	Salmon	4	161	5
Food52	Salmon	12	181	6
Delicious Magazine	Salmon	10	159	4
Happy Foodie Co				
UK	Salmon	11	282	5
Food52	Salmon	11	257	4
Great British Chefs	Cod	15	521	11
Jamie Oliver	Tuna	21	429	11
Food52	Tuna	9	444	5
BBC Co UK	Salmon	9	260	7
Food52	Salmon	11	117	3
Food52	Salmon	12	224	7
Jamie Oliver	Tuna	13	409	3
BBC Good Food	Prawn & Shrimp	10	138	3
BBC Good Food	Salmon	11	164	2
Taste	Prawn & Shrimp	11	132	3
Jamie Oliver	Haddock	14	430	11
Delicious Magazine	Prawn & Shrimp	19	222	4
Food52	Tuna	19	435	5
Food52	Cod	20	652	7
Great British Chefs	Prawn & Shrimp	10	279	4
Great British Chefs	Prawn & Shrimp	13	561	13
Great British Chefs	Cod	24	496	7
Delicious Magazine	Salmon	4	174	3
BBC Good Food	Salmon	15	161	3
BBC Good Food	Prawn & Shrimp	5	87	2
BBC Good Food	Haddock	10	227	3
BBC Good Food	Cod	22	202	3
BBC Co UK	Salmon	9	226	8
Food52	Prawn & Shrimp	7	197	8
BBC Good Food	Prawn & Shrimp	8	123	2
Happy Foodie Co				
UK	Salmon	20	495	8
Great British Chefs	Haddock	15	262	7

Food52	Prawn & Shrimp	11	97	1
Food52	Salmon	7	47	5
Food52	Salmon	8	153	9
BBC Co UK	Prawn & Shrimp	32	200	5
Food52	Tuna	10	132	2
Delicious Magazine	Prawn & Shrimp	12	124	3
Taste	Prawn & Shrimp	15	172	5
Food52	Prawn & Shrimp	11	150	3
Food52	Tuna	10	98	2
Great British Chefs	Cod	14	325	10
BBC Co UK	Prawn & Shrimp	14	234	7
Taste	Prawn & Shrimp	21	263	6
Jamie Oliver	Salmon	12	193	6
Jamie Oliver	Tuna	5	142	6
Delicious Magazine	Prawn & Shrimp	13	136	2
Food52	Other Shellfish	14	366	5
Delicious Magazine	Other Shellfish	11	285	4
Delicious Magazine	Other White Fish	8	143	5
Delicious Magazine	Other Oily Fish	9	86	3
BBC Co UK	Other White Fish	9	169	11
BBC Good Food	Other White Fish	9	198	3
Delicious Magazine	Other Shellfish	9	137	4
BBC Good Food	Other Shellfish	22	215	4
Food52	Other Oily Fish	10	359	4
Food52	Other Shellfish	11	419	9
Food52	Other Shellfish	23	159	5
Food52	Other Shellfish	12	364	4
Food52	Other Shellfish	18	691	4
Taste	Other White Fish	10	260	6
Food52	Other Shellfish	11	540	8
Tesco Real Foods	Other Shellfish	10	191	4
Delicious Magazine	Other Shellfish	13	279	6
Food52	Other White Fish	7	387	6
Jamie Oliver	Other Oily Fish	5	44	4
Delicious Magazine	Other Oily Fish	12	142	3
Taste	Other White Fish	12	155	3
Food52	Other Shellfish	10	193	3
Delicious Magazine	Other White Fish	10	409	4
Delicious Magazine	Other Oily Fish	9	161	3
BBC Good Food	Other White Fish	16	258	4
BBC Co UK	Other White Fish	7	232	3
BBC Good Food	Other White Fish	11	182	3

BBC Co UK	Other White Fish	17	271	8
BBC Co UK	Other White Fish	12	166	7
Delicious Magazine	Other Oily Fish	11	171	4
Food52	Other White Fish	10	385	3
BBC Co UK	Other White Fish	23	259	6
Food52	Other Shellfish	14	161	5
Food52	Other Shellfish	15	590	9
Tesco Real Foods	Other White Fish	6	68	3
Food52	Other Shellfish	11	192	5
Taste	Other Shellfish	7	102	2
BBC Co UK	Other Shellfish	8	220	11
Delicious Magazine	Other Oily Fish	10	224	3
Delicious Magazine	Other Shellfish	14	468	7
BBC Co UK	Other White Fish	24	450	10
Food52	Other White Fish	13	135	3
Delicious Magazine	Other White Fish	11	163	3
Taste	Other White Fish	11	109	3
Food52	Other Shellfish	11	125	7
Tesco Real Foods	Other Oily Fish	9	172	4
Tesco Real Foods	Other White Fish	10	193	5
BBC Good Food	Other Oily Fish	9	121	3
Delicious Magazine	Other Shellfish	7	171	3
BBC Co UK	Other Shellfish	17	266	8
BBC Co UK	Other White Fish	14	235	7
Food52	Other White Fish	10	407	4
Food52	Other Shellfish	11	298	5
Food52	Other White Fish	9	236	8
Happy Foodie Co UK	Other White Fish	15	397	7
Delicious Magazine	Other Oily Fish	12	159	4
Taste	Other White Fish	13	182	3
Great British Chefs	Other Shellfish	15	433	9
Taste	Other White Fish	13	247	7
BBC Co UK	Other White Fish	38	302	5
Food52	Other White Fish	10	443	8
Delicious Magazine	Other White Fish	13	237	5
Great British Chefs	Other Shellfish	10	377	13
Food52	Other White Fish	13	214	5
Delicious Magazine	Other Oily Fish	20	339	9
Jamie Oliver	Other Shellfish	12	419	6
Food52	Other White Fish	5	166	6

BBC Co UK	Other White Fish	13	456	8
Food52	Other Shellfish	7	148	1
Tesco Real Foods	Other Oily Fish	8	194	3
Food52	Other Shellfish	11	139	5
BBC Good Food	Other Shellfish	10	148	3
Delicious Magazine	Other Shellfish	8	66	2
Food52	Other White Fish	7	126	5
Food52	Other White Fish	13	634	17
Taste	Other White Fish	16	177	5
Delicious Magazine	Other White Fish	8	114	3
Delicious Magazine	Other White Fish	15	584	8
Food52	Other Shellfish	12	205	5
Taste	Other Shellfish	6	124	3
Great British Chefs	Other White Fish	13	260	6
Great British Chefs	Other White Fish	17	246	5
Food52	Other Oily Fish	6	425	8
Delicious Magazine	Other White Fish	12	290	4
Food52	Other White Fish	10	178	5
Tesco Real Foods	Other Oily Fish	10	127	3
Great British Chefs	Other White Fish	7	218	5
Taste	Other Shellfish	20	295	5
Food52	Other Shellfish	5	291	7
BBC Co UK	Other White Fish	11	135	4
Food52	Other White Fish	12	245	4
Great British Chefs	Other White Fish	10	215	7
BBC Co UK	Other White Fish	8	180	6
Tasty	Other Shellfish	8	118	5
Great British Chefs	Other Shellfish	33	654	12
Delicious Magazine	Other White Fish	7	164	4
Delicious Magazine	Other Shellfish	11	237	3
BBC Good Food	Other Oily Fish	15	191	3
BBC Co UK	Other Oily Fish	9	157	2
Food52	Other Oily Fish	9	150	3
Delicious Magazine	Other Oily Fish	12	223	4
Tesco Real Foods	Other Shellfish	14	105	2
Great British Chefs	Other Shellfish	14	296	5
Great British Chefs	Other Shellfish	10	665	13
Food52	Other Oily Fish	15	350	10
BBC Good Food	Other White Fish	15	158	4
Great British Chefs	Other Oily Fish	11	306	6
Taste	Other White Fish	9	143	3

Food52	Other Shellfish	13	410	6
Tesco Real Foods	Other White Fish	9	119	2
Great British Chefs	Other Shellfish	8	193	10
BBC Good Food	Other Shellfish	12	156	2
Food52	Other Oily Fish	13	229	7
Delicious Magazine	Other White Fish	14	163	3
Tesco Real Foods	Other White Fish	14	266	6
Food52	Other White Fish	13	395	7
Great British Chefs	Other Shellfish	12	433	9
Delicious Magazine	Other White Fish	17	297	3
Delicious Magazine	Other White Fish	16	246	5
BBC Co UK	Other White Fish	10	174	2
Delicious Magazine	Other White Fish	17	224	3
Delicious Magazine	Other White Fish	11	434	6
Food52	Other Shellfish	9	94	3
BBC Good Food	Other Shellfish	9	141	2
Jamie Oliver	Other Shellfish	15	254	9
Great British Chefs	Other White Fish	13	252	5
Taste	Other White Fish	17	165	6
Great British Chefs	Other Shellfish	18	361	6
Tasty	Other Shellfish	8	49	3
Delicious Magazine	Other White Fish	30	49	4
Great British Chefs	Other Oily Fish	19	383	9
Taste	Other Shellfish	7	95	3
Food52	Other Shellfish	8	176	8
Food52	Other Shellfish	11	174	4
Great British Chefs	Other Shellfish	14	368	6
Great British Chefs	Other Shellfish	14	329	6
Delicious Magazine	Other White Fish	11	193	3
Great British Chefs	Other White Fish	13	225	6
Great British Chefs	Other Shellfish	23	607	20
Food52	Other Shellfish	8	776	5
Delicious Magazine	Other Shellfish	14	261	4
Food52	Other White Fish	7	376	8
Delicious Magazine	Other Oily Fish	12	156	4
BBC Good Food	Other Shellfish	8	218	3
Food52	Other Shellfish	21	608	9
Food52	Other White Fish	12	139	3
Tesco Real Foods	Other Oily Fish	9	244	4
Great British Chefs	Other Oily Fish	34	680	16
Taste	Other White Fish	18	129	4

Food52	Other Shellfish	10	329	8
Great British Chefs	Other White Fish	16	370	5
Taste	Other Oily Fish	7	82	3
Food52	Other Shellfish	13	298	6
BBC Co UK	Other White Fish	21	375	9
Food52	Other White Fish	11	339	3
Food52	Other Shellfish	24	757	9
Great British Chefs	Other Shellfish	49	741	18
Taste	Other White Fish	14	145	4
Great British Chefs	Other Shellfish	9	329	7
Food52	Other White Fish	14	367	10
Food52	Other Shellfish	10	194	2
BBC Co UK	Other White Fish	25	269	11
Food52	Other White Fish	9	113	2
Food52	Other Shellfish	11	113	3
Food52	Other White Fish	9	272	7
Food52	Other Shellfish	9	347	7
Delicious Magazine	Other White Fish	8	182	4
Taste	Other White Fish	19	183	5
Delicious Magazine	Other Shellfish	9	181	4
Delicious Magazine	Other Shellfish	7	145	4
Taste	Other White Fish	13	210	4
BBC Co UK	Other White Fish	11	256	4
BBC Good Food	Other Shellfish	5	116	2
BBC Co UK	Other Oily Fish	17	129	4
BBC Good Food	Other Shellfish	13	240	3
Taste	Other White Fish	9	189	4
Food52	Other White Fish	6	378	13
Jamie Oliver	Other Oily Fish	2	150	6
Food52	Other Shellfish	7	408	7
Food52	Other Shellfish	10	312	3
Food52	Other Shellfish	9	149	3
Food52	Other Oily Fish	7	77	2
Food52	Other Shellfish	10	254	3
Great British Chefs	Other White Fish	14	270	5
Food52	Other Oily Fish	12	358	15
Food52	Other Shellfish	14	544	14
BBC Co UK	Other White Fish	14	175	6
Happy Foodie Co				
UK	Other Shellfish	9	180	2
Jamie Oliver	Other Oily Fish	8	178	4

Food52	Other Shellfish	5	94	1
Great British Chefs	Other Oily Fish	12	297	6
Food52	Other White Fish	8	147	7
Delicious Magazine	Other Oily Fish	13	188	3
Food52	Other White Fish	10	353	8
Food52	Other Shellfish	19	305	5
Jamie Oliver	Other White Fish	15	274	4
Food52	Other Shellfish	17	66	2
BBC Co UK	Other Shellfish	16	390	13
Food52	Other Oily Fish	13	500	15
Food52	Other Shellfish	8	331	7
Delicious Magazine	Other Shellfish	25	224	5
Food52	Other Shellfish	14	305	5
Great British Chefs	Other Shellfish	18	374	9
Food52	Other Shellfish	10	390	4
Tesco Real Foods	Other White Fish	10	196	3
Food52	Other White Fish	10	135	4
Taste	Other White Fish	14	243	5
Great British Chefs	Other White Fish	22	427	7
Tasty	Other White Fish	7	472	6
Great British Chefs	Other White Fish	12	156	2
Food52	Other White Fish	13	221	2
Taste	Other Shellfish	12	95	2
Food52	Other Shellfish	6	196	5
Food52	Other Shellfish	11	1283	6
Food52	Other Shellfish	9	154	6
BBC Good Food	Other Oily Fish	8	52	1
Food52	Other White Fish	15	402	6
Food52	Other Shellfish	16	327	9
Food52	Other Shellfish	10	494	5
Jamie Oliver	Other White Fish	6	81	5
Food52	Other Shellfish	15	243	7
BBC Good Food	Other White Fish	12	114	2
BBC Good Food	Other Shellfish	5	69	2
BBC Co UK	Other White Fish	16	256	6
Food52	Other Shellfish	7	238	4
Delicious Magazine	Other Shellfish	13	195	4
BBC Good Food	Other Shellfish	10	424	6
Great British Chefs	Other Shellfish	20	336	5
Tesco Real Foods	Other Oily Fish	10	126	2
Food52	Other White Fish	18	212	4

Great British Chefs	Other Shellfish	5	240	5
Food52	Other Shellfish	13	318	5
Food52	Other White Fish	13	531	3
Delicious Magazine	Other Shellfish	6	84	2
Great British Chefs	Other White Fish	26	494	8
Great British Chefs	Other Shellfish	14	551	13
Tesco Real Foods	Other White Fish	12	203	4
Food52	Other Oily Fish	8	80	4
Food52	Other Shellfish	9	217	4
BBC Good Food	Other White Fish	10	47	2
BBC Good Food	Other White Fish	23	505	6
Great British Chefs	Other Shellfish	8	223	7
BBC Co UK	Other White Fish	4	88	7
Food52	Other Shellfish	13	239	6
Tesco Real Foods	Other Oily Fish	8	178	3
Food52	Other Oily Fish	8	311	3
Delicious Magazine	Other White Fish	15	125	2
BBC Co UK	Other White Fish	7	189	6
BBC Good Food	Other Oily Fish	15	291	5
BBC Co UK	Other Oily Fish	10	154	5
Food52	Other Oily Fish	7	243	6
Happy Foodie Co UK	Other Shellfish	32	485	7
Food52	Other White Fish	13	424	4
BBC Co UK	Other Shellfish	12	177	6
BBC Co UK	Other White Fish	18	391	11
BBC Good Food	Other Oily Fish	5	148	3
Jamie Oliver	Other White Fish	11	326	7
Food52	Other Oily Fish	6	280	3
Food52	Other Shellfish	32	268	4
Jamie Oliver	Other Shellfish	11	167	5
BBC Co UK	Other White Fish	11	87	3
Great British Chefs	Other White Fish	17	529	6
Taste	Other White Fish	13	186	5
Food52	Other Oily Fish	14	180	4
Delicious Magazine	Other Oily Fish	7	143	3
Food52	Other Oily Fish	10	359	4
BBC Co UK	Other White Fish	16	247	6
Taste	Other Shellfish	7	136	4
Food52	Other Shellfish	14	144	3
BBC Co UK	Other White Fish	18	327	8

Delicious Magazine	Other White Fish	8	316	3
BBC Good Food	Other White Fish	7	113	2
Delicious Magazine	Other Oily Fish	11	165	3
Delicious Magazine	Other Oily Fish	11	410	6
Jamie Oliver	Other White Fish	17	334	10
Great British Chefs	Other White Fish	9	214	4
Tesco Real Foods	Other Shellfish	6	162	3
BBC Co UK	Other White Fish	19	208	5
Food52	Other White Fish	10	278	3
Food52	Other Oily Fish	9	144	6
Tesco Real Foods	Other White Fish	9	211	5
Taste	Other White Fish	15	127	3
Food52	Other Shellfish	7	123	8
BBC Co UK	Other White Fish	16	168	2
Great British Chefs	Other White Fish	12	350	9
Delicious Magazine	Other White Fish	11	221	3
Food52	Other White Fish	18	533	8
Great British Chefs	Other White Fish	29	486	8
BBC Co UK	Other White Fish	16	260	6
Great British Chefs	Other Oily Fish	11	213	5
Delicious Magazine	Other Oily Fish	10	149	3
Great British Chefs	Other Oily Fish	20	423	9
Delicious Magazine	Other Shellfish	10	301	5
Food52	Other Shellfish	13	171	2
Delicious Magazine	Other Oily Fish	7	146	2
Food52	Other Shellfish	11	245	5
Great British Chefs	Other White Fish	17	398	7
BBC Co UK	Other White Fish	12	239	5
Food52	Other White Fish	18	243	5
BBC Good Food	Other Oily Fish	7	116	2
BBC Co UK	Other White Fish	30	476	18
BBC Good Food	Other White Fish	9	147	2
Great British Chefs	Other Shellfish	28	746	10
BBC Good Food	Other White Fish	7	142	2
Happy Foodie Co UK	Other Shellfish	8	281	3
Jamie Oliver	Other Oily Fish	13	397	11
BBC Co UK	Other Oily Fish	14	222	4
Food52	Other Oily Fish	5	69	1
Jamie Oliver	Other White Fish	9	301	5
BBC Good Food	Other Oily Fish	11	172	2

Taste	Other Shellfish	11	269	5
Food52	Other White Fish	20	321	6
Taste	Other Oily Fish	12	186	5
Delicious Magazine	Other Shellfish	13	391	6
Food52	Other White Fish	13	256	2
Delicious Magazine	Other Shellfish	6	153	3
Food52	Other Shellfish	12	116	2
BBC Good Food	Other Oily Fish	24	406	7
Food52	Other Shellfish	14	270	6
BBC Co UK	Other Oily Fish	19	200	5
Delicious Magazine	Other Oily Fish	14	265	4
Food52	Other Shellfish	17	155	8
Great British Chefs	Other White Fish	18	562	9
Taste	Other Oily Fish	8	72	3
Great British Chefs	Other Oily Fish	12	92	7
Delicious Magazine	Other Oily Fish	16	194	4
Food52	Other White Fish	10	118	4
Great British Chefs	Other Shellfish	10	198	5
Delicious Magazine	Other Shellfish	9	157	7
Food52	Other White Fish	13	182	4
Food52	Other Oily Fish	5	77	3
Food52	Other White Fish	12	199	3
Taste	Other White Fish	6	96	3
Jamie Oliver	Other Shellfish	15	358	9
Great British Chefs	Other Shellfish	22	325	7
Food52	Other Shellfish	19	470	7
Jamie Oliver	Other Oily Fish	15	359	8
BBC Good Food	Other Oily Fish	8	277	5
Food52	Other Shellfish	13	346	9
Food52	Other Shellfish	14	233	4
Food52	Other Oily Fish	12	427	8
Great British Chefs	Other Shellfish	25	362	9
Delicious Magazine	Other White Fish	9	310	6
Great British Chefs	Other Oily Fish	18	231	5
Jamie Oliver	Other White Fish	8	233	6
Great British Chefs	Other Shellfish	14	172	3
Taste	Other Oily Fish	10	45	3
Taste	Other Shellfish	13	67	3
Great British Chefs	Other Shellfish	16	302	5
Food52	Other Shellfish	7	59	3
BBC Co UK	Other White Fish	11	309	5

Food52	Other Oily Fish	16	377	9
BBC Good Food	Other Oily Fish	7	79	1
Delicious Magazine	Other Shellfish	9	162	4
BBC Co UK	Other White Fish	18	176	7
Happy Foodie Co UK	Other Shellfish	8	269	4
Taste	Other Shellfish	9	114	3
Food52	Other Shellfish	15	448	5
Jamie Oliver	Other Shellfish	12	351	7
BBC Co UK	Other White Fish	11	239	5
Great British Chefs	Other Shellfish	16	334	7
BBC Co UK	Other White Fish	8	120	4
Taste	Other White Fish	14	220	5
Delicious Magazine	Other Shellfish	10	333	4
Food52	Other Shellfish	19	207	5
Delicious Magazine	Other Shellfish	16	208	5
Tesco Real Foods	Other Shellfish	12	257	3
Taste	Other White Fish	11	118	4
BBC Co UK	Other White Fish	33	561	21
Jamie Oliver	Other White Fish	5	84	5
Food52	Other Shellfish	9	154	8
Delicious Magazine	Other White Fish	12	190	3
Taste	Other White Fish	14	142	3
Taste	Other White Fish	10	143	3
Food52	Other White Fish	9	198	4
Food52	Other Shellfish	11	458	3
Food52	Other Oily Fish	12	241	5
Jamie Oliver	Other Shellfish	10	296	3
Tasty	Other Shellfish	13	85	2
Food52	Other Shellfish	10	624	6
Delicious Magazine	Other White Fish	17	300	5
BBC Co UK	Other White Fish	11	243	4
Taste	Other White Fish	12	173	6
Food52	Other Shellfish	26	564	11
Food52	Other Shellfish	7	406	12
Food52	Other Shellfish	14	424	6
Great British Chefs	Other Oily Fish	15	344	9
Food52	Other Shellfish	14	628	6
Taste	Other Shellfish	12	151	4
Taste	Other White Fish	24	325	5
BBC Co UK	Other White Fish	10	385	7

BBC Good Food	Other White Fish	18	251	3
Food52	Other Oily Fish	6	84	1
Taste	Other White Fish	14	335	5
BBC Co UK	Other White Fish	27	624	6
Delicious Magazine	Other Shellfish	8	168	3
Food52	Other Shellfish	11	226	1
Great British Chefs	Other White Fish	25	841	15
BBC Good Food	Other Shellfish	6	238	4
Food52	Other Oily Fish	11	88	3
Taste	Other Shellfish	10	232	6
Food52	Other Shellfish	12	145	2
Great British Chefs	Other White Fish	9	312	6
Food52	Other Shellfish	7	142	4
Taste	Other White Fish	13	136	4
Food52	Other Shellfish	19	412	11
Delicious Magazine	Other Shellfish	8	135	2
Taste	Other Shellfish	11	155	3
Food52	Other Shellfish	14	245	3
Food52	Other Shellfish	23	698	4
BBC Good Food	Other White Fish	8	141	3
Food52	Other Shellfish	9	252	8
Food52	Other White Fish	12	195	5
BBC Good Food	Other Oily Fish	11	204	3
Taste	Other Oily Fish	12	220	5
BBC Co UK	Other White Fish	13	281	8
Jamie Oliver	Other Shellfish	16	328	9
Delicious Magazine	Other Shellfish	15	197	5
Food52	Other Oily Fish	8	259	4
Food52	Other Oily Fish	12	374	8
BBC Co UK	Other White Fish	21	277	8
Taste	Other Shellfish	14	120	3
Food52	Other White Fish	4	62	3
Food52	Other White Fish	13	300	5
Food52	Other Shellfish	11	268	3
Food52	Other Oily Fish	9	179	10
Taste	Other Oily Fish	12	115	3
Great British Chefs	Other White Fish	17	412	7
Food52	Other White Fish	17	183	9
Delicious Magazine	Other Shellfish	9	161	2

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1083 **Appendix 3. Descriptive Statistics, ANOVA (Analysis of Variance) with Tukey's**
 1084 **Honestly Significant Difference post-hoc tests for Recipe Complexity**

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Seafood Type	Mean	Median	Lower Quartile	Upper Quartile	Minimum	Maximum	Outliers
Cod	329	294	203	452	55	767	None
Haddock	251	234	174	285	108	502	502
Prawn & Shrimp	251	201	136	303	51	1495	1495, 941, 876, 710, 652, 651, 628, 618, 604, 584, 571, 561
Salmon	243	204	160	287	37	909	909, 856, 672, 603, 528, 518, 512, 495, 495, 480
Tuna	234	182	132	322	54	662	662
White Fish	258	234	166	324	47	841	841, 634, 624, 584, 562
Oily Fish	218	187	143	293	44	680	680
Shellfish	287	244	159	361	49	1283	1283, 776, 757, 746, 741, 698, 691
Seafood Type	Mean	Median	Lower Quartile	Upper Quartile	Minimum	Maximum	Outliers
Cod	15	15	11	17	4	27	27, 27
Haddock	12	13	10	15	7	19	None
Prawn & Shrimp	13	12	10	15	3	45	45, 23, 23, 24, 24, 28, 25, 32
Salmon	12	10	9	14	4	45	23, 23, 45, 26, 21, 22, 22, 24
Tuna	11	10	7	12	5	21	20, 20, 21, 21
White Fish	13	12	10	16	4	38	27, 33, 26, 29, 30, 38, 30
Oily Fish	11	11	8	13	2	34	34, 24
Shellfish	13	11	9	14	5	49	24, 28, 49, 23, 23, 33, 26, 32, 32, 25, 25

Seafood Type	Mean	Median	Lower Quartile	Upper Quartile	Minimum	Maximum	Outliers
Cod	7	6	4	10	2	16	None
Haddock	6	5	3	7	2	12	12
Prawn & Shrimp	5	4	3	6	1	19	17, 11, 19, 15, 13, 11, 13
Salmon	6	5	3	7	1	20	20, 17, 17, 18
Tuna	4	4	3	5	1	14	14, 10, 11, 9
White Fish	5	5	3	6	2	21	15, 17, 21, 18, 11, 13, 11, 11
Oily Fish	5	4	3	6	1	16	16, 15, 11, 15
Shellfish	5	5	3	7	1	20	18, 20, 14

Tukey HSD Results – Word Count by seafood type

ANOVA result: $F(7,852) = 3.373, p < 0.001$ (Statistically significant)

Seafood type - Comparison	Difference (diff)	Lover Bound (lwr)	Upper Bound (uwr)	Adjusted P-value (p adj)	Significant difference?
Haddock-Cod	-78.20	-193.36	36.97	0.4399731	No
Oily Fish-Cod	-110.98	-199.21	-22.74	0.0035458	Yes
Prawn & Shrimp-Cod	-77.60	-158.71	3.51	0.0724020	No
Salmon-Cod	-86.30	-167.30	-5.30	0.0273768	Yes
Shellfish-Cod	-42.41	-122.77	37.94	0.7481228	No
Tuna-Cod	-94.80	-194.97	5.37	0.0788509	No
White Fish-Cod	-71.43	-151.69	8.84	0.1227417	No
Oily Fish-Haddock	-32.78	-136.07	70.51	0.9792048	No
Prawn & Shrimp-Haddock	0.59	-96.68	97.87	1.0000000	No
Salmon-Haddock	-8.10	-105.28	89.08	0.9999967	No
Shellfish-Haddock	35.78	-60.87	132.43	0.9513491	No
Tuna-Haddock	-16.61	-130.26	97.05	0.9998469	No
White Fish-Haddock	6.77	-89.80	103.34	0.9999990	No
Prawn & Shrimp-Oily Fish	33.37	-29.74	96.49	0.7463176	No
Salmon-Oily Fish	24.68	-38.30	87.65	0.9346245	No
Shellfish-Oily Fish	68.56	6.41	130.71	0.0189079	Yes
Tuna-Oily Fish	16.17	-70.08	102.42	0.9991996	No
White Fish-Oily Fish	39.55	-22.48	101.58	0.5254788	No
Salmon-Prawn & Shrimp	-8.70	-61.23	43.83	0.9996473	No
Shellfish-Prawn & Shrimp	35.19	-16.35	86.72	0.4322648	No
Tuna-Prawn & Shrimp	-17.20	-96.15	61.74	0.9978897	No
White Fish-Prawn & Shrimp	6.17	-45.22	57.57	0.9999592	No
Shellfish-Salmon	43.89	-7.48	95.25	0.1586708	No
Tuna-Salmon	-8.50	-87.34	70.33	0.9999805	No
White Fish-Salmon	14.87	-36.35	66.09	0.9876106	No
Tuna-Shellfish	-52.39	-130.56	25.79	0.4578912	No
White Fish-Shellfish	-29.01	-79.21	21.19	0.6501040	No
White Fish-Tuna	23.38	-54.71	101.46	0.9851632	No

Tukey HSD Results – Ingredients by seafood type					
<i>ANOVA result: F (7,852) = 3.992, p <0.001 (Statistically significant)</i>					
Seafood type - Comparison	Difference (diff)	Lower Bound (lwr)	Upper Bound (upr)	Adjusted P-value (p adj)	Significant difference?
Haddock-Cod	-2.56	-6.56	1.45	0.5248	No
Oily Fish-Cod	-3.83	-6.90	-0.76	0.0039	Yes
Prawn & Shrimp-Cod	-1.99	-4.82	0.83	0.3855	No
Salmon-Cod	-3.40	-6.21	-0.58	0.0064	Yes
Shellfish-Cod	-2.35	-5.15	0.44	0.1725	No
Tuna-Cod	-4.07	-7.55	-0.58	0.0098	Yes
White Fish-Cod	-1.72	-4.52	1.07	0.5677	No
Oily Fish-Haddock	-1.28	-4.87	2.32	0.9608	No
Prawn & Shrimp-Haddock	0.56	-2.82	3.95	0.9996	No
Salmon-Haddock	-0.84	-4.22	2.54	0.9952	No
Shellfish-Haddock	0.20	-3.16	3.56	1.0000	No
Tuna-Haddock	-1.51	-5.46	2.44	0.9425	No
White Fish-Haddock	0.83	-2.53	4.19	0.9953	No
Prawn & Shrimp-Oily Fish	1.84	-0.36	4.04	0.1777	No
Salmon-Oily Fish	0.44	-1.75	2.63	0.9988	No
Shellfish-Oily Fish	1.48	-0.68	3.64	0.4299	No
Tuna-Oily Fish	-0.23	-3.23	2.77	1.0000	No
White Fish-Oily Fish	2.11	-0.05	4.27	0.0608	No
Salmon-Prawn & Shrimp	-1.40	-3.23	0.42	0.2772	No
Shellfish-Prawn & Shrimp	-0.36	-2.15	1.43	0.9987	No
Tuna-Prawn & Shrimp	-2.07	-4.82	0.67	0.2982	No
White Fish-Prawn & Shrimp	0.27	-1.52	2.06	0.9998	No
Shellfish-Salmon	1.04	-0.75	2.83	0.6398	No
Tuna-Salmon	-0.67	-3.41	2.07	0.9956	No
White Fish-Salmon	1.67	-0.11	3.45	0.0842	No
Tuna-Shellfish	-1.71	-4.43	1.01	0.5423	No
White Fish-Shellfish	0.63	-1.12	2.38	0.9574	No
White Fish-Tuna	2.34	-0.37	5.06	0.1499	No

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Tukey HSD Results – Steps by seafood type					
<i>ANOVA result: F (7, 852) = 2.943, p = 0.00473 (Statistically significant)</i>					
Seafood type - Comparison	Difference (diff)	Lower Bound (lwr)	Upper Bound (uwr)	Adjusted P-value (p adj)	Significant difference?
Haddock-Cod	-1.40	-3.67	0.87	0.5725	No
Oily Fish-Cod	-2.05	-3.79	-0.31	0.0088	Yes
Prawn & Shrimp-Cod	-1.95	-3.54	-0.35	0.0056	Yes
Salmon-Cod	-1.44	-3.04	0.15	0.1106	No
Shellfish-Cod	-1.46	-3.04	0.13	0.0971	No
Tuna-Cod	-2.51	-4.48	-0.53	0.0031	Yes
White Fish-Cod	-1.56	-3.14	0.03	0.0579	No
Oily Fish-Haddock	-0.65	-2.69	1.39	0.9784	No
Prawn & Shrimp-Haddock	-0.55	-2.47	1.37	0.9886	No
Salmon-Haddock	-0.05	-1.96	1.87	1.0000	No
Shellfish-Haddock	-0.06	-1.97	1.84	1.0000	No
Tuna-Haddock	-1.11	-3.35	1.13	0.8039	No
White Fish-Haddock	-0.16	-2.06	1.74	1.0000	No
Prawn & Shrimp-Oily Fish	0.10	-1.14	1.35	1.0000	No
Salmon-Oily Fish	0.60	-0.64	1.85	0.8182	No
Shellfish-Oily Fish	0.59	-0.64	1.81	0.8275	No
Tuna-Oily Fish	-0.46	-2.16	1.24	0.9919	No
White Fish-Oily Fish	0.49	-0.73	1.71	0.9254	No
Salmon-Prawn & Shrimp	0.50	-0.53	1.54	0.8202	No
Shellfish-Prawn & Shrimp	0.49	-0.53	1.50	0.8290	No
Tuna-Prawn & Shrimp	-0.56	-2.12	0.99	0.9574	No
White Fish-Prawn & Shrimp	0.39	-0.62	1.40	0.9402	No
Shellfish-Salmon	-0.02	-1.03	1.00	1.0000	No
Tuna-Salmon	-1.06	-2.62	0.49	0.4274	No
White Fish-Salmon	-0.11	-1.12	0.90	1.0000	No
Tuna-Shellfish	-1.05	-2.59	0.49	0.4356	No
White Fish-Shellfish	-0.10	-1.09	0.89	1.0000	No
White Fish-Tuna	0.95	-0.59	2.49	0.5656	No

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1103 **9. Tables and Figures**

Website	URL	Seafood recipes scraped	Seafood recipe site visits (2 years)
BBC Co UK	https://www.bbc.co.uk/food/recipes	816	299,994
BBC Good Food	https://www.bbcgoodfood.com/	805	350,335
Delicious Magazine	https://www.deliciousmagazine.co.uk/	1,054	450,655
Food52	https://food52.com/	2,766	1,234
Great British Chefs	https://www.greatbritishchefs.com/	860	16,605
Happy Foodie Co UK	https://thehappyfoodie.co.uk/	214	10,124
Jamie Oliver	https://www.jamieoliver.com/	356	123,503
Taste	https://www.taste.com.au/	806	17,414
Tasty	https://tasty.co/	92	451
Tesco Real Foods	https://realfood.tesco.com/	345	32,444
TOTAL	-	8,114	1,302,759

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1105 **Table 1. Websites, their URL and number of seafood content visits utilised for the study**
1106 **(covering September 2021 to 2023)**

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1108 **Figure 1**

1109 See attached file

1110

1111 **Figure 2**

1112 See attached file

1113

1114 **Figure 3**

1115 See attached file

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1117 **Figure 1. Percentage distribution of seafood types across websites.** The stacked bar chart
1118 displays the percentage of seafood recipes (x-axis) across the top ten most visited food
1119 websites in the UK (y-axis). The seafood recipes, including cod, haddock, prawn and shrimp,
1120 salmon, tuna, whitefish, oily fish, and shellfish, are indicated by distinct icons and colours. It
1121 is important to note that the percentages represent the relative distribution of each seafood
1122 type, remaining consistent despite adjustments based on visit counts.

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1124 **Figure 2. Distribution of seafood parts across websites.** The figure illustrates the adjusted
1125 percentage of recipes that specifically mention different seafood parts in their titles. These
1126 percentages reflect the distribution after considering user engagement through visit counts.

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1128 **Figure 3. The complexity of different seafood recipes.** The figure depicts the complexity of
1129 a subset of recipes that were collected randomly from the 8,144 recipes – 5% from the Big
1130 Five species and 5% from non-Big Five species, as determined by three metrics: (a) recipe
1131 word count, which depicts the total number of words used to describe the making of the

1132 seafood recipes within the website sources; (b) the number of ingredients which shows the
1133 total number of ingredients that were listed in the recipes, and the (c) number of steps which
1134 is the extent of the instructions shown in the recipes as either bullet points or numbered items.
1135 It is important to note that the complexity metrics are influenced by the weighting applied
1136 based on user engagement with the recipes. The box plots show the distribution and central
1137 tendency of these factors for the different seafood types, with outliers indicated by dots.
1138 Seafood icons and colours correspond to the seafood type in the recipe (x axis).