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**PSYCHOLOGICAL STRATEGIES INCLUDED BY STRENGTH AND
CONDITIONING COACHES IN APPLIED STRENGTH AND
CONDITIONING**

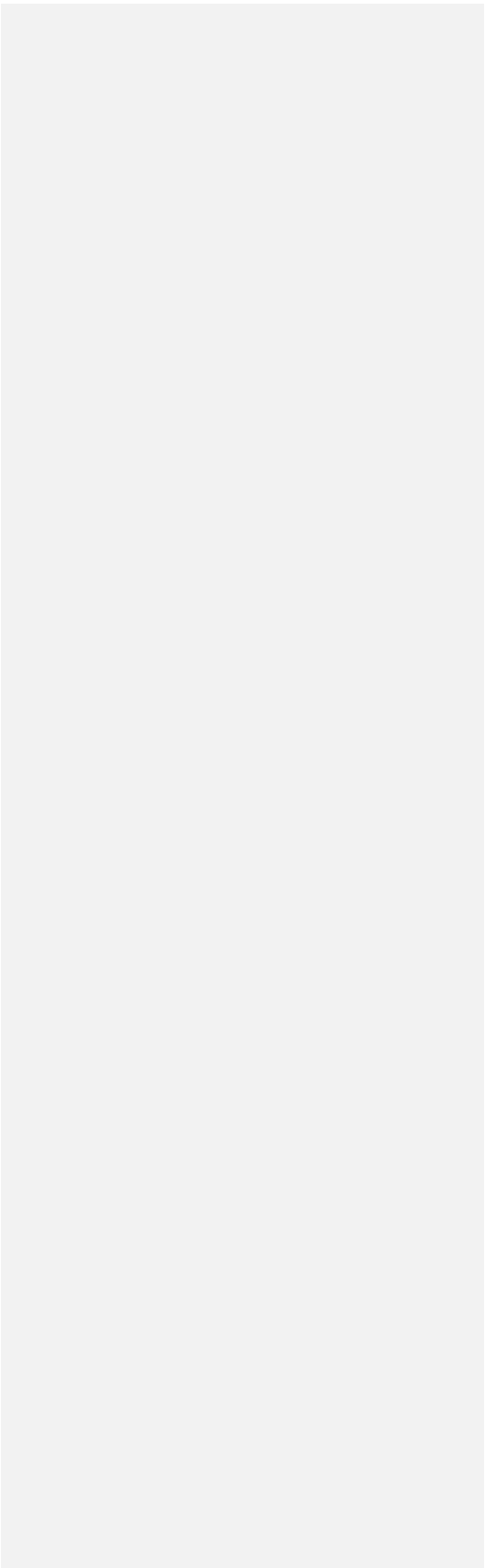
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ABSTRACT

41 This study provided the basis by which professional development needs can be addressed
42 and add to the applied sport psychology literature from an under-researched sport domain.
43 The current study endeavored to utilize qualitative methods to explore the specific
44 techniques applied by the strength and conditioning professional. Eighteen participants were
45 recruited for interview, via convenience sampling, drawn from a previously obtained
46 sample. Participants comprised 10 participants working within the UK, 3 within the USA
47 and 5 within Australia offering a cross section of experience from raging sport disciplines
48 and educational backgrounds. Participants were interviewed Using semi-structured
49 interviews. Thematic clustering was employed utilizing interpretative phonological analysis
50 to identify common themes. The practitioners referred to a wealth of psychological skills
51 and strategies that are used within strength and conditioning. Through thematic clustering,
52 it was evident that a significant emphasis is on the development or maintenance of athlete
53 self-confidence specifically with a large focus on goal-setting. Similarly, albeit to a lesser
54 extent, there was a notable attention on skill acquisition and arousal management strategies.
55 The strategies used by the practitioners consisted of a combination of cognitive strategies
56 and behavioral strategies. It is important to highlight the main psychological strategies which
57 are suggested by strength and conditioning coaches themselves in order to guide
58 professional development towards the specific areas. Such development should strive to
59 develop coaches' awareness of strategies to develop confidence, regulate arousal and
60 facilitate skill and technique development.

61

KEY WORDS

62 **Goal setting; Confidence; Attentional focusing; Skill acquisition; Motivation;**
63 **Activation; Professional development.**

64

65

INTRODUCTION

66 A robust evidence base exists exploring psychology within applied practice settings,
67 demonstrating the importance of varying sport psychology interventions within a variety of
68 sporting contexts (37). The importance of using such skills is cemented in research into elite
69 performance, in which increased psychological skill use was observed in successful athletes
70 compared to those that are less successful (16, 60). Similarly, the importance of
71 psychological skill use in practice and competition has been investigated, with observable
72 benefits when the use of psychological skills were utilized in practice compared to
73 competition alone; performers were more successful when psychological skills were
74 employed in both practice and competition settings (14, 53). This indicates that
75 psychological skills are required to excel in sport, with the requirements to incorporate such
76 skills into practice as well as competition. Rather than innate personal characterizes,
77 psychological skills are able to be developed through both formal settings, such as structured
78 sport psychology consultation and practice, and informal settings, including coaches, team
79 mates, and support staff interactions (12, 16).

80

81 Within psychological preparation there is a plethora of research supporting the advantages
82 of utilizing psychological strategies. Williams and Krane (66) reviewed the characteristics
83 of peak performance, concluding that athletes achieve their optimal performance through
84 the use of an array of cognitive behavioral strategies. Such strategies comprised emotional
85 control, arousal control, mental imagery, goal setting, attentional control and developed
86 performance routines and coping strategies.

87

88 Psycho-physiological research has evidenced the benefits of psychological inventions to
89 physiological and biomechanical variables pertinent to strength and conditioning, for
90 example the use of mental imagery strategies which have been utilized to elicit strength
91 gains over a six week period (32), whilst the variation of attentional focusing plays an
92 important role in the electromyography observed and the force produced by muscle (34, 59).
93 Therefore, it has been suggested that it would be beneficial for strength and conditioning
94 specialists to apply key psychological self-regulatory and self-expectancy theories and
95 concepts such as imagery, goal setting, motivation, and self-talk to their clients
96 individualized programs (24, 25). Nonetheless, there appears to be a lack of published work
97 evidencing the application of such skills within strength and conditioning.

98
99 More recently, Mellalieu and Shearer (38) suggested that based on the mental skills training
100 approach it would be beneficial to use particular strategies within strength and conditioning.
101 These consisted of goal setting, mental imagery, self-talk and techniques to regulate the
102 activation of athlete. Such approaches align with the self-regulatory techniques identified by
103 Holloway (24, 25) and are considered to be the 'big four' of psychological mental skills
104 training techniques used within broader sport psychology (38). However, despite the
105 consensus of the value of using techniques within sport psychology and the justified value
106 of employing such techniques specifically within the strength and conditioning domain,
107 there is a lack of research examining the particular skills and strategies that are employed
108 by the strength and condition coach.

109
110 Recently evidence has been presented that psychological strategies are prescribed by
111 strength and conditioning professionals albeit to differing extents (43). Radcliffe et al. (43)
112 employed a qualitative approach which yielded data indicating that particular psychological

113 strategies such as goal setting were used extensively, however complex cognitive strategies
114 such as mental imagery were used considerably less. This could imply that, at least within
115 the strength and conditioning community, goal setting is viewed as a generic psychological
116 skill which is readily translated into the practice domain, however it is evident that similar
117 crossover is not observed with strategies such as mental imagery. It may be that the
118 perception of the skill and the perceived value and application may limit the use of such
119 techniques. Such research is encouraging as it indicates that particular strategies are being
120 utilized, however the quantitative nature of the work presented closed responses, therefore
121 neglecting to provide the practitioners the opportunity to divulge particular techniques or
122 the instances when such techniques are employed which was not included within the initial
123 questionnaire.

124

125 The present investigation aimed to explore the psychological strategies employed by
126 strength and conditioning coaches with the intention of identifying specific strategies
127 commonly prescribed by strength and conditioning coaches. While not to distract from the
128 exploratory nature of the work, the present study hypothesized that, in line with previous
129 work (43), there would be an imbalance in the modes of psychological skills prescribed and
130 strategies to such as goals setting will be widely used in comparison to lesser prescribed
131 complex cognitive strategies such as mental imagery.

132

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METHOD

138 **Experimental approach to the problem**

139 In order to answer the aims of the current research question an ideographic approach was
140 adopted where by each individual case was examined in detail prior to the amalgamation of
141 key concepts resonant across the sample. The approach utilized semi-structured interviews,
142 transcribed verbatim, which were analyzed for key resonant themes using interpretive
143 phenomenological analysis (IPA: 48). Such a design is applicable when examining topics
144 centered on lived experiences where standardized research instruments may prevent the
145 collection of relevant data (54). Furthermore as stated by Tod et al. (54) the use of qualitative
146 methods employing semi structured interviews hay proven successful in answering
147 psychology orientated research questions within strength and conditioning.

148

149 **Ethical approval**

150 Before commencing the study, the University Institutional Review Board provided ethical
151 approval for the experimental procedures. Prior to participation all subject received an
152 invitation email containing participant information including clear explanation of the
153 potential benefits and risks associated with the research, how the data will be handled, the
154 dissemination of findings, and voluntary nature of the study. An email contact was provided
155 for the lead investigator should any potential applicants request additional information.

156

157 **Participants**

158 Eighteen participants were recruited for interview. The present study employed convenience
159 sampling drawn from a previously obtained sample pool initially compiled through
160 purposive sampling. Additional snowball sampling was used as it is regarded as an effective

161 method to enlist potential participants and compatible with the concept of purposive
162 sampling. Participants comprised 17 males and one female. Of these participants, 10
163 participants were working within the UK, 3 within the USA and 5 within Australia. Each
164 was accredited by the National Strength and Conditioning Association, the United Kingdom
165 Strength and Conditioning Association, the Australian Strength and Conditioning
166 Association, or a combination of dual accreditation. The participants provided a cross-
167 section of experience working as strength and conditioning practitioners, ranging from two
168 years to over 20 years within various sport disciplines. All participants had experience
169 working at a minimum of national level.

170

171 **Procedure**

172 Interviews were conducted at a mutually-agreed time and location with specific
173 consideration of time zone differences and typically lasted between 40-80 minutes. Data was
174 recorded using digital voice recorder (Olympus, VN-5500PC), and transcribed verbatim.
175 Interviews were conducted over the period commencing October 2011 to January 2012.

176

177 The semi-structured interview schedule was composed and scrutinized by one specialist
178 from each of the disciplines of psychology and strength and conditioning for content
179 validity. The questions explored the individuals' narrative of their experience being a
180 strength and conditioning coach. The purpose of psychology and the perceived importance
181 of psychology within strength and conditioning were questioned. The methods of skill use
182 and perceived barriers to using psychology were also explored. The questioning was open
183 ended to allow elaboration around personal professional development and to promote
184 participant narrative.

185

186 **Analysis**

187 The analysis employed interpretive phonological analysis (IPA:Smith & Osborn, 2003)
188 conducted with NVivo 9 (QSR International Pty Ltd., Victoria, Australia) software to
189 identify common themes.

190

191 The researcher transcribed all interviews verbatim. Adhering to IPA guidelines (49) the
192 transcripts were read sufficiently to provide an in-depth familiarization with the data and
193 specific context of the data. Considering specific questions, each transcript was analyzed to
194 highlight specific instances within the participants' accounts. During first stage analysis,
195 Nvivo 9 assistive software (QSR International Pty Ltd., Victoria, Australia) was used to
196 extract pertinent notes for the participant narrative. Notes were then compiled to form
197 thematic emergences after which the themes were reviewed for confirmation of
198 understanding within the contexts outlined during the narrative. This procedure was repeated
199 for the remaining transcripts with the application of an evolving 'master template' guided
200 through emerging themes used to focus the analysis (4).

201

202 Commonalities were explored between transcripts. This resulted in the development of
203 higher order themes with appropriate supporting quotes identified. In instances where quotes
204 failed to sufficiently evidence themes, the theme was removed from analysis (4).

205

206

207

208 **RESULTS**

209 The practitioners referred to a wealth of psychological skills and strategies that are used
210 within strength and conditioning. There were 130 references made to the use of specific

211 psychological strategies from 16 of the 18 practitioners. Through thematic clustering, it is
212 evident that a significant emphasis is on the development or maintenance of athlete *self-*
213 *confidence*. Similarly, albeit to a lesser extent, there is a notable focus on *skill acquisition*
214 and *arousal management*. In addition to this the strength and conditioning practitioners
215 made reference to the manner in which the psychological strategies are applied within the
216 strength and conditioning domain. The results will address two global themes identified; the
217 specific skills used and the methods in which psychology is integrated within strength and
218 conditioning practice.

219

220 The emergence of such themes is evidenced by both the frequency of emergences of
221 concepts and also the resonance, the specific individual meaning, on an individual level. The
222 emergence of such themes is evident in the cluster diagrams demonstrating the prevalence
223 and resonance of specific strategies within overarching themes (Figure 1).

224

225 **Confidence building**

226 The most prevalent theme that emerged was that of the importance of nurturing a confident
227 athlete. This was predominately via the use of goal setting however application of concepts
228 surrounding self-efficacy emerged. Each of the dominant themes relating to enhancing the
229 confidence of the athlete will be discussed in the subsequent section.

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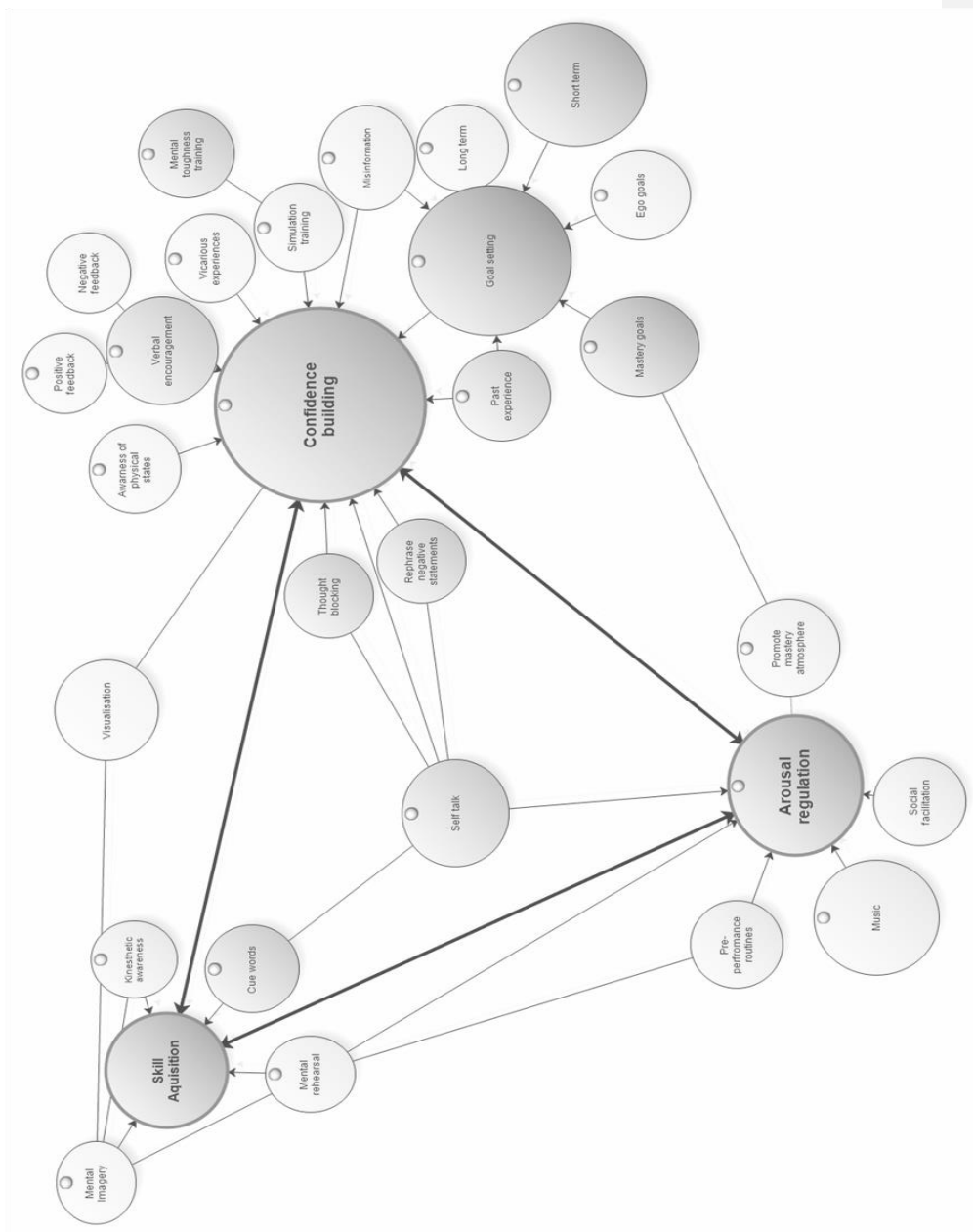


Figure 1 Thematic emergences depicting the integration of psychological skills within strength and conditioning. Resonance is indicated by size.

<u>Higher order themes</u>	<u>Lower order themes</u>	<u>Sub themes</u>
<u>Confidence</u>	Goal setting	Short term goals long term goals Athlete agreed goals Lack of athlete control Mastery orientated goals Ego orientated goals
	Emphasising accomplishments	
	Simulation training	
	Learning to fail/managing expectations	Emphasising process/mastery objectives
	Misinformation	
	Verbal Persuasion	Positive feedback Negative feedback
	Vicarious experiences	
	Imagined experiences	Visualisation Mental imagery Mental rehearsal Internal perspective External perspective
	Self-talk	Rephrase negative thoughts Thought blocking
	<u>Arousal regulation</u>	Reducing arousal intensity
Increasing Arousal intensity		Social facilitation Pre-performance routines Music
Self-talk		Technical cueing Focus attention
Mental Imagery		
<u>Skill acquisition</u>	Kinaesthetic awareness	

235

236

Figure 2 Thematic emergences depicting the most prevalent resonant higher order and lower

237

order themes

238

239

240 Goal setting was the most resonant theme within the overarching higher order theme of

241 enhancing athlete confidence. The use of goal setting received considerable attention within

242 individual narratives with 15 of the 18 respondents referring directly to the use of goal

243 setting or synonyms such as ‘target setting’.

244

245 Specific emphasis was provided to utilizing short-term goals. The formal strategy of goal
246 setting was focused around the use of short-term targets whereas there was an informal
247 attitude towards the inclusion of long-term goals.

248 *“The goals that we set would be more short-term although we would discuss*
249 *longer-term goals with them. But in terms of formalizing stuff, the majority of*
250 *goals will be shorter term goals”*

251 The concept of differing level of importance, evidenced through formal recognition,
252 indicates that there is a greater importance placed on the use of short-term goals compared
253 to long-term goals. This was also evident in the emphasis of short-term goal setting through
254 the participant narratives. Overall, considerably more emphasis exists on the use of shorter
255 term goals compared to long-term objectives.

256

257 This was especially evident when providing frequent senses of achievement when shaping
258 the development of technical skills.

259 *“Yeah they’re pretty good. We keep reminding the athletes of those [short-term*
260 *goals] so they’ve always got them in their mind and they know what they want*
261 *to achieve and we know the stepping-stones towards that.”*

262 Aligned with self-efficacy theory (6), short-term goal setting provides frequent opportunities
263 to experience achievement (17) and consequently short-term goal setting can prove a
264 powerful tool in facilitating the self-confidence of the athlete. In addition to benefiting the
265 athlete self-efficacy frequent goal setting can serve as an effective motivational tool. The
266 use of short-term goal setting was indeed perceived to be a method of increasing the athletes’
267 motivation.

268

269 There is evidence that the athlete input in the development of training objectives can range
270 from extremely limited athlete contribution through to a considerable athlete input.

271 Nevertheless, the importance of athlete input when designing goals and programs was

272 resonant through the practitioner narratives biasing towards the suggestion that involving
273 the athlete in the generation of psychological strategies appears beneficial for training
274 adherence.

275 *“That’s going to help their adherence. I have for them and agree goals and set*
276 *the goals so when they’re going to train and how they are going to train and*
277 *where they are going to train and they just turn up”*

278 In addition to the specific inclusion of goal setting, there was evidence that strength and
279 conditioning coaches were specifically referencing the athlete’s previous accomplishments

280 *“...if say they have done a certain weight before you have done this in the past*
281 *this is nothing. It will be an easy lift, so reverting them back to a previous*
282 *instance they have had success in and bringing that into the current session*
283 *would be a good way.”*

284 The use of previous accomplishments aligns strongly with self-efficacy theory. Indeed, past
285 performances are the greatest source of self-efficacy as they are grounded in the athlete’s
286 own experience (6). Various empirical sources support the effect previous experiences have
287 upon self-efficacy (see 47 for review).

288

289 A prime role of the coach in providing opportunities to experience success would be through
290 the use appropriate goal setting as previously discussed. In order to provide a sense of
291 achievement there is evidence that strength and conditioning coaches are utilizing
292 misinformation strategies by which the athletes are misinformed as to their actual
293 performance.

294 *“Used to train a lot with training partners people who would say 20kilo*
295 *Olympic bars that you are lifting and then some training sessions would come*
296 *back through saying they would of loaded it with a 25kilo Olympic bar still doing*
297 *the same sort of stuff you are lifting it a little bit extra doing very similar reps*
298 *and then finding out later that you been had [laughs].”*

299 The reference to false feedback has previously been documented within self-efficacy
300 literature and with particular relevance to strength and conditioning practice. For instance

301 informing the athlete that they are lifting a lower weight than they actually are the task is
302 perceived as less challenging and subsequently more readily achievable to the athlete. As a
303 result the athletes' self-efficacy and subsequent lifting performance has been demonstrated
304 to improve (13, 64). It should be noted however that caution is warranted when utilizing
305 such a strategy, not least because of the danger posed to the trust between athlete and trainer
306 (7) and also the ethical concerns regarding the potential risk of injury without having true
307 informed consent of the athlete.

308

309 Within the narratives, the importance of verbal persuasion is a resonant theme comprising
310 motivational and confidence enhancing benefits.

311 *"Make them focus on what they are actually there for which is good*
312 *performance it's just to try to from my part not focus on the negative but say*
313 *actually you are really good at this, this can be improved"*

314 There was evidence of positive performance feedback and verbal encouragement. Thus it
315 was evident that the strength and conditioning environment is one in which required
316 considerable encouragement and persuasion. Nevertheless, it would appear that such a view
317 was not universal within the strength and conditioning community. Some strength and
318 conditioning practitioners employ negative feedback

319 *"I think it, and this is one thing I struggle within the S&C world is that we point*
320 *out a lot of things that they are doing wrong, that they are not strong enough*
321 *they are not flexible enough, they are not all these things ... I think it is*
322 *absolutely utterly, I don't think it is right"*

323 It is apparent that within the individual's experience, within strength and conditioning
324 practice, there is the tendency to neglect positive reinforcement and focus upon the negative.

325 Whilst it is important to correct techniques it is apparent that specific feedback practices are
326 inconsistent across the strength and conditioning community. Such a perception is
327 important, especially as the debilitating effects of verbal persuasion are more powerful than
328 the facilitative effects brought through persuasive communication (7).

329

330 It is evident that the coach is aware of the athletes using visualization and the relationship
331 between visualization and confidence, however equally it is clear that there is little input
332 from the strength and conditioning coach into the style of mental imagery employed rather
333 it is self-selected by the athlete.

334 *“I know that a lot of my athletes, to keep their self-confidence up, sometimes*
335 *use alternative methods where they may do some visualization work.”*

336 Visualization is one component of the psychological skill termed mental imagery. Mental
337 imagery encompasses a spectrum of imagined sensory inputs in addition to the imagined
338 visual stimuli with qualified sport psychologist practitioners attempting to foster an
339 imagined holistic sensory experience utilizing an increased numbers of imagined sensory
340 and emotional inputs. Originally considered part of vicarious experiences (6, 7), imagery
341 has since been considered an independent source of self-efficacy (47).

342

343

344 There is evidence that the coaches are aware of the potential effects of self-talk. This is
345 evident with coaches instructing individuals to use positive statements to prevent attention
346 being focused on negative thoughts.

347 *“I definitely just direct people to not dwell on negative aspects - only positive*
348 *statements, there is no set formula there is no set words, whatever works for you*
349 *work of something that you are trying to achieve or is a positive thing for*
350 *yourself. It’s just no negative conversation within the place.”*

351

352 It is evident that the attentional focusing mechanism can govern self-confidence by
353 inhibiting focus upon cognitions detrimental to confidence. The lacking specificity of self-
354 talk strategies acknowledges the need for individual specific strategies Thus, the use of self-
355 talk may be an important strategy to prevent attention being directed towards maladaptive

356 cognitions. Indeed, the requirement to focus attention is regarded as a commonly cited use
357 of self-talk (20) demonstrating positive effects on concentration (58).

358

359

360 **Arousal regulation**

361 Arousal regulation strategies received significant emphasis within the participant narratives
362 with both elevations and reduction strategies described. The importance of regulating
363 arousal is evident throughout, with practitioners indicating that rather than being a linear
364 relationship, there is an optimal point in which arousal intensity facilitates performance.

365 *“Arousal is what people who are unskilled call psych up. We look at the inverted*
366 *U arousal and skill. The lifts we use for the major strength needs high level of*
367 *arousal when we lift heavy so we have certain strategies that we use at my club*
368 *that if someone is lifting maximal effort weights”*

369 It is also evident that strategies are being employed to reduce or elevate arousal. The use of
370 arousal elevating strategies within strength and conditioning has been a well-researched area
371 (36, 55, 56) however as yet there is a lack of consensus regarding the benefits of utilizing
372 such a technique. Interestingly it is implied that, across the strength and conditioning
373 professional field, there are inconsistencies in practice. The specific reference to the
374 “unskilled” and “psych-up” indicates that there are strength and conditioning practitioners
375 who are only aware of the need to elevate arousal and it is only the skilled coaches who are
376 aware of the need for downwards regulation. The notion that the ability to regulate arousal
377 both up and down is a distinguishing factor between skilled and unskilled strength and
378 conditioning coaches.

379

380 Initially the equivocal results of existing research are surprising given the significant
381 attention offered to ‘Psych-up’ within the narratives. However the fact that that the

382 practitioners are moderating arousal rather than simply elevating suggest that there is an
383 optimal level of arousal depending on the activity

384 *“You don’t learn that fine motor skill like throwing if you go nuts, you can’t so*
385 *I talk about throwing motivation and football motivation take it down, let’s be*
386 *little bit more calmer, let’s be a little bit more methodical with the approach an*
387 *little bit more thoughtful. Don’t just go nuts in motivation because when you go*
388 *nuts in motivation that technique can, not always but it can get out of whack so*
389 *the timing of the throw becomes a problem so we got get ourselves, reign*
390 *ourselves back in to throwing motivation rather than football motivation”*

391 The example uses arousal and motivation interchangeably and notes the different types, or
392 levels, of arousal required for different behaviors. At an implicit level the term “go nuts”
393 suggested that, despite the understanding of appropriate levels of arousal, the use of arousal
394 regulation strategies is unstructured and devised by the athletes themselves with little
395 specific technical input from the coaches.

396

397 Although not directly referred to, the use of goal setting is considered a regulatory strategy
398 with regard to reducing training stress. Goal setting was widely reported to be centered on
399 mastery goals in which the individual athlete appraises performance against self-referenced
400 targets. One such example did reference the effect of goal focus has upon the performance.

401 *“Occasionally someone gets too hyped up if it’s a new weight they go up more*
402 *and then they get over aroused and their technique falls apart and we have to*
403 *bring them back so we bring the weight back and concentrate on technique that*
404 *gave success.”*

405 The present example characterizes the emphasis on the technical execution and movement
406 form, termed process goals, rather than the actual performance outcome of the lift, thus
407 termed performance goals (29). The emphasis towards the process goals has been reported
408 to benefit performance over a season long intervention, with improvements attributed to
409 factors such as increased self-efficacy and a greater control of cognitive anxiety (30).

410 *“So again if you take weightlifting as an example, when an athlete is learning*
411 *to weight lift if they are very focused on the outcome goal of getting the bar from*

412 *the floor to above their head than they will tend to lose the mechanics of the*
413 *lift.”*

414 Through focusing attention on the technical mechanics of the lift there is an emphasis on
415 processes that would likely reduce the goal importance and subsequently be less stress
416 provoking (52). Whilst not universally established, the mechanism responsible for the
417 reduced performance stress is hypothesized to be owing to the level of control the individual
418 can possess over the outcome of the performance (26).

419

420 There was evidence for the use of pre-performance routines prior to skill execution. The
421 present example emphasizes the use of both cognitive and behavioral preparatory strategies
422 in which the athletes are instructed to perform both breathing and visualization strategies to
423 regulate arousal intensity.

424 *“I’ve tried just some sort of mental relaxation so that before we go out to throw*
425 *we do some breathing exercises. Do some relaxation exercises and some mental*
426 *feedback, you know biofeedback type stuff just lying relaxing, visualization,*
427 *visualizing the throw.”*

428 Pre-performance routines have been suggested to benefit performance through regulating
429 arousal to the optimal threshold and focusing the athletes attention to the relevant cues
430 associated with the skill execution (8, 63). The present example typifies how such
431 requirements are achieved through cognitive, bodily, and behavioral interventions.

432

433 There is evidence to suggest that the strength and conditioning coaches are utilizing music
434 to manage levels of arousal. This can consist of reducing arousal and then, through
435 modifying the type of music, increase activation to the appropriate level at the appropriate
436 time.

437 *“We live 60 km from [city], what we have, over the years, encouraged our teams*
438 *to the iPod™ so they have a selection of relaxing music that they would play in*
439 *the bus on their way to the event and when they are warming up.”*

440 Music has been shown to manipulate emotional states to alleviate anxiety and result in a
441 relaxed state (9). Such a mechanism for regulating arousal is hypothesized to be aligned with
442 Rajeski's (44) Parallel Processing Model through which attentional capacity is switched to
443 the music stimulus and thus away from anxiety provoking cues. Music has previously been
444 demonstrated to enable the athlete to disassociate away from unpleasant sensations, in
445 particular at low work intensities (11). Music has previously been credited with the ability
446 to alter psychomotor activation, serving as either a stimulant or sedative (28). Such psych-
447 up strategies have long been endorsed by reviewers, however equivocal experimental
448 conclusions exist, predominantly due to the idiosyncratic nature of music preference (28).

449

450 It is also evident that music is being used in conjunction with other psychological strategies

451 *"We also use a bit of music but we tend not to let the guys walk around the*
452 *space like the transitional area with iPod™ in. We like them to soak up the*
453 *atmosphere and realize that they here for an event but when it comes time to*
454 *visualize which is usually about, we like to give it about 30 min before a race we*
455 *let them go away just by themselves to listen to some – not big heavy music it's*
456 *more everyone got their own play lists so they listen to that for a couple of*
457 *minutes and they come back out and start warming up."*

458 Such an example supports previous work in which the use of music has been suggested to
459 aid the use of mental imagery, thus serving as a valuable pre-competitive routine (28).

460 Furthermore, the use of music has been found to increase the effectiveness of imagery
461 strategies when performing a strength endurance task compared to the use of mental imagery
462 alone (27).

463

464 There is evidence that the practitioners are manipulating the training environment to
465 manipulate the levels of arousal that the athlete may face.

466 *"I think to psych them up if you are going to attempt a personal best in the gym*
467 *the music stops and it is like all eyes on you and it sort of heightens you up a*

468 *little bit so that is a way we sort of spike arousal perhaps. It's an interesting way*
469 *of going about it but it is like lights are on you almost."*

470 The audience effect is a well-established concept in which the presence of others influences
471 the arousal experiences by the individual (71). Typically, in the presence of others,
472 performance is facilitated should the task be well-learned, yet inhibits performance should
473 the skill be difficult (50, 71).

474

475 **Skill Acquisition**

476 The narratives of the strength and conditioning coaches revealed that of the strategies used,
477 there was an emphasis on attentional focusing strategies to aid skill acquisition. This
478 comprised of the use of self-talk to provide technical cuing, the use of mental imagery as
479 mental rehearsal, and an emergent theme was the use of strategies to improve the kinesthetic
480 awareness of the athlete.

481

482 Despite self-talk being heavily used for motivational and confidence purposes, there is
483 evidence to suggest that self-talk is being employed as a behavioral mechanism to shape
484 technical skill execution. This includes the use of self-talk to for technical cuing.

485 *"So it's more to embed coaching cues a little bit ... so rather than me saying it*
486 *over and over is to get them to say it so they know what their one technical or*
487 *their one cue during that lift would be to switch core on. To make sure you know*
488 *I kind of find it helps it sink in more; they might get sick of my own voice so I*
489 *like to use self-talk for that."*

490 The use of such a strategy to regulate technique and skill acquisition is in agreement with
491 the emphasis which sport coaches place on technical execution (21). However such
492 behavioral functions of self-talk are relatively under explored within the academic setting
493 (21). Nonetheless technical cue words have been effective in facilitating motor skill
494 acquisition (1, 31). It should be noted that evidence exists suggesting that technical

495 execution would be improved through the use of cues to focus attention externally with
496 regard to both power output, improved muscle activation efficiency, and movement
497 economy (67, 70). The additional cues are thought to promote conscious interference to the
498 detriment of automaticity when executing the skill (68) .

499 *“So we have key cues that we use on a lot of exercises, so a back press can be*
500 *chest up, body tight blast off the chest drive with the arms we give them those*
501 *cues and then as the bar is coming down we will say “blast” on the way up say*
502 *drive to your eyes, eyes, eyes, eyes, and obviously blast at the bottom, explode.*
503 *So if we can get them to focus on those things but one think at a time or one or*
504 *two key things”*

505 The present example supports the notion of instilling an external focus of attention using
506 cue words. Such an approach utilizes individual words that are representative of the
507 movement kinetics such as “blast” that is associated with rapid and forceful movement. Such
508 an example is indicative that coaches are not providing excessive instruction regarding
509 desired movement coordination, rather, using cues which associate with the desired kinetic
510 outcome. Noticeably the use of reduced cues was regarded as beneficial when refining the
511 athlete’s technique.

512 *“So if we can get them to focus on those things but one think at a time or one or*
513 *two key things. Whatever they need to do. And just focus on what is important*
514 *and away from what is not important.”*

515 Such an approach is particularly relevant when shaping a skill, as according to human
516 performance models of information processing (2) there is a limited capacity to attend to
517 information and as such coaching information should be limited to emphasis only the most
518 important elements to avoid the danger of “paralysis by analysis” (2). Such examples have
519 previously been evidenced by which the addition of supplementary technical instruction has
520 failed to facilitate (23) and inhibit skill execution (69).

521 The use of visualization received attention in which mental imagery techniques are
522 integrated into a pre-performance routine.
523

524 *“Visualizing the throw. Think about where you want to place your left leg, where*
525 *do you want to place your right leg and I know [that] in certain situations there*
526 *are people who can feel it and people who can visualize it. And usually it is the*
527 *people who can feel the throw who are your good throwers not just being able*
528 *to visualize what they are doing. They feel like they are inside the throw rather*
529 *than looking at the throw from outside so we talk about that.”*

530 The use of mental imagery aligns with attentional focusing theory that states the individuals
531 must deliberately concentrate on the desired outcome or the required processes (39). This
532 preparatory strategy is likely to direct the attention towards the relevant cues required for
533 successful skill execution. Such a hypothesis exists in support of the use of mental imagery
534 to focus attention (62).

535

536 There was emphasis provided to the use of kinesthetic indicators or performance when
537 developing skills; that is the muscular and proprioceptive feedback associated with
538 becoming more adept at the skill execution.

539 *“Technique. Whether it feels good and should feel the sweet spot. So you feel*
540 *the spring it is not a grind it should be fluid.”*

541 During skill acquisition, the knowledge of performance provided by intrinsic feedback, in
542 this case kinesthetic awareness of the movement, is a valuable source of information from
543 which to shape motor programs (72). The strength and conditioning coach suggests that in
544 addition to broadly used augmented feedback the athletes are encouraged to attend to the
545 intrinsic feedback gained from performing an action.

546

547 **Mechanisms for including psychological strategies within strength and conditioning**

548 *Integrated during the session*

549 In examining the methods in which psychological strategies are included it is important to
550 determine the mechanisms for including psychological strategies. Thematic analysis

551 indicated this can take two positions, either a purposeful blocked-out period during the
552 training session or an unstructured spontaneous approach.

553 *“We’ll spend some time I guess a little bit of blocked out time initially where*
554 *we talk a little bit about the psychological cues that we are wanting to introduce*
555 *in the same that we would introduce a training session with agility and talk*
556 *about the aims and the goals of the session we try and integrate it into the*
557 *physical side so a lot of concentration, like during the warm up for example”*

558 It is worth noting the development of the psychological skills and the opportunity provided
559 to practice the skills during a warm up rather than even during the training itself. Such
560 findings would suggest that the strength and conditioning coach is adopting an active role
561 in suggesting psychological strategies rather than adopting a passive role in supporting such
562 skills only when they become apparent. However there was considerable evidence that
563 psychological skills and strategies are utilized in a spontaneous manner.

564

565 This particular respondent typifies the responses of other coaches suggesting that the use of
566 psychological strategies are used predominantly in an unstructured manor within the
567 strength and conditioning physical session, as and when they are needed.

568 *“I’d see that as a little bit more of the psychological side coming into effect you*
569 *know pre-lift routines those kinds of things, using visualisation and self-talk,*
570 *it’s all integrated rather than being a separate session”*

571 The scope to practice psychological skills is encouraging; however the unplanned nature of
572 the psychological skills could suggest that the limited attention is afforded to the
573 development of psychological skills within strength and conditioning.

574

575 Making particular reference to the educational stage of psychological skill development, one
576 individual alluded to the spontaneous manner in which sessions targeting psychological
577 development occur.

578 *"I don't think I have any educational sessions but you know I am quite happy to*
579 *sit and chat in the middle of a session or you know at the right time my practice*
580 *will always be in a session but I am not unhappy if I don't do a lot physical*
581 *training in that session."*

582 The quotation summarises the unstructured and informal approach to applying
583 psychological skills within training, ~~but also however~~ acknowledges the value of psychology
584 within strength and conditioning to the point of sacrificing physical training. ~~It is unclear~~
585 ~~the~~ The extent to which such an approach caters for the reinforcement of psychological skill
586 use in practice ~~is unclear~~ and evidences a polar approach to the systematic development of
587 psychological strategies.

588

589 ***Dedicated session***

590 There is evidence that there are individuals who are utilising dedicated sessions to facilitate
591 the psychological skills of the athletes.

592 *"It would be a dedicated sit down session. Then the next one would be a goal*
593 *setting session where we like I say go into the long term, medium term and daily*
594 *actions that they can do so it would be half an hour of maybe one session that*
595 *we could go thorough certain goals and targets that they want to achieve."*

596 Such an approach is less common than the ~~use~~ employing psychological strategies as an
597 integrated part of strength and conditioning training. Nonetheless, it is evident that the
598 specific psychological strategy is likely to influence the method ~~or of~~ of integrating
599 psychological skills either as a standalone session or integrated within the physical training
600 session. ~~For~~ For example, it is evident that coaches are integrating specific attentional
601 focussing techniques and motivational approaches within the strength and conditioning
602 session.

603 *"Well in the way I do it is not separate. I give them motivation, goal setting*
604 *reinforcement, it's just in our sessions, we teach players how to cue and give the*
605 *cues, technical cues to their training partners"*

606 However, specific cognitive strategies are also used during sessions but are separated from
607 the physical aspect of the training.

608 *“The self-regulatory and the cognitive function stuff that would be separate*
609 *from the physical stuff, you know you might do that at the end when you have*
610 *finished.”*

611 This would suggest that in distinguishing the two approaches the practitioner appears to be
612 attempting to equip the athletes with psychological skills yet does not appreciate the
613 application of such skills within strength and conditioning rather that they are attempting to
614 equip the athlete with transferable skills applicable within the wider sport performance
615 context.

616

617 ***Level of athlete involvement***

618 Concerning the involvement of the athletes in the development of mental strategies, the
619 narratives of the strength and conditioning coaches suggest that such discussions occur in a
620 variety of ways. Coaches are engaging athletes in the discussion making process with the
621 athletes in a structured and premeditated method.

622 *“It would be a dedicated sit down session.”*

623 *“...that would be a separate session at the beginning of the pre-season...”*

624 Alternatively, strength and conditioning coaches engage using informal sporadic and
625 spontaneous discussion.

626 *“Not really only through discussion. Again a lot of it to me is an education a lot*
627 *of them are using these psychological skills without them realising so whether I*
628 *use the terminology as self-talk or just have a discussion about internalising*
629 *certain messages to motivate or to clear their minds or what have you then it is*
630 *more of an informal conversation rather than saying you know this is a*
631 *particular skill that your using and I want to measure the benefit its giving you.”*

632 The narratives provide evidence that the athlete input can range from extremely limited
633 athlete input through to a considerable contribution. Nevertheless, throughout the narratives

634 there is ~~there is~~ an emerging theme that ~~that~~ involving the athlete in the generation of
635 psychological strategies is beneficial for training adherence.

636 *“It’s usually a number of questions that I fire out to them so they actually take*
637 *ownership on how they wish to do it themselves. I don’t say “hey, look you have*
638 *got to get your arousal down” because that’s telling them something and most*
639 *people won’t respond to someone telling them something”*

640 *“It’s more or less sticking with what they want for their goals and asking them*
641 *what goals are relevant to them”*

642 Intrinsic motivation is fundamental to promoting athletes to develop psychological skills
643 and strategies. Therefore, the sense of initiative when devising training requirements is
644 fundamental in providing the intrinsic motivational requirements to engage with the training
645 program. It is evident that coaches engaging with the athletes concerning the use of
646 psychological skills however it is also evident that coaches are withholding information to
647 suggest the use of psychology; instead, the coaches integrate psychological strategies
648 without the athlete associating the use of psychology within strength and conditioning
649 training.

650 *“And that rather than psych being explicit within those settings that it is implicit*
651 *that it is included as part of behaviour and that the athlete isn’t necessarily*
652 *aware that we are doing this for our psych, or we are doing that about our*
653 *arousal, or we are doing goal setting that actually they are just good*
654 *behavioural practices that are imbedded in the S[strength] and*
655 *C[conditioning]”*

656 Such an approach would suggest that the perception exists amongst some coaches that it
657 would be detrimental for ~~the~~ athletes to be aware that they are engaging with sport
658 psychology practices within strength and conditioning settings. This notion would align with
659 the concept that athletes exhibit a negative attitude towards with the use of psychology and
660 the strength and conditioning coach, although aware of the benefits of psychology, are
661 implementing such skills covertly.

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671 **DISCUSSION**

672 The present study endeavored to ascertain the range of psychological skills and strategies
673 that are being employed by strength and conditioning practitioners. It was apparent, via the
674 use of thematic clustering, that the strength and conditioning coaches directed attention to
675 three main areas. These comprise nurturing confidence, regulating arousal, and strategies to
676 facilitate skill acquisition. Whilst not to distract from the qualitative and naturalistic nature
677 of this article it is significant to identify that of the major themes, facilitating self-confidence
678 was the most prevalent within the narratives of the coaches.

679

680 The perceived importance of self-confidence to strength and conditioning has previously
681 been documented, with strength and conditioning practitioners regarding the motivation and
682 self-confidence of athletes as most important characteristics (42, 43). The current research
683 would endorse such a view and it is unsurprising that the strategies perceived to be the most
684 important received the greatest emphasis regarding the prescription of psychological
685 strategies. Despite the consensus regarding the importance of a skill and the resonance of
686 strategies to facilitate that skill, there are inconsistencies between the results observed in the

687 present study and in previous research (42, 43). Specifically the use of strategies to develop
688 self-confidence has previously been documented as ranking low in comparison to other
689 strategies, receiving only moderate use (42, 43).

690

691 Within the present study, goal setting received considerable attention within the participant
692 narratives. The current qualitative study, with scope to include context on the analysis,
693 suggested that the manner in which goal setting is used would imply that goal setting is a
694 key strategy used to facilitate the global construct of self-confidence. For example, research
695 has demonstrated that short-term goals are amongst the most commonly utilized
696 psychological strategies in athletic training (65) and physiotherapy (3, 4), whilst the
697 academic community suggest variations in goal setting strategies can account for athletic
698 performance differences (12, 41).

699

700 Work has previously identified that long- and short-term goals used in conjunction resulted
701 in a better performance than would occur should either strategy be used singularly (33). This
702 was predominantly owing to the vague nature of the long-term goals providing little
703 motivational impact within the here and now (61). Despite the widespread support for the
704 effectiveness of goal setting compared to no goals, or a simplistic 'do your best' goal (51),
705 there is a relative paucity of literature examining the optimal mechanism for integrating
706 short and long term goal setting strategies (29).

707

708 Advantages of proximal goal setting relate to the increased controllability of short-term
709 goals in which modifications can be made to ensure that the goal difficulty is appropriately
710 challenging, whilst distal goals provide a direction in which to strive. The benefits of short-
711 term goals are suggested to be related to the extent that proximal goals serve as an effective

712 feedback tool which offer frequent opportunities for participants to sense achievement (17).
713 Such a suggestion aligns with the mechanics of self-efficacy, that previous accomplishments
714 are the greatest moderator of athlete's self-efficacy (6). Equally, comparisons with distant
715 aspirations have the ability to destabilize self-efficacy and motivation should the disparity
716 between the goal and the current level be perceived as failure or insufficient process (18).

717

718 A comparison between the present investigation and earlier research concerns the use of
719 mental imagery. Previous research has identified that mental imagery is neglected in relation
720 to other psychological strategies (3, 4, 42, 43). However, the present study demonstrated
721 that strength and conditioning coaches are proposing utilizing mental imagery techniques to
722 benefit both athlete confidence and skill development and execution. It should be noted that
723 despite being ranked low in previous studies with regard to other strategies (42, 43), mental
724 imagery strategies were still utilized a moderate amount. Reasons for the infrequent use of
725 imagery strategies have been suggested to be a lack of perceived importance and difficulty
726 in prescription of strategies (19, 65). However, despite limited references to kinesthetic
727 'feeling' being noted, imagery references were predominantly focused on the visual
728 component of imagery. Such an approach would indicate that there is still a considerable
729 lack of understanding regarding the application of mental imagery.

730

731 The difficulty in prescribing mental imagery strategies is reflected in the current study in the
732 misunderstanding of what constitutes mental imagery. That is it was apparent that
733 practitioners were, with a few exceptions, utilizing only the visualization component of
734 mental imagery. Thus it is likely that as well as difficulty in prescribing mental imagery
735 techniques, the lack of knowledge would render such techniques ineffective and therefore
736 reduce the likelihood of the practitioner pursuing such an approach.

737

738 An emphasis on the use of arousal inducing strategies was expected due to the fact that many
739 athletes attempt to elevate arousal levels prior to lifting (56); strength benefits from
740 employing arousal inducing strategies are observed (46, 56, 57). However, it was evident
741 that an optimal level of arousal existed, beyond which performance would deteriorate.
742 Consequently, strategies were reported to both elevate and reduce levels of arousal. The
743 prominence of arousal regulation strategies, whilst expected does not reflect previous
744 findings in which only a small consensus of strength and conditioning practitioners reported
745 that 'arousal' was important. Interestingly, the need to relax was regarded as important by a
746 larger proportion of practitioners (43) whilst the detrimental factor of inappropriate arousal
747 was similarly documented (43). This would imply that rather than simple elevation of
748 arousal, the practitioners perceive it is important to tune arousal to the appropriate level
749 specific to the task and the individual. This notion was supported by the description of
750 techniques to both reduce and increase levels of arousal.

751

752 The final prominent higher order theme was the use of strategies to aid in the acquisition of
753 skill. This comprised instructional self-talk, mental imagery, and emphasis of kinesthetic
754 awareness. The use of such strategies fulfils key roles in the skill acquisition process. When
755 learning and executing a skill there is a proposed finite attentional capacity that can be
756 afforded to external and internal cues, therefore, preparatory strategies are important in
757 focusing attention towards the cues most relevant for the task execution. The use of effective
758 attentional strategies can reduce the time taken to learn new skills (35). One reason is that
759 self-talk and preparatory imagery could serve as strategies to facilitate prior identification
760 of the most pertinent task relevant cues.

761

762 In developing autonomous actions, it is important that the athlete develop awareness of what
763 the movement should feel like. Termed the image of action (45), this motor image governs
764 the extent to which immediate fine adjustments can be made to movement characteristics.
765 In developing the image of action, it is important that the athlete is able to provide self-
766 reinforcement of what the movement should feel like. Such specific feedback, the
767 knowledge of performance, is based on kinesthetic feedback (35). It is therefore
768 encouraging that strength and conditioning coaches are employing strategies to direct
769 attention to the kinesthesia of the movement however, the consensus offered little evidence
770 of the widespread use of strategies to aid in motor skill acquisition.

771

772 The large emphasis on cognitive and behavioral strategies to promote confidence and
773 regulate arousal is indicative that such strategies are important within strength and
774 conditioning practice. It is however interesting that a relative paucity of skill acquisition
775 strategies were presented. Such a lack of psychological strategies to facilitate in skill
776 acquisition is surprising, not least because one of the prime responsibilities of the strength
777 and conditioning professional is the teaching of exercise technique (40). Furthermore,
778 strength and conditioning coaches have been documented to spend the majority of their time
779 teaching correct techniques (10) and providing instruction during performances (15).

780

781 It is interesting that within the present study there is an apparent under-representation of
782 skill acquisition strategies. It may be that with the apparent focus on the psychological
783 constructs of confidence and motivation of the athlete (43), the strength and conditioning
784 coaches in the present study were more aware of specific techniques to influence confidence.
785 Similarly, the regulation of arousal, often termed 'psyching up' (46, 55, 57), is by name
786 association a psychological factor. It is therefore possible that the majority of the

787 practitioners will not have associated skill development as a psychological factor within
788 strength and conditioning and thus naively withheld information. Such a conclusion would
789 indicate that there is a lack of understanding regarding the total role psychology can play
790 within strength and conditioning. Additionally it is possible that a lack of understanding
791 around the mechanics of skill acquisition, which go beyond the use of basic use of
792 instruction, would provide greater scope to develop the instructional skill set of the strength
793 and conditioning coach and is an area worth of focusing coach development programs.

794

795 When examining the specific psychological strategies it was important to explore how
796 specific strategies are integrated into strength and conditioning. This approach included the
797 specific timing of psychological interventions and the level of athlete input in development
798 of applicable psychological strategies. The involvement of the athlete in the decision making
799 process is a critical component with regard to motivational consequences, especially
800 pertinent as motivation is regarded as the most important of all psychological constructs
801 within strength and conditioning (43).

802

803 Such an awareness of the need to include the athlete in the planning stages of psychological
804 strategies is encouraging, with a bias toward the inclusion of the athlete rather than ~~forming~~
805 developing and prescribing strategies independent of athlete input. It is apparent that the
806 instances when the athlete is not party to psychological techniques and the associated
807 rationale for such strategies is owing to the perception that the athlete would respond
808 negatively to the inclusion of psychology.

809

810 The spontaneous integration of psychology within sessions was prevalent amongst coaches,
811 indicating an unstructured view towards applying psychological strategies within strength

812 and conditioning. Such an approach is polar to the recommended systematic education and
813 acquisition of psychological skills and as such is likely to be a sub-optimal approach.
814 Nevertheless the application of psychological skills during training is encouraging with
815 regard to the association between skills use in practice and skill use during competition (16,
816 14).- The spontaneous inclusion of psychology is likely to be owing due to the lack of time
817 available with the athlete. With demanding time constraints, it is likely that the physical
818 training takes precedence. A second potential reason would comprise the perceptions of the
819 practitioners and the myth the psychological skills can be quickly acquired and provide
820 quick fix solutions.

821

822 An interesting observation concerning the methods of including psychological skills training
823 was that particular skills were introduced away from the training session, yet others were
824 introduced during the strength and conditioning setting. This would indicate that particular
825 skills are suited to being integrated during the training session whilstwhilst others may be
826 better suited to be introduces-introduced away from the training setting, for example, goal
827 setting was the most used strategy away from the training environment.

828

829 -It is noteworthy to suggest that as goal setting has previously been identified as the most
830 frequently utilised technique (43) coaches have greater awareness of utilising goal setting
831 techniques in a variety of settings whilst the incorporation of other techniques are still in
832 relative infancy. Consequently, the coaches may be naive as how particular techniques can
833 be introduced or promoted away from the immediate physical conditioning setting. This
834 highlights the need for professional development work to be provided to develop the
835 awareness of the use of psychological interventions within the applied strength and
836 conditioning environment.

837

838 Concerning the qualitative nature of the work, the present investigation is effective in
839 identifying specific strategies which are used in strength and conditioning and also the
840 rationale for using such strategies in relation to developing confidence, regulating arousal
841 or facilitating skill acquisition. Such a question was answered using a diverse sample with
842 regard to experience and geographical location. However the sample in question was small
843 and whilst providing detailed responses, caution is warranted if generalising the findings.
844 Nevertheless, the present work supports previous quantitative research (43) which
845 effectively quantified psychological skill use within strength and conditioning with regard
846 to the most prevalent strategies used and important psychological constructs. Future work
847 would be advised to examine the knowledge base on which strength and conditioning
848 coaches base their psychological practice.

849

850

851

PRACTICAL APPLICATIONS

852 The findings of the present research provide encouraging direction as the strategies which
853 are most frequently prescribed by strength and conditioning coaches. This provides direction
854 in targeting specific strategies which can be further developed through continuing
855 professional development and provides guidance towards techniques applicable within the
856 strength and conditioning domain. The range of strategies used by the practitioners is
857 indicative of those which could be classified as cognitive strategies, or as behavioral
858 strategies. The thematic clustering of strategies is indicative of a triadic model where the
859 key concepts within strength and conditioning practice appear to relate to the need to
860 regulate arousal, the importance of shaping confident athletes, and, albeit to a lesser extent,
861 the use of attentional focusing techniques to facilitate skill acquisition. It is pertinent to

862 highlight such areas with scope to guide professional development towards the specific
863 areas. The particular relevance of such areas is supported in the psychology chapter within
864 the *Essentials of Strength and Conditioning* (5), in which emphasis is provided to arousal
865 regulation, motivation, and attentional focusing (22) and more recently, and extensively, in
866 the text specifically detailing the use of psychological skills training within strength and
867 conditioning (38). It is therefore particularly pertinent to reinforce such concepts within the
868 development of strength and conditioning practitioners. Such development programs could
869 be in the guise of case studies or using simulated scenarios that could provide inexperienced
870 practitioners with focused experiences to develop discipline specific skill sets. Whilst the
871 present research has evidenced the use of psychological interventions within strength and
872 conditioning, it is important to consider that the importance to be flexible in meeting the
873 individual training needs (54). Nevertheless, the present work has potential benefits for the
874 strength and conditioning community through providing direction towards a suitable skill
875 set for the coach practitioner to possess.

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