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

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Abstract

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

Keywords: applied research; monitoring; profiling; psychological competences; psychological assessment

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

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

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

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

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

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

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

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

Case Context

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

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

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

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

The Case

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

Phase 1: Determining the key psychological characteristics

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

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

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

Results from phase 1

The first characteristic was labelled ***coachability***. Coachability was defined as ‘taking the opportunity to learn from coaches and their feedback; and actively use this information 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

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

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

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

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

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

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

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

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

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

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

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

Phase 2: Development and testing of the psychological assessment instrument

Instrument development

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Instrument testing

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

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

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

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

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

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

Finally, intercorrelations between the different psychological characteristics were also 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.

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

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

Case Reflections

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

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

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

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

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

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

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

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

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

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

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

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

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707

Table 1.

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

* $p < .05$

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).*