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A Scientist-Practitioner Approach to an On-Field Assessment of Mental Skills in Collegiate Soccer Student-Athletes

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Abstract

1
2 Sport psychology practitioners frequently utilize questionnaires to evaluate sport
3 psychology services, yet questionnaires may not be valued as highly by the coaches and/or
4 athletes themselves. Therefore, an alternative, more reliable and ecologically valid method of
5 assessing mental skills is needed for sport psychology practitioners. As such, the purpose of this
6 paper is to illustrate how an authentic field-based mental skills program assessment was used in
7 the off-season for collegiate soccer teams. Following discussions between the sport psychology
8 practitioners and coaching staff, pre- and post- test activities were developed and implemented
9 on an outdoor soccer field, which was determined to be a more authentic “real-world”
10 environment. Activities evaluated situational and tactical awareness, on-field communication,
11 shooting self-efficacy, and performance under pressure and fatigue. The field assessment
12 experience provided a good method for the sport psychology practitioners to observe
13 improvements in mental skills, and the student-athletes and coaches reported that the activities
14 and debrief demonstrated the involvement of mental skills in every aspect of their soccer
15 performance.

16 *Keywords:* Sport psychology, program evaluation, student-athletes

17

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19 Soccer Student-Athletes

20 At high levels of competition, such as collegiate athletics, oftentimes the deciding factor
21 that determines athletic success on a given day is which athlete or team has the mental edge over
22 the other (Weinberg & Gould, 2015). A wide array of psychosocial variables (e.g., anxiety,
23 communication, concentration, confidence, decision-making) have been found to have an impact
24 on athletic performance, especially in collegiate level and adult athletes (Gee, 2010; Weinberg &
25 Gould, 2015). Sport psychology practitioners work to arm athletes and coaches with skills and
26 tools to optimize performance and minimize the negative impact of such psychosocial variables
27 on performance. The field of sport psychology has continued to increase over the past 20 years
28 with more and more sport psychology or mental skills training programs being developed for
29 collegiate and elite level athletes and teams (Blann, Shelley, & Gates, 2011; Weinberg & Gould,
30 2015). It has been recommended that effective mental skills training programs at the collegiate
31 level be implemented in the off-season and address performance issues such as arousal
32 regulation, mental preparation, confidence, and attention or concentration skills (Weinberg &
33 Gould, 2015).

34 While significant growth has been made in the usage of sport psychology services, a
35 challenge still faced by many practitioners in the field is the "buy-in" of services and
36 demonstrating their value (Blann et al., 2011). Oftentimes this challenge stems from the lack of
37 education coaches and athletes have regarding the nature of sport psychology services and the
38 impact of sport psychology services on performance (Gee, 2010; Zakrajsek, Martin, & Zizzi,
39 2011). One factor contributing to coaches and athletes misconceptions regarding sport
40 psychology services is that the evaluation of sport psychology programs or mental skills training

41 programs is too often overlooked. However, coaches who are utilizing sport psychology services
42 want to know if the services are benefitting their athletes (Weinberg & Gould, 2015). Oftentimes
43 coaches want to see performance indicators used as the primary index of sport psychology
44 service effectiveness. However, it is difficult to attribute changes in performance to the sport
45 psychology services alone (Woodcock, Duda, Cumming, Sharp, & Holland, 2012).

46 When sport psychology services are evaluated, questionnaires aimed to assess mental
47 skills are frequently used as an indicator of service effectiveness (Beckmann & Kellmann, 2003).
48 However, coaches and the athletes themselves, may not place as much value on questionnaires as
49 sport psychology practitioners. Beckmann and Kellman (2003) highlight the need to have both
50 coach and athlete commitment, understanding, and “buy-in” when implementing questionnaires
51 or more formal psychological assessments. Athletes may not respond truthfully on questionnaires
52 due to social desirability or the fear that their coaches may have access to the results (Woodcock
53 et al., 2012). Additionally, Weinberg and Gould (2015) recommend using both quantitative and
54 qualitative data to evaluate program effectiveness. Therefore, an alternative, more reliable and
55 ecologically valid method of assessing mental skills is needed for sport psychology practitioners.
56 Utilizing a more authentic assessment will aid in demonstrating the usefulness and impact of
57 mental skills to both coaches and athletes. Accordingly, the purpose of this paper is to illustrate
58 how an authentic field-based mental skills program assessment was used in the off-season for
59 collegiate soccer teams.

60 **Background**

61 The four authors had been working as Mental Performance Consultants (MPCs) with
62 men’s and women’s collegiate National Association of Intercollegiate Athletics (NAIA) soccer
63 teams for approximately three and a half years. Neither team had received any previous mental

64 skills training. Both teams were coached by the same head coach, who had five years coaching
65 experience with the two teams and a total of 12 years of collegiate soccer coaching experience.
66 Approximately 95% of the sessions the MPCs conducted with the soccer student-athletes were
67 conducted in an indoor classroom, with only the occasional session conducted in the bleachers
68 on the soccer field following a practice. However, discussions between the MPCs and coaching
69 staff revolved around the possibility of assessing the effectiveness of these group sessions in a
70 more authentic “real-world” environment, namely outdoors on the soccer field. The skills the
71 MPCs selected to address were based on discussions with the coaching staff, student-athletes,
72 and also through the MPCs own observations of the teams. Specifically, pre- and post-test
73 activities were designed and selected for the men’s and women’s teams to address each team’s
74 respective weaknesses from the previous season, based off of observations and discussions with
75 those involved. The head coach was the same for both the men’s and women’s teams, and he
76 desired to create distinction so that the two teams were not seen as one large team. Thus, it was
77 determined that creating assessments for each team individually would help the teams to
78 establish individuality.

79 **Program and Assessment Delivery**

80 Throughout the off-season, collegiate male ($n = 25$) and female ($n = 20$) soccer student-
81 athletes received imagery, self-talk, and perceptual-cognitive training on a bi-weekly basis from
82 four MPCs. Each topic was addressed separately, with three to five sessions devoted to each
83 topic. Prior to receiving mental skills training, these student-athletes were assigned to small
84 groups of five (women) or six (men), balanced by years on the team and playing position, and
85 completed a pre-test at the beginning of one off-season and a post-test at the end of the off-
86 season (three months). The off-season was selected as the ideal time for this program, given

87 there was more time available to work on the mental skills and the off-season has been
88 recommended as the best time to implement such programming (e.g., Weinberg & Gould, 2015).

89 At the beginning of both pre-test days, student-athletes were told that the purpose of the
90 field day was to test them in groups on different activities relating to the goals set by the
91 coaching staff, the players, and the MPCs. The student-athletes were instructed that they would
92 be divided into groups and would work to earn a group score, thus adding a social and
93 competitive nature to the activities. The student-athletes were only instructed they would be
94 competing against each other, they were not told there would be any reward, however, the MPCs
95 had previously observed the student-athletes put more effort into practices and activities when
96 they were told they would be competing against each other. The student-athletes were also
97 informed that a second day with the same activities (the post-test) would be set at the end of their
98 spring off-season. The groups would be assessed on their improvement on the activities.

99 During both the pre- and post-testing, the groups rotated between three different stations
100 created and led by the MPCs. During the time period when one group was not participating in
101 one of the assessments, they were instructed to sit in bleachers off to the side of the field and not
102 engage with the other groups. Student-athletes spent 12 minutes at each station before a whistle
103 was blown and athletes rotated onto the next station. The entire assessment procedure took
104 approximately one hour in total. During the post-test, student-athletes were placed into the same
105 groups as they had been during the pre-test and participated in the same stations as they had done
106 in the pre-test. Findings were not discussed with the athletes or coaching staff until after the post-
107 testing.

108

Assessments

109 A total of four assessments were developed by the MPCs, based off the literature,
110 observations of the specific teams at hand, discussions with the student-athletes and coaching
111 staff, and extensive feedback from a supervisor with over 30 years of applied consulting
112 experience with collegiate and elite athletes. Both the men's and women's teams participated in
113 the shooting self-efficacy and performance under pressure and fatigue conditions tasks, while the
114 men also participated in an assessment of situational and tactical awareness, and the women
115 participated in an on-field communication assessment. These assessments were selected to
116 address each team's respective weaknesses from the previous season, based off of observations
117 and discussions with those involved; hence there were different tasks for each gender.

118 **Situational and Tactical Awareness (Men Only)**

119 Tactical awareness pertains to the ability to adapt to moment-to-moment information
120 during high pressure-situations (Gréhaigne, Godbout, & Bouthier, 1999). It is essential for
121 teammates to also be aware of their team members' individual traits, the team strategy,
122 characteristics of the task at hand, and contextual constraints at large (personal-task-team-
123 contextual awareness; see Filho, Bertollo, Robazza, & Comani, 2015). In other words, to
124 successfully adapt to ever-changing performance constraints and achieve team synchronization,
125 team members must develop extant personal-task-team and situational shared schemas.

126 Under pressure, teams frequently transition to a more implicit type of coordination
127 relying on Shared Mental Models, or a team's shared representation of knowledge (SMM; Entin
128 & Serfaty, 1999). Gershgoren et al. (2016) organized SMM into hierarchical levels with
129 situational cognitions being the most specific one. This level was composed of both game
130 intelligence and game plan components, with game intelligence revolving around anticipation
131 skills given present information. The concept of the game plan centers on the athlete's ability to

132 understand and execute tactical instructions (i.e., tactical understating). To operate
133 synchronically as a team, tactical understanding and execution relies on the players' agreement
134 on their positioning on the field (Gershgoren et al., 2016).

135 To assess both tactical and situational awareness, a small-sided field was set up, and two
136 groups played a 10 minute scrimmage against each other, with the element of competition adding
137 pressure. Athletes were provided the following initial instructions for both assessments, “your
138 two teams will be playing a 10 minute small-sided scrimmage against each other. Periodically,
139 when we blow the whistle you should stop and freeze where you are.” During the scrimmage, the
140 MPC periodically blew a whistle to stop play, and the student-athletes were asked to close their
141 eyes and point to where two other student-athletes on their own team were positioned (closest
142 and farthest) and then two student-athletes from the opposing team (i.e., situational awareness).
143 Situational awareness was scored by measuring the distance from the individual’s actual physical
144 placement and the student-athlete’s estimated positioning in 15 degree increments. To assess
145 tactical awareness, when the MPC blew the whistle the student-athletes were asked to rate the
146 correctness of their teammates’ field position on a scale of 1 (poor) to 10 (very good) based on
147 where the ball was. Tactical awareness was scored by computing an average score for each
148 student-athlete, for each small group, and for the entire team collectively. See Figure 1 for a
149 sample diagram of this assessment. Two MPCs independently completed ratings for both tasks,
150 and interrater reliability revealed a high degree of consistency between the MPCs ratings ($\kappa =$
151 $.88, p < .001$ and $\kappa = .91, p < .001$, respectively).

152 **On-Field Communication (Women Only)**

153 Employing a communication skills training program for interactive teams has been
154 shown to be positively evaluated by the athletes (Sullivan, 1993). Additionally, previous research

155 has found a positive relationship between team communication and team success (e.g., Lausic,
156 Tenenbaum, Eccles, Jeong, & Johnson, 2009; Sullivan, 1993). In one study, Sullivan (1993)
157 found that athletes positively evaluated a communication skills training program for interactive
158 teams. Specifically, athletes reported the program raised awareness of their strengths and
159 weaknesses in communication skills and provided them with opportunities to practice skills and
160 improve upon their weaknesses. Lausic et al. (2009) examined doubles tennis teams and found
161 successful teams communicated more often than less successful teams, and had a more
162 homogeneous model of communication. Therefore, a task was designed to assess the ratio of
163 positive, negative, and neutral on-field comments for the women's soccer team specifically.

164 For the communication task a small-sided field was set up and the two groups played a 10
165 minute scrimmage against each other. Student-athletes were not informed that the station was
166 measuring communication, rather, they were merely given the instructions, "your two teams will
167 be playing a 10 minute small-sided scrimmage against each other." Four MPCs recorded the
168 number of positive, negative, and neutral comments heard within each team. Comments directed
169 toward the opposing team were not included. An example of a positive comment was "Great
170 pass!", whereas "That was an awful shot!" was recorded as a negative comment. Neutral
171 comments were comments such as, "I've got ball." Two MPCs were assigned to record data for
172 each team to ensure reliability ($\kappa = .96, p < .001$), and the number of positive, negative, and
173 neutral comments made were averaged between the two researchers. This assessment was scored
174 by calculating the ratio of positive to negative comments.

175 **Shooting Self-Efficacy (Men and Women)**

176 Imagery, creating or recreating experiences in the mind utilizing multiple senses and
177 involving moods and emotions, is often considered the most popular mental training technique

178 that athletes use (Weinberg, 2008; Weinberg & Gould, 2015). Athletes use imagery for a number
179 of different reasons, including skill practice and enhancing self-confidence (Weinberg, 2008;
180 Weinberg & Gould, 2015). In addition to the relationship between imagery use and performance,
181 several studies have shown a positive relationship between imagery use and confidence or self-
182 efficacy, which can be defined as one's belief in one's ability to produce desired effects by one's
183 actions (Bandura, 1997). Several studies found that using an imagery intervention enhanced
184 athletes' confidence in their playing ability in various different sport athletes (see Weinberg,
185 2008).

186 Therefore, the self-efficacy task was designed to measure the athletes' self-efficacy for
187 shooting and test if their self-efficacy and skill could be improved by using imagery. The athletes
188 were given five balls each to shoot from the penalty mark into a regulation sized flat goal that
189 was divided up into six areas by duct tape. They were shown Figure 2 noting the points available
190 for each area, with more difficult shots resulting in a greater number of points available. Athletes
191 were given the following instructions, "Your task is to score as many points as possible. You'll
192 each take five shots from the penalty mark, and prior to each shot you'll tell us which area you're
193 aiming for based on a diagram of the goal area. Your task is to score as many points as possible."
194 The athletes were required to indicate which area they were aiming for prior to each shot. The
195 MPC recorded which area the athlete was aiming for and which area the ball was shot into using
196 Figure 3. Thus, accuracy of shots was used to measure shooting skill, and choice of target area
197 was used to measure self-efficacy (difficult target area = high self-efficacy).

198 **Performance under Pressure and Fatigue Conditions (Both Men and Women)**

199 The relationship between pressure and performance deterioration has been well studied
200 (for a review see Beilock & Gray, 2007). Athletes encounter a wide array of physical and

201 psychological demands that can impact performance, stemming from a variety of sources,
 202 including physical fatigue and both internal and external pressures and performance expectations
 203 (Weinberg & Gould, 2015). The ability to perform at one's peak despite these various physical
 204 and psychological demands can be developed by a number of different strategies, including
 205 through mental skills training. Additionally, coaches and practitioners can integrate increasingly
 206 more demanding mental and physical challenges into training to also enhance athletes' ability to
 207 perform well under pressure (Bell, Hardy, & Beattie, 2013).

208 This assessment challenged the athletes to push physically and mentally through fatigue
 209 competing against one another using a speed and accuracy trade-off task, thus creating a
 210 performance under time pressure task. Student-athletes were instructed to make as many shots as
 211 possible in 35 seconds. Student-athletes began the task by completing a 10 yard sprint to a cone
 212 and then sprinted another 10 yards back to their starting cone where they then took a shot on a
 213 four foot goal that was 10 yards away from their shooting position (see Figure 4). The student-
 214 athlete continued this process of sprinting then shooting until the 35 seconds expired. The total
 215 numbers of goals scored was calculated as a measurement of performance.

216 **Results**

217 The field assessment experience provided a good method for the MPCs to observe
 218 improvements in mental skills. Weinberg and Gould (2015) recommended observations be used
 219 as one method of assessing sport psychology intervention effectiveness. On the women's team,
 220 we observed an increase in the ratio of positive to negative comments from 1.65:1 (pre-test) to
 221 2.50:1 (post-test), an increase in shot accuracy on the performance under fatigue task from
 222 56.7% to 75.7%, an increase in self-reported shooting self-efficacy from 20.6 (out of a total of 25
 223 points) to 24, as well as an increase in actual points (obtained from the number of shots correctly

224 made compared to what the student-athlete predicted) from 10.4 to 12.33. On the men's side,
225 there was an increase in shot accuracy on the performance under fatigue task from 66.7% to
226 80%, an improvement in situational awareness from an error of 17.10 degrees to 15, but a small
227 decrease in tactical awareness from an average rating of 6.95 to 6.02. On the situational
228 awareness task the student-athletes were most inaccurate when trying to gauge where the farthest
229 opponent was located. On the tactical awareness task, we estimate the possible decrease was due
230 to the lack of practice and games the team had during spring off season. Additionally we
231 observed no improvement on self-efficacy or shooting accuracy; however, we had designed this
232 activity specifically with the women's team in mind.

233 Upon completion of the field assessment and its analysis, a performance report was
234 provided to the student-athletes and the coaches and professional recommendations for
235 performance enhancement were discussed. The coaching staff was provided with a detailed
236 report for each individual student-athlete as well as for each team. The student-athletes were
237 provided with their own individual results as well as their overall team results during a team
238 meeting. The MPCs led discussions with both teams regarding their areas of improvement from
239 pre- to post-test, and also provided recommendations for both teams to work on moving forward.
240 Student-athletes were also given the opportunity to meet individually with the MPCs to further
241 discuss their results and develop an individual plan. Both student-athletes and coaches reported
242 that the activities and debrief demonstrated the involvement of mental skills in every aspect of
243 their soccer performance. During the post-testing, numerous athletes asked to stay longer to
244 repeat a station as they felt the stations were very tangible representations of their mental skills
245 and were motivated to continue improving their mental skills. Additionally, the student-athletes
246 asked to move more of the group sessions outdoors to the soccer field as they enjoyed being able

247 to see first-hand how the mental skills could be applied to various soccer skills and tasks.
248 Furthermore, they claimed to acquire a better understanding of how psychological skills may be
249 utilized in soccer. Such an understanding may motivate athletes and coaches to commit more
250 time to developing psychological skills.

251 **Recommendations for Practitioners**

252 Despite the overwhelmingly positive feedback, there are limitations to assessing mental
253 skills in a field-based setting that practitioners should consider. While these student-athletes
254 improved from pre- to post-test, many of these improvements (e.g., positive to negative comment
255 ratios) were not substantial, therefore practitioners should consider this when deciding to take the
256 time to implement field-based assessments such as these. Moving assessments and activities to a
257 more authentic setting, such as a soccer field, does provide a less controlled environment to work
258 in. For example, a public or open location could result in varied weather conditions.
259 Additionally, these assessments were more timely to develop, set-up, and administer than
260 questionnaires or other evaluations. Furthermore, due to the time, location, and resources
261 required for these assessments, they would not have been possible without full support from the
262 coaching staff. It is important to note that an open and strong relationship with the coaching staff
263 is essential and their input in discussing issues, developing interventions, and designing
264 assessments is the key to a productive and effective mental skill training program (Weinberg &
265 Gould, 2015; Zakrajsek et al., 2011).

266 Given the qualitative feedback provided by both the student-athletes and coaches, we
267 believe this on-field assessment served its purpose in aiding with “buy-in” from both student-
268 athletes and coaches by providing them with a more tangible demonstration of the usefulness and
269 impact of mental skills on performance. Indeed, these attitudes support previous research

270 indicating that one of the main reasons coaches and athletes don't use sport psychology services
271 is because of their failure to understand the link to performance (Zakrajsek et al., 2011). Thus,
272 more sport psychology consultation sessions should be conducted in the field and outdoors, so
273 that athletes and coaches associate mental skills with performance improvements (Gee, 2010). It
274 is strongly recommended that sport psychology practitioners working with a variety of sports
275 consider using assessments such as this one alongside questionnaires or other measures of sport
276 psychology effectiveness.

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