

The identification of reasons, solutions, and techniques informing a theory-based intervention targeting recreational sports participation

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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, Presseau, & 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.

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

Demographic		N (22)
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

Type of questions	Example of questions asked
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, ⁽¹⁾ 2, *3, ⁽¹⁾ 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, ⁽²⁾ 4	“perceive it to be enjoyable if you are getting healthier”
Improves mental well-being	⁽²⁾ 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 ⁽¹⁾represents the most important reason when a focus group were not in agreement

472 ⁽²⁾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

Reason given	Focus group(s) stating the reason	Example quote
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*

Reason given	Focus group(s) stating the reason	Example quote
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

Reason given	Focus group(s) stating the reason	Example quote
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

Solution given	Focus group(s) stating the solution	Example quote
Organization	*1, *2, *3, ⁽¹⁾ 4	“Better organization or preparation”
Prioritize	1, ⁽²⁾ 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 ⁽¹⁾represents the most important solution when a focus group were not in agreement490 ⁽²⁾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

Targeted belief	Focus group response concerning potentially effective BCTs	Focus group(s) stating the BCT	Related technique from the BCT taxonomy (v1)
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
Friends (injunctive)	Experience participation	2	Behavioral experiments
	Inform students of approval	1, 2, 3, 4	Information about others' approval
Friends (descriptive)	Experience participation as a group	2, 3	Social support (practical)
	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

494