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**Determining and Measuring Key Psychological Characteristics: The Case of a National
Basketball Federation**

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16 **Determining and Measuring Key Psychological Characteristics: The Case of a National**
17 **Basketball Federation**

18

19

Abstract

20 This case study presents our structured and evidence-informed approach towards developing a
21 psychological assessment instrument within a national basketball federation. To this end, a
22 two-phase approach was adopted. During the first phase, a focus group with the coaches was
23 conducted to determine the key psychological characteristics pertinent to the case
24 environment. This resulted in ten identified key psychological characteristics. During the
25 second phase, the results from the focus group were used to develop and conduct preliminary
26 testing of a context-specific assessment instrument. Preliminary testing of the instrument was
27 conducted, resulting in a refined instrument including nine characteristics. Based on the
28 findings of our case study, we conclude this paper by outlining a number of reflections that
29 can provide important considerations for sport psychologists, coaches and talent identification
30 and development organizations looking to develop and implement psychological assessment
31 within their programs.

32

33 **Keywords:** applied research; monitoring; profiling; psychological competences; psychological
34 assessment

35 **Determining and Measuring Key Psychological Characteristics: The Case of a National**
36 **Basketball Federation**

37 Psychological characteristics play a crucial role in successful talent development and
38 elite performance (Dohme et al., 2019; Rees et al., 2016). Psychological factors are a key
39 determinant for the quantity and quality of practice athletes engage in (e.g., Tedesqui &
40 Young, 2018) as well as the ability to perform under pressure (e.g., Swann et al., 2017), cope
41 with and rebound from major challenges and adversities (e.g., Kegelaers & Wylleman, 2019)
42 and balance the demands of different life domains with athletic development (e.g., sport and
43 study; De Brandt et al., 2018). Scholars have therefore called for sport psychologists, coaches
44 and talent identification and development (TID) organizations to structurally integrate the
45 development of psychological characteristics within talent development pathways (Blijlevens
46 et al., 2018; Dohme et al., 2019). Within such an approach, psychological profiling or
47 assessment can be used to facilitate and monitor the development of these characteristics and
48 ultimately optimize talent development (Hill et al., 2019; Rees et al., 2016). With such
49 psychological assessment we refer to the structured and systematic measuring of
50 psychological characteristics through the use of psychometric instruments.

51 Sport psychology already has a long history of using psychometric instruments in
52 practice (e.g., O'Connor, 2004). Nevertheless, a number of challenges exist for TID
53 organizations to integrate psychological assessments in their programs. Measuring
54 psychological characteristics should occur strategically based on a clear understanding and
55 operationalization of the most salient characteristics within a given context (O'Connor, 2004).
56 However, coaches and practitioners may experience challenges delineating the most salient
57 characteristics for their program, given the plethora of psychological constructs available in
58 the literature. To illustrate, a recent systematic review of the psychological factors facilitative
59 of youth sport development identified at least 19 different characteristics and skills (Dohme et

60 al., 2019). Just some commonly heard terms within the applied field include constructs such
61 as commitment, confidence, focus, grit, growth mindset, hardiness, mental toughness,
62 motivation, perseverance, resilience, self-control, self-efficacy, self-regulation, and volition.
63 In addition to the sheer number of constructs, the popularity of some of these buzzwords
64 could lead to selection based on hype rather than a careful consideration of the most relevant
65 characteristics within a given context.

66 Alternatively, some scholars have made attempts to present a universal set of
67 psychological characteristics for athletic success (e.g., the 5C's, Harwood, 2008;
68 *Psychological Characteristics of Developing Excellence*, MacNamara et al., 2010). Although
69 insightful, these approaches can still fail to account for the contextual specificity of many
70 psychological characteristics. Research shows that the relevance and importance of specific
71 characteristics can differ for performance level (e.g., Rees et al., 2016), developmental stage
72 (e.g., Blijlevens et al., 2018), type of sport (e.g., Blijlevens, 2019), or even for playing
73 positions within a sport (e.g., Andrew et al., 2007). Such potential issues have commonly
74 been recognized within more idiosyncratic self-driven assessment strategies, such as
75 performance profiling (Bird et al., 2020). However, sport psychologists and coaches might
76 find little guidance in the available literature to determine a relevant and comprehensive set of
77 objective psychological characteristics pertinent across their particular context.

78 The challenges of selecting the most appropriate psychological characteristics also
79 translate to the selection of the most appropriate measurement instruments. A large number of
80 psychometric instruments can be found within the literature aimed towards measuring specific
81 psychological constructs. Moreover, other questionnaires have been developed to measure
82 multiple psychological characteristics within a single instrument. For example, the *Athletic*
83 *Coping Skills Inventory-28* (ACSI-28; Smith et al., 1995) measures constructs such as
84 coachability, concentration, or goal setting and mental preparations among others; whereas

85 the *Psychological Characteristics of Developing Excellence Questionnaire 2* (PCDEQ2; Hill
86 et al., 2019) measures characteristics such as active coping, imagery and active preparation, or
87 seeking and using social support. From an applied perspective, however, there still exists
88 limited evidence to support the selection of one of these scales over another.

89 The case study presented in this article outlines a structured and evidence-informed
90 approach towards developing an assessment instrument to measure psychological
91 characteristics within an applied TID organization. Our purpose here is not to determine a
92 definitive set of psychological characteristics, which is applicable across multiple contexts.
93 Rather, we aimed to explore how an applied organization can systematically determine which
94 characteristics are most salient to their context and compile an instrument to measure these,
95 based on a robust scientific understanding of these psychological constructs. We recognize
96 that different conceptualizations and definitions of psychological characteristics and
97 associated terms (e.g., psychological skills) exist (e.g., Vealey, 1988). Within our approach
98 we largely adhere to the recent conceptualization of psychological characteristics proposed by
99 Dohme et al. (2017) based on an extensive literature review. They defined psychological
100 characteristics as the “qualities of the mind” (p.157) which are thought to enable athletic
101 success and the development of expertise (Dohme et al., 2017). These characteristics (e.g.,
102 motivation, self-confidence) are relatively stable but can still be developed through targeted
103 interventions. As such, our focus was not necessarily on pure psychological skills. These are
104 the specific learned strategies (e.g., relaxation, imagery) which can be used to develop or
105 regulate psychological characteristics, either immediately or over time (Blijlevens et al., 2018;
106 Dohme et al., 2017). Additionally, we also did not focus on pure personality traits (e.g., Big-
107 5; Allen et al., 2011), which are considered stable and largely untrainable, and therefore hold
108 less practical implications within TID (Rees et al., 2016).

109

Case Context

110 This case study started with the explicit question formulated by a national female
111 basketball federation for support in the development of an instrument to measure
112 psychological characteristics in their organization. The federation includes a talent
113 development program, which aims to prepare young players (aged 15-21) for a durable career
114 within elite international basketball. The program contributes to this goal by giving athletes a
115 fundamental basis for their sport careers and their future social careers. It is a full-time
116 program including about 15-20 hours of training, with one or two matches per week. It offers
117 young talented basketball players the opportunity to combine training, study and living in the
118 same city. In addition to the talent development program, the federation is also responsible for
119 the national teams, including the senior national team, U20 national team, and the 3x3 senior
120 and U20 national teams. For this case study, all athletes within the talent development
121 program and national teams were included. This resulted in a total of 53 players, aged
122 between 15 and 29 years old ($M = 20.3$ years, $SD = 4.2$ years). Three coaches (2 males, 1
123 female) also collaborated within the case, including the senior national team head coach (who
124 was also the talent development program head coach), the senior national team assistant
125 coach, and the U20 national team head coach. All three coaches were also involved in the
126 daily workings of the talent development program. The coaches ranged in age between 39 and
127 43 ($M = 40.3$ years, $SD = 1.3$ years). On average, they had 14.7 years of coaching experience.

128 Our applied work – within this case and other settings – is in large part informed by
129 our work as academic researchers in addition to our applied experience. Both the first and
130 third author hold an academic position within sport and performance psychology as a primary
131 occupation. The first author has a background in clinical psychology before specializing and
132 obtaining a PhD in sport and performance psychology, and positions himself within
133 humanistic psychological approaches (Egan, 2018). The second author collaborated in this
134 case as part of obtaining her master's Sport Psychology degree. She has experience with

135 coaching and applied sport psychology work in tennis, in addition to being a high-
136 performance athlete herself. The third author has a background in human movement sciences
137 and sport and performance psychology. He has much experience in research within applied
138 performance contexts (e.g., sports, music, dance, police work), with a specific focus on how
139 scientific knowledge can be transferred to actual practice in these domains. His work is
140 grounded within ecological psychology (Michaels & Beek, 1995). We believe that applied
141 work should be informed by sound theory and empirical evidence. At the same time, our
142 philosophical approach in this project was a pragmatic one (Giacobbi et al., 2005). As such,
143 we were not interested in uncovering absolute truths or building theory. Rather, our aim was
144 to gain an evidence-informed perspective on ‘what works’ when trying to establish a practical
145 assessment instrument to measure psychological characteristics within a real-life TID
146 environment.

147 In line with the *holistic ecological approach* towards TID (Henriksen, 2015), we
148 believe that the environment around an athlete has a strong influence on the psychosocial
149 development of the athlete. This has the important implication that interventions should be
150 conducted “inside the athlete’s environment and involving the environment as much as
151 possible—rather than removing them from their natural setting and into the practitioner’s
152 office” (Henriksen, 2015, p.144). We argue that a psychological assessment instrument can
153 help coaches to understand the psychosocial functioning of their athletes and design
154 interventions to develop psychological characteristics within the daily practice environment.
155 Within such an approach, sport psychology practitioners can adopt a supporting role rather
156 than being the main intervention agent. Hence, the assessment instrument presented here was
157 designed to facilitate understanding of and discussion around key psychological
158 characteristics among coaches, athletes and sport psychologists; ultimately supporting the
159 development of these characteristics within the day-to-day work of the TID environment.

160

The Case

161 In order to develop a pragmatic evidence-informed assessment instrument, we adopted
162 a two-phase approach in this case study. During the first phase we tried to establish which
163 specific psychological characteristics coaches believed to be the most relevant for their
164 athletes and their specific TID organization. Based on the insights gained from the first phase,
165 we developed an assessment instrument by drawing on existing validated psychometric
166 instruments and conducted preliminary testing of the usability of this instrument during the
167 second phase.

Phase 1: Determining the key psychological characteristics

169 In order to examine the coaches' perspectives on the most important psychological
170 characteristics within their TID organization, we conducted a focus group with all three
171 coaches involved in the TID. A semi-structured focus group guide was developed to direct the
172 conversation. The focus group started with a general discussion about the importance of
173 psychology for development and performance in basketball. From here, the discussion went
174 more in-depth on the psychological characteristics that coaches believed to be important for
175 their specific sport, athletes and organization. A particular focus point during the discussion
176 was on the importance of psychological characteristics within different contexts. The
177 multidimensional and dynamical nature of sports asks for a holistic approach when exploring
178 psychological characteristics (Wylleman & Rosier, 2016). Therefore, important psychological
179 characteristics were asked in relation to training, competition and daily life outside sport.
180 Examples of probing questions included: "*What characteristics are important in, for example,*
181 *the training context?*" and "*Are these characteristics also important in other contexts?*"
182 Dohme et al. (2017) highlighted the risk of using ordinary words (e.g., mindset, motivation)
183 to label psychological characteristics. Such labels "assume a shared understanding" (p.136)
184 whereas in reality coaches often construct their own understanding and meaning of these

185 psychological constructs, leading to inconsistent use of terms and definitions. To counteract a
186 misinterpretation of terminology, clear descriptions of each term used by the coaches was
187 asked. Such probing questions included examples such as: “*What does this psychological*
188 *term mean exactly to you?*” and “*Can you further clarify what you mean by this term?*” To
189 further operationalize the psychological characteristics, coaches were also asked about the
190 prototypical and antitypical observable behaviors they associated with the described
191 characteristics. Examples of probe questions included: “*What behavior would a player show*
192 *who (does not) excel(s) in this characteristic?*” and “*When are these behaviors important?*”

193 The duration of the focus group was around 70 minutes. Subsequently, data from the
194 focus group was analyzed and interpreted using latent thematic data analysis. To this end, the
195 six phases described by Braun et al. (2016) were used to analyze, identify and structure
196 patterns within the data. Based on the descriptions of the coaches, each theme was given a
197 composite definition to describe the psychological characteristics. These definitions were then
198 deductively compared to and matched with the scientific constructs which best encompassed
199 said definition, even when coaches did not directly mention this specific scientific construct
200 verbatim. Such deductive classification requires an interpretative activity and can arguably
201 create a separation between the coaches’ own perspectives and the obtained outcomes.
202 Nevertheless, in agreement with the coaches, we decided such interpretations were needed to
203 move beyond colloquial understandings to a set of robust, scientifically informed and
204 measurable constructs. The thematic data analysis resulted in ten psychological
205 characteristics. Each characteristic is explained briefly below.

206 ***Results from phase 1***

207 The first characteristic was labelled ***coachability***. Coachability was defined as ‘taking
208 the opportunity to learn from coaches and their feedback; and actively use this information
209 during practice and matches.’ Within this theme, coaches mentioned the necessity of being a

210 coachable player in order to reach one's maximal potential. This was described as a "an active
211 learning attitude," a "willingness to get feedback" and being "eager to hear what they can
212 improve":

213 The best players are really open to feedback. [...] If you speak to them they are not
214 immediately defending themselves and are not like "Yeah, but..", but more like "Great
215 idea coach, we'll do it like this.". Or something like "I don't see it like that, because
216 she was standing there and that is why I rotated my position." Those are the real
217 champions in my experience. [...] They want to be coached, they want to hear the
218 truth. They have attitude like "tell me what to do, I want to get better." (C1)

219 The second characteristic was labelled *reflection*. Reflection was defined as 'being
220 able to reflect on prior situations and experiences, both on small or detailed events as well as
221 the bigger picture; and use this knowledge to come up with improved strategies.' The coaches
222 emphasized the importance of the ability to reflect as "a part of the development of one's
223 learning ability":

224 Reflection is something that we want to teach our girls to do independently as well.
225 [...] it is something which is also important in a group situation, and for them as
226 individuals. Being better able to reflect after a shooting practice or at the end of a
227 game or something, is important for them to learn. (C3)

228 As such, the coaches were constantly striving for players to reflect on their actions:

229 We want the players to be trained in an environment where it is normal to reflect after
230 a drill. Not only the opinion of the coach, but what do you think of it personally, what
231 went well, and should we do different next time. [...] That they see what they need to
232 do better next time: "these are my points of improvement." (C1)

233 The third characteristic was labelled *growth mindset*. Growth mindset was defined by
234 the coaches as 'the belief that practice will eventually make you a better player, even when

235 you make mistakes or have to put in a lot of extra effort.’ Coaches described such a growth
236 mindset as “the attitude that every minute you work on something will help to become a better
237 player.” In line with Dweck (2008), coaches also believed that such a growth mindset is a
238 strong driver for athletes to initiate and engage in positive learning attitudes and activities by
239 “stepping out of your comfort zone,” “always taking the opportunities to improve themselves”
240 and “owning responsibility” for one’s own learning process.

241 The fourth psychological characteristic was labelled *commitment*. This was defined as
242 ‘being inspired and determined to play the game of basketball and to get the best out of
243 yourself; and to act accordingly.’ Coaches described commitment as “loving the sport,”
244 “being passionate” and “having the intrinsic motivation to play basketball.” Furthermore,
245 coaches argued that “being part of the program is a deliberate choice made by the players.”
246 Therefore, players were also expected to be fully committed to the elite sport lifestyle and the
247 program:

248 We want players that say “Okay, I’m going to the club, I’ll do my homework now and
249 get some sleep because tomorrow early morning I have practice.” And they are not
250 like, “pfff... do I need to go to bed already? Do I have to go to early practice again?”
251 Because we have some girls that are coming to practice in the morning and we as
252 coaches do not know why they came, because they are not yet awake. And that only
253 leads to injuries and dangerous situations. (C1)

254 The fifth characteristics was labelled *confidence*. This was defined as ‘having faith in
255 one’s own talents and ability to achieve success.’ The coaches described those confident
256 athletes as: “They have the attitude like ‘I want to get better. I don’t come here to get told how
257 good I am, because I already know that.’ That is why the real champions who play in Europe
258 stand out” (Coach 1). The coaches believed players who possessed confidence had a
259 competitive advantage because they “do not directly feel offended by feedback,” dare to

260 “make their own choices,” “share their opinions more often” and “have more joy playing the
261 game.”

262 The sixth characteristic was labelled *competitiveness*. This was defined as ‘the desire
263 and determination to win and be better than other players.’ The coaches described this as
264 “having the mentality of breaking down the opponent,” the “killer instinct” or an attitude of “I
265 want to be the best and I’m going to be the best.” Behaviorally, competitive athletes were
266 believed to always strive for their best performance as well as trying to be better than other
267 athletes on every task they do. This occurred during competition, but also during practice
268 when competing against teammates. Importantly, the coaches also believed that a fine balance
269 between this competitiveness and still enjoying the game would lead to the most optimal
270 performance.

271 The seventh psychological characteristic was labelled *focus*. This was defined as ‘the
272 ability to direct your attention, time and energy to one particular activity.’ Coaches described
273 having “the right focus” before and during games as:

274 As soon as you are on the floor you are involved with every process of the warming-
275 up and the game, which goes on for two and a half hours. And maybe it is different for
276 one person than it is for another, but the choice that you make when you step on the
277 court is to be totally involved and to know what is going on. Put on your stuff and be
278 ready to play a game. (C3)

279 The coaches argued that such focus or “being mentally and cognitively completely engaged
280 with the match [or training]” reflects a quality that could differentiate the good pro-players
281 from lower-level players.

282 The eighth characteristic was labelled *resilience*. This was defined as ‘the ability to
283 withstand and cope with any stressors or major setbacks.’ Coaches highlighted the importance
284 of being able to cope with stressors during a game, including among others the referees,

285 opponents or simply a bad play: “Within the course of the game, how do you react on missing
286 a shot or making a bad pass on defense? Not only your own reaction, but also how your
287 reaction reflects on your own teammates and your opponents” (C2). Moreover, coaches also
288 emphasized the importance of resilience and coping with adversity in the longer term. For
289 example, after a tough loss or other types of setbacks:

290 The first two games [of a tournament] were great, but the third game they got a pretty
291 big slap in the face and they were not yet recovered in the next match so to say. It
292 takes quite long before they fully recover. [...] It’s not only coping under pressure, it
293 is also managing stress and being adaptive. Like “this is what just happened, what is
294 next for me?” Here I see a really big difference with the real champions. (C1)

295 The ninth characteristic was labelled *perseverance*. This was defined as ‘the ability to
296 push through challenging situations and continue striving towards one’s goal, without giving
297 up before this goal is reached.’ This perseverance was described by the coaches using terms
298 such as “showing grit,” “muddling through,” “remain stoic,” “embracing the grind” and
299 “being persistent.” The coaches argued that the essence of having perseverance reflected the
300 ability to maintain effort and strive for one’s goals, without giving up before the goal is
301 reached. Again, coaches believed this perseverance, both in training and during competition,
302 was one of the characteristics differentiating top-level players with those of a lower level:

303 You know, they just don’t quit. That is what we see with our national players, so the
304 best players that we have, they don’t think about quitting. They just have this idea of,
305 alright, the next time I just try something else. (C1)

306 The tenth and final key characteristic was labelled *being a team player*. This was
307 defined as ‘adapting to the team rules and culture, embracing your role and being positive
308 towards your teammates.’ According to the coaches, being a team player meant “honoring
309 your existing commitments [to the team],” “adapting to the team rules and culture,”

310 “accepting your role” and acting accordingly, demonstrating “positive verbal and non-verbal
311 communication” towards the rest of the team and coaching staff, to “encourage your
312 teammates” and, overall, trying to provide a positive impact on the rest of the team.

313 In sum, the aim of the first phase was to establish the key psychological characteristics
314 pertinent to the specific case environment, as indicated by the coaches. In total, 10 key
315 characteristics were identified. Although some characteristics seemed to be mentioned
316 slightly more in relation to certain athletes (e.g., commitment appeared somewhat more
317 important for younger athletes moving to the boarding school), coaches mostly discussed
318 these characteristics as important for all their athletes, without distinction based on age or
319 position. Based on the coaches’ own detailed descriptions of the different relevant
320 characteristics and associated behaviors within different TID contexts, we developed
321 composite definitions for each of the relevant characteristics. These composite definitions
322 were used to guide the development of an assessment instrument during the second phase.

323 **Phase 2: Development and testing of the psychological assessment instrument**

324 *Instrument development*

325 Based on the information gained in the first phase, we developed a pragmatic
326 evidence-informed psychological assessment instrument to measure each of the identified
327 relevant psychological characteristics. To this end, the literature was scanned to find suitable
328 scales or sub-scales for each characteristic. As highlighted earlier, colloquial understandings
329 of psychological terms might differ from scientific conceptualizations (Dohme et al., 2017).
330 As such, we compared the latent meanings of each characteristic, captured within the
331 composite definitions rather than the explicit terminology used by the coaches, with the
332 existing literature (e.g., the construct resilience was not mentioned verbatim, but captured a
333 specific part of the coaches’ experiences). To be selected, each scale had to be validated and
334 have an acceptable demonstrated validity and reliability. Furthermore, as the aim of the

335 assessment instrument was to provide a parsimonious and pragmatic instrument for use in a
336 real-life TID organization, we also tried to select relatively short scales. A complete overview
337 of the specific scales for each psychological characteristic is outlined below.

338 **Coachability** was measured using the coachability sub-scale of the ACSI-28 (Smith et
339 al., 1995). This sub-scale includes four items scored on a 4-point Likert scale, ranging from 1
340 (*Almost never*) to 4 (*Almost always*). An example of items included in this scale is “*If a coach*
341 *criticizes or yells at me, I correct the mistake without getting upset about it.*”

342 **Reflection** was measured using the reflection sub-scale of the Self-Regulation of
343 Learning Self-Report Scale (SRL-SRS; Toering et al., 2012). This scale includes five items
344 scored on a 5-point Likert scale, ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*). An
345 example of one of the items includes “*I evaluate the events that I experienced, so that I can*
346 *learn from them.*”

347 **Growth mindset** was measured using the Conceptions of the Nature of Athletic Ability
348 Questionnaire-2 (CNAAQ-2; Biddle et al., 2003). The CNAAQ-2 includes 12 items scored
349 on a 5-point Likert scale, ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*). The items
350 include examples such as “*You need to have certain ‘gifts’ to be good at sport.*”

351 **Commitment** was measured using the enthusiastic commitment sub-scale from the
352 Sport Commitment Questionnaire-2 (SPQ-2; Scanlan et al., 2016). This sub-scale consists of
353 six items scored on a 5-point Likert scale, ranging from 1 (*Strongly disagree*) to 5 (*Strongly*
354 *agree*). An example item includes “*I am dedicated to keep playing this sport.*”

355 **Confidence** was measured using the self-confidence sub-scale of the Psychological
356 Skills Inventory of Sports, Youth Version – Short form (Milavic et al., 2019). The self-
357 confidence sub-scale includes three items scored on a 5-Point Likert scale, ranging from 1
358 (*Almost never*) to 5 (*Almost always*). Examples of such items include “*I can usually remain*
359 *confident even through one of my poorer performances.*”

360 **Competitiveness** was measured using the desire to excel-social achievement sub-scale
361 of the SPQ-2 (Scanlan et al., 2016). This sub-scale consists of five items scored on a 5-point
362 Likert scale, ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*). Items included for
363 example “*I push myself to win every time I compete in this sport.*”

364 **Focus** was measured using the concentration sub-scale of the ACSI-28 (Smith et al.,
365 1995). This sub-scale contained four items scored on a 4-point Likert scale, ranging from 1
366 (*Almost never*) to 4 (*Almost always*). It included items such as “*When I am playing sports, I*
367 *can focus my attention and block out distractions.*”

368 **Resilience** was measured using the brief resilience scale (Smith et al., 2008). The brief
369 resilience scale encompasses six items scored on a 5-point Likert scale, ranging from 1
370 (*Strongly disagree*) to 5 (*Strongly agree*). This includes items such as “*I usually come through*
371 *difficult times with little trouble.*”

372 **Perseverance** was measured using the perseverance of effort sub-scale of the Grit
373 scale (Duckworth et al., 2007). This sub-scale contained six items on a 5-point Likert scale,
374 ranging from 1 (*Not at all like me*) to 5 (*Very much like me*). Items included examples such as
375 “*I finish whatever I begin.*”

376 Finally, **being a team player** was measured using the interpersonal skills sub-scale of
377 the Sport Mental Training Questionnaire (Behnke et al., 2019). The interpersonal skills sub-
378 scale included four items scored on a 5-point Likert scale, ranging from 1 (*Strongly disagree*)
379 to 5 (*Strongly agree*). Examples of items in this sub-scale include “*I understand my role, and*
380 *the role of others on my team and how it all fits into the greater system.*”

381 These 10 scales resulted in an initial assessment instrument containing 55 items. Prior
382 to use in the case setting, we pilot tested the instrument with three female national level tennis
383 players aged fifteen and sixteen. These tennis players were chosen as a convenience sample as
384 they had a similar profile (i.e., active within a high-performance talent academy), were aged

385 around the lower age limits of the players within the case environment and already worked
386 with the second author. During the pilot study, the participants were asked to complete the
387 instrument and note any difficulties they found in the items and instructions or any additional
388 questions that they had. The instructions and questions were understandable and clear, but the
389 pilot study showed that there was a need to accentuate the context of the questions, that is, the
390 sport context. In the final form of the assessment instrument, the context of the questions was
391 therefore further highlighted. The time to complete the instrument was approximately 15
392 minutes, which matched our aim to develop a brief and accessible instrument.

393 *Instrument testing*

394 After completing the instrument development and pilot testing, the athletes within the
395 case environment were all asked to complete the assessment instrument. Due to the COVID-
396 19 pandemic, we were necessitated to administer the instrument via online survey software
397 (i.e., Survalyzer) rather than in person. The invitations to complete the survey were sent
398 through the coaches, with three reminders being sent after one, two and three weeks
399 respectively. The survey itself started with a description of the aim (i.e., ‘to help coaches
400 better understand you and how you practice your sport’) and instructions (i.e., ‘please answer
401 as truthfully as possible, there are no right or wrong answers’) for completing the instrument.
402 The athletes were also asked to complete some demographics (e.g., age, playing position,
403 years since starting to play competitive basketball) in addition to the 10 psychometric scales.
404 In total, 42 players out of 53 players involved in the case environment completed the full
405 instrument (response rate = 79%).

406 We also wanted to compare the results from the assessment instrument with the
407 coaches’ own perceptions of the psychological characteristics. As such, coaches were asked to
408 rank their players on each of the 10 psychological characteristics. Rather than doing this for
409 the whole group, coaches did this for a sub-set of 21 players. The reasons for this were

410 twofold. First, from a pragmatic perspective, doing this for a limited set of players was
411 considered to be more time efficient; an important consideration for the coaches during the
412 uncertainty of the COVID-19 crisis. Second, the 21 included athletes were all players who
413 were involved within the daily training academy, and thus, excluded the national team
414 players. Given the more frequent (i.e., daily) interactions with these 21 players, it was
415 believed that coaches might have a better perspective on each athlete's strength and
416 weaknesses when it comes to the psychological characteristics. Practically, coaches received
417 the written composite definition for each of the 10 characteristics and were asked to rank their
418 players in descending order for their possession of each characteristic. Aggregates of the
419 coach rankings were subsequently compared with the athletes' own scores on each of the
420 characteristics.

421 The main results of the assessment instrument are summarized in Table 1. Basic
422 descriptive statistics demonstrate that mean scores for all characteristics are relatively high.
423 Although this is not necessarily unexpected within an elite sport organization, it suggests a
424 ceiling effect. Although we should be careful with comparing averages of different scales
425 (with a different number of items and different anchors), the athletes seemed to score
426 themselves highest on characteristics such as commitment, competitiveness, reflection and
427 coachability; whereas they tended to score themselves lower on characteristics such as focus,
428 resilience and confidence. Also included in Table 1 are the Cronbach's alpha scores for each
429 scale. Cronbach's alpha is a measure to assess the internal consistency, or reliability, of a
430 particular scale (Taber, 2018). Within our case study, only the constructs reflection ($\alpha = .73$),
431 commitment ($\alpha = .83$), confidence ($\alpha = .85$), and resilience ($\alpha = .72$) scored within the
432 typically considered range for good internal consistency ($.95 \geq \alpha \geq .70$). However, as Taber
433 (2018) highlighted, lower internal consistency scores do not always need to be problematic,
434 especially for scales with a limited number of items administered in a relatively small sample.

435 As such, internal consistency for coachability ($\alpha = .58$), growth mindset ($\alpha = .65$), focus ($\alpha =$
436 $.58$), perseverance ($\alpha = .68$) and team skills ($\alpha = .53$) might still be considered acceptable,
437 especially for applied purposes. Only the construct competitiveness ($\alpha = .39$) showed an
438 unacceptable internal consistency. As such, we decided to remove the competitiveness scale
439 from the final instrument.

440 Spearman's rank correlations coefficients (r_s) were used to calculate the correlations
441 between the relative rankings from the coaches and the athletes' scores on the assessment
442 instrument (see last column of Table 1). Only growth mindset ($r = -.46, p = .035$) and
443 resilience ($r = -.47, p = .033$) demonstrated significant moderate correlations. Some overlap
444 also seemed to be present between the athletes' and coaches' ratings for confidence ($r = -.41$),
445 being a team player ($r = -.35$) and focus ($r = -.33$), which nevertheless failed to reach
446 significance. Overall, the findings suggest that there was relatively low agreement between
447 the coaches' perceptions and the athletes' scores on the psychological assessment instrument.
448 A number of potential explanations might be formulated for this finding. First, it is unclear to
449 which extent coaches have an accurate assessment of their athletes' possession of
450 psychological characteristics. Some characteristics, such as reflection, result from primarily
451 internal processes and may therefore not easily be observable for coaches. Conversely, more
452 overt characteristics with stronger expected links to observable behaviors, such as
453 commitment or perseverance, also failed to demonstrate strong correlations. Alternatively,
454 athletes themselves might find it difficult to realistically evaluate their own possession of
455 psychological characteristics or feel tempted to respond in a socially desirable manner.

456 Finally, intercorrelations between the different psychological characteristics were also
457 calculated using Pearson correlation coefficients, as illustrated in Table 2.¹ Dohme et al.

¹Note: commitment is still included in the correlation table, despite being omitted from the final assessment instrument based on its poor internal consistency.

458 (2019) highlighted that many overlaps exists between common psychological constructs, as
459 well as synonymous use of terminology. As such, we used the intercorrelations to explore
460 how strongly different constructs were related to each other, as a potential sign of overlap. In
461 general, we found limited correlations between the different constructs, with the few
462 significant correlations being only small to moderate ($r_s < .43$). Although by no means
463 conclusive as a test for discriminatory validity, this finding suggests limited redundancy
464 within or overlap between the selected 10 psychometric scales. As such, each construct seems
465 to hold a distinct value within the TID organization.

466 In sum, we developed and conducted some early testing for a psychological
467 assessment instrument within an applied TID organization. Based on the evaluations of the
468 internal consistency of the different scale, the decision was made to drop the competitiveness
469 scale, resulting in a final instrument measuring nine characteristics (the final instrument can
470 be found as supplementary material). The evaluations of the coaches involved in this project
471 were highly positive and they believed the instrument could be of great added value for their
472 organization going into the future. However, some potential issues were also revealed during
473 the early testing of the instrument, including the questionable internal consistency of some
474 scales, the limited agreement between coaches and athletes, and the potential for social
475 desirability and ceiling effects. We believe these issues do not necessarily impede the
476 usability of the developed instrument. However, they raise some important considerations for
477 how, when and why this instrument might be useable. We will reflect further on these
478 considerations and examine how they might be relevant for other TID contexts within the
479 final section of this case study.

480 **Case Reflections**

481 The aim of this case study was to outline a structured and evidence-informed approach
482 towards developing an assessment instrument to measure psychological characteristics within

483 an applied TID organization. It was not our aim to develop a definitive measurement
484 instrument applicable to a wide range of contexts, nor was it our goal to assess the
485 psychometric qualities of this instrument. Rather we hope that within this paper we illustrate
486 how coaches, sport psychologists or other TID stakeholders can systematically approach the
487 development and use of psychometric assessment within their organization, as well as offer
488 some critical reflections.

489 In total, we identified ten key psychological characteristics pertinent to our case
490 environment, which were later adjusted to nine characteristics within the instrument. When
491 looking at these characteristics, we find some overlap with previous studies exploring key
492 psychological characteristics within different sport environments. For example, Blijlevens et
493 al. (2018) also identified focus, confidence, perseverance and competitiveness in their study
494 with top-level gymnasts. Similarly, Dohme et al. (2019) identified confidence,
495 competitiveness, resilience and focus as crucial psychological characteristics within youth
496 sports. However, the differences among the psychological characteristics identified in this
497 case study and other studies (see also e.g., Harwood, 2008; MacNamara et al., 2010), also
498 highlights the potential context specificity of many of these psychological characteristics. As
499 such, TID organizations would do well to carefully and strategically outline the characteristics
500 most pertinent to their organization, rather than adhering to a single existing framework.
501 Although we focused on the perspective of coaches in our case study, practitioners looking to
502 determine a similar context-specific set of crucial psychological characteristics might also
503 consider the perspectives of athletes and other stakeholders (e.g., sport psychologists) within
504 the TID organization.

505 As we explored the psychological characteristics pertinent to our specific case
506 environment, characteristics were mostly discussed as important for all players. Nevertheless,
507 we recognize that there can still be considerable contextual differences even for the athletes

508 within this environment. For example, within the total sample, athletes from a relatively broad
509 age range were included. These players were often situated at different stages within their
510 career. The younger players were members of the academy, hopeful for a professional career;
511 whereas the older players were already established national team members. It would seem
512 likely that the relative importance of the identified psychological characteristics might differ
513 among these athletes. A next step could therefore be to design a development pathway,
514 outlining the most important characteristics per development stage and pinpointing the
515 relative priorities for development per stage (see Blijlevens, 2019).

516 Within this case study, we are also not looking to uncritically endorse the constructs
517 underlying the psychological assessment instrument. We recognize that many psychological
518 constructs gain considerable hype and attention within the applied field; whereas in reality
519 science is murky and key constructs regularly have their validity questioned. For example,
520 despite its wide popularity, the concept of growth mindset – or at least its proposed universal
521 positive impact – has increasingly been called into question (e.g., Sisk et al., 2018). However,
522 by clearly defining, operationalizing and monitoring psychological characteristics, coaches
523 can move beyond colloquial understandings of a certain construct and evaluate the relevance
524 of said characteristic within their TID environment over time.

525 When developing an assessment instrument like the one presented in this case study, a
526 crucial consideration is of course how this instrument should be used. Some scholars have
527 tentatively suggested that psychological assessment can provide a useful tool for talent
528 selectors (e.g., Tedesqui & Young, 2018). Indeed, many stakeholders within the applied field
529 can be tempted to use psychological assessment for the purpose of talent selection, given the
530 constant pressures to gain a competitive edge in their selection procedures. However, we
531 would argue against such a use of psychological assessment for a number of reasons. First, it
532 has been noted that many psychometric instruments used within sport psychology do not meet

533 the highest validation standards (Andersen et al., 2007). Although all scales used in our case
534 study were validated and published, several of these scales still lacked basic robust internal
535 consistency. Again, we do not believe this precludes any usability of these scales within an
536 applied setting. However, it raises questions concerning the validity of these measures to
537 guide high-impact decisions such as talent selection. Second, there also exist the previously
538 mentioned potential issues of a lack of self-insight, ceiling effects and particularly social
539 desirability. Social desirability refers to the conscious or unconscious tendency to rate items
540 in line with the perceived socially desirable responses, rather than in a way that accurately
541 reflects one's own feelings or attitudes; and has long been recognized as an important issue
542 regarding the use of self-report measures. However, such issues of socially desirable
543 responses would likely increase exponentially when athletes are aware of the considerable
544 impact good test scores can have on their further athletic career, further calling into question
545 the validity of psychometric instruments for talent selection purposes.

546 Third, too little is known about how scores on these validated questionnaires link up
547 with actual real-life behaviors. Although we know psychological characteristics are important
548 within talent development, we do not know the effect size that an increase of, for example,
549 one point on a psychometric scale has on corresponding real-life behaviors (Andersen et al.,
550 2007). Finally, too little knowledge is still available on how and to which extent these
551 important characteristics can be developed (Rees et al., 2016). Some authors have suggested
552 that psychological characteristics reflect relatively stable factors (e.g., Dohme et al., 2017),
553 whereas others have suggested that psychological characteristics hold much more room for
554 development (Blijlevens et al., 2018). A “snapshot” style assessment for talent selection
555 purposes therefore does not take into account the dynamic and temporal aspects of the
556 development of such psychological characteristics (Den Hartigh et al., 2018; Hill et al., 2019).

557 In sum, currently the evidence is not there to advocate the use of psychological assessment to
558 guide talent selection.

559 Instead, we would argue that psychological assessment is better used for development
560 purposes. Coaches or practitioners might use psychometric instruments to track dynamic
561 changes within athletes' psychological characteristics over time (Den Hartigh et al., 2018). Of
562 course, users should still be cognizant of the previously mentioned issues. However, by using
563 the instrument to track changes over time some of these issues could be somewhat mitigated.
564 For example, when systematically used in combination with applied efforts to develop
565 psychological characteristics, athletes might actually increase their self-insight and perceive
566 less incentives to answer in a socially desirable manner. In this regard, coaches may even
567 expect scores to decrease in certain circumstances. Not because athletes actually decrease in
568 their possession of psychological characteristics, but rather because they gain a more realistic
569 perspective on their own strengths and weaknesses with regards to the specific characteristic.
570 Furthermore, by using psychological assessment instruments systematically over time they
571 can also be linked to changes in real-life behaviors (Andersen et al., 2007). As such, we
572 strongly agree with Hill et al. (2019), suggesting that psychological assessment should ideally
573 be used as a part of a triangulation process, complemented with other indicators such as
574 behavioral observations, performance parameters and face-to-face discussions.

575 As part of this triangulation process, we believe the strongest value of a psychological
576 assessment instrument such as the one presented in this case actually lies in its use as a
577 reflection tool. Data from our case illustrates that agreement between coaches' and athletes'
578 perspectives is not always very high when it comes to certain psychological characteristics.
579 We believe that this should not necessarily be a negative. Rather, the scores can be used as a
580 starting point for a non-judgmental discussion whereby coaches, athletes and sport

581 psychologists help each other gain more insight into one's own thoughts, feelings and
582 behaviors.

583 In conclusion, although the extant literature shows strong support for the importance
584 of psychological characteristics within talent development, no clear guidelines exist for how
585 this knowledge should be used within applied settings, particularly with regards to
586 psychological assessment. Within this paper, we presented our approach to develop an
587 evidence-informed assessment instrument within an applied TID organization. It was not our
588 goal to build theory or validate the instrument presented here but rather to outline a strategic
589 approach towards developing such an instrument. Based on the findings in our case study, we
590 have presented a number of key reflections that can provide important considerations for TID
591 organizations looking to develop and implement psychological assessment within their
592 programs.

593

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707

708 Table 1.

709 *Descriptive statistics, internal consistency and correlations with coach rankings*

Competency	Items	M	SD	Range	α	r_s
Coachability	4	2.44	0.37	2.50 – 4.00 (1 – 4)	.58	-.16
Reflection	5	3.17	0.40	3.40 – 5.00 (1 – 5)	.73	-.19
Growth mindset	12	2.92	0.34	3,08 – 4.83 (1 – 5)	.65	-.46*
Commitment	6	3.42	0.46	3.17 – 5.00 (1 – 5)	.83	-.14
Confidence	3	2.34	0.66	1.67 – 4.67 (1 – 5)	.85	-.41
Competitiveness	5	3.20	0.39	3.40 – 5.00 (1 – 5)	.39	-.11
Focus	4	1.74	0.47	1.50 – 3.75 (1 – 4)	.58	-.33
Resilience	6	2.34	0.49	2.50 – 4.33 (1 – 5)	.72	-.47*
Perseverance	6	2.91	0.48	2.67 – 5.00 (1 – 5)	.68	.20
Being a team player	3	3.01	0.43	3.25 – 4.75 (1 – 5)	.53	-.35

710 * $p < .05$

711

Table 2.

Pearson correlation coefficients between the psychological characteristics

	CB	RF	GM	CM	CF	CO	FO	RE	PE	TP
CB	-									
RF	.06	-								
GM	.27	-.12	-							
CM	.30	.02	.21	-						
CF	.20	.03	.18	.07	-					
CO	.27	.42**	.00	.27	-.08	-				
FO	.38*	-.12	.06	.20	.20	-.15	-			
RE	.31*	.28	.24	.15	.34*	.19	.20	-		
PE	.22	.23	-.04	.04	.28	.37*	.04	.08	-	
TP	.08	.31*	.15	.28	.24	.29	.15	.19	.35*	-

712 *Note: Coachability (CB), Reflection (RF), Growth mindset (GM), Commitment (CM),*
713 *Confidence (CF), Competitiveness (CO), Focus (FO), Resilience (RE), Perseverance (PE)*
714 *and being a team player (TP).*