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## 42 **Introduction**

43 Recent concerns over the increase in diet related chronic diseases including obesity (Ogden et al.,  
44 2014; Olshansky et al., 2005; Lim et al., 2013) have been partially attributed to a decrease in diet  
45 quality (Drewnowski et al., 2009; Eyre et al., 2004). A number of factors associated with the decline  
46 in diet quality include; snacking, increased consumption of take away and meals consumed outside  
47 the home environment as well as the increased consumption of convenience products (Zizza and Xu,  
48 2012; Moore et al, 2009; Monteiro et al., 2011; Wolfson and Bleich, 2015). These factors have also  
49 transformed the domestic meal preparation landscape where meals are prepared at home. Current  
50 trends show less time is spent in meal preparation, larger portions are served, less skills are used to  
51 prepare the meal and convenience products are being used in the majority of meals if not the entirety  
52 of the meal (Beck, 2007; Worsley et al., 2015; Steenhuis and Vermeer, 2009; Daniels and Glorieux,  
53 2015).

54 In response to this transformation in food preparation and the types of food products typically  
55 consumed there has been an increase in the number of nutrition intervention programmes more  
56 specifically cooking skills interventions (Reicks et al., 2014; McGowan et al., 2015). The desire for  
57 the population to return to home meal preparation has been highlighted as a significant concern  
58 throughout government policy, media, health professionals and in the academic literature (Jones et al.,  
59 2012; Caraher, Seeley, Wu, & Lloyd, 2013; Oliver, 2015; National Cancer Institute, 2016). While  
60 research has shown positive outcomes from home meal preparation including improved diet quality  
61 and weight reduction (Wolfson & Bleich, 2015; Chen, Meei-Shyuan, Yu-Hung, & Wahlqvist, 2012;  
62 McGowan et al., 2015; van der Horst, Brunner, & Siegrist, 2011) it has also been highlighted that the  
63 inclusion of convenience products in modern home meal preparation (Beck, 2007; Daniels and  
64 Glorieux, 2015), has negative dietary implications (Monteiro et al., 2011). Therefore caution should  
65 be exercised when discussing the merits of home meal preparation in the public domain. An  
66 awareness of the possible negative side effects of consuming convenience foods (typically those high  
67 in sugars, salt, fat and additives), including weight gain (van der Hoorst et al., 2011) and a possible  
68 link to an increased risk of autoimmune diseases must be highlighted (Lerner & Matthias, 2015).

69 Thus, what is needed is the encouragement to increase cooking ‘from scratch’ and the reduction in the  
70 use of convenience products (Lavelle et al., 2016), similar to the guidelines of other countries, such as  
71 Brazil, where one of the key recommendations is “*Always prefer natural or minimally processed*  
72 *foods and freshly made dishes and meals to ultra-processed products*” (Monteiro et al., 2015).

73 In general, the aim of the majority of the cooking interventions has been to improve diet quality  
74 through increasing cooking and food skills (McGowan et al., 2015) and not solely on cooking from  
75 scratch. However, studies have shown that those with higher levels of cooking skills are less likely to  
76 use many convenience products (Hartmann et al., 2013). Furthermore, some studies have shown an  
77 increased enjoyment in cooking, learning from simple and easily replicable recipes and increasing  
78 confidence help participants to engage with cooking more in their home environment, with a positive  
79 impact on diet quality (Caraher et al., 2013; Reicks et al., 2014; Stead et al., 2004; Hartmann et al.,  
80 2013; Hartman et al., 2013). In addition, Chapman-Novakofski and Karduck (2005), found a  
81 significant decrease in the perceived difficulty in meal preparation after partaking in a cooking  
82 intervention study with women.

83 Furthermore, despite the current interest in cooking skills interventions, many of the devised  
84 community or adult? programmes tend not to be underpinned by theoretical concepts (McGowan et  
85 al., 2015). Those that do, cite psychological theories, such as Social Cognitive Theory (SCT) and the  
86 Transtheoretical Model (Adam et al., 2015; ....) provide few details on how the theories informed?  
87 were operationalised or implemented during the planning of the intervention. Learning cooking skills  
88 is also addressed in the occupational therapeutic literature, where it is seen as a basic fundamental life  
89 skill needed for a satisfactory functioning life for people with disabilities (Graves et al., 2005;  
90 McGraw-Hunter et al., 2006). Here, Applied Behavioural Analysis, Systematic Instruction and  
91 Information Processing Theory (Graves et al., 2005; ...) are used in the interventions design. In  
92 educational settings, the teaching of cooking skills is frequently underpinned by Blooms Taxonomy  
93 (1956; Anderson et al., 2001 Fordyce-Voorhams work? ) which is based on three domains of learning:  
94 cognitive, affective and psychomotor. While there is overlap between these theories, for example  
95 relating to key techniques such as observation and modelling, the important techniques that provide

96 optimal learning of cooking skills remains unclear. In relation to this, Michie and colleagues (2013)  
97 developed a 40-item taxonomy of Behaviour Change Techniques (BCTs), for example, goal setting  
98 and provision of information. This taxonomy was created so that researchers could identify and repeat  
99 successful elements in interventions that target change in behaviours. This form of standardisation  
100 could be implemented within cooking interventions and enable the identification and replication of  
101 successful elements. Needs more description as to how it informed this work??

102

103 In light of this, this study designed and tested the efficacy of some commonly used BCT's in cooking  
104 interventions, through different instruction modes, to make a meal from scratch. In addition, the role  
105 played by enjoyment, confidence and perceived difficulty on intention to cook from scratch were  
106 explored. Fine but in terms of the above so how did Michie et al inform the intervention/study?

107

## 108 **Methods**

### 109 *Design and Sampling*

110 This research was a dual-site randomised controlled study conducted in Sligo (Republic of Ireland  
111 [ROI]) and Coleraine (Northern Ireland [NI], United Kingdom [UK]). A sample of young mothers (77  
112 participants in NI, 64 participants in ROI) were recruited by the market research company SMR as  
113 mothers remain the primary source for learning cooking skills (Lavelle et al., *under review*).  
114 Participants were eligible if they were between the ages of 20 to 39 years, had young children, were of  
115 a lower socioeconomic status, had no strict dietary requirements (such as lactose intolerant,  
116 vegetarian) and prepared meals more than twice a week using mainly prepared ingredients.  
117 Participant's incentive package for taking part in the study included a small financial gift as  
118 contribution for time and travel, a cookbook and a cooked meal to take home. Women were  
119 randomised after recruitment to one of four conditions (1) recipe card only [control condition]; (2)  
120 recipe card plus video modelling; (3) recipe card plus video prompting; (4) recipe card plus video  
121 elements. The four conditions were based on the most commonly found BCT's in cooking and food

122 skills interventions (See Table 1) (Hollywood et al., *under review*). The effects of the different BCTs  
123 (Michie et al., 2013), through different modes of instruction, on the intention to cook the meal again  
124 from scratch was investigated. Each condition offered a technique that could be used by a person  
125 when trying to learn to cook adding ecological validity. Participants were provided with cooking  
126 instructions on how to cook a lasagne from scratch based on one of four conditions within which the  
127 mode of instruction varied. Condition 1, was the control condition, where a recipe card with a picture,  
128 similar to a traditional cookbook was used. This condition addressed the technique provide instruction  
129 on how to perform behaviour (BCT 21). Condition 2 added video modelling to the recipe card, where  
130 participants watched a full demonstration of the meal being made on a tablet prior to starting the  
131 cooking task, this condition is similar to watching a meal being cooked on a TV programme.  
132 Condition 2 added BCT 22; Model or demonstrate the behaviour. In condition 3 video prompting,  
133 where participants watched a step by step instruction in a guided sequence while cooking the recipe,  
134 was added to the recipe card. This condition was similar to learning meal preparation in a school  
135 setting where a teacher would demonstrate skills in a step sequence and then the class would copy the  
136 teacher after each step. This condition included BCT's 21, 22 and BCT 9; set graded tasks. In the final  
137 condition the recipe card and the video elements were presented to the participants and they were told  
138 they had full control of viewing the video clips as and when they needed to while cooking the recipe.  
139 This was considered similar to current use of online videos including YouTube clips, where they can  
140 watch full videos, watch elements, replay or rewind. Condition 4 addressed all previous BCT's and  
141 BCT 26; behavioural practice/rehearsal. In the condition regardless of whether the participants  
142 watched the video elements or not, they were advised to 'practice.' All other aspects of the experiment  
143 (e.g. ingredients, equipment, allotted time and protocols, etc.) were controlled and kept identical in all  
144 four conditions and across both sites including the observers (two researchers attended all sessions  
145 across both locations to maintain consistency).

146 *[Insert Table 1]*

147 Ethical approval for this study was obtained from Queen's University Belfast Research Ethics  
148 Committee and research was conducted in accordance to the guidelines given in the Declaration of

149 Helsinki. All participants consented to partake in the study and were aware that they could withdraw  
150 at any point in the experiment.

### 151 *Procedure and Measures*

152 For the cooking experiment, participants were required to make a lasagne from basic or raw  
153 ingredients following the instructions given in their assigned condition, within an allocated time. The  
154 lasagne recipe was developed by the researchers (including two Home Economic lecturers) to include  
155 multiple skills and different ingredients. All aspects of this intervention were extensively piloted from  
156 initial concepts to final format. Piloting occurred in both sites to reduce any differences between sites.  
157 Minimal changes occurred after these trials, such as the inclusion of background music to make the  
158 atmosphere more relaxing and to give a homely feel, the reduction of the number of observers as to  
159 reduce the stress on the participants. It was deemed acceptable for observers to intervene in the  
160 experiment if it was felt there was a significant health and safety risk to the participant, however, this  
161 was to be noted.

162 All eligible participants completed an adapted cooking and food skills questionnaire at home  
163 (McGowan et al., *under review*) and brought it to the site. This enabled the researchers to determine  
164 baseline cooking skills confidence and food skills confidence. Once all questionnaires were collected  
165 from participants, participants were informed of the dish they were making 'lasagne from scratch.'  
166 First participants completed questions regarding previous attempts at making lasagne and the types of  
167 ingredients used (of the participants that reported the types of ingredients used in previous lasagnes,  
168 72% used convenience products). They also were asked four questions which were repeated again at  
169 the mid-point and post the experiment. These four questions were; (1) at this moment how confident  
170 do you feel about producing a safe, edible meal (not at all confident to extremely confident); (2) At  
171 this moment, how enjoyable do you think you will find cooking this meal (not at all enjoyable to  
172 extremely enjoyable); (3) At this moment, how difficult do you think it will be to cook this meal (not  
173 at all difficult to extremely difficult); and (4) At this moment, do you think you would cook this meal  
174 from scratch at home (not at all likely to extremely likely)? All answers were given on a 7 point Likert  
175 score, ranging from 1 to 7.



176 *Data Analysis*

177 All data were analysed using IBM SPSS Statistics Version 22 (IBM Corporation, 2013). Descriptive  
178 statistics (means, standard deviations [SD]), Chi squared and ANOVAS with Tukey HSD post hoc  
179 tests were used to assess any baseline differences between the four conditions (recipe only, recipe plus  
180 full demo, recipe plus video prompting, recipe plus video elements). For the analysis the answers of  
181 the four questions of confidence, enjoyment, perceived difficulty and intention to cook from scratch  
182 again, were recoded to scores with low scores being negative and high scores being positive, with the  
183 exception of level of difficulty, which lows scores of difficulty being positive and high scores being  
184 negative. Repeated measures one-way factorial ANOVAs were conducted to test between and within  
185 conditions, to determine an interaction effect of the intervention for confidence, enjoyability,  
186 difficulty and likelihood to cook again. Using correlations, the strength of the relationships among the  
187 variables were evaluated. Further, using a hierarchical regression model, it was determined how much  
188 of the variance in the dependant variable (likelihood to cook the meal again from scratch) was  
189 accounted for by the predictor variables (likelihood to cook again at the beginning, and both pre and  
190 post scores for confidence, enjoyability, and difficulty). These interactions were considered as  
191 significant for all analysis, at a level of 0.05.

192 **Results**

193 *Baseline*

194 The baseline demographic details between the different conditions are displayed in Table 2. There  
195 were no differences between the conditions on all measures, however, there was a borderline  
196 significance found in food skills confidence, with condition 4 participants having less food skills  
197 confidence than participants in condition 1 and 3. Further, there was no differences between the  
198 conditions for: the highest level of education achieved ( $\chi^2 (1,139) = 13.15, P = 0.36$ ), number of  
199 children ( $\chi^2 (6,139) = 10.05, P = 0.12$ ), perceived weight status ( $\chi^2 (9,140) = 6.49, P = 0.69$ ), and the  
200 type of ingredients used in previous versions of lasagne ( $\chi^2 (12,125) = 12.18, P = 0.43$ ).

201 *[Insert Table 2]*

202 *Effect of experiment*

203 Factorial repeated measures ANOVAs were conducted to check for the effects of the experiment and  
204 an interaction effect, conditions and time on confidence scores, enjoyment scores, perceived levels of  
205 difficulty, and likelihood to cook the meal again from scratch. For each score no significant difference  
206 was found between the conditions; confidence ( $F = 1.18 (3,137), P = 0.32$ ), enjoyment ( $F = 0.54$   
207 ( $3,136), P = 0.66$ ), difficulty ( $F = 0.39 (3,137), P = 0.76$ ), and intention to cook again from scratch ( $F$   
208  $= 2.28 (3,137), P = 0.32$ ). However, for each of these scores, a significant effect of time was seen  
209 (Figure 1). Confidence significantly increased across all time points ( $P < 0.001$ ). With a large effect  
210 size (Eta squared = 0.44). The effect of time for enjoyment scores was also seen ( $P < 0.001$ ), with a  
211 large effect size (Eta squared = 0.17). There was a significant increase in enjoyment between the start  
212 and the end and midpoint and the end of the task ( $P < 0.001$ ). Again for difficulty scores a significant  
213 effect of time was seen ( $P = 0.001$ ), with a medium effect size (Eta squared = 0.10). There was a  
214 significant decrease between the start and midpoint and the start and the endpoint for difficulty scores  
215 ( $P < 0.05$ ), however, no further decrease was seen between the mid-point and the end point. Finally,  
216 there is a significant effect of time ( $P < 0.001$ ) for intention to cook the meal from scratch again, with  
217 intention to cook increasing over each time point ( $P < 0.05$ ). With a large effect size (Eta squared =  
218 0.32).

219 *[Insert Figure 1]*

220 There was no significant difference between the conditions for the amount of time it took to complete  
221 the lasagne ( $F = 1.41 (3,118), P = 0.16$ ), with times ranging from 15 minutes to 170 minutes. The mean  
222 and SD for each condition was: Condition 1 - 73.50 min (31.57), Condition 2 - 70.48 min (17.64),  
223 Condition 3 - 81.28 min (20.51), and Condition 4 - 71.67 min (14.67).

224 *Predictors of Intention to cook from scratch*

225 Bivariate correlations between the intention to cook a meal from scratch again, confidence in cooking,  
226 enjoyment and in perceived difficulty of cooking are given in Table 3. Confidence ( $r = 0.38, P < 0.01$ )  
227 and enjoyment ( $r = 0.50, P < 0.01$ ) in the cooking experiment was positively associated with intention

228 to cook from scratch again. Perceived difficulty of cooking the lasagne was negatively correlated with  
229 intention to cook again ( $r = -0.26, P < 0.01$ ). Similarly, confidence was positively correlated with  
230 enjoyment ( $r = 0.42, P < 0.01$ ) and perceived difficulty was negatively correlated with both confidence  
231 ( $r = -0.27, P < 0.01$ ) and enjoyment ( $r = -0.19, P < 0.05$ ).

232 *[Insert Table 3]*

233 Table 4 shows the results of a hierarchical multiple regression predicting intention to cook the meal  
234 from scratch again. The baseline model included the participants' intention to cook the meal from  
235 scratch at the beginning of the experiment as a potential predictor of cooking from scratch upon  
236 completion of the experiment. This variable accounted for 28% of the variance, with a significant  
237 independent contribution ( $P < 0.001$ ). As the different models are accumulative, models 1 and 2 control  
238 for initial conditions and model 3 tests the impact of enjoyment, perceived difficulty and confidence  
239 on intention to cook from scratch. Model 2 included the participants' confidence, enjoyment and  
240 difficulty scores at the beginning of the experiment. These variables accounted for a further 4% of the  
241 variance. In model 3, the model was adjusted to include participants' confidence, enjoyment and  
242 difficulty scores at the end of the experiment which lead to an additional 10% of the variance being  
243 explained. Each model explained a significant amount of variance ( $P < 0.05$ ). The final model  
244 explained 42% of the total variance in participants' intention to cook the meal from scratch again.

245 *[Insert Table 4]*

## 246 **Discussion**

247 This novel study investigated people's intention to cook from basic ingredients when the instructions  
248 are presented in different modes. In addition, the impact of enjoyment, confidence and perceived  
249 difficulty of the task on the intention to cook from scratch was studied using an RCT design. It is the  
250 first study to design the experimental conditions based on commonly found BCT's in cooking  
251 interventions. Overall, while the intervention increased the participants' intentions to cook the meal  
252 again from basic ingredients, no differences were found between the different conditions. This may  
253 show that the important component of the intervention is the practical experience and the instruction

254 on how to make the dish is not as essential. Further possible reasons for no difference between the  
255 conditions being found are discussed in the limitations section, however, the importance of identifying  
256 and detailing the use of BCTs in future interventions should still be implemented to assess these  
257 results taking into consideration the limitations of this study.

258 The positive correlations between confidence, enjoyment and likelihood to cook again and the  
259 negative correlation with difficulty, highlight how these elements are linked and that all these  
260 elements should be considered when designing future cooking and food skills interventions. The  
261 increase in confidence after practical experience of cooking seen here is similar to findings by Wriden  
262 et al (2007). Furthermore, the results support previous qualitative research which noted that those  
263 participants with a higher cooking efficacy attributed it to the practical hands on cooking experiences  
264 they had at a younger age (Lavelle et al., 2016). Thus, it appears that practical cooking experience  
265 increases cooking confidence and it should be an essential component to interventions or programmes  
266 with the aim of increasing home meal preparation and cooking from scratch.

267 The observed decrease in difficulty over the course of the experiment is regarded as a positive  
268 outcome of this intervention, this mirrors what Chapman-Novakofski and Karduck (2005) found in  
269 their study which was a cooking intervention aimed at a clinical population. Considering that desire  
270 for effortless meals has been previously inferred as a barrier to cooking from scratch (Lavelle et al.,  
271 2016) reducing perceived difficulty may encourage general consumers to cook from scratch as it is  
272 removing a barrier to this type of cooking.

273 The role of enjoyment in cooking is an element that may not be the focus of studies and interventions  
274 that promote cooking skills with a health agenda (Lang and Caraher, 2001), however, this may be a  
275 crucial component to the success of these interventions. Our results show that enjoyment increased  
276 with practical cooking experience and enjoyment was the most significant predictor of intention to  
277 cook from scratch in our final regression model. Previous studies have shown that enjoyment was the  
278 most significant predictor of cooking skills (Hartmann et al., 2013) and that adults who enjoyed  
279 cooking were most likely to have engaged in meal preparation at younger ages (Laska et al., 2012). In  
280 light of this, the importance of enjoyment in health promoting cooking interventions is evident.

281 Practical cooking experience increases enjoyment, adults who enjoy cooking have had experience at  
282 younger ages, those that enjoy cooking have greater cooking skills and increasing enjoyment  
283 increases intention to cook from scratch. Health promoting cooking interventions should have a strong  
284 emphasis on the enjoyment and fun in cooking for optimal outcomes.

285 Similar times for completion when using different methods, highlighting that although some methods  
286 for learning skills may appear to take longer, in reality the amount of time may not be as significant as  
287 using the participants preferred method. Lack of time has been stressed throughout the healthy eating,  
288 home meal preparation and cooking from scratch literature (Jabs & Devine, 2006; Wolfson et al.,  
289 2016; Lavelle et al., 2016) as a barrier. This study suggests that when learning new meals, there is no  
290 time difference between the different mode of delivery, indicating that the choice of medium is not  
291 significant, thereby suggesting the importance of encouraging people to choose the method they find  
292 the most effective method for learning rather than the method they consider the fastest. This may then  
293 result in inspiration to try cooking new meals or meals that had previously relied on convenience  
294 products from scratch more often.

295 The regression model accounts for a substantial amount of the variance (42%) in likelihood to cook  
296 again from scratch, which suggests the practical experiment (the additional 10% in the final model)  
297 contributed significantly to their intention to cook from scratch. This would appear to support past  
298 qualitative research which suggested that practical experience increased self-efficacy in cooking and  
299 this facilitated their cooking from scratch (Lavelle et al., 2016). Both enjoyment and confidence  
300 remained as significant predictors in the final model, suggesting that these are particularly important  
301 factors when considering the design and implementation of cooking interventions. However, it should  
302 be noted that a lack of confidence at the beginning of the intervention also had a significant impact on  
303 intention to cook again. This was further investigated and appeared to be a statistical artifact. The  
304 unaccounted variance (58%) in intention to cook from scratch again, may be attributable to external  
305 factors which were controlled in this experiment. In the home environment barriers to cooking from  
306 scratch have been previously explored (Lavelle et al., 2016) and can include family preferences,  
307 financial restraints, time pressures of work and family commitments and previous negative

308 experiences. Future interventions must take these external factors into consideration and design  
309 strategies to permeate through their interventions that help participants cope with and overcome these  
310 barriers to maximise participants' likelihood of cooking from scratch again in their home  
311 environment.

### 312 *Implications for cooking interventions*

313 The importance of home meal preparation has been previously stressed (Short, 2006; Caraher & Lang,  
314 1999; Halkier, 2009) which has resulted in the increase of cooking interventions to enable the general  
315 population to do this (Reicks et al., 2014; McGowan et al., 2015). Recently, in a European population  
316 it was shown that only 30% of the household budgets are being spent on raw or basic ingredients  
317 (Daniels and Glorieux, 2015). Similarly, in this study, only 28% of participants had not used  
318 convenience products in previous attempts at preparing a Lasagne. The negative health aspects of  
319 convenience products (Moodie et al., 2013; Lerner and Matthias, 2015; van der Hoorst et al., 2011)  
320 have been noted and it has also been shown that health is a principal motivator for cooking for scratch  
321 (Lavelle et al., 2016). Therefore, it is important for health promoting cooking interventions to support  
322 cooking from scratch. From our results it can be seen that increasing confidence and practical  
323 experience are essential to improving intentions to cook from scratch and strategies should be  
324 implemented to improve confidence in cooking. Interventions should include some level of practical  
325 cooking experience, ideally some element in each session if feasibly possible. Most notably from our  
326 study is the importance of enjoyment in cooking which may not always be an element considered in  
327 health focused cooking interventions (Lang and Caraher, 2001). Interventions should be practical with  
328 some fun activities and some achievable cooking activities to increase confidence.

### 329 *Strengths, Limitations and Future Research*

330 A key strength to this study lies in its randomised control design and that each condition for the  
331 experiment had both ecological validity and incorporated and explicitly highlighted its use of some  
332 commonly implemented BCT's in cooking research. Some limitations to this study must be  
333 considered and in turn provide areas for improvement for future research.

334 Although participants recruited were screened for using mainly prepared ingredients, a small number  
335 of this sample had previously made a lasagne from scratch. The recipe was chosen and adapted from  
336 the funding body's cookbook, future interventions should consider using a relatively new or unknown  
337 recipe not commonly cooked in its target population. The sample consisted of young mothers only  
338 and this could be regarded as a further limitation of this study. Currently, mothers remain as the main  
339 cook in households (Lavelle et al., *under review*), and perhaps targeting a different sample of the  
340 population, such as young men or students, or a larger sample size would yield different results that  
341 can be compared. Furthermore, the results should be considered within the cultural context of the UK  
342 and Ireland populations; it may be interesting to repeat this study in other populations to understand  
343 key cultural differences.

344 Measures discussed were self-reported and therefore the data may be subject to social desirability.  
345 This being said, participants were not focused on the measurements but on the actual act of cooking;  
346 they may not have had much time to consider what would be a socially desirable response.

347 Although the strength of this study is in the randomised controlled design, it would be interesting to  
348 repeat this study where participants were able to choose what instruction method they were able to  
349 follow to see whether this impacts the differences between the conditions. As there was no differences  
350 between the conditions when participants were randomised to each condition, by allowing participants  
351 choice in their learning, it increases autonomy, which is a key element of adult learning (Taylor and  
352 Hamdy, 2013). In addition, as there are different types of learners and by giving the participants the  
353 choice of whichever condition is close to their learning style may achieve better outcomes and would  
354 establish initial evidence in how different learning styles impact cooking education (Pashler et al.,  
355 2008).

## 356 **Conclusions**

357 The practical experience of cooking a meal appears to have a greater impact on the likelihood to cook  
358 a meal from scratch rather than the different methods used in learning to make the dish. Enjoyment in  
359 cooking the meal and confidence in cooking the meal have a significant impact on intention to cook

360 from scratch. In light of these results, cooking and food skills interventions should focus on the  
361 practical experience of cooking and increasing participants enjoyment and confidence during  
362 interventions with the aim of increasing the likelihood of increasing and maintaining cooking from  
363 scratch within the home.

#### 364 **Abbreviations:**

365 SCT: Social Cognitive Theory; BCT: Behavioural Change Technique; ROI: Republic of Ireland; NI:  
366 Northern Ireland; UK: United Kingdom; RCT: Randomised Controlled Trial.

367

#### 368 **Ethics approval and consent to participate**

369 Ethical approval for this study was obtained from Queen's University Belfast Research Ethics  
370 Committee and research was conducted in accordance to the guidelines given in the Declaration of  
371 Helsinki. All participants were informed that by taking part in the survey they were giving consent  
372 for their data to be used.

373

#### 374 **Consent for Publication**

375 Not Applicable

376

#### 377 **Availability of data and materials**

378 Database available upon request presently, as further publications are planned, however, it will be  
379 made openly available when publications are completed.

380

#### 381 **Competing Interests**

382 The authors declare that there are no conflicts of interest.



383

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387 **Author Contributions**

388 FL and MD conceived the manuscript. FL conducted the data analysis with advice from MD.  
389 FL drafted the manuscript and MD edited. All authors read, edited and approved the final  
390 manuscript.

391

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554 **Table 1 – Overview of Experimental conditions**

	<b>Condition 1</b>	<b>Condition 2</b>	<b>Condition 3</b>	<b>Condition 4</b>
<b>Experimental Instructions</b>	Recipe plus picture only – static cookbook condition – CONTROL	Video modelling (plus recipe) (watch full demo as a group, then -> cook - with recipe + pic)	Video prompting (plus recipe) (do it in a sequence, step by step -> cook - with recipe + pic)	Video ‘elements’ (plus recipe) – user has total control over what to watch/re-watch) -> cook - with recipe + pic
<b>Ecological Validity</b>	Similar to traditional cookbook	Similar to seeing on TV	Similar to School, Teacher demonstrate skill and class repeats	Similar to watching video clips online, can watch parts of videos, rewind, fast forward, repeat.
<b>BCTs</b>	21	21 + 22	21 + 22 + 9	21 + 22 + 9 + 26
<b>BCT Explanations</b>	Provide instruction on how to perform behaviour	Provide instruction on how to perform behaviour	Provide instruction on how to perform behaviour	Provide instruction on how to perform behaviour
		Model or demonstrate the behaviour	Model or demonstrate the behaviour	Model or demonstrate the behaviour
			Set graded tasks	Set graded tasks
				Behavioural practice/rehearsal- As regardless of whether the participants watch the podcasts or not, they are being advised to ‘practice’

555 **Table 2 – Baseline demographic characteristics of participants by condition**

Baseline	Significance (P)	Recipe Only	Recipe + Full Video	Recipe + Video Prompting	Recipe + Video Elements
<b>Number</b>		34	33	35	39
		M (SD)	M (SD)	M (SD)	M (SD)
Age	0.27	31.52 (5.77)	30.03 (5.51)	31.28 (5.64)	29.18 (5.78)
Perceived Enjoyment	0.42	4.94 (1.37)	5.27 (1.26)	4.91 (1.48)	4.72 (1.49)
Perceived Difficulty	0.19	3.35 (1.35)	3.88 (1.36)	3.80 (1.23)	3.33 (1.42)
Likelihood to cook again	0.40	4.59 (1.76)	4.67 (1.43)	5.23 (1.65)	4.85 (2.01)
Perceived Confidence	0.49	4.71 (1.47)	4.49 (1.54)	4.63 (1.21)	4.20 (1.67)
Cooking Skills Confidence	0.62	65.56 (15.77)	66.81 (15.31)	68.00 (12.53)	63.92 (15.03)
Food Skills Confidence	0.05	88.64 (20.92)	82.13 (19.78)	88.80 (17.72)	77.72 (21.45)

556 *Cooking skills confidence range: 30-97; Food skills confidence range: 14-124.*

557 **Table 3 – Unadjusted bivariate correlations between predictor variables and intention to cook from scratch again**

Variable	Confidence	Enjoyment	Difficulty
1. Confidence	-	0.42**	-0.27**
2. Enjoyment	-	-	-0.19*
3. Difficulty	-	-	-
4. Intention to cook again	0.38**	0.50**	-0.26**
M	5.78	5.54	3.16
SD	1.17	1.18	1.52

558 \*Significant at 0.05 level

559 \*\*Significant at 0.01 level

560 **Table 4 – Hierarchical multiple regression predicting intention to cook from scratch again**

Variables	Model 1		Model 2		Model 3	
	B (SE)	$\beta$	B (SE)	$\beta$	B (SE)	$\beta$
Intention to cook from scratch again at start	.455 (.062)	.535***	.417 (.074)	.491***	.351 (.072)	.413***
Confidence at start			-.152 (.092)	-.153	-.196 (0.92)	-.197*
Enjoyment at start			.287 (.091)	.272**	.178 (.090)	.169*
Difficulty at start			-.007 (.086)	-.007	-.035 (.084)	-.032
Confidence at end					.263 (.100)	.208**
Enjoyment at end					.292 (.102)	.233**
Difficulty at end					-.010 (.074)	-.010
<b>F</b>	<b>54.007***</b>		<b>16.773***</b>		<b>14.854***</b>	
<b>Adjusted R<sup>2</sup></b>	<b>.28***</b>		<b>.32*</b>		<b>.42***</b>	

561 \* P<0.05, \*\* P<0.01, \*\*\* P<0.001.

562