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26 **Optimal Emotional Profiles for Peak Performance in Strength and Conditioning**

27

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**OPTIMAL EMOTIONAL PROFILES FOR PEAK PERFORMANCE IN STRENGTH
AND CONDITIONING**

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ABSTRACT

77 This study investigated athletes' performance-related emotions and emotional profiles for
78 optimal performance in strength and conditioning (S&C). It is suggested that the identification
79 and control of emotions associated with successful and unsuccessful performances are essential
80 for achieving peak psychological states and optimal performance in sports-related tasks. The
81 Individual Zone of Optimal Functioning (IZOF) model outlines an idiographic and
82 comprehensive conceptual framework of interrelated dimensions that describe the structure and
83 dynamics of subjective emotional experiences and performance-related psychobiological
84 states. With institutional ethics approval, 13 competitive-elite athletes (male, $n = 7$; female, n
85 $= 6$; mean age = 21.7 ± 4.0 years) completed IZOF-based emotion profiling, in which
86 participants were asked to recall their perceived best and worst S&C session, outlining
87 emotions and intensity within four global emotional categories. A significant difference was
88 evidenced between best ever and worst ever performance within positive functional emotions
89 ($p < 0.001$, $d = 3.63$) and negative dysfunctional emotions ($p < 0.001$, $d = 4.92$). Initial findings
90 suggest that perceived peak performance states within S&C are associated with a high intensity
91 of positive functional emotions (confident, motivated and energetic) and a low intensity of
92 negative dysfunctional emotions (worn out, sluggish, annoyed and discouraged). Whilst future
93 research is necessary to fully understand this area, the present data suggests that, in order to
94 assist athletes in achieving perceived peak performance states within S&C, psychological skills
95 and strategies should be informed and developed in collaboration with Sport Psychologists,
96 with the aim of achieving an optimal emotional profile.

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KEY WORDS

98 IZOF Model, Functional, Dysfunctional, Emotion, Peak Performance State

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INTRODUCTION

101 Strength and conditioning (S&C) as a research area and applied field, is constantly searching
102 for factors that can contribute to superior physiological performance gains, including
103 investigating the contribution of sport psychology (26, 31, 41, 43). Achieving physiologically
104 optimal performance is associated with psychological ‘peak performance’, namely a high level
105 of functioning and performance outcome that results in a best performance (1, 16, 17, 20).
106 Literature suggests that achieving peak performance is a result of a highly developed ability to
107 identify and self-regulate cognitive, emotional and behavioural factors, in order to facilitate
108 automatic skill execution across many sports and contexts (1, 8, 20). As such, the role of sport
109 psychology within S&C is to assist athletes in consistently achieving high levels of
110 performance, as close to their physical potential as possible, by minimising the negative impact
111 of psychological factors via appropriate cognitive, emotional and behavioural tools and
112 strategies. (1, 7, 8, 20, 41).

113

114 Within S&C, it is widely recognised that a high level of athletic performance is a result of
115 highly skilled movement, effective physical training, optimal rest, appropriate diet and a stable
116 genetic ‘ceiling’ of performance (41). However, it is also recognised that the expression of
117 performance is highly variable and inconsistent (41). Gee (7) acknowledges the psycho-
118 physiological aspect of performance and suggested the terms *absolute* performance (referring
119 to the maximum physiological output an athlete can achieve) and *relative* performance
120 (referring to performance resulting from impeding or regulatory factors, such as the cognitions
121 of the athlete). Since psychological factors might facilitate or impede an athlete’s ability to
122 perform, Gee (7) suggests that the role of sport psychology is to assist an athlete in optimising
123 psychological state, and as such, attaining as close as possible to their absolute performance.
124 In the context of sport psychology within S&C, research has considered the importance of areas
125 such as nurturing confidence, regulating arousal and facilitating skill acquisition (30, 31).

126 However, to the authors' knowledge, there is currently no research investigating the emotions
127 experienced or emotional zones of optimal or dysfunctional performance within S&C. It is
128 suggested that a task specific, idiographic and theoretical approach is required to effectively
129 study optimal zones of arousal/anxiety/emotions for peak performance (39).

130

131 Emotions have been described as subjective feelings experienced in response to events in the
132 athlete's environment or mind that cause a physiological, cognitive and behavioural response
133 (24). It is widely evidenced that emotions experienced before and during a performance can
134 have a significant impact on the outcome of this performance being successful or unsuccessful
135 (21, 22, 44). The Cognitive-Motivational-Relational (CMR) theory describes the relationship
136 between cognitions and discrete emotions outlining that core relational themes are a result of
137 an individual's primary and secondary appraisals (25, 44). The specific combination of primary
138 (whether a situation is personally relevant to an athletes goals and values) and secondary (an
139 athlete's perceived coping ability) appraisals is suggested to influence the type and intensity of
140 emotion experienced (44). Within sport, CMR theory can be summarised as an on-going
141 athlete-environment interaction resulting in positive or negative emotions and therefore
142 functional and dysfunctional emotional experiences that could influence performance (38).
143 Hanin (10) examined peak psychological states, with respect to performance-related emotional
144 states, and developed the Individual Zone of Optimal Functioning (IZOF) model. The IZOF
145 model is a sport-specific, idiographic approach towards describing the emotional experiences
146 and patterns associated with an athlete's successful and unsuccessful performances (11, 39).
147 Since sporting activity is repetitive, situational state-like experiences are suggested to develop
148 into relatively stable emotional patterns, which athletes can reflect on with respect to the
149 performance outcome and develop meta-experiences (9, 13, 27, 28).

150

151 The IZOF model provides a comprehensive conceptual framework of interrelated dimensions
152 (form, content, intensity, context and time) to describe the structure and dynamics of subjective
153 experiences and performance-related psychobiological states (32). Emotional content is
154 conceptualised using hedonic tone and performance functionality, within four global emotional
155 categories: pleasant functional emotions (P+), unpleasant functional emotions (N+), pleasant
156 dysfunctional emotions (P-) and unpleasant dysfunctional emotions (N-) (9, 11, 13, 32, 39).
157 Functional emotions are those considered to enhance performance whilst, conversely,
158 dysfunctional emotions inhibit performance. Thus, a pleasant emotional tone can be
159 experienced which could facilitate (P+) or debilitate (P-) performance whilst, equally, a
160 negative emotional tone can be associated with facilitating performance (N+). Intensity is a
161 quantitative characteristic of individual experience that outlines the magnitude of emotion
162 experienced (32). When emotional content and intensity are assessed within successful and
163 unsuccessful performance experiences, an emotional profile is established that describes
164 performance-enhancing optimal zones and performance-inhibiting dysfunctional zones (9, 10,
165 12, 20). Research across a variety of sports suggest that a successful or best performance is
166 associated with a similarity to an optimal zone or a large difference from a dysfunctional zone,
167 whereas an unsuccessful or worst ever performances is associated with a similarity to a
168 dysfunctional zone or a large difference from an optimal zone (12, 29, 34-36, 39). The impact
169 of emotions on performance is described by the mobilisation or demobilisation and use or
170 misuse of energy (11, 15, 32). Functional emotions are suggested to generate sufficient and
171 appropriate levels of effort/energy to initiate and maintain the task and the efficient use of
172 available resources to result in successful completion (11). Whereas, dysfunctional emotions
173 are suggested to result in an excess or dearth of energy/effort to complete the task and
174 inefficient or inappropriate use of available resources, such as a task-irrelevant focus or

175 diminished information processing (11). As such, emotional state may play a considerable role
176 in facilitating an energetic or fatigued athlete during S&C sessions.

177

178 The assessment of optimal and dysfunctional emotional states, grounded in the IZOF model,
179 has been utilised across a variety of sports and practically applied in designing and delivering
180 interventions to achieve peak psychological states and therefore peak performance (16, 38, 47).

181 However, to date, the assessment of emotional experience has not been explored within the
182 context of S&C. The aim of this paper is to investigate athletes' performance-related emotions
183 and emotional profiles for peak performance in S&C. Subsequently, these findings will add to
184 the dearth of literature and, as such, assist athletes and coaches toward finding optimal
185 emotional states. This in turn might serve to effectively mobilise an athlete's physical and
186 mental resources in order to perform as close to their physical potential as possible.

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188

METHOD

189 **Experimental approach to the problem**

190 In order to effectively investigate athletes' performance-related emotions and emotional
191 profiles in S&C, a within-subject research design was utilised to identify differences between
192 two conditions, "best ever" and "worst ever" performance within 4 global constructs of
193 emotional experience (18). A retrospective, task-specific and individual-oriented procedure
194 that requires recall of past experiences and idiographic emotional descriptors is suggested to
195 be effective in outlining athletes' emotional experiences (10, 13, 38). In congruence with
196 criterion outlined by Swann, Moran and Piggott (42), competitive-elite level athletes
197 participated within this study as they are suggested to have a more vivid recall ability of past
198 experiences, awareness of state-like zone sensations and possess a high level of emotional

199 knowledge and self-awareness (1, 5, 27, 35, 38). Such an approach has been previously utilised
200 to examine IZOF within a wide variety of sports and contexts (39).

201

202 **Subjects**

203 This study was conducted in accordance with ethical approval from the first authors
204 institutional review board. All participants were aged 18 years or above and gave informed
205 consent to participate in the study prior to testing. A non-probability theoretical sampling
206 method was used to select participants of competitive-elite standard (18, 42). Thirteen
207 competitive-elite athletes (male, n =7; female, n =6: mean age = 21.7 ± 4.0 years, age range =
208 18-33 years) from a variety of sports, consisting of: athletics (n = 4); basketball (n = 2); boxing
209 (n = 1); football (n = 2); hockey (n = 1) and sailing (n = 2), participated in the study. Participants
210 had 9.2 ± 4.1 years competitive experience within their sport at national and international level
211 and 3.9 ± 1.5 years' experience participating within high performance S&C.

212

213 **Procedure**

214 IZOF-based emotion profiling was conducted, adapted from Hanin (10) and Woodcock (46).
215 Athletes identified a perceived "best ever" performance (BEP) and "worst ever" performance
216 (WEP) within an S&C session. In order to aid recall of BEP and WEP, athletes were asked to
217 consider the quality of performance process, namely technically proficient movement patterns
218 and/or achieving personal best (PB) results (12). Participants were also asked to provide
219 qualitative comments or important details of each session and rated overall performance on a
220 1-11, modified format of the Borg's Category Ratio (CR-10) scale (3). The CR-10 scale was
221 guided by the following verbal anchors, 1 = Worst and 10 = Best Ever (no verbal anchors were
222 used for 2-9 and 11), as outlined by Woodcock (46). Participants were then asked to identify
223 helpful pleasant and unpleasant emotions during their BEP, and unhelpful pleasant and

224 unpleasant emotions during their WEP. 5 emotion descriptors were selected for each global
225 emotional category (P+, N+, P-, N-), resulting in 20 idiosyncratic emotional descriptors linked
226 to performance (12). Emotions were selected from a list of 96 emotion content descriptors that
227 were grouped into positive (e.g., glad, active, excited) and negative (e.g., angry, afraid,
228 doubtful) terms and collated into synonym-based sub-groups (12). Participants were only
229 allowed to select one emotional descriptor within a sub-group. If participants were unable to
230 select a descriptor that appropriately described an important emotion, they could add their own
231 words or descriptors to the list. Participants were then asked to rate the intensity of each
232 emotion experienced during BEP and WEP. Intensity of each item descriptor was rated on a 0
233 to 11 modified format of the CR-10 scale with the following verbal anchors: 0 = nothing at all,
234 0.5 = very, very little, 1 = very little, 2 = little, 3 = moderate, 5 = much, 7 = very much, 10 =
235 very, very much, 11 = maximal possible (no verbal anchors were used for 4, 6, 8, and 9) (3,
236 10).

237

238 **Statistical Analysis**

239 Descriptive statistics (Mean \pm Standard Deviation, $M \pm SD$) were calculated to evidence: the
240 overall performance rating, the frequency of emotions selected and intensity of emotion
241 between BEP and WEP. Samples of verbatim qualitative descriptors are also provided to
242 evidence differences between BEP & WEP. A Shapiro-Wilk test was used to assess the
243 assumption of normality. Normality was assumed for all variables ($p > 0.05$), except WEP P+
244 ($p = 0.03$). As a result inter-performance differences within parametric data (N+, P-, N-) were
245 calculated using a paired-samples *t*-test with a Bonferroni correction and inter-performance
246 differences within non-parametric data (P+) were calculated using a Wilcoxon signed-rank test
247 (6, 18). Effect sizes were also calculated, using Cohen's *d*, to outline the magnitude of observed
248 effect within intensity of emotion between BEP and WEP (4). Differences were deemed as

249 significant when $p \leq 0.05$ and a small, medium, large and very large effect size determined at
250 values of 0.2, 0.5, 0.8 and 1.3 respectively (4, 6, 18).

251

252 RESULTS

253 Within BEP, participants reported overall performance ratings of 8.2 ± 2.6 . Participants stated
254 that the identification of their BEP session was attributed to “hitting new PBs in a squat”,
255 “being able to perform technically difficult exercises” and “feeling powerful and energized”.

256 Within WEP, participants reported overall performance ratings of 2.9 ± 1.6 . Participants stated
257 that the identification of their WEP session was attributed to “fatiguing quickly and feeling
258 discouraged”, “struggling to technically perform a complex lift” and “feeling weak, tired and
259 demotivated to train”.

260

261 The emotional intensities reported during BEP and WEP are outlined in **Table 1.** and illustrated
262 in **Figure 1.** Differences between BEP & WEP, within emotional categories P- (BEP = $3.65 \pm$
263 1.89 , WEP = 5.04 ± 1.74) and N+ (BEP = 6.03 ± 2.23 , WEP = 4.74 ± 1.96) calculated as non-
264 significant ($p = 0.086$, $p = 0.151$ respectively). However, differences between BEP & WEP,
265 within emotional categories P+ (BEP = 8.19 ± 1.33 , WEP = 2.82 ± 1.61) and N- (BEP = 1.42
266 ± 1.19 , WEP = 7.66 ± 1.34) calculated as significantly different ($p < 0.001$). Effect size between
267 BEP & WEP for P- was calculated as $d = 0.76$ and effect size between BEP & WEP for N+
268 was calculated as $d = 0.62$ respectively, both evidencing medium to strong effect size (4). Effect
269 size between BEP & WEP for P+ was calculated as $d = 3.63$ and effect size between BEP &
270 WEP for N- was calculated as $d = 4.92$, both evidencing very strong effect size (4).

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INSERT FIGURE 1 HERE

The frequencies of emotional items selected by participants within each global emotional category are outlined within **Table 2.** (full list in **Appendix A.**) Within P+, participants most frequently identified feeling motivated/inspired, confident/certain and energetic/dynamic. Within P- participants most frequently identified feeling unhurried/quiet/calm, carefree and relaxed/easy. Most frequently identified N+ emotions outlined feeling intense/fierce, aggressive/angry, annoyed/irritated and doubtful/uncertain/irresolute. Finally, most frequently identified N- emotions outlined feeling worn out/tired/exhausted, sluggish/inactive/lazy, annoyed/irritated/distressed, and discouraged/dispirited.

INSERT TABLE 2 HERE

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DISCUSSION

This study investigated athletes' performance-related emotions and emotional profiles for peak performance in S&C. Specifically, any potential differences between BEP and WEP emotional profiles with respect to intensities of global emotional categories and idiosyncratic emotions selected and their functional or dysfunctional impact on performance. Results indicated a significant difference between BEP and WEP within P+ and N- emotional categories. As well as a high frequency of specific emotional descriptors determined to be functional (such as motivated, confident, energetic, intense and aggressive) and dysfunctional (such as unhurried/quiet, carefree, relaxed, tired/worn-out, sluggish and annoyed/irritated).

Emotional Profiles

As previously stated, a successful or best performance is associated with a similarity to optimal zone profile which typically comprises of a lower intensity of P- & N- emotions and a higher intensity of P+ & N+ emotions, or a large difference to dysfunctional zone profiles, which typically comprises of a lower intensity of P+ & N+ emotions and a higher intensity of P- & N- emotions (12, 29, 34, 36). The present investigation reported, as evidenced in **Table 1.** and **Figure 1.**, that within S&C, a BEP emotional profile was significantly different from an unsuccessful or WEP profile, within emotional categories P+ and N-. A BEP profile, with

325 overall performance ratings of 8.2 ± 2.6 , consisted of a high intensity of P+ emotions ($8.2 \pm$
326 1.3) and a low intensity of N- emotions (1.4 ± 1.2). Consistent with the previously stated impact
327 of emotions on energy mobilisation, this can be interpreted to suggest that a high intensity of
328 P+ and a low intensity of N- generate sufficient energy/effort to initiate and maintain the task
329 with an adequate effort level and the efficient use of available resources (10, 14, 29). This is
330 further supported by perceived high overall performance ratings and “*hitting new PBs*” or
331 “*feeling powerful and energized*”. Whereas, a WEP profile with overall performance ratings of
332 2.9 ± 1.6 , consisted of a low intensity of P+ emotions (2.8 ± 1.6) and a high intensity of N-
333 emotions (7.7 ± 1.3). This would suggest that a high intensity of N+ and a low intensity of P+
334 generated an excess or lack of energy/effort to complete the task and an inefficient or
335 inappropriate use of available resources (11, 15, 32). This is further supported by low overall
336 performance ratings and “*feeling weak, tired and demotivated to train*” or “*struggling to*
337 *technically perform a complex lift*”. These findings are in congruence with previous research
338 that suggest, successful performances across a variety of sports are linked to a nomothetic
339 profile of a high intensity of positive functional emotions and a low intensity of negative
340 dysfunctional emotions (12, 29, 34, 36).

341

342 Furthermore, the present investigation also indicated that within S&C, no significant
343 differences were observed between BEP and WEP with regards to functionally reversed
344 emotional categories (P-, N+). During BEP and WEP, moderate intensities were evidenced for
345 P-, 3.65 ± 1.89 and 5.04 ± 1.74 respectively, and N+, 6.03 ± 2.23 and 4.74 ± 1.96 respectively.
346 Although no significant differences were observed, a medium to strong effect size was
347 evidenced for P- ($d = 0.76$) and N+ ($d = 0.62$), suggesting that functionally reversed emotional
348 categories (P-, N+), have an impact on performance. This finding is consistent with previous
349 research that states, functionally reversed emotional categories are suggested to have a positive

350 effect on performance when moderate in intensity as could be perceived by the athlete as
351 “*under control*” and therefore facilitative (33, 35). The perception and interpretation of
352 emotions is significant, as reversal theory suggests that interpretation of emotions can be
353 unstable as it is possible for athletes to reverse their perception of hedonic orientation of
354 emotions experienced and thus athletes and coaches should be educated regarding the potential
355 for factitive influences of, traditionally considered, negative emotions. (41).

356

357 **Idiosyncratic emotions and functional impact**

358 A wide array of emotions have been linked to performance (9, 12, 14, 16, 22, 33, 35, 38), as a
359 result it is essential to identify the idiosyncratic emotions associated with BEP and WEP and
360 outline their functional or dysfunctional impact on performance within S&C. The present
361 investigation reported, as evidenced in **Table 2.**, that within S&C, the most frequently
362 identified P+ emotions included feeling motivated/inspired, confident/certain and
363 energetic/dynamic. The most frequently identified N+ emotions included feeling intense/fierce,
364 aggressive/angry, annoyed/irritated and doubtful/uncertain/irresolute. Previous research also
365 identified similar functional emotions (P+, N+), in particular feeling motivated, confident,
366 energetic, intense, aggressive, angry, annoyed and uncertain as functional or facilitative
367 emotions (9, 12, 33, 35). Additionally, Radcliffe et al. (30) identified motivation and
368 confidence as psychological factors important to athlete’s successful performance within S&C
369 with more recent work (31) identifying that strength and conditioning coaches consider arousal
370 regulation as a main function of psychology orientated skills. Thus, when combining previous
371 work (30, 31) and the findings of the current work, it is encouraging that the optimal facilitative
372 mood states, and associated emotional descriptors, are related to being confident yet activated
373 to an appropriate level. The most frequently selected dysfunctional emotions (P-, N-) consisted
374 of feeling unhurried/quiet/calm, carefree, relaxed/easy, worn out/tired/exhausted,

375 sluggish/inactive/lazy, annoyed/irritated/distressed, and discouraged/dispirited. This finding is
376 congruent with previous research, that identified feeling relaxed, calm, tired, sluggish, lazy and
377 discouraged as dysfunctional emotions to performance (9, 12, 33, 35).

378

379 It is hypothesized that a nomothetic profile of emotions relevant to most athletes could be
380 identified from consistent emotional patterns between individuals for achieving optimal
381 performance (9, 45). It could therefore be recommended that within skilled athletes with
382 experience in S&C, feeling confident, motivated, energetic, intense, aggressive and annoyed is
383 functional for performance, whereas feeling relaxed, calm, tired, lazy and discouraged is
384 dysfunctional for performance. However, between-individual emotional patterns within the
385 present investigation also evidenced inconsistencies within perceived functionality of
386 emotional descriptors. As evidenced within **Appendix A.**, emotions such as
387 energetic/vigorous, relaxed/comfortable, satisfied, cheerful/happy, worn-
388 out/tired/weary/exhausted and tense/strained/tight have been identified as both functional and
389 dysfunctional. Therefore a nomothetic approach can be outlined, however may not accurately
390 represent the idiosyncratic and subjective responses to emotions experienced or perceived by
391 the athlete (9, 33, 35, 47).

392

393 As with most research the present study is not without limitations which should be
394 acknowledged. Firstly, smaller samples are more likely to be affected by chance variation. The
395 present study considered a practically sized sample of both male and female athletes, however
396 there was no previous research from which to conduct a power analysis and little research that
397 considered both sexes. It is therefore recommended that future studies consist of larger sample
398 sizes, in order to produce accurate and reproducible research (40). Secondly, recall method
399 adopted in this study may also be seen as a limitation as retrospective data collection relies on

400 an athlete's awareness and interpretation of past events (29, 33). Further limitations could also
401 include a possible carryover effect between recall of performance conditions, the impact of any
402 physical training variables, phases of skill acquisition or variety within periods of training on
403 emotional state and the potential bi-directional relationship between performance and
404 emotions. It is therefore proposed that using repeated or longitudinal assessments of emotional
405 profiling should be utilised within future research in order to identify stable patterns of
406 emotions and zones of optimal and dysfunctional emotions during successful and unsuccessful
407 performances (29, 33). Furthermore, it is argued that assessing emotional experience using 5
408 modalities (form, content, intensity, context and time) does not comprehensively represent a
409 subjective state-like experience (39). Ruiz et al. (38) therefore propose an updated profiling
410 procedure including assessment of 8 modalities of performance-related states including
411 psychological (cognitive, affective, motivational, volitional), psycho-physiological (bodily-
412 somatic, motor-behavioural) and social (behavioural, communicative) states. However, as
413 previously stated, to the authors' knowledge there is currently no other research investigating
414 the role emotions or emotional profiles within S&C. As a result, further research is necessary
415 to comprehensively study performance related experiences within this field, such as a
416 longitudinal study investigating emotional experiences during various phases of training
417 utilising an updated profiling procedure.

418

419

PRACTICAL APPLICATIONS

420 Previous research has outlined the use of emotional profiling to assess athletes' performance-
421 related experiences within a variety of sports and subsequent utilisation in the design and
422 delivery of effective psychological skills training and strategies (16, 39, 41). Initial findings
423 evidence that emotional experiences during best and worse performances were significantly
424 different. Optimal performance states within S&C, consisted of: a high intensity of positive

425 facilitative emotions (e.g. confident, motivated and energetic), a low intensity of negative
426 dysfunctional emotions (e.g. worn out, sluggish, annoyed and discouraged) and a moderate
427 intensity of functionally reversed emotions (e.g. intense/fierce, aggressive/angry,
428 unhurried/quiet/calm, carefree and relaxed/easy).

429

430 A variety of psychological strategies have been evidenced to promote an optimal emotion
431 profile within IZOF based interventions, as well as being utilized within current S&C practice,
432 including goal setting, relaxation techniques, imagery, self-talk, pre-performance routines,
433 music and social facilitation (26, 31, 37, 41, 47). Whilst inappropriate to advocate that S&C
434 coaches serve the role of a Sport Psychologist, it is important for coaches to recognize the
435 impact of their interactions on an athlete's affective state, and the subsequent impact within the
436 S&C training environment. An oft-cited method of provoking facilitative emotions in the
437 strength and conditioning setting is music (31). Music has been reported to impact emotions
438 positively (2, 23) however possibly due to the subjective nature of music preference and, as
439 proposed by Karageorghis and Priest (19), only the 'right' type of music will produce such
440 positive affective responses and the athlete's preferences must be accordingly considered.

441

442 It is therefore recommended that, in order to assist athletes in achieving peak performance
443 states within S&C, athletes and strength and conditioning coaches should develop collaborative
444 relationships with Sport Psychologists who may inform and develop psychological skills and
445 strategies to achieve an emotional profile with: a high intensity of positive functional emotions,
446 a low intensity of negative dysfunctional emotions and maintain perceived control over
447 functionally reversed emotions. It is also important for practitioners to acknowledge that the
448 same affective states may provide an alternative *function* dependent upon individual

449 differences of the athletes. As the impact of distinct emotions can differ between athletes, an
 450 individualized approach in promoting optimal emotional states is suggested.

451

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570 **Table 1.** Descriptive statistics, effect sizes and variance comparing best and worst performance.**

	BEP	WEP	Effect Size (<i>d</i>)
P-	3.65 ± 1.89	5.04 ± 1.74	0.76
P+	8.19 ± 1.33*	2.82 ± 1.61*	3.63
N+	6.03 ± 2.23	4.74 ± 1.96	0.62
N-	1.42 ± 1.19*	7.66 ± 1.34*	4.92

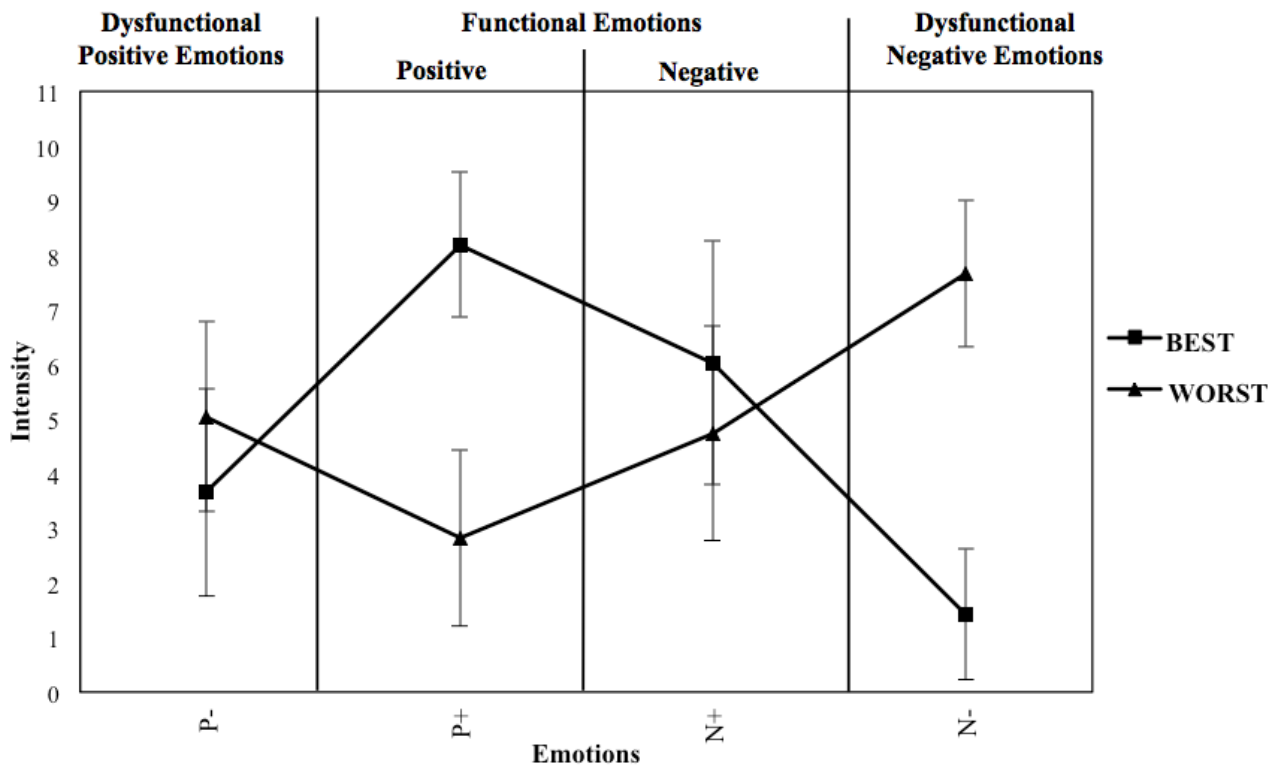
571 *indicates significant difference, $p < 0.05$.

572 ** BEP = best ever performance; WEP= worst ever performance; P- = pleasant dysfunctional

573 emotions; P+ = pleasant functional emotions; N+ = unpleasant functional emotions; N- = unpleasant

574 dysfunctional emotions.

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586 **Figure 1.** IZOF based emotional profiles for BEP and WEP in a strength and conditioning session.*

587 *BEP = best ever performance; WEP = worst ever performance.

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Emotion	Item	Freq	Item	Freq	Item	Freq	Total
P+	<i>Inspired</i>	2	<i>Motivated</i>	11			13
	<i>Confident</i>	8	<i>Certain</i>	1			9
	<i>Dynamic</i>	2	<i>Energetic</i>	7			9
P-	<i>Unhurried</i>	5	<i>Quiet</i>	4	<i>Calm</i>	2	11
	<i>Carefree</i>	8					8
	<i>Relaxed</i>	5	<i>Easy</i>	1			6
N+	<i>Intense</i>	7	<i>Fierce</i>	2			9
	<i>Angry</i>	1	<i>Aggressive</i>	7			8
	<i>Annoyed</i>	4	<i>Irritated</i>	3			7
	<i>Doubtful</i>	2	<i>Uncertain</i>	3	<i>Irresolute</i>	2	7
N-	<i>Tired</i>	3	<i>Worn Out</i>	4	<i>Exhausted</i>	2	9
	<i>Inactive</i>	2	<i>Sluggish</i>	5	<i>Lazy</i>	1	8
	<i>Annoyed</i>	4	<i>Irritated</i>	3	<i>Distressed</i>	1	8
	<i>Discouraged</i>	4	<i>Dispirited</i>	3			7

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601 **Table 2.** Most frequently selected emotions within each global emotional category.*

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603 * P- = pleasant dysfunctional emotions; P+ = pleasant functional emotions; N+ = unpleasant

604 functional emotions; N- = unpleasant dysfunctional emotions.

605 *Note:* Items on the same row are recognised as synonyms (10).

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617 **Appendix A** - Frequency of selected emotion descriptors within each global category.

Optimal Emotional Profiles for Peak Performance in Strength and Conditioning 25

618 Note: Items on the same row are recognised as synonyms (10).

Emotion	Item	Freq	Item	Freq	Item	Freq	Item	Freq	Item	Freq	Total
Positive Functional (P+)	Active	0	Dynamic	2	Energetic	7	Vigorous	1			10
	Relaxed	3	Comfortable	3	Easy	0					6
	Calm	2	Peaceful	0	Unhurried	1	Quiet	0			3
	Cheerful	2	Merry	0	Happy	3					5
	Confident	8	Certain	1	Sure						9
	Delighted	1	Set	1	Settled	1	Resolute	1			4
	Excited	2	Thrilled	0							2
	Overjoyed	0	Exhilarated	1							1
	Brave	0	Bold	0	Daring	1	Dashing	0			1
	Glad	1	Pleased	0	Satisfied	2	Contented	1			4
	Inspired	2	Motivated	11	Stimulated	0					13
	Light-Hearted	0	Carefree	0							0
	Nice	0	Pleasant	1	Agreeable	0					1
	Quick	0	Rapid	0	Fast	3	Alert	2			5
Focused	1									1	
Positive Dysfunctional (P-)	Active	0	Dynamic	0	Energetic	2	Vigorous	2			4
	Relaxed	5	Comfortable	0	Easy	1					6
	Calm	2	Peaceful	0	Unhurried	5	Quiet	4			11
	Cheerful	2	Merry	0	Happy	1					3
	Confident	2	Certain	0	Sure	1					3
	Delighted	0	Set	2	Settled	3	Resolute	0			5
	Excited	0	Thrilled	0							0
	Overjoyed	3	Exhilarated	2							5
	Brave	2	Bold	1	Daring	1	Dashing	0			4
	Glad	1	Pleased		Satisfied	4	Contented	0			5
	Inspired	1	Motivated	2	Stimulated	0					3
	Light Hearted	0	Carefree	8							8
	Nice	1	Pleasant	0	Agreeable	3					4
	Quick	0	Rapid	0	Fast	1	Alert	1			2
Relief	1									1	
Chilled	1									1	
Negative Functional (N+)	Afraid	1	Fearful	1	Scared	0	Panicky	2			4
	Angry	1	Aggressive	7	Furious	0	Violent	0			8
	Annoyed	4	Irritated	3	Distressed	0					7
	Anxious	2	Apprehensive	2	Worried	2					6
	Concerned	0	Alarmed	0	Disturbed	0	Dissatisfied	1			1
	Discouraged	1	Dispirited	0	Depressed	0					1
	Doubtful	2	Uncertain	3	Indecisive	0	Irresolute	2			7
	Helpless	0	Unsafe	0	Insecure	2					2
	Inactive	0	Sluggish	0	Lazy	0					0
	Intense	7	Fierce	2							9
	Jittery	0	Nervous	4	Uneasy	1	Restless	1			6
	Sorry	0	Unhappy	0	Regretful	0	Sad	0	Cheerless	0	0
	Tense	3	Strained	2	Tight	1	Rigid	0			6
	Tired	0	Worn Out	3	Weary	1	Exhausted	2			6
Reckless	1									1	
Negative Dysfunctional (N-)	Afraid	2	Fearful	1	Scared	0	Panicky	2			5
	Angry	2	Aggressive	0	Furious	0	Violent	0			2
	Annoyed	4	Irritated	3	Distressed	1					8
	Anxious	0	Apprehensive	1	Worried	2					3
	Concerned	0	Alarmed	0	Disturbed	0	Dissatisfied	3			3
	Discouraged	4	Dispirited	3	Depressed	0					7
	Doubtful	3	Uncertain	0	Indecisive	2	Irresolute	0			5
	Helpless	3	Unsafe	1	Insecure	0					4
	Inactive	2	Sluggish	5	Lazy	1					8
	Intense	0	Fierce	0							0
	Jittery	0	Nervous	0	Uneasy	0	Restless	1			1
	Sorry	1	Unhappy	0	Regretful	0	Sad	2	Cheerless	0	1
	Tense	2	Strained	0	Tight	3	Rigid	0			5
	Tired	3	Worn Out	4	Weary	0	Exhausted	2			9
Disappointed	1									1	