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28 **Where science meets practice: Olympic coaches' crafting of the tapering**  
29 **process**

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31

32 **Abstract**

33 Although there is research providing physiologically-based guidance for the content of the  
34 taper, this study was the first to examine how coaches actually implement the taper. The  
35 purpose of this study was to examine the taper planning and implementation processes of  
36 successful Olympic coaches leading up to major competitions and how they learned about  
37 tapering. Seven track and field coaches participated in semi-structured interviews exploring  
38 their tapering processes. To be considered for inclusion, coaches were required to have  
39 coached one or more athletes to an Olympic or Paralympic medal. Through a process of axial  
40 and open coding interview transcripts were analysed and lower and higher order themes  
41 developed describing the coaches' tapering processes. Our findings indicate that the strategies  
42 employed to achieve the desired physiological adaptations of the taper were consistent with  
43 research (e.g., reduction in volume whilst maintaining intensity and frequency). However, our  
44 findings also suggest that tapering is far from a straight forward 'textbook' process. The taper  
45 was not restricted to physiological outcomes with coaches considering athletes' psychological  
46 as well as physical state. Coaches also involved the athlete in the process, adapted the taper to  
47 the athlete, continually monitored its progress, and adapted it further as required.

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50 **Keywords:** coaching process, applied sport science, periodisation, psychological preparation

51 **Where science meets practice: Olympic coaches' crafting of the tapering**  
52 **process**  
53

54 **Introduction**

55 For many coaches and athletes, there is nothing higher on their wish list of  
56 accomplishments than to achieve the best performance at the most important competition of  
57 the year. Performance coaches and athletes around the world are seeking the optimal training  
58 load dose response with the aim of achieving top performances at major events. An important  
59 part of the process to achieve these performances is the systematic reduction in the athlete's  
60 training load during several days prior to the competition. This period of reduced training is  
61 known as the taper (Bompa & Haff, 2009; Mujika & Padilla, 2003).

62 The science, strategy and programme design of tapering have been described in  
63 several texts (e.g., Mujika, 2009). Research has also examined the tapering process; using  
64 mathematical models (Sanchez, et al., 2013), modeling and simulations (Thomas, Mujika &  
65 Busso, 2008) and fundamental physiological training adaptations (Bompa & Haff, 2009;  
66 Mujika, 2009). This work almost exclusively focuses on methods to reduce training load and  
67 optimise physiological adaptations. It is also used extensively in sports science and coach  
68 education to inform how training programmes are designed. There has, however, been limited  
69 focus on how these theories are applied in the coaching world. Therefore, the purpose of this  
70 study was to examine the taper planning and implementation processes of successful Olympic  
71 coaches leading up to major competitions and how they learned and developed their tapering  
72 processes. This work is important because the understanding gained could inform sport  
73 science practitioners and coaches.

74 According to Lyle (2002), the coach's role is to reduce the unpredictability of  
75 performance and this requires planned harmonisation of the contributory elements of the  
76 coaching process. The concept of periodisation was developed to assist coaches' planning by

77 breaking down a year into phases (e.g., preparation, competition, taper) and cycles (Bompa,  
78 1994; Matveyev, 1981). As a result, different kinds of work could be prioritised at specific  
79 periods to build and prepare an athlete to perform to their best at a designated competition  
80 (Bompa, 1994; Bosch & Klomp, 2001), whilst also minimising training problems such as  
81 staleness, overtraining, burnout, and injury (Kraemer & Bush, 1998; Wathen & Roll, 1994).  
82 The taper is part of this periodised programme of training. The purpose of the taper is to  
83 maximise the readiness to perform through a balance between reducing the cumulative effects  
84 of fatigue (Pyne, Mujika & Reily, 2009) and maintaining fitness (Sanchez et al., 2013). This  
85 is generally achieved through a reduction in the athlete's training load prior to the  
86 competition (Bompa & Haff, 2009).

87         There has been substantial, largely laboratory-based, research interest into the taper  
88 with a number of reviews conducted examining the physiological (Bosquet, Montpetit,  
89 Arvisais, & Mujika, 2007; Houmard & Johns, 1994; Mujika, Padilla, Pyne, & Busso, 2004;  
90 Sanchez et al., 2013) and performance (Mujika & Padilla, 2003; Mujika et al., 2004) aspects  
91 of the taper. In their review, Bosquet and colleagues (2007) confirmed that performance  
92 improvement during the taper was more sensitive to reductions in training volume than the  
93 manipulation of other training variables, such as training frequency or training intensity.  
94 Although the manipulation of training volume is understood by most coaches, many of them  
95 fear a potential loss of physical conditioning when training volume is markedly reduced  
96 (Pyne et al., 2009), causing a de-training effect (Bompa & Haff, 2009). Many coaches still  
97 question how to manipulate the key elements of the taper; type, frequency, duration, and  
98 intensity of training, to enhance or optimise performance for a predetermined day (Pyne, et  
99 al., 2009). It is perhaps not surprising that this question remains when we consider that,  
100 although much of the research examining the taper is based on principles of physiological

101 responses to training adaptations, there has been little examination of how the taper has been  
102 applied by coaches as they prepare athletes for competition.

103         The current study aimed to begin to bridge the gap between the science and practice  
104 (coaching) of tapering. To do so, a more detailed examination of coaching practice in relation  
105 to tapering is needed. Coaching in a performance context is a complex, uncertain, and often  
106 ambiguous process (Jones & Wallace, 2005; Ritchie & Allen, 2015). It is “inextricably linked  
107 to both the constraints and opportunities of human interaction” (Potrac, Jones, & Armour,  
108 2002, p. 184), and is best conceptualised and understood as a series of inter-related and  
109 interconnected relationships (Cushion, Armour & Jones, 2006; Lyle, 2002). Research in  
110 performance contexts demonstrates that coaches can impact athletes' behaviour, cognitions  
111 and affective responses, and influence whether athletes achieve at a high level (Gould,  
112 Greenleaf, Dieffenbach, & McCann, 2001; Gould, Guinan, Greenleaf, Medbury, & Peterson,  
113 1999; Lara-Bercial & Mallett 2016; Ritchie & Allen, 2015). Furthermore, coaches'  
114 perceptions of the factors that enable them to coach effectively in a stressful Olympic  
115 environment include the ability to focus on the needs of the individual athlete and adapt their  
116 coaching practice according to the individual athlete's progress and responses (Olusoga,  
117 Maynard, Hays & Butt, 2012; Ritchie & Allen, 2015).

118         The purpose of this study was to extend our understanding of tapering and coaching  
119 practice in preparation for a major competition in performance contexts by examining how  
120 successful Olympic and Paralympic coaches plan and implement the taper. In doing so, the  
121 study extends our understanding of how the science of tapering is used in real world settings.  
122 In addition, understanding the factors that influence the implementation and effectiveness of  
123 the taper will assist athletes, coaches, sports science practitioners and researchers in their  
124 efforts to optimise performance.

125 **Method**

126 ***Participants***

127           Seven male track and field coaches (e.g., jumps, sprints, and combined disciplines)  
128 from the United Kingdom volunteered to participate in the study. They ranged from 47 – 73  
129 years of age. To be considered for inclusion in the study, and to ensure the credibility of the  
130 data emerging from the interviews, coaches were required to have coached one or more  
131 athletes to an Olympic or Paralympic medal (10 gold, 6 silver, 2 bronze). All the coaches had  
132 attended between one and ten Olympic or Paralympic Games and between them amassed  
133 over 30 Olympic and Paralympic coaching appearances. The participants had been coaching  
134 for between 22 and 52 years (average 31 years).

135 ***Procedure***

136           Following university ethical approval and in accordance with the university's ethical  
137 procedures for research, initial contact was made through email or a telephone call to each of  
138 the participants. The aims of the study and the expected commitment was explained. All the  
139 coaches agreed to participate in the study. The participants were assured that their comments  
140 would remain anonymous and treated confidentially. Convenient dates and times for the  
141 interviews were then agreed. All interviews were conducted by the first researcher.  
142 Interviews were carried out either face to face, through Skype or over the telephone. Each  
143 interview lasted between 40 and 60 minutes and was digitally audio recorded.

144 ***Data Collection***

145           The views of the participants were gathered through semi-structured interviews.  
146 Based on existing coach development literature (e.g., Gilbert, Cote', & Mallett, 2006), a  
147 semi-structured interview guide was developed. This contained four sections and ensured that  
148 all participants were asked the same set of major questions. Participants were also encouraged  
149 to elaborate on their responses. The natural flow of conversation directed the discussion and  
150 explored participants' unique experiences in greater depth (Patton, 2002). If needed, sub-

151 questions were used to elicit in-depth information and to ensure that participants had  
152 discussed everything they felt relevant before they were moved on to the next section (Patton,  
153 2002). Participants were also given the opportunity to add anything they felt was relevant and  
154 that was not discussed during the preceding interview sections.

155         The interview guide was divided into four main sections and participants were  
156 reminded to focus on their Olympic and Paralympic experiences throughout. The first  
157 involved introductory questions about their experience and background, and encouraged  
158 participants to talk descriptively (Patton, 2002). The second part of the interview looked at  
159 the participants' design and the content of their taper, and the factors taken into consideration  
160 when implementing their taper (e.g., what does your tapering process look like? How long is  
161 the process? Is there a set pattern, or is the process highly contingent, and why?). The third  
162 part of the interview looked at how each of the participants have developed their taper (e.g.,  
163 how have you developed this process? What are the challenges you have experienced during  
164 the tapering process, and how have you overcome these?). This was followed by questions  
165 that looked at the participants' tapering process development (e.g., has anyone or anything  
166 specifically helped you develop the tapering process?).

### 167 *Data analysis*

168         The recorded interviews were transcribed verbatim. In keeping with recognised  
169 content analysis procedures (Patton, 2002), the first two researchers, independently  
170 familiarised themselves with the transcripts by reading the interview text several times and  
171 generated initial meaning units by identifying phrases and comments relevant to the purpose  
172 of the study. The analysis was both deductive and inductive using axial and open coding  
173 (Patton, 2002). The analysis was deductive in that the overall areas of the study were  
174 delineated by the literature and interview guide (e.g., taper content, implementation process).  
175 Axial coding was used to find evidence of the coaches' tapering process. Inductive analysis

176 and open coding were used to analyse features of the complex and dynamic process.  
177 Following initial coding of the data, preliminary lower order themes were developed. The  
178 themes were then discussed between the two researchers and consensus reached on the names  
179 of the higher order themes and names as well as appropriate placement of lower order  
180 themes. The third researcher acted in the role of 'critical friend' in the final phase of analysis  
181 to achieve triangular consensus (Faulkner & Biddle, 2002). The third researcher was not  
182 involved with the data collection or initial analysis of data. His role was to confirm, or  
183 otherwise, the placement of data into higher order themes.

## 184 **Results**

185         As a result of the analysis of the coaches' discussion of their tapering process four  
186 higher order themes were developed, each comprising a number of lower order themes. The  
187 higher order themes were: planned taper (length, load, technical input); crafting the process  
188 (how the taper was implemented and adapted); challenges (factors that coaches perceived to  
189 affect the effectiveness of the taper); and developmental experiences (e.g., how the coaches  
190 had learned and developed their practice of tapering). In Figure 1, an overview of the themes  
191 is provided along with the frequency of coaches' responses (cited next to each higher-order  
192 and lower-order theme) and meaning units are presented to provide further context to the  
193 lower-order themes. While the frequency of coaches' responses does not equate to the  
194 importance of the theme, it has been suggested that the most cited themes are more likely to  
195 be transferable to other coaches and their tapering process (Weinberg, Butt, & Knight, 2001).  
196 In the subsections below all higher-order themes are discussed, with the most cited lower-  
197 order themes explored in detail. In addition, descriptive quotes are used to illustrate the  
198 themes so that the reader can understand the context of the data (McKenna & Mutrie, 2003).  
199 To protect the confidentiality of the coaches, they were assigned a code (i.e., Coach A, Coach  
200 B, etc.).



201 ***Planned taper***

202           This theme represented the planned content of the taper. It comprised four lower-  
203 order themes: taper length (e.g. the period of time identified by the coach for final preparation  
204 into the major competition), loading (e.g. coaches' strategies for manipulation of volumes,  
205 intensities and training frequency), technical input (e.g. the level of technical focus during the  
206 taper), and psychological preparation (e.g., supporting athletes' mental preparation).

207           *Taper length.* The coaches identified different lengths of the tapering process ranging  
208 from 7 to 21 days. For example, Coach D explained, "in planning to do well at a major  
209 championships then I tend to like a two week clear period of no competition before they  
210 compete at the world championships". Coach C commented, "so we normally work between  
211 7-10 days."

212           *Loading.* Coaches described the manipulation of loading that helped the athlete  
213 physically prepare for the major championships. To achieve a successful taper, the coaches  
214 all considered manipulating the training volume, frequency and intensity. Volume was the  
215 most cited factor that was manipulated during the taper, specifically, the reduction of training  
216 volume. For example Coach C described: "I like to keep the frequency of training the same,  
217 the intensity definitely stays, the volume is reduced greatly."

218           *Technical input.* This lower-order theme represented responses from coaches  
219 explaining technical considerations during the taper and comprised three meaning units:  
220 quantity (e.g. number of coaching points); quality (e.g. complexity of technical points, and  
221 execution); and contingent (e.g. variable technical focus based on the coach's emphasis at  
222 that time). One of the most frequently cited meaning units highlighted the importance  
223 considering carefully how much technical information was being provided at this time.  
224 Specifically, coaches explained "that it was important to keep the number of technical points  
225 to a minimum because you don't want to cloud them with too many things to think about"

226 (Coach G). Six coaches also emphasised the importance of not adding any new technical  
227 elements during this phase. Coach F explained:

228         From a technical perspective, from late May, that's it, I'm done tinkering. Whatever  
229         I've got, that's what I've got. Which means we go into competition and I'm trying to  
230         get the jumper to work with what they have, as well as they can.

231         The quality of execution of the event was also important during this phase.  
232         Specifically, the coaches would look at the event as a whole, "practicing the skill itself in the  
233         right context rather than breaking the elements down" (Coach F). Coach C explained that  
234         they would keep the technical element very simple by "going back to basics, and take them  
235         back to what I call fundamentals." Coach D discussed that any technical work carried out  
236         during the taper was, "more about rehearsal and refinement rather than being technical."

237         *Psychological preparation.* The coaches explained that the training objectives of the  
238         taper were not only based on physiological responses. Psychological factors were also  
239         considered when planning the training content, suggesting that "a lot of tapering is about  
240         confidence" (Coach B). The coaches felt that the role of installing confidence in the athletes  
241         in the preparation for the major competition was vital for an effective taper. This was  
242         explained by Coach D who stated that, "as well as the physical tapering, there is the  
243         psychological tapering as well, if you like, which is about confidence giving." The coaches  
244         described how mentally preparing athletes for the 'big stage' was a conscious role performed  
245         during the taper: "we have to get athletes where they are empowered and mentally strong,  
246         because when they are in the stadium they have to be strong mentally" (Coach C). Coach F  
247         explained that,

248         I only say the right things that are positive in nature, I use evidence from training to  
249         bolster their confidence... I am using real life information that they can relate to. That  
250         would give them real confidence, rather than a superfluous thing.

251 *Crafting the process*

252           How the coaches implemented and adapted the tapering process comprised three  
253 lower-order themes: adaptations to planned content (e.g. factors that influenced the training  
254 content), monitoring the process (e.g. strategies employed by coaches to assess and manage  
255 the effectiveness of the taper), and athlete collaboration (e.g., input from athletes that  
256 influenced the taper). The importance of reflecting on and adapting the tapering process  
257 throughout was emphasised by all the coaches. For example, coaches described that whilst  
258 the outline of their training during the taper was scripted “with a set structure” (Coach G), in  
259 each session it was “highly contingent” (Coach A). Coaches explained that the content “tends  
260 to be a bit ad-hoc” (Coach D) and “very touchy feely” (Coach B) [dependent on the athlete’s  
261 responses during the taper]. Coach B explained further:

262           There is a formula to it, but it is not as prescriptive as that. There are 3 or 4 core  
263 sessions that I want to get in, and what I do a lot of is ask the athlete, what do you  
264 want to do, and it becomes that.

265           *Adapting the planned content.* This lower-order theme comprised responses from  
266 coaches identifying factors that influenced the training content of the taper and contained four  
267 meaning units: Athlete characteristics (e.g. based on the individual athlete); confidence  
268 building (e.g., use of specific sessions to boost confidence); prior preparation (e.g. the  
269 training carried out leading into the taper); and context (e.g. tapering for a major  
270 championship or the championship trials). The athlete’s characteristics was a key factor in  
271 deciding the content delivered during the tapering phase. For example, Coach C highlighted  
272 that the “specifics are quite individual for each athlete” and “it all depends on the type of  
273 athlete.” A common factor that influenced the taper was the athlete type. For example, Coach  
274 E explained:

275 I don't have a set taper length, because it varies upon the individual. If we talk about  
276 400m, there are two types of individual; this is the more speed based and one that's  
277 strength based. With the strength based athlete, I would taper much closer to the  
278 championships, their volume of work will stay higher for longer, it should be around 7  
279 days. Whereas with the speed based person who is neurally wired, it would be  
280 between 10 and 14 days.

281 One of the most cited considerations for the adapting the content of training sessions  
282 during the taper was the inclusion of confidence building sessions when needed. Coach E  
283 explained:

284 There will be certain sessions that the athlete feels they respond best to. Every athlete  
285 has a 'go to' session, if things aren't going very well. So we have sessions where the  
286 athlete done particularly well, and in that window they PB'd [recorded a personal best  
287 time or distance]. So they can relate a session to a PB. The way I see it, tapering is  
288 about understanding the athlete. That for me counts for everything. Confidence is the  
289 big thing.

290 Six coaches felt that the preparation work in the build up to the taper was an important  
291 factor in deciding the content of the taper. For example Coach E explained the importance of  
292 the preparation phase: "Whether you start from 14, 10, 7 days out, it depends on what  
293 happened in the two months prior to that. I don't think you can divorce the tapering from the  
294 preparation."

295 *Monitoring the process.* This lower-order theme comprised strategies employed by  
296 coaches to assess and manage the effectiveness of the taper, enabling them to adapt the  
297 process during this phase. This theme contained five meaning units: performance outcome  
298 (e.g. the athletes' performance on the day of competition), observation (e.g. the assessment of  
299 the athlete against the coach's mental model), psychological state (e.g., provision or not of

300 feedback), performance analysis (e.g. the use of video analysis during the taper), and  
301 nutrition (e.g. the monitoring of the athlete's body weight and hydration levels). The  
302 performance outcome of the athlete was the most frequently cited response to the monitoring  
303 of the tapering process. One coach of jumps athletes simply commented, "my monitoring  
304 process is height achieved" (Coach A). Closely connected to this was observation. Coaches  
305 described how they would assess the athlete against where they expected them to be, or  
306 against their technical model for that athlete. Coach F explained:

307       I could use omega waves, which tells you when you are in the best shape of your life.  
308       I haven't got into that at all, I have relied upon what I see and what the athletes are  
309       doing throughout the process.

310       During the taper coaches paid attention to the athletes' psychological state, including  
311 athlete's confidence, carefully considering the timing and content of feedback, and ensuring  
312 both coach and athlete are realistic in the performance expectations. Coach B explained that,  
313 "you are dealing with human beings. And this is that art of coaching; when to say something  
314 and when to not."

315       *Athlete collaboration.* This lower-order theme represented the extent to which the  
316 taper was a collaborative process between coach and athlete. There were three meaning units  
317 comprising this lower order theme: coach-athlete relationship (e.g., how they work together),  
318 athlete input (e.g., athlete's preferences based on their own experiences, feedback from the  
319 athlete), and coach or athlete led (e.g. content was coach or athlete led).

320       The quality of the working relationship between coach and athlete, "how we interact  
321 with each other" (Coach E), was seen as critical for an effective tapering process. Coaches  
322 highlighted the importance of being "honest with the athletes and praising them when praise  
323 was due" and "being there for the athlete" (Coach G). It was also important that athletes had  
324 confidence in the coach and they worked together. Coach A explained that one of the reasons

325 their taper was not successful was because the athlete didn't have any confidence in the coach  
326 and the relationship broke down:

327         The athlete became less of a believer in subtlety, and more a believer of hard work, so  
328         he wanted to go to the major champs feeling strong, and I wanted him to go to the  
329         major champs feeling fresh. In the end the athlete did not perform at the major  
330         championships, and that's why our relationship ended.

331         Five coaches explained that the athlete was involved in deciding the content of the  
332 taper. The level of athlete involvement varied with each coach but was usually based on the  
333 experience of the athlete. For example Coach D described:

334         Beginner athletes going into the U20 European or World U20, if it's their first time,  
335         they will need a fair degree of direction and will rely on the coach's expertise if the  
336         coach has it. With an experienced athlete, going into the World Championships for  
337         example, they will very much prescribe what programme they want to do and I'm a  
338         helper in that programme, because they have been through it and they know what  
339         works.

340         This input also extended to coaches' value of feedback from the athlete during the  
341 taper. Coach C explained that, "I think the athlete has to be empowered to give you  
342 feedback." However, again, this also depended on the athlete's experience, with more  
343 credence given to feedback from more experienced athletes compared with less experienced  
344 athletes. For example, Coach D explained, "It depends on the experience of the athlete really  
345 as to what feedback and advice you take."

### 346 ***Challenges***

347         This higher-order theme comprised factors that coaches perceived to have an impact  
348 on the effectiveness of the taper. There were three lower-order themes: psychological (e.g.  
349 psychological state of the athlete, coach or team staff), physical (e.g. athlete injury or the

350 training preparation leading into the taper), and external commitments (e.g. media or  
351 commercial and competition agents).

352         *Psychological.* The largest of the lower-order themes comprised responses describing  
353 the psychological factors that were the biggest challenge for coaches during the taper and  
354 were categorised into the following meaning units: psychological state (e.g. over/under  
355 confidence, coping with nervousness, athlete focused on other people, irrational behaviours  
356 of coaches, athletes, and team staff), environment (e.g. factors athletes and coaches are  
357 exposed to in the holding camp and village), and conflict (e.g. between coach and athlete, or  
358 with head coach).

359         One of the largest meaning units was the psychological state of athletes, coaches and  
360 team staff. All seven coaches identified the challenges of athletes obtaining and maintaining  
361 an optimal psychological state, including the effects of over and under confidence, “dealing  
362 with boredom” (Coach B), and maintaining a focus on the athlete’s own preparation. Coach  
363 A cited examples of both over and under confidence from two different athletes, and how this  
364 affected their performance:

365         I remember doing a session with [athlete 1], and he looked amazing. And he said after  
366 this time next week my life is going to be different. And it was a revelation, because  
367 he knew he was going to get an Olympic medal, he just didn’t know what colour.  
368 Now interestingly he messed it up. He was in a brilliant place mentally, too brilliant,  
369 he was too cocky. However with [athlete 2], he was lacking in confidence, and I saw  
370 him talking himself out of the competition leading into the Olympics. So the biggest  
371 issues are over confidence and under confidence.

372         Coach E explained the importance of staying focused on the athlete’s own preparation  
373 rather than what other athletes were doing. This was particularly important with younger  
374 athletes, or those preparing for the major championship for the first time:

375 The big danger is getting wrapped up in other people's preparation, and that you see  
376 someone doing something and the athlete wants to join them. I have also witnessed  
377 athletes 'performing' in training in front of other athletes, specifically their  
378 competitors to try and psych them out. So the challenges during the taper are being  
379 surrounded by your opposition and not pumping up the volume.

380 The mental state of the coach could also be a challenge because it could affect how  
381 the coach behaved. Coach B explained that "I think you have got to look at yourself as a  
382 coach in that period of time at your own behaviours." Coach B went on to further explain:

383 When you are in holding camps, there is a boredom factor, not only for the athlete,  
384 but for the coach as well. We can actually get on each other's nerves, so you have to  
385 find some way to entertain yourself and keep yourself occupied. So for me, I tend to  
386 run a lot during holding camps and do training for myself and that helps burn off my  
387 excessive nervous energy. Because you get just as nervous as the athlete, I don't care  
388 who you are.

389 The psychological state of the coach could also be affected by the environment of  
390 major events but the coach needed to maintain their composure. Coach E recognised being in  
391 the holding camp or village during the taper had the potential to affect their coaching and  
392 planning behaviours:

393 The environment where you train changes, the expectation of those around you  
394 changes, and as a coach to the athlete, you are trying to keep things as they were, and  
395 not change a thing. So it's at that point the coach has to become a damn good actor,  
396 and hold their emotions within and let nothing out.

397 *Physical.* In this lower-order theme, coaches' explained the importance of 'work  
398 done' leading into the taper and comprised three meaning units: preparation (e.g. the training  
399 carried out leading into the taper), injury (e.g. working with an athlete who is injured, or has



400 been injured), and coach contact (e.g. the personal coach being at practice with the athlete  
401 during the taper). Coaches all commented that one of the biggest challenges for coaches was  
402 the preparation training, “work done”, leading into the taper. Coach G explained, “you can’t  
403 taper from a taper.” This was in response to the challenge of preparing athletes for a major  
404 competition, soon after the championship trials. However if there was a sufficient period  
405 between the two events, Coach E explained, “If there is time and sufficient focus, we would  
406 go back for a bit of volume before starting to taper down again.” The preparation training was  
407 also affected by injuries. Coach G explained, “the only challenge I’ve come across is if the  
408 athlete picks up an injury or something, because now you can’t actually deliver your taper.”

409 *External commitments.* In this lower-order theme, coaches’ responses explained that  
410 external factors could have a negative impact on the effectiveness of the taper including  
411 media (e.g. press commitments in the final days leading into the main competition), partner  
412 (e.g. pressure from a significant other), and agents (e.g. commitments related to the athletes’  
413 professional status). For example Coach E explained that, “if you work with a high profile  
414 athlete at the championships there is often a lot of media interest, and that can drain their  
415 central nervous system, and their emotions.”

#### 416 *Developmental experiences*

417 This higher-order theme captured how coaches’ had learned to develop and improve  
418 the taper process. This theme included the following lower-order themes: experiential  
419 learning (e.g. trial and error and personal experience over the years), informal learning (e.g.  
420 talking to other coaches, mentoring, talking to athletes), educational material (e.g. reading  
421 books on planning, peaking, and tapering, developing knowledge of sciences). One of the  
422 most frequently cited responses that helped coaches to develop their taper process was  
423 learning through experience. Coach G explained that “over the years you change your  
424 approaches and methods”, and that “you kind of have to experiment.” Coach A described

425 development as “trial and error, but more like trial and analysis rather than error. So it’s more  
426 about evolution rather than revolution.” Other development sources included informal  
427 learning opportunities through interactions with other coaches and athletes. For example,  
428 Coach C emphasised that, “there are people that have made a big impact on how I’ve  
429 developed, and those are the people that I’ve coached, the information I got back is from  
430 those that I’ve coached.” Although Coach E commented, “certainly not through reading,  
431 more from talking to [experienced coaches]”, other coaches valued educational materials to  
432 develop a framework of the taper. Coach B explained that “you need to have knowledge and  
433 understanding on planning and tapering, I work in a way, where you read about literature  
434 tapering and stuff like that and you put that knowledge in place as a framework.”

#### 435 **Discussion**

436       Much of our understanding of physiological processes, including tapering, comes  
437 from laboratory experiments and does not reflect real-world high-performance competition  
438 environments. Although there is research providing physiologically based guidance for the  
439 content of the taper (e.g., Bompa & Haff, 2009; Mujika, 2009), the current study is the first to  
440 examine coaches’ taper content and implementation process in preparation for performance  
441 competitions. The purpose of the study was to examine Olympic and Paralympic coaches’  
442 planning and implementation of the tapering process leading up to major competitions and  
443 how they had learned to improve the process. Our findings suggest that tapering is far from  
444 being a straight forward ‘textbook’ process restricted to physiological outcomes. Rather,  
445 coaches took an integrated holistic approach involving the athlete in the planning process,  
446 individualising the taper, considering the impact of technical input, and considering athletes’  
447 psychological as well as physical state. When implementing the taper they continually  
448 monitored its progress, involved the athlete, and adapted the taper further as required to  
449 optimise competition performance.

450           The taper is a period of time when the amounts of training load are reduced before a  
451 competition in an attempt to peak performance at a target time (Thomas & Busso, 2005).  
452 When discussing the planned elements of the taper, the coaches in the present study shared  
453 the view of (Houmard & Johns, 1994) who indicated that the length of taper should occur 7 to  
454 21 days prior to a championship event. The strategies employed to achieve the desired  
455 physiological adaptations of the taper were also consistent with research (e.g., Mujika, 2009).  
456 The reduction of training load was primarily achieved through the reduction of training  
457 volume, with coaches reducing the volume from 60% to 40%. Training intensity during this  
458 phase was unchanged and kept to a high level, close to or at the competition intensity. Several  
459 coaches explained that it was important to keep the training frequency the same, with some  
460 coaches concerned about the risk of detraining if frequency and volume were both reduced. A  
461 concern that is consistent with those found by Pyne, et al. (2009).

462           The training load of the taper described by the coaches in the current study was  
463 largely consistent with research and 'textbooks' guidelines (e.g., Mujika, 2009), however, in  
464 contrast to guidelines it was not restricted to physiological outcomes. The coaches adopted a  
465 more integrated holistic approach. For example, the coaches involved the athletes in the  
466 planning process, individualised the taper, considered the level of technical input they  
467 provided, and integrated psychological preparation. Considering the athlete, current  
468 circumstances, and involving the athletes in the planning process can foster autonomy  
469 support and an environment where the planning process is a motivational tool which can  
470 contribute to the athletes' performances in major competitions (Holiday, et al., 2008; Ritchie  
471 & Allen, 2015). The coaches also considered a range of factors in order to individualise and  
472 adapt the taper including the type of athlete, prior preparation, and the athlete's confidence  
473 levels. The individualised approach is consistent with discussions of coaching, more  
474 generally, which reinforces that not all athletes are the same, nor are circumstances and

475 contexts, and therefore a 'one size fits all' approach will not work for all athletes in all  
476 situations (Amorose, 2007).

477 In addition to training load manipulation, coaches also identified that the level of  
478 technical input provided by coaches was a critical consideration for the taper. Consistent with  
479 recommendations (e.g., Yingbo, 1994), the coaches indicated that it was important not to add  
480 new elements, as this would introduce uncertainty and unsettle the athlete's confidence at the  
481 critical period. For the coaches in the present study, technical sessions during the taper were  
482 about rehearsal and refinement, with coaches keeping the technical components basic,  
483 working on the fundamentals of the event, and keeping the sessions simple. Our findings  
484 support research with Olympic coaches and athletes who advocated keeping things simple,  
485 not over-coaching, and limiting technical input in the immediate preparation prior to or  
486 during competition (Gould, et al., 2001; 2002; Ritchie & Allen, 2015).

487 Further evidence of the coaches' integrated approach to tapering was the importance  
488 coaches in the current study placed on psychological preparation. It was an integral part of  
489 the tapering process and the coaches actively planned for and monitored it. This finding has  
490 not been previously documented. The coaches recognised the importance of building (or  
491 maintaining) athletes' confidence during the taper and this was a key consideration in  
492 deciding the training content. They employed a range of strategies including the use of 'go to  
493 sessions' that they knew the athletes enjoyed and providing a more collaborative approach,  
494 whereby the athlete was empowered through being more involved in the design and  
495 implementation of the taper. Confidence is a vital component of athletic performance (Hays,  
496 Thomas, Maynard, & Bawden, 2009), and an athlete's confidence can be fragile in the  
497 Olympic environment (Gould, et al., 1999). Therefore, actively planning for athletes'  
498 psychological preparation during the taper, particularly around confidence, should be an  
499 important consideration for coaches.

500           When discussing the implementation of the taper, the coaches described several  
501 monitoring strategies, however, they relied largely on the use of observation of performance  
502 and also of the athlete's psychological state. Through these subjective observations (Franks &  
503 Miller, 1991), the coaches would analyse the athletes' behaviours and performance in training  
504 against their own mental models for that athlete and event. Where, from an observer, the  
505 coaches may appear to be 'off-task' and 'not coaching', in fact, the coaches were silently  
506 observing the athlete. This information collection activity was important for the coaches to  
507 enable them to adapt the training content during the tapering period, if it was needed.  
508 Although being readily used in coaching, observations, which are fundamentally subjective in  
509 nature (Hughes & Franks, 2008), do come with limitations due to the capacity to recount  
510 information reliably and accurately (Franks & Miller, 1991). However, research has also  
511 shown that when compared with novice coaches, experts' ability to recall visual patterns is  
512 better, as long as the patterns are meaningful and domain specific, and that they place greater  
513 emphasis on analysing situations (e.g., Randel, et al, 1996). In addition, research from a  
514 professional judgement and decision making perspective (e.g., Abraham & Collins, 2011;  
515 Collins, Collins, & Carson, 2016) would support the view that experienced coaches, such as  
516 those in the current study, are capable of, and do use, sophisticated decision making  
517 processes that employ intuitive and deliberative decision making enabling a check of the  
518 validity and accuracy of a decision. To add to the information gained through observation, the  
519 coaches also engaged the athletes in the process. They sought feedback from the athletes  
520 which added to their observation and experience-based knowledge which informed on-going  
521 decisions made about the taper. The coaches were comfortable with this collaborative process  
522 when working with experienced athletes, however, they were more cautious with less  
523 experienced athletes.

524 An important finding in relation to factors effecting the implementation of the taper  
525 was coaches' awareness that confidence in their own ability was as vital for them as it was  
526 for the athletes operating in world-class sports environments. For example, one coach noted  
527 how the tapering process had failed due to the athlete's lack of confidence in him. Coaches  
528 have cited a loss of confidence to be the effect of the stressors involved in world-class sports  
529 coaching (Olusoga, Butt, Maynard & Hays, 2010, Olusoga et al., 2012) therefore, mental  
530 preparation for coaches, themselves, is important so that they can be effective in their role  
531 during the tapering process.

532 The planned content of the taper was based on knowledge of training principles,  
533 previous experience of what worked and didn't work, and what the athlete preferred. A  
534 number of coaches explained they had developed their taper through reading literature on  
535 planning (e.g., Bompa, 1999; 2005; Bompa & Haff, 2009), peaking and tapering (e.g.,  
536 Mujika, 2009), and sports training principles (e.g., Dick, 2002). The coaches, however, only  
537 accessed these sources to gain a better understanding of the fundamentals of training  
538 principles, planning and peaking and provided a base knowledge to start from. Once they  
539 understood the basics, they developed more through their own coaching experiences of 'trial  
540 and error' of previous tapers. Race (2005) described this as learning by doing, 'having a go',  
541 experimenting, and practicing something. Race also identified learning by making mistakes,  
542 by 'trial and error'. An important feature that enables coaches to learn from 'doing' is the  
543 reflective practice (Schön, 1983). The coaches in the current study had and continued to exert  
544 conscious effort toward examining the tapering process (content, implementation, and  
545 challenges) and adjusted it to improve the athlete's performance during the tapering period  
546 and in subsequent tapers.

547 Limitations and future directions

548           Our study provides valuable insight into the process of implementing the taper in the  
549 lead up to a major competition, however, no study is without limitations. Due to the small  
550 number of participants and contextualised nature of the study (i.e., coaches working in one  
551 sport, track and field) it would be inappropriate to generalise the findings beyond this sample.  
552 How coaches in different sports determine, implement, and develop further the tapering  
553 process may not be the same as the coaches in our study. However, future research to further  
554 our understanding of the implementation of the tapering process might examine the process  
555 employed by female coaches as well as coaches working in different sports. For example,  
556 how do coaches working in sports with important competitions each week or every few  
557 months implement tapering principles? How do coaches working in team sports implement  
558 and individualise the taper? Future research might also examine athletes' views on the  
559 tapering process, their perceptions of the coaches' role and their own engagement in the  
560 process with a view to considering what athletes' consider to be effective content and  
561 implementation of the tapering process. Although the coaches in the current study did not  
562 mention use of any tools other than observation for monitoring the tapering process, future  
563 research could also explore coaches' perceptions and use of the various available monitoring  
564 tools (e.g., questionnaires).

## 565 **Conclusion**

566           In the build up to major competitions, including during tapering periods, coaches need  
567 to consider, plan for, and adapt to situations that can affect athletes' physiological adaptation  
568 and mental processes leading to impaired performance (Marcora, Staiano, & Manning, 2009;  
569 Van Cutsem et al., 2017). Whilst the disciplinary approach in the sports sciences means that  
570 physical and psychological components are explored in isolation, based on the findings from  
571 the current study, it is suggested that they should be integrated holistically into periodised  
572 plans and taper strategies. The coaches in this study appeared to do so implicitly during the

573 tapering phase of training, and what they did could not be defined through any set of  
574 formulaic rules (Kiely, 2012). Rather, they recognised the relationship between the body and  
575 mind (Bailey, 2016) when attempting to optimise performance for a major competition.

576         The current study findings are important because these coaches' methods suggest that,  
577 at least for them, the physiologically based taper theory (Bompa & Haff, 2009; Mujika &  
578 Padilla, 2003) is not reflective of what happens in a real-world delivery context. In agreement  
579 with Denison (2007) we do not suggest tapering theory should be disregarded. However, we  
580 argue for a wider and more holistic conceptualisation of tapering, which not only draws from  
581 theory but also from coaches' knowledge and experiences of what it takes to peak for a major  
582 competition. The coaches in this study indicated that an effective taper allows an athlete's  
583 confidence to grow, whilst allowing them to recover through a systematic reduction in  
584 training load. Therefore, we suggest consideration of a more holistic approach to the taper is  
585 required, in particular, physiological and psychological processes.



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705 Figure 1. Olympic track and field coaches' tapering practices leading up to major events.