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### Abstract

Purpose: This study is the third piece of formative research utilizing the Theory of Planned Behavior to inform the development of a behavior change intervention. Focus groups were used to identify reasons and solutions to previously identified key beliefs in addition to potentially effective behavior change techniques. Method: A purposive sample of 22 first-year undergraduate students ( $n = 8$  males;  $M = 19.8$  years,  $SD = 1.3$  years) attending a university in the North of England, UK, was used. Focus groups were audio-recorded, transcribed verbatim, analyzed thematically and coded for recurrent themes. Results: Fourteen reasons were given regarding enjoyment, eleven reasons for friends' approval, eleven reasons for friends' own participation, fourteen reasons for the approval of family members, and ten solutions to time constraints. Eleven distinct techniques were suggested to attend to these reasons and solutions. Conclusion: This qualitative research will be used to inform the development of a theory-based intervention to increase students' participation in university recreational sport.

Keywords: behavior change methods; theory of planned behavior; intervention development; recreational sport

28 Sport refers to physical activities with certain rules and organized conditions  
29 (Coakley, 2009). Students participating in university recreational sport may see an  
30 improvement in academic studies (Huesman, Brown, Lee, Kellogg, & Radcliffe, 2009), a  
31 reduction in stress (Kanters, 2000), and greater rates of retention (Kampf & Teske, 2013).  
32 Despite these benefits, rates of participation decrease when students begin higher education  
33 (Gucciardi & Jackson, 2015). Despite investing millions of pounds to increase participation  
34 rates in the UK, the interventions funded by Sport England (Sport England, 2012) have  
35 demonstrated limited success to date. For example, although the Active Universities Project  
36 showed a 2% increase in sports participation within the first year, no change was found in the  
37 following two (Sport England, 2014). One explanation for these modest findings could be the  
38 lack of theory used in intervention development. As theoretical designs outperform  
39 atheoretical approaches (Webb, Joseph, Yardley, & Michie, 2010), theory should be included  
40 within interventions attempting to change behavior. More specifically, theory-based  
41 interventions could prove useful in increasing participation rates in university recreational  
42 sport.

### 43 **TPB and Behavior Change**

44 With a number of theories developed to understand behavior, one of the most widely  
45 used is the Theory of Planned Behavior (TPB; Ajzen, 1985). According to the TPB, intention  
46 is the proximal determinant of behavior and is determined by three factors; attitude,  
47 subjective norm, and perceived behavioral control. Attitude refers to the evaluation of  
48 behavior, subjective norm concerns the social pressure to perform the behavior, and  
49 perceived behavioral control refers to the amount of control over the behavior. These  
50 determinants are influenced by behavioral, normative, and control beliefs, respectively.  
51 Behavioral beliefs are the perceived consequences of behavior and the evaluation of these  
52 consequences. Normative beliefs are the perceived expectations of important referents and

53 the motivation to comply with such referents. Control beliefs are the evaluation of factors that  
54 may facilitate or impede behavior. To identify suitable intervention targets, formative work  
55 comprising of belief elicitation and belief measurement should be undertaken (Ajzen, 2011).  
56 Those critical beliefs should then be the focus of behavior change interventions.

57       **Reasons and solutions.** Despite offering robust guidelines on the identification of  
58 *what* to change, the TPB is relatively silent on *how* to do so. As such, interventions  
59 successfully changing the psychological processes have been scarce, with some even  
60 suggesting a retirement of the theory (Sniehotta, Pesseau, & Araújo-Soares, 2014). To  
61 address this gap, two studies have attempted to identify the ‘reasons’ and ‘solutions’ to  
62 previously identified key beliefs to provide avenues for the shaping of health messages (e.g.,  
63 Epton et al., 2015; Vayro & Hamilton, 2016). Using open-ended questions within a  
64 questionnaire, Epton et al. (2015) asked participants to provide up to three reasons for each  
65 key belief in addition to rating the importance of these responses. The behaviors under  
66 investigation were fruit and vegetable uptake, binge drinking, smoking, and physical activity  
67 within a first-year university sample. For example, participants stated ‘reducing the risk of  
68 disease’ as the salient reason for physical activity improving health. Vayro and Hamilton  
69 (2016) identified the reasons and solutions to key beliefs pertaining to healthy eating within  
70 truck drivers. One solution relating to a belief concerning time constraints, for example, was  
71 to have the food already prepared. The additional information from these reasons and  
72 solutions were then used to form the content of theory-based messages.

73       Despite providing greater information on the content of interventions, this work was  
74 undertaken using questionnaires, thus neglecting the opportunity for valuable information to  
75 be gained from other qualitative approaches, such as focus groups. Indeed, such an approach  
76 allows for a detailed account of participants’ perceptions that would be less accessible in  
77 quantitative approaches (Krueger & Casey, 2014). Furthermore, as Vayro and Hamilton

78 (2016) acknowledge, these reasons and solutions do not specifically identify how change can  
79 be achieved. As an example, Epton et al. (2015) found ‘Aids concentration’ as a solution to ‘a  
80 lack of time’. Although providing additional information countering the key belief, it is still  
81 not clear how one should use this information to target this belief within an intervention. That  
82 is, how should one specifically integrate the idea that physical activity ‘Aids concentration’  
83 within a theory-based message? To answer this type of question, one must refer to the  
84 literature on techniques.

85         **Behavior change techniques and taxonomies.** The changing of behavior depends  
86 heavily on the ‘active ingredients’ within interventions, commonly known as behavior change  
87 techniques (BCTs; Michie et al., 2013). Taxonomies of BCTs were recently developed to  
88 standardize intervention ingredients and thus provide a common language for interventionists  
89 to utilize techniques. For example, the CALO-RE taxonomy (Michie et al., 2011), which  
90 targets change in physical activity and eating behaviors, includes 40 BCTs such as ‘Provide  
91 normative information about others’ behavior’, ‘Action planning’, and ‘Time management’.  
92 Similarly, the BCT taxonomy (v1; Michie et al., 2013), which is aimed at behavior in general,  
93 includes 93 distinct BCTs, organized into 16 groupings. In addition to standardizing scientific  
94 language, these classifications enable interventionists to understand the different types of  
95 BCTs available to potentially alter specific psychological targets. To gain a greater  
96 understanding of this, researchers linked BCTs to psychological processes (e.g., Cane,  
97 Richardson, Johnston, Ladha, & Michie, 2015; Michie, Johnston, Francis, Hardeman, &  
98 Eccles, 2008). Due to the number of constructs used in health psychology, these studies used  
99 the Theoretical Domains Framework (Cane, O’Connor, & Michie, 2012) to categorize  
100 determinants. As an example of specific links, the experts within the Michie et al. (2008)  
101 study agreed that the domain ‘Beliefs about consequences’ could be targeted with the BCTs  
102 ‘Self-monitoring’, ‘Persuasive communication’, ‘Information regarding the behavior’,

103 ‘Feedback’, ‘Self-talk’, and ‘Motivational interviewing’. Similarly, using techniques within  
104 the BCT taxonomy (v1), Cane et al. (2015) linked ten BCTs to the domain ‘Social  
105 Influences’ including ‘Information about others’ approval’ and ‘Modelling’.

106 The benefit of linking BCTs to determinants is that it allows intervention designers to  
107 select potentially useful mechanisms of change. Despite this, there are a couple of potential  
108 issues relating to the mapping of BCTs. First, the identification of appropriate BCTs through  
109 this process was conducted through an expert consensus approach, rather than an evidence  
110 base. As such, there could be BCTs included that do not change the theorized determinants or  
111 BCTs not included that do in fact have the potential to change such processes. Indeed,  
112 Prestwich et al. (2014) found no support for the use of setting graded tasks to increase self-  
113 efficacy, despite Michie et al. (2008) suggesting this BCT would be useful. Although  
114 research is in its infancy regarding technique effectiveness, failure to link BCTs to  
115 determinants using evidence is problematic (de Bruin, Crutzen, & Peters, 2015). Second, due  
116 to the number of BCTs applicable to each domain, it can be difficult to identify which  
117 specific technique, amongst many, will be appropriate to the behavior under investigation.

118 Taking these two issues into consideration, the identification of the most appropriate  
119 BCTs may be facilitated by gaining the opinions of the population under study. More  
120 specifically, BCTs provided by a sample of the population may result in the identification of  
121 techniques not linked to certain domains. If BCTs mirror those previously suggested, the  
122 specific techniques elicited from the population may have an enhanced likelihood of success,  
123 particularly due to the number of techniques linked to each domain.

124 In summary, studies have helped shape the content of health messages by identifying  
125 reasons and solutions to relevant psychological targets. These studies, however, do not make  
126 use of mapping approaches that provide explicit links to potentially effective BCTs. Even  
127 when these approaches are used, there may be BCTs lacking utility that are mapped onto

128 domains or effective BCTs that are missing altogether. The number of BCTs relevant to each  
129 domain also adds confusion to those most appropriate. Although such issues are a product of  
130 the early stages of BCTs and taxonomies, the problems are nevertheless apparent. Gaining  
131 information on these issues from the participant perspective could be an important avenue to  
132 pursue. Making use of a qualitative approach may provide an ideal methodology to answer  
133 such research questions.

### 134 **Purposes**

135         The study was designed to (a) highlight the reasons and solutions to the key beliefs  
136 identified in a previous study (Author citation, in press) and (b) identify potentially effective  
137 BCTs to attend to these beliefs from the participant perspective. To the authors' knowledge,  
138 this is the first study qualitatively targeting previously identified salient beliefs concerning  
139 university students' recreational sports participation using focus groups. With this, such work  
140 will add to this field of study by identifying the reasons, solutions, and BCTs that can help  
141 facilitate the development of a tailored behavior change intervention attempting to modify  
142 critical beliefs.

## 143 **Method**

### 144 **Study Design and Participants**

145         The study used a qualitative design to investigate students' views and experiences of  
146 university recreational sport. Participants were first-year students attending a university in the  
147 North of England, UK, and were eligible if they were enrolled on a full-time degree course.  
148 Demographics of study participants are summarized in Table 1.

149 [Table 1 near here]

150

**151 Procedures**

152           **Recruitment.** After gaining ethical approval from the university ethics board (Ref:  
153 SSHS/2016/023), a purposive sampling strategy was used to recruit participants from various  
154 degree courses. Participants were approached within lectures where a study outline,  
155 information sheets and contact details were provided. Once contact was made, interested  
156 participants were given a more detailed information sheet which outlined their potential  
157 involvement in the study. Snowball sampling was also used, with interested participants  
158 asked to inform others of the study within their cohort. To ensure a varied range of degree  
159 subjects within each focus group, participants were arranged under degree programs and  
160 assigned to a group based on their time of acceptance (i.e., the first confirmed student from  
161 six different degree courses were assigned to focus group one).

162           **Focus groups.** Focus groups were used to gain a deeper understanding of the research  
163 question (Krueger & Casey, 2014). The researcher booked a quiet room within the university  
164 at a date and time convenient to the participants. Participants gave full consent and completed  
165 a self-report questionnaire of demographic characteristics (e.g., age, sex, year of study,  
166 degree course). A semi-structured focus group schedule was employed consisting of open-  
167 ended questions and specific areas of interest (see Table 2 for example questions). The design  
168 and content of the schedule was developed based on formative research and the researchers'  
169 past experience with qualitative research. Post-it notes and a white board were used to  
170 highlight responses and generate further discussions. Participants were probed to reveal more  
171 in-depth information throughout the session when appropriate. Upon completion, participants  
172 were thanked for their participation and were given the opportunity to add any additional  
173 information. Focus groups were audio-recorded and anonymity was ensured with  
174 pseudonyms used both during the focus groups and data transcription. With the study being



175 heavily reliant on data from a formative study undertaken during semester one, focus groups  
176 were undertaken during the second semester of the 2016/2017 academic year (March-April).

177 [Table 2 near here]

## 178 **Analysis**

179 Thematic analysis was conducted by both authors of the paper using NVivo 10 (TSQ  
180 and JB). The first author had previous experience with qualitative research and had  
181 undergone additional training prior to the analysis. The second author had extensive  
182 knowledge and experience in qualitative methodologies. The analysis followed the thematic  
183 analysis specifications outlined by Braun and Clarke (2006). First, data were transcribed  
184 verbatim by the first author, printed and read several times over for familiarity. Transcripts  
185 were inductively analyzed into initial codes by both authors independently and these codes  
186 were analyzed thematically into recurrent themes. For example, phrases such as ‘be with  
187 friends’ and ‘hang out with mates’ were placed within the theme ‘Socializing’. Themes were  
188 then placed deductively under the respective question heading (i.e., see example exploration  
189 and technique questions within Table 2). Comparisons were then made between these themes  
190 and those identified initially within the printed copies.

191

## 192 **Results and Discussion**

### 193 **Participants**

194 Participants were 22 first-year undergraduate students ( $n = 8$  males;  $M = 19.8$  years,  
195  $SD = 1.3$  years) who attended one of four focus groups. Two groups consisted of five  
196 participants and two groups included six participants.

### 197 **Reasons and Solutions**

198 Fourteen reasons were given as to why university recreational sport is enjoyable (see

199 Table 3), eleven reasons were given for why friends may approve of participation (see Table  
200 4), fourteen reasons were given for the approval of family members (see Table 5), and eleven  
201 reasons were given for why friends might themselves participate in university recreational  
202 sport (see Table 6). With regards to time constraints, ten solutions were offered (see Table 7).  
203 Participants also identified the most important reasons and solutions to identified beliefs.

204 [Table 3 near here]

205 [Table 4 near here]

206 [Table 5 near here]

207 [Table 6 near here]

208 [Table 7 near here]

209

## 210 **BCTs**

211 Twelve distinct BCTs were identified; three influencing enjoyment, two for the  
212 approval of friends, one for the approval of family members, three for the participation of  
213 friends themselves, and five for time constraints (see Table 8).

214 [Table 8 near here]

## 215 **Discussion**

216 The study used a qualitative approach to identify the reasons and solutions relating to  
217 key beliefs previously found to influence student participation in university recreational sport.  
218 The study also identified BCTs that could be effective in targeting these beliefs if included  
219 within a theory-based intervention to increase participation rates. These findings and their  
220 implications will now be discussed.

## 221 **Reasons and Solutions**

222 To convince students that university recreational sport is enjoyable, a theory-based  
223 message should seek to include the reasons identified in Table 3. For example, it could be

224 fruitful to emphasize that university recreational sport has a relatively low cost and provides a  
225 number of benefits relating to mental well-being. As three focus groups identified  
226 ‘Socializing’ as being an important reason, this reason could offer the greatest utility. Thus,  
227 rather than merely stating ‘recreational sport is enjoyable’, a health-related message should  
228 also justify this statement with other social benefits. Targeting the reason ‘a lack of  
229 competition’ may also be a more appropriate reason due to one group stating its importance.  
230 Furthermore, ‘Health and fitness benefits’ was also mentioned as the most important reason  
231 by one participant, thus may also be a suitable reason to promote the enjoyable nature of  
232 university recreational sport.

233         Regarding the approval of friends, the reasons outlined in Table 4 could provide an  
234 intervention with useful additional information. Amongst other reasons, participants stated  
235 that friends would approve of their participation due to the health benefits that can be  
236 achieved and the sensible nature of the behavior. Including such benefits within health  
237 messages could persuade students that friends are supportive of their participation in  
238 recreational sport. In terms of the most important reason, all four groups stated to ‘Socialize’  
239 as that with most significance. That is, friends would approve of their participation because it  
240 enables them to be sociable. This reason implicates a health message such as ‘Friends may  
241 support your decision to play sports because it provides you with an opportunity to socialize’,  
242 rather than merely stating ‘Friends may support your decision to play sports’.

243         Concerning the approval of family members, Table 5 shows the different reasons  
244 elicited from the focus groups that could increase the utility of interventions targeting this  
245 belief. Regarding the reasons potentially offering greater promise, two focus groups stated the  
246 most important related to happiness, one group suggested it was to make friends, and one  
247 group stated it was to socialize. As such, there are a number of reasons that a theory-based  
248 message could include to persuade students of the approval of family members.

249 As can be seen in Table 6, a total of eleven reasons were mentioned as to why friends  
250 may themselves participate in recreational sport. Incorporating reasons such as ‘study relief’  
251 or to ‘improve sport-specific skills’ within a theory-based message may provide students with  
252 appropriate reasons for them to also engage in the behavior. Concerning the most important  
253 reason, all four groups agreed on the reason ‘to socialize’ as being the most important. This  
254 reason may thus offer the greatest utility in altering this belief. For example, a theory-based  
255 message could include ‘your friends participate in recreational sport because it provides them  
256 with an opportunity to socialize’.

257 Finally, Table 7 shows the ten solutions that could be used within an intervention to  
258 address time constraints. All four focus groups suggested a solution relating to greater  
259 organization or preparation as the most important. This suggests that participants felt being  
260 better at organizing their time would enable them to participate in recreational sport.  
261 Although the majority of participants within each group agreed with this solution, one  
262 participant did state ‘prioritize’ as being the most important. Three groups also suggested  
263 commitment as being a solution to time constraints, although this was not the most important.  
264 The implications here are that a number of solutions can be used to attend to issues of time.  
265 These solutions, as is highlighted below, can be attended to using a number of BCTs.

266 Although there is a lack of research identifying the reasons and solutions to  
267 previously elicited beliefs, particularly in reference to university recreational sports  
268 participation, the study does share similarities with the PA study conducted by Epton et al.  
269 (2015). For example, in their study, participants mentioned that friends would want them to  
270 engage in the behavior because they could ‘Do it together’. Furthermore, a solution to time  
271 constraints was ‘Plan it into your day’. Such similarities suggest students possess some  
272 similar explanations for certain beliefs (i.e., why friends may want them to participate and

273 how time constraints can be overcome). However, the lack of research conducted within this  
274 area prevents any further comparisons.

### 275 **BCTs**

276 In terms of potential BCTs to deliver these messages, a number of strategies were  
277 identified by the focus groups to address each belief (see Table 8). As the participants did not  
278 have experience or knowledge of the BCTs, they were stated in lay language. This discussion  
279 will therefore link those that were expressed with either a technique or one closely related.

280 From the perspective of the participants, ‘Information about emotional consequences  
281 [5.6]’ could be used to promote the important reasons concerning enjoyment. More  
282 specifically, it was suggested that the consequences of participation could be specifically  
283 endorsed using posters and flyers. Participants also suggested that such messages could be  
284 delivered by friends and the sport development team within the university. Technique  
285 specific, this relates to a ‘Credible source [9.1]’ as the information provided (i.e., that sport is  
286 enjoyable) is presented by those identified as being trustworthy. It was also suggested that  
287 experiencing participation could facilitate the enjoyment of sport. The BCT ‘Behavioral  
288 experiments [4.4]’, whereby individuals’ knowledge is shaped by testing beliefs, could be  
289 applied here. In this way, positive experiences could result in the realisation that sports  
290 participation is enjoyable.

291 Concerning friends’ approval, participants suggested that friends should explicitly  
292 communicate the message that they approve of their participation. This response can relate to  
293 the BCT ‘Information about others’ approval [6.3]’ whereby information is provided about  
294 what others think. To increase its likelihood of success, the most important reason identified  
295 (i.e., socialization) could be included within these messages. Participants also suggested that  
296 actually experiencing participation with their friends could convey the message of approval.  
297 This suggestion can be linked with the technique ‘Social support (practical) [3.2]’ whereby

298 practical help is provided by significant others.

299           Similar to the approval of friends, responses concerning the approval of family  
300 members primarily concerned the technique ‘Information about others’ approval [6.3]’. To  
301 improve its effectiveness, this message should include the reasons elicited from the focus  
302 groups. For example, encouraging students that family members would want them to play  
303 because they would be happy, making friends and socializing could increase the effectiveness  
304 of the message.

305           To communicate the message that friends participate in recreational sport themselves,  
306 participants suggested this message could come from both friends themselves and facts and  
307 figures of participation rates. These suggestions can relate to ‘Social comparison [6.2]’,  
308 which draws attention to the behavior of others to allow comparison with their own behavior.  
309 Including the most important reason could improve the effectiveness of these messages. For  
310 example, friends informing students that they participate to socialize may persuade them to  
311 do the same. Participants also suggested that actually observing friends participating could  
312 provide the relevant information regarding their actual behavior. Technique specific, this can  
313 relate to ‘Demonstration of the behavior: modelling [6.1]’ whereby the behavior is performed  
314 and witnessed either directly (i.e., in person) or indirectly (i.e., using pictures).

315           Finally, a number of BCTs were elicited relating to time constraints. First, participants  
316 stated that actually committing to the decision to play sport could negate issues of time.  
317 Relating to the BCT ‘Commitment [1.9]’, this could involve students affirming or reaffirming  
318 their behavioral decision. Second, participants stated that the ability to plan their time more  
319 effectively could help with time constraints. ‘Action planning [1.4]’, which has been found to  
320 be highly successful in facilitating behavior change (Webb & Sheeran, 2007), could be a  
321 useful BCT to prompt participation in sport. The same BCT could also be used to develop  
322 greater organization. Specifically, if/then plans could provide students with relevant skills

323 that foster organization. Next, participants suggested that successfully engaging in the  
324 behavior could convince them that time constraints can be overcome. The BCT ‘Self-  
325 monitoring of behavior [2.3]’ could be of use here whereby the individual records when the  
326 behavior has been performed. Thus, successfully engaging in sport could result in the belief  
327 that issues of time are not necessarily barriers that cannot be overcome. Finally, participants  
328 suggested that being able to manage their time more effectively could be beneficial. Although  
329 there is no explicit mention of time management within the BCT taxonomy (v1; Michie et al.,  
330 2013), the technique is included within the CALO-RE taxonomy (2011). The technique  
331 attempts to free up times when the behavior could be performed available by teaching  
332 individuals how to manage their time.

333         When comparing the studies mapping BCTs to domains with those BCTs suggested  
334 by the focus groups above, all BCTs have been covered. That is, Michie et al. (2008) and  
335 Cane et al. (2015) identified similar BCTs to be influential in changing these types of  
336 psychological processes. For example, Michie et al. (2009) agreed that the domain ‘Social  
337 influences’ could be influenced through ‘Modelling/demonstration of the behavior by others’.  
338 Similarly, Cane et al. (2015) suggested the same domain could be influenced through BCTs  
339 such as ‘Information about others’ approval’ and ‘Social support (practical)’. The study  
340 therefore provides support for the accuracy of these mapping approaches. Furthermore, those  
341 elicited from the focus groups could still be useful, particularly due to the number of BCTs  
342 theorized to influence each domain. Thus, although suggested within prior mapping  
343 approaches, those outlined within the study may demonstrate greater utility if integrated  
344 within an intervention. Some of these BCTs may also yield further benefits if integrated with  
345 the reasons and solutions, as outlined above.

### 346 **Strengths**

347         The study has a number of strengths. First, the study sought to identify the reasons

348 and solutions to identified beliefs. These explanations provide greater content for an  
349 intervention, as opposed to only identifying key beliefs. Second, the study utilized focus  
350 groups to gain the reasons and solutions to key beliefs, rather than questionnaires as done  
351 within the two prior studies. This method allowed for greater introspection and catered for the  
352 participant context. Third, the study sought to identify relevant BCTs that may be appropriate  
353 for changing psychological processes, particularly from the participant perspective.  
354 Understanding participant suggestions may lead to greater intervention utility. Finally, the  
355 study was underpinned by a well-established theory of behavior change and informed by two  
356 pieces of formative research. This rigorous research answers the call for an increase in  
357 theoretically informed behavior change interventions.

### 358 **Limitations**

359         Despite these strengths, the study also has some limitations. First, due to the number  
360 of psychological processes, BCTs have been linked to domains rather than specific beliefs.  
361 As such, the beliefs were placed within these domains, as opposed to being directly linked to  
362 BCTs. Nevertheless, the authors placed the identified beliefs within the domains deemed  
363 appropriate, which were then used to highlight relevant BCTs. Second, although the  
364 researcher strove to recruit participants with different views on sport, for example by using  
365 different degree subjects, it could be that those recruited nevertheless demonstrated a  
366 preference towards the behavior. Furthermore, the use of snowball sampling and the  
367 subsequent small sample size may restrict the generalizability of study findings. Next, BCTs  
368 were identified by inferring the meaning behind responses, thus it is possible that the  
369 researcher may not have accurately identified the BCTs that participants actually referred to.  
370 Finally, it is not guaranteed that those BCTs identified by participants would actually  
371 demonstrate effectiveness. Indeed, other BCTs linked to domains but not stated may also  
372 successfully change behavior.



**373 Conclusion**

374 To conclude, the study followed the work of Epton et al. (2015) and Vayro and  
375 Hamilton (2016) by identifying the reasons and solutions to key beliefs previously elicited in  
376 formative work. These reasons and solutions can help form the content of a theory-based  
377 intervention. The study also identified a number of potentially useful BCTs from the  
378 participant perspective that could be used within an intervention. These BCTs, in  
379 combination with the reasons and solutions, may demonstrate efficacy if developed and  
380 implemented within a behavior change intervention. The result of such work could be an  
381 increase the number of students participating in university recreational sport.

382

383

**What Does This Article Add?**

384 This qualitative study helps facilitate the content of a future intervention through the  
385 identification of reasons and solutions to beliefs previously found to influence participation in  
386 recreational sport. We found a number of reasons and solutions that could be integrated  
387 within messages to provide important information in favor of the behavior. The study also  
388 identifies a number of BCTs that can be specifically utilized within the intervention. These  
389 BCTs could be effective in bringing about change, particularly due to the limited success of  
390 previous interventions. We recommend that future studies also seek the opinion of the target  
391 population when developing theory-based messages. In doing so, the effectiveness of  
392 behavior change interventions may be significantly improved.

## 393 References

- 394 Ajzen, I. (1985). From intentions to action: A theory of planned behavior. In J. Kuhl & J.  
395 Beckman (Ed.), *Action control: From cognitions to behaviours* (pp. 11-39). New  
396 York, NY: Springer.
- 397 Ajzen, I. (2011). Behavioral interventions: Design and evaluation guided by the theory of  
398 planned behavior. In M. M. Marks, S. I. Donaldson & B. Campbell (Eds.), *Social*  
399 *psychology for program and policy evaluation* (pp. 74-100). New York, NY:  
400 Guilford.
- 401 Author citation (In press)
- 402 Braun, V. & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research*  
403 *in Psychology, 3*, 77-101.
- 404 Cane, J., O'Connor, D., & Michie, S. (2012). Validation of the theoretical domains  
405 framework for use in behavior change and implementation research. *Implementation*  
406 *Science, 7*, 1-17.
- 407 Cane, J., Richardson, M., Johnston, M., Ladha, R., & Michie, S. (2015). From lists of  
408 behaviour change techniques (BCTs) to structured hierarchies: Comparison of two  
409 methods of developing a hierarchy of BCTs. *British Journal of Health Psychology,*  
410 *20*, 130-150.
- 411 Coakley, J. J. (2009). *Sport in society: Issues and controversies*. New York, NY: McGraw-  
412 Hill.
- 413 de Bruin, M., Crutzen, R., & Peters, G. J. Y. (2015). Everything should be as simple as  
414 possible, but this will still be complex: A reply to various commentaries on IPEBA.  
415 *Health Psychology Review, 9*, 38-41.
- 416

- 417 Epton, T., Norman, P., Harris, P., Webb, T., Snowsill, F. A., & Sheeran, P. (2015).  
418 Development of theory-based health messages: Three-phase programme of formative  
419 research. *Health Promotion International*, *30*, 756-768.
- 420 Gucciardi, D. F., & Jackson, B. (2015). Understanding sport continuation: An integration of  
421 the theories of planned behaviour and basic psychological needs. *Journal of Science  
422 and Medicine in Sport*, *18*, 31-36.
- 423 Huesman Jr, R., Brown, A. K., Lee, G., Kellogg, J. P., & Radcliffe, P. M. (2009). Gym bags  
424 and mortarboards: Is use of campus recreation facilities related to student success?.  
425 *NASPA Journal*, *46*, 50-71.
- 426 Kampf, S., & Teske, E. J. (2013). Collegiate recreation participation and retention.  
427 *Recreational Sports Journal*, *37*, 85-96.
- 428 Kanters, M. A. (2000). Recreational sport participation as a moderator of college stress.  
429 *NIRSA Journal*, *24*, 10-23.
- 430 Krueger, R. A., & Casey, M. A. (2014). *Focus Groups: A practical guide for applied  
431 research* (5th ed.). Thousand Oaks, CA: Sage Publications.
- 432 Michie, S., Ashford, S., Sniehotta, F. F., Dombrowski, S. U., Bishop, A., & French, D. P.  
433 (2011). A refined taxonomy of behaviour change techniques to help people change  
434 their physical activity and healthy eating behaviours: The CALO-RE taxonomy.  
435 *Psychology & Health*, *26*, 1479-1498.
- 436 Michie, S., Johnston, M., Francis, J., Hardeman, W., & Eccles, M. (2008). From theory to  
437 intervention: Mapping theoretically derived behavioral determinants to behavior  
438 change techniques. *Applied Psychology*, *57*, 660-680.
- 439 Michie, S., Richardson, M., Johnston, M., Abraham, C., Francis, J., Hardeman, W., . . .  
440 Wood, C. E. (2013). The behavior change technique taxonomy (v1) of 93

- 441 hierarchically clustered techniques: Building an international consensus for the  
442 reporting of behavior change interventions. *Annals of Behavioral Medicine*, 46, 81-95.
- 443 Prestwich, A., Kellar, I., Parker, R., MacRae, S., Learmonth, M., Sykes, B., . . . Castle, H.  
444 (2014). How can self-efficacy be increased? Meta-analysis of dietary  
445 interventions. *Health Psychology Review*, 8, 270-285.
- 446 Sniehotta, F. F., Pesseau, J., & Araújo-Soares, V. (2014). Time to retire the theory of  
447 planned behaviour. *Health Psychology Review*, 8, 1-7.
- 448 Sport England. (2012). *Creating a sporting habit for life*. Retrieved from  
449 [https://www.gov.uk/government/publications/creating-a-sporting-habit-for-life-a-](https://www.gov.uk/government/publications/creating-a-sporting-habit-for-life-a-new-youth-sport-strategy)  
450 [new-youth-sport-strategy](https://www.gov.uk/government/publications/creating-a-sporting-habit-for-life-a-new-youth-sport-strategy).
- 451 Sport England. (2014). *Higher Education Sport Participation and Satisfaction Survey*.  
452 *National Report. Year Three*. TNS BMRB: England.
- 453 Vayro, C., & Hamilton, K. (2016). Using three-phase theory-based formative research to  
454 explore healthy eating in Australian truck drivers. *Appetite*, 98, 41-48.
- 455 Webb, T. L., Joseph, J., Yardley, L., & Michie, S., (2010). Using the internet to promote  
456 health behavior change: A systematic review and meta-analysis of the impact of  
457 theoretical basis, use of behavior change techniques, and mode of delivery on  
458 efficacy. *Journal of Medical Internet Research*, 12, e4.
- 459 Webb, T. L., & Sheeran, P. (2007). How do implementation intentions promote goal  
460 attainment? A test of component processes. *Journal of Experimental Social*  
461 *Psychology*, 43, 295-302.

462 Table 1  
 463 *Participant demographics including age, sex, and degree program*

<b>Demographic</b>		<b>N (22)</b>
Age (years)	M = 19.8 SD = 1.3	
Sex	Male	8
	Female	14
Degree program	Primary Physical Education & Sports Coaching	2
	Secondary Physical Education & Sports Coaching	2
	Sport & Exercise Sciences	1
	Exercise, Health & Nutrition	2
	Early Childhood Studies	4
	Business & Management	2
	History & Philosophy	1
	Counselling Psychology	1
	Forensic Psychology	1
	Film & Television Production	2
	Television Production	1
	Media & Marketing	3

464 *Note.* All data is from self-report.

465 Table 2  
 466 *Example of questions used in focus group discussions*  
 467

<b>Type of questions</b>	<b>Example of questions asked</b>
Engagement questions	<i>In your opinion, what are the good and bad things about sport? Describe what you think about the recreational sport that the university offers</i>
Exploration questions	<i>What are the reasons your friends would want you to participate in sport? What are some of the solutions to sport being time consuming? Which of these reasons do you think is the most important?</i>
Technique questions	<i>What are some of the ways university sport can be made more enjoyable? Can you name some strategies that can be used to attend to issues of time?</i>
Exit questions	<i>Describe any other things that could be done to increase participation rates? Are there any other things that you think should be included within an intervention to increase participation rates?</i>

468 Table 3  
 469 *Reasons why university recreational sport is enjoyable*

Reason given	Focus group(s) stating the reason	Example quote
Socializing	1, <sup>(1)</sup> 2, *3, <sup>(1)</sup> 4	“You’ll find it much more enjoyable if you are playing with people that you get on with”
Lack of competition	*1, 3	“is good for those who don’t want to play in a competitive environment”
Health & fitness benefits	1, 2, 3, <sup>(2)</sup> 4	“perceive it to be enjoyable if you are getting healthier”
Improves mental well-being	<sup>(2)</sup> 2, 3, 4	“if you can improve mentally, and by that I mean you just feel better from exercising and playing, then the chances are you’ll enjoy it”
Make friends	3, 4	“You might not intend to go and make friends, you might just want to play because you enjoy it but you still end up meeting new people”
Stress relief	1, 4	“relaxes your mind and gives stress relief”
Improve sport-specific skills	1, 4	“If you can improve your sports skills and get better then that will make you enjoy it more”
Low cost	2, 4	“If you pay just a couple of quid then you aren’t worrying about money”
No commitment needed	2, 3	“you aren’t tied to anything or you don’t have to do it. You have the option of turning up”
Low number due to university size	1, 4	“It’s smaller so you know the people who go there”
Potential avenues to sports teams	3	“a way to maybe get into a team so if that happens or if you feel that it could happen then that could be a reason for making it more enjoyable”
Improves academic performance	4	“improves studies because you’re relaxed”
Undertaking a new sport	2	“playing a sport that you aren’t familiar with, one that you haven’t done before”
Opportunity to impress	2	“the opportunity to show off with your skills, like showing people how good you are”

470 \*represents the most important reason stated by a focus group

471 <sup>(1)</sup>represents the most important reason when a focus group were not in agreement

472 <sup>(2)</sup>represents the second most important reason when a focus group were not in agreement

473 Table 4  
 474 *Reasons why friends approve of participation in university recreational sport*  
 475

<b>Reason given</b>	<b>Focus group(s) stating the reason</b>	<b>Example quote</b>
Socializing	*1, *2, *3, *4	“want you to play cos you’ll be with them”
Health & fitness benefits	1, 3, 4	“They’d want you to get the physical benefits and be fitter”
You would be happy	1, 2	“you would be with them whilst you’re playing. And from the perspective of your friends, the fact you’re with them would make you happy”
Improve sport-specific skills	3, 4	“They might encourage you to play to get better, or want you to play because you can get better”
Create competitiveness	1, 4	“I know we’re talking about non- competitive sport, but you could make it competitive with your friends”
Study relief	2, 3	“if like playing sport takes the pressure off university work then your friends would like be happy with that”
Sensible activity	2, 4	“approve of you doing something productive, like playing sport”
Money saving	2, 4	“saving money by playing because it’s not expensive”
To win a bet	4	“if I beat you then you owe me a drink or if we beat you then you have to do something”
To meet a partner	1	“They also might want you to meet someone. It’s quite a slim chance but they could have that reason”
Opportunity to discuss studies	3	“you have the chance to catch up and maybe talk about work together”

476 \*represents the most important reason stated by a focus group



477 Table 5

478 *Reasons why family members may approve of participation in university recreational sport*

479

<b>Reason given</b>	<b>Focus group(s) stating the reason</b>	<b>Example quote</b>
Happy/enjoyment	*1, *2, 3	“would want you to be happy and enjoying yourself”
Socializing	3, *4	“you’d be with your friends socializing”
Make friends	1, *3	“If they think that you’re playing with mates or making new mates then that’s another reason for them to approve of it”
Health & fitness benefits	1, 2, 3, 4	“They will encourage it because you are becoming healthier, that’s a positive reason”
Productive/sensible activity	2, 3	“you could be doing other social activities like going out drinking or on the sesh. I reckon family members would approve of you more playing sport”
Safety of location	3	“They want you to be safe. They wouldn’t be worrying in a way”
Saving money	4	“would want you to have money to use and not waste”
Develop a competitive edge	1	“you might not be competitive at the start but this might develop and from the perspective of the family member this might be seen as good. They might want this competitive edge to you”
Develop a sporting habit	4	“could be happy if you develop sport into like a habit”
Make them proud	4	“If you aren’t active and then all of a sudden you are then you could make them proud”
Study relief	1	“it’s taking the pressure off studying”
Aware of your location	3	“they know where you are”
To meet a partner	1	This reason was stated on a post-it note but not discussed. Therefore, there is no direct quote for this reason.
Make new friends	1	“making friends as well”

480 \*represents the most important reason stated by a focus group

481 Table 6

482 *Reasons why friends participate in university recreational sport themselves*

483

<b>Reason given</b>	<b>Focus group(s) stating the reason</b>	<b>Example quote</b>
Socializing	*1, *2, *3, *4	As these reasons had already been covered within prior belief questions, participants were asked to just rate the most important. As such, there are no quotes relating to the participation of friends.
Health & fitness benefits	1, 2, 4	
Enjoyment	1, 2, 4	
Improve sport-specific skills	1, 3, 4	
Improve mental well-being	3, 4	
Study relief	2, 3	
To be active	3, 4	
Make new friends	1, 3	
Something to do	2	
To meet a partner	1	
Lack of competition	4	

484 \*represents the most important reason stated by a focus group

485 Table 7

486 *Solutions to time constraints influencing participation in university recreational sport*

487

<b>Solution given</b>	<b>Focus group(s) stating the solution</b>	<b>Example quote</b>
Organization	*1, *2, *3, <sup>(1)</sup> 4	“Better organization or preparation”
Prioritize	1, <sup>(2)</sup> 4	“This relates to the priorities of social activities in that we might say we will but we don’t because we get distracted or convinced into doing something else”
Commit to decision	1, 2, 3	“we sometimes go into things like this not fully committed and then make out like we don’t have enough time”
Plan in advance	3, 4	“planning your time can help”
Set reminders	1, 4	“Having a reminder would make sure you don’t forget”
Organize with friends	2	“can organize it to go as a collective”
Reduce the number of social activities	4	“the number of social activities, reducing how many you get involved in”
Complete university work quickly	2	“If we do our work quicker then we can free up time to play sport”
Allow greater flexibility	2	“sometimes don’t let ourselves enjoy things because we think that we have work to do but if we did then we would have more time for sport”
Be encouraged	3	“if we have friends who play and almost force us to go with them. If they are going and drag you along then you almost make the time for it”

488 \*represents the most important solution stated by a focus group

489 <sup>(1)</sup>represents the most important solution when a focus group were not in agreement490 <sup>(2)</sup>represents the second most important solution when a focus group were not in agreement

491 Table 8  
 492 *Potential BCTs from the perspective of the focus groups*  
 493

<b>Targeted belief</b>	<b>Focus group response concerning potentially effective BCTs</b>	<b>Focus group(s) stating the BCT</b>	<b>Related technique from the BCT taxonomy (v1)</b>
Enjoyment	Convince students	1	Information about emotional consequences “ ” “ ”
	Use posters	3	
	Use flyers	4	
	Use friends and members of the sports development team	1, 2	Credible source
	Experience participation	2	Behavioral experiments
Friends (injunctive)	Inform students of approval	1, 2, 3, 4	Information about others' approval
	Experience participation as a group	2, 3	Social support (practical)
Friends (descriptive)	Use friends themselves	1, 2, 3	Social comparison
	Provide facts and figures	1, 4	“ ”
	Observe friends participating	4	Demonstration of the behavior/Modelling
Family (injunctive)	Inform students of approval	1, 2, 3, 4	Information about others' approval
Time constraints	Commit to the decision	1, 2, 3	Commitment
	Make use of planning	1, 3, 4	Action planning
	Greater organization	2, 3, 4	Action planning
	Manage time more effectively	1	Time management (within the CALO-RE taxonomy)
	Successfully participate in the behavior	4	Self-monitoring of behavior

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