This study presents a complete psychological skills training (PST) program with a wheelchair athlete and examines the program effectiveness using a mixed-method approach. After initial testing, the athlete followed a two-month program of self-confidence building, motivational, visualization/relaxation, and injury management techniques. Quantitative and qualitative methods were used to examine the impacts on performance and psychological abilities. The triangulated results suggest that the PST program was perceived as effective by the athlete in terms of his sporting performances and mental skills. The characteristics and implications of a PST program with this wheelchair athlete are discussed, as well as the study limitations and the perspectives for future research.

Keywords: mental preparation, sport, athlete with disability, performance enhancement.

The literature on sport psychology and disabilities indicates more similarities than differences between individuals with and without disabilities (Sherrill, 1999). Psychological techniques like imagery (Eddy & Mellalieu, 2003), self-talk (Stamou, Theodorakis, Kokaridas, Perkos, & Kessanopoulou, 2007), and goal setting (Lowther, Lane, & Lane, 2002) are effective and appreciated by individuals with disabilities. However, more research is needed to confirm these results specifically in athletes with disabilities (Goudas, Kontou, & Theodorakis, 2006).
Case studies are a good way to enrich the literature and explore the practical implications of interventions (Morris, 2004). Although this study design is somewhat controversial because of the low statistical requirements, it provides the opportunity to observe and evaluate participants in their real environment, without disrupting natural ways of training (Flyvbjerg, 2006). Furthermore, rather than using a rigid protocol to examine a limited number of variables (as in the questionnaire survey), a case study is an in-depth examination of a single person or group (Dul & Hak, 2008). It is thus a valuable source of data that are directly relevant to applied psychology. Interest in this research design has been growing in sport psychology (Hemmings, 2011), particularly with regard to psychological skills training (PST).

PST is defined as an individualized program combining several psychological methods to improve psychological skills and sporting performance (Weinberg & Williams, 2006). To date, researchers have applied this approach to many types of athlete (Bertollo, Saltarelli, & Robazza, 2009), with a range of age groups (McCarthy, 2009) and ethnic backgrounds (Hung, Lin, Lee, & Chen, 2008). General PST packages have not been developed because a PST program should be constructed, adapted, and applied according to the specific physical and psychological needs of the individual athlete (Bertollo et al., 2009). Despite the numerous similarities between individuals with and without disabilities, athletes with disabilities face many physical and psychological challenges in the sport context specific to their conditions. These challenges include potential injury related to material constraints, the need for medical care, negative social reactions from the community, and lack of autonomy and accessibility (Jaarsma, Geertzen, de Jong, Dijkstra, & Dekker, 2013). Developing and implementing PST programs for athletes with physical disabilities therefore raises several issues of practical importance.

A few case studies have examined the rehabilitation process to evaluate how an individual with a severe disability can be integrated into a team or how a sport can have a beneficial impact on a person with a disability (Goodwin, Krohn, & Kuhnle, 2004; Vogler, Koranda, & Romance, 2000). Although improved performance has been found to be one of the most important factors (Brady & Maynard, 2010), little attention has been given to determine how a complete systematically and individually designed PST program can help athletes with disabilities to perform at a higher level.

Gorely, Jobling, Lewis, and Bruce (2002) presented an interesting PST program for athletes with intellectual disabilities. The participants were able to follow the entire program with appropriate adaptations (e.g., language, time of session, repetition), and both athletes and coaches perceived the techniques as useful during competition. Hanrahan (1995) focused on athletes with physical disabilities and provided valuable information on how to conduct an intervention in a group setting. These authors emphasized how to consider the type of disability and its severity to deliver adapted exercises. Brooks (2007) and Jackson (2006) also provided interesting information from their sport psychology consultancy on how to work with this population.

To summarize, the studies using a PST program to improve the performances of athletes with disabilities have focused on intellectual disabilities or groups with physical disabilities. However, to our knowledge, no case study of an elite athlete with physical disabilities has been published. Yet, Wollman (1986) recommended single-subject designs because small but consistent changes can be detected, whereas they would be lost in a group design. Indeed, this systematic way of
collecting data, analyzing information, and reporting the results may provide greater insight into how a PST program best works for a wheelchair athlete and what should be explored more extensively in future research (Baxter & Jack, 2008).

We therefore designed and conducted a single-case study with one wheelchair water-skiing athlete. Water-skiing was chosen because the inherent risks and characteristics of this sport require high levels of psychological skills like concentration, mental toughness, commitment, motivation, and planning.

The aim of the study was to respond the following research question: “Can a PST program improve the performance, or at least some psychological skills, of a wheelchair athlete?” A complete PST program was conducted and a mixed-methods approach was used to evaluate the findings. We assumed that the response would be positive if this PST program was successful based on objective and perceived improvement in performances and mental skills. We did not set out to present an ideal model of a PST program, but rather to give an example of sport psychology applied to a wheelchair athlete to inspire sport psychologists in their practice, as well as researchers in their future research on this topic.

Method

Initial Description

To better understand the modifications induced by our intervention, a precise description of the initial situation was first obtained using Vealey and Garner-Holman’s (2000) four broad domains as the basis for assessment, subsequent intervention, and evaluation with athletes. These domains are as follows: (a) the athlete’s personal characteristics (gender, country, age, sport); (b) contextual characteristics (coaches, teammates, family, period in the competitive season); (c) organizational culture of the sport (disciplines, organization, participation); and (d) the consultant’s characteristics (competence, philosophy, and style). We also included a fifth domain related to (e) the specific characteristics of the disability.

Individual characteristics of the athlete. The participant was identified as T.L., a 38-year-old male living in the south of France. At the time of the intervention, T.L. had been practicing disabled water-skiing for 9 years and had competed at an international level for 6 years. This athlete was selected because of his high involvement in his sport; he was one of the few athletes to take part in all three disciplines of water-skiing (i.e., slalom, jump, and tricks) in international competitions, and he acted as his own coach, as well as a coach for beginners and as the president of a water-skiing organization.

Disability characteristics. T.L. had become disabled in an accident 13 years before the case study. As a person with paraplegia (level T8), he has no use of his abdominal muscles and is wheelchair-bound. In water-skiing, this disability requires a seated position with the knees above the bottom, to prevent the athlete falling during movement.

Contextual characteristics. T.L. was single and strongly supported by family and friends. As noted, he did not have a coach, which is frequently the case for athletes with disabilities (Martin, 2012).
Organizational culture of the sport. The scoring in water-skiing for people with disabilities is specific to each discipline. Slalom is evaluated by measuring boat speed and the number of buoys successfully passed. Jump length is quantified in meters, and tricks are scored on the basis of the difficulty of the performance. One of the main differences with nondisabled water-skiing is the larger size of the ski, which requires a different way of sliding and causes greater water resistance. Another important specificity of wheelchair athletes is when they jump and rotate above the waves: their inability to create impulsion with their legs pushes them to compensate with more spring, momentum, and amplitude than nondisabled water-skiers.

Characteristics of the consultant. T.L. and the consultant were first in contact following a snow ski competition a few months before the PST program began, so a friendly relationship had already been built. The consultant was a PhD student in sport psychology, and T.L. was informed that she planned to conduct a case study with an athlete with disabilities. He spontaneously proposed himself, as he was greatly interested in anything that could improve his performances and thus wanted to test sport psychology. The intervention program presented here was the only one performed with T.L. (i.e., it was not part of an ongoing program). The consultant had been a coach for more than 10 years and a gymnast for many years at both regional and international levels. She therefore had a background in both sport psychology and elite sport, but not specifically in water-skiing. She had previously worked with athletes with disabilities, and she was the chairman of an association to develop sports competition for athletes with physical disabilities. Despite a lack of experience in water-skiing, it was assumed that the consultant had both the theoretical and practical skills to work with T.L.

Ethical Considerations

Approval for this study was given by the University Research Committee. Researchers adhered to the British Psychological Society’s code of ethics and conduct (Ethics Committee of the British Psychological Society, 2009) at all times. The athlete was informed of the nature, purpose, and anticipated consequences of the research project before giving written consent to participate; he was also informed of his right to withdraw from the study at any time. Confidentiality was ensured, and two random letters (T.L.) were used to identify the athlete.

Measures

We used a mixed-method approach to evaluate the effectiveness of the PST program, as it has the potential to increase the depth of perspective on findings and provide comprehensive understanding. Many researchers explicitly recommend triangulating the evidence in single-case studies to enhance the reliability of the results (Anderson, Miles, Mahoney, & Robinson, 2002; Baxter & Jack, 2008). Quantitative and qualitative data, as well as objective and subjective methods, were therefore used to broaden the spectrum of performances and mental skills evaluated with a sensitive approach (Thelwell & Maynard, 2003). Based on recommendations from Anderson et al. (2002), psychological skills and performance were measured at pre- and postintervention. The methods included performance
observation, self-assessment, questionnaire completion, subjective mental skills evaluation, and semistructured interviews.

**Performances observation.** In the year before the PST program, T.L.'s best scores were: 4/31 (number of buoys/speed of the boat) in slalom, 570 points in tricks, and 13 m in jump, and he obtained a mean score of 517.5 points in tricks and 12.23 m in jump (Table 1). Furthermore, in the current study, successful objective performances were also operationalized, such as breaking a record and/or winning a medal, following Kuan and Roy's (2007) study. Before beginning the study, T.L. had already obtained fourth place in slalom, third place in tricks, and second place in jump in the preceding European championships.

**Self-assessment performances.** T.L. was asked to evaluate his “overall level of performance” before and after the PST program on a scale from 0 to 10 (0 being a very poor level and 10 a very high level). His rating at the first session was 6/10.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Objective Performances of T.L. in the Seasons Before and During the PST Program</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The Season Before the PST Program</strong></td>
<td><strong>The Season During the PST Program</strong></td>
</tr>
<tr>
<td>Slalom (number of buoys/distance in km/h)</td>
<td>3/31</td>
</tr>
<tr>
<td></td>
<td>4/31</td>
</tr>
<tr>
<td></td>
<td>0/31</td>
</tr>
<tr>
<td>Tricks (total number of points)</td>
<td>500 pts</td>
</tr>
<tr>
<td></td>
<td>570 pts</td>
</tr>
<tr>
<td></td>
<td>500 pts</td>
</tr>
<tr>
<td></td>
<td>500 pts</td>
</tr>
<tr>
<td>Mean scores</td>
<td>517.5 pts</td>
</tr>
<tr>
<td>Jump (distance in meters)</td>
<td>11m</td>
</tr>
<tr>
<td></td>
<td>12.7m</td>
</tr>
<tr>
<td></td>
<td>13m</td>
</tr>
<tr>
<td>Mean scores</td>
<td>12.23m</td>
</tr>
</tbody>
</table>
**Questionnaire completion.** The athlete was also asked to complete the Psychological Performance Inventory (PPI; Loehr, 1986) in the first and last sessions. According to Loehr (1986), mentally tough people have the ability to remain relaxed, calm, and energized under pressure, increase their positive energy when facing difficulties, and stay confident and motivated in competition. Based on this definition, he created a 42-item scale which yields an overall mental toughness score, as well as seven subscale scores: (a) self-confidence, (b) negative energy control, (c) focus control, (d) imagery control, (e) motivation, (f) positive energy, and (g) attitude control. Preliminary support for the factorial validity and reliability of the short version of the PPI has been provided (Golby, Sheard, & van Wersch, 2007); however, the negative energy control subscale did not display good internal consistency (Golby & Sheard, 2004) and was excluded from the current study. Although further investigation of the validity of this scale is required, it was retained because of its high relevance for practitioners and for T.L.’s needs. To compare T.L.’s results with a norm, we selected Golby and Sheard’s findings (2004) as a reference for international elite athletes.

**Subjective mental skills evaluation.** The Performance Profile (PP) developed by Butler (2000) is a subjective evaluation method to identify the athlete’s perceived strengths and weaknesses in terms meaningful to the athlete. This assessment technique, theoretically reviewed and recommended by sport researchers and coaches (Hemmings, 2011; Thelwell & Maynard, 2003), is usually a first step in designing a training program (Butler & Hardy, 1992). By providing a visual display of the athlete’s self-evaluation, the PP helps both the consultant and athlete to determine the important mental skills to work on. This technique is also a way of testing the effectiveness of any intervention or program designed to help an athlete (Jones, 1993). Three PP evaluations were carried out: (1) as a baseline evaluation (PP1, session 1); (2) after his first important competition (PP2, session 6); and (3) to conclude the PST program (PP3, session 13). As suggested by Anderson et al. (2002), the pre- and postmeasures indicated whether progress on mental skills was perceived by T.L. An intermediate measure was made just after his first competition, because this stressful event was expected to be a concrete illustration of the development of T.L.’s performances. One purpose was to adjust, if required, the content of the PST program utilizing this feedback.

**Semistructured interviews.** The consultant conducted interviews during the PST program to strengthen its quality by staying close to T.L.’s needs and to collect data about its perceived effectiveness regarding his performances and mental skills.

The first interview was conducted in the first session to determine the main psychological skills and objectives to work on during the PST program. Interviews were then routinely conducted at the end of each session to evaluate the perceived effectiveness of the tools and exercises. The final interview was conducted at the end of the PST program to evaluate the perceived effectiveness of the overall program on performances and mental skills. Rubin and Rubin’s (1995) guidelines for in-depth interviews were followed. The interviews followed a guide adapted to the session theme (i.e., self-confidence, visualization and relaxation, motivation and determination, and injury management) and were based on the categories of questions proposed by Spradley (1979): main questions, probe questions, and follow-up questions. Reformulation techniques and contrast questions also were used (Spradley, 1979).
Specifically, the athlete was invited to describe (a) significant training or competition situations, (b) the mental skills he used, (c) their perceived effectiveness, and (d) the reasons why these mental skills were perceived as effective/ineffective (e.g., “What makes this behavior effective/ineffective?”; “How would you explain it?”).

**Intervention**

The intervention took place in the summer, which is the active period for water-skiing. The PST program lasted 2 months (from July 5th to August 28th), with a mean of 2 sessions (30 min each) per week. The 13 sessions are described below. The program was conducted at the height of the season because the athlete felt motivated by the direct link between the PST program and his skiing performances. The main purpose of the intervention process was to determine the best adapted tools and techniques to improve performances and selected psychological skills (depending on T.L.’s needs).

**Session 1.** The main goal of this session was to select the appropriate mental skills to work on during the PST program. T.L. completed the PP (Butler, 2000) and chose 19 attributes that he defined, rated, and divided into four subdomains: (a) eight psychological skills, (b) seven technical aspects, (c) two physical attributes, and (d) two elements related to external and equipment factors (see Table 2). Furthermore, he evaluated his overall “level of performance” on a scale from 0–10.

During the interview, T.L. described his difficulties during training and competitive situations and identified objectives for the PST program (e.g., “Can you describe how things went in your last competition?”; “Did you feel a decrease in self-confidence before your jump?”). The two most important objectives were as follows: (a) to improve his performances and scores in the current European championship and (b) to overcome a new fear of falling and being injured in the act of jumping, caused by an accident that had occurred in the previous season.

<table>
<thead>
<tr>
<th>Attributes</th>
<th>PP1</th>
<th>Objectives</th>
<th>PP2</th>
<th>PP3</th>
<th>Definitions Given by the Participant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mental (mean score)</td>
<td>7.37</td>
<td>9.87</td>
<td>7.62</td>
<td>8.12</td>
<td>Ability to optimize recovery after an injury</td>
</tr>
<tr>
<td>Injury management</td>
<td>5</td>
<td>10</td>
<td>6</td>
<td>7</td>
<td>Positive determination to achieve the right movement execution</td>
</tr>
<tr>
<td>Pugnacity</td>
<td>7</td>
<td>9</td>
<td>7</td>
<td>7</td>
<td>Mental preparation of the passage—movement visualization in his mind-body spatial representation</td>
</tr>
<tr>
<td>Visualization</td>
<td>9</td>
<td>10</td>
<td>8</td>
<td>8.5</td>
<td>(continued)</td>
</tr>
<tr>
<td>Attributes</td>
<td>PP1</td>
<td>PP2</td>
<td>PP3</td>
<td>Definitions Given by the Participant</td>
<td></td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Humility</td>
<td>9</td>
<td>10</td>
<td>9</td>
<td>8  Stay honest with his own performances</td>
<td></td>
</tr>
<tr>
<td>Be analytical</td>
<td>9</td>
<td>10</td>
<td>9</td>
<td>9  Use of a videotape to review mistakes and good points</td>
<td></td>
</tr>
<tr>
<td>Calmness</td>
<td>8</td>
<td>10</td>
<td>7</td>
<td>8  Mental well-being, no excitation</td>
<td></td>
</tr>
<tr>
<td>Concentration</td>
<td>7</td>
<td>10</td>
<td>8</td>
<td>9  Thinking only about a movement when doing it</td>
<td></td>
</tr>
<tr>
<td>Self-confidence</td>
<td>5</td>
<td>10</td>
<td>7</td>
<td>8  Self-confidence in his own ability to achieve a movement, knowledge that he is able to do it</td>
<td></td>
</tr>
</tbody>
</table>

**Technical (mean score)**

<table>
<thead>
<tr>
<th>Attributes</th>
<th>PP1</th>
<th>PP2</th>
<th>PP3</th>
<th>Definitions Given by the Participant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trained in the sport</td>
<td>8</td>
<td>10</td>
<td>7</td>
<td>8  Strength, techniques, and material application in the sport</td>
</tr>
<tr>
<td>Tricks techniques</td>
<td>7</td>
<td>10</td>
<td>7</td>
<td>7  Slides, jumps, rotation on the wave or between the waves</td>
</tr>
<tr>
<td>Jump technique</td>
<td>8</td>
<td>10</td>
<td>8</td>
<td>8  Momentum, movement on the springboard, landing</td>
</tr>
<tr>
<td>Slalom technique</td>
<td>6</td>
<td>10</td>
<td>5</td>
<td>6  Rubber ring to pass, braking, equilibrium. . .</td>
</tr>
<tr>
<td>Slalom braking</td>
<td>3</td>
<td>10</td>
<td>5</td>
<td>6  Ability to slow down before the rubber for turning well</td>
</tr>
<tr>
<td>Wave passage in slalom</td>
<td>5</td>
<td>10</td>
<td>5</td>
<td>6  Passage on the boat wake</td>
</tr>
<tr>
<td>Entrance on the wave in slalom</td>
<td>3</td>
<td>10</td>
<td>5</td>
<td>6  Need to have the ski well-oriented</td>
</tr>
</tbody>
</table>

**Physical (mean score)**

<table>
<thead>
<tr>
<th>Attributes</th>
<th>PP1</th>
<th>PP2</th>
<th>PP3</th>
<th>Definitions Given by the Participant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physically trained</td>
<td>9</td>
<td>10</td>
<td>7</td>
<td>8  Muscle production to be “one strength unity”</td>
</tr>
<tr>
<td>Physical strength</td>
<td>7</td>
<td>10</td>
<td>8</td>
<td>8  Physical/muscular training consequence</td>
</tr>
</tbody>
</table>

**External (mean score)**

<table>
<thead>
<tr>
<th>Attributes</th>
<th>PP1</th>
<th>PP2</th>
<th>PP3</th>
<th>Definitions Given by the Participant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparation/external condition on the contest day</td>
<td>7</td>
<td>10</td>
<td>8</td>
<td>9  Water test, boat waves, weather condition</td>
</tr>
<tr>
<td>Equipment well-prepared</td>
<td>8</td>
<td>10</td>
<td>8</td>
<td>8  Material adjustments</td>
</tr>
</tbody>
</table>

Notes: PP1: scores of the first profile of performance (session 1); PP2: scores of the second profile of performance (session 6); PP3: scores of the third profile of performance (session 13).
After analysis of T.L.'s verbalizations and PP results, the consultant and athlete selected four mental skills to work on to help him achieve his objectives:

Self-confidence
Visualization and relaxation techniques
Injury management
Determination and motivation

Self-confidence was a priority as the PP indicated that this skill had the greatest difference between his actual level (5) and the objective to attain (10). T.L. agreed that working on this skill would increase the likelihood of improving his performances, by reducing his fears of making a mistake and falling. Next, they decided working on both visualization and relaxation techniques would help him perform better by improving his concentration and calm on the day of competition. Third, injury management was chosen as an essential mental skill to work on to diminish his fear of falling and getting hurt. Last, determination and motivation were chosen as important areas to work on to strengthen the ability to perform. Thus, this first session was used to plan an adapted PST program focused on improving several appropriate psychological skills to improve T.L.'s performances. The following sessions followed this program.

Sessions 2, 3, 4, and 5: Enhancing self-confidence. T.L. defined self-confidence in terms of knowing that he had the skills to do something. He then revealed that any unanticipated event or situation with many new parameters to manage caused a significant decline in confidence. Moreover, this decline pushed him into a vicious circle, where lack of confidence negatively affected performance, and poor performances further reduced his self-confidence. As the problem became better defined, two parallel interventions were proposed (a) to increase his self-confidence and (b) to help him cope with new stimuli that induced a loss of confidence and decreased performances (in other words, to improve his perceived control of the situation).

First, a global approach was undertaken, focusing directly on self-confidence. Several exercises were chosen to help the athlete concentrate his attention on his positive attributes and abilities. This method contrasted with his tendency to criticize his performances (Hanrahan, 1995) and thus recalibrated his self-analysis more objectively (balance between positive and negative view). These sessions concluded by reinforcing the importance of T.L. continuing to think about himself in a positive way. The consultant used the occasion to introduce the notion of positive self-talk and emphasized the importance of using positive and encouraging thinking to improve self-confidence (Hatzigeorgiadis, Zourbanos, Mpoumpaki, & Theodorakis, 2009).

Second, special attention was given to perceived control. Following Banks’ (1992) recommendations to minimize the feelings arising from uncontrolled environments, a personalized routine was proposed, as this useful tool is frequently suggested by sport psychologists (Bertollo et al., 2009; Si & Lee, 2008). T.L. performed no special routine before competition, which may have accentuated feelings of panic and loss of control. The appropriate pre-performance routine developed with T.L. involved three main aspects. First, he was required to anticipate and organize his time optimally (e.g., being at the competition site a few days in advance and ensuring that his equipment was prepared the night before arriving).
to diminish fears of the unknown and the need for haste (Banks, 1992). Second, T.L. had to pay more attention to positive visualization exercises (McCarthy, 2009) before going to sleep and before competition. Third, a few minutes before the beginning of competition, T.L. was requested to create a “mental bubble” to isolate himself from external distractions. Once in this positive state of mind, he was asked to visualize his future performance in minute detail followed by a positive mental self-talk sentence to increase motivation and prepare for enjoying the fun and challenge of competition (Hatzigeorgiadis et al., 2009). In summary, the routine required T.L. to spend more time at the competition site, to carry out visualization exercises, and to identify and use a short but crucial time specifically for himself (mental bubble, visualization, and self-talk).

**Sessions 6, 7, 9, and 10: Enhancing visualization and relaxation.** At the start of these sessions, T.L. took 10 min for relaxation based on the progressive muscle relaxation described by Jacobson (1938). These relaxation periods were adapted to T.L.’s disability. Thus, he had to focus on and progressively relax every part of his body for at least one minute, except his legs due to his disability. To improve his concentration and enhance a relaxed attitude, he was also requested to focus on breathing slowly and peacefully (Haddad & Tremayne, 2009). Once completely relaxed, the visualization exercises began; these differed, depending on the session. Visualization exercises proved to be a sound way for T.L. to diminish the feelings of discomfort generated by a new situation (Si & Lee, 2008) and to increase self-confidence (Munroe, Giacobbi, Hall, & Weinberg, 2000), concentration, and movement understanding (Butler, 2000), thereby positively impacting performances. In the first session, T.L. felt comfortable with both the internal and external visualization of an ideal performance focused on an imagined lake, although he stated that he had some difficulty linking visualization with reality. Consequently, in the next sessions, the aim was to work on more realistic imagery. T.L. had to focus on every detail around him (water, vegetation, wind effects, the boat, the cord size, the spectators, himself) and mentally copy the exact situation, beginning with his pre-performance routine and then a perfect complete performance. Once T.L. felt at ease, the consultant introduced potential difficulties during his routine (e.g., someone speaking loudly when he needed to concentrate) and competition (e.g., bad posture before a trick). This kind of exercise was aimed at helping him to anticipate perturbations and learn how to react positively in cases when the routine or competition performance could not be perfectly carried out. T.L. chose to focus on the specific technical moments when he had to enter the wave during the big slalom. Over the course of the exercise, T.L. appeared to become progressively more confident; he was no longer affected by unexpected mistakes and he learned to accept new difficulties as challenges. The sessions were considered as successful, because T.L. felt a clear and positive link between the visualization exercises and reality. Thus, he was asked to continue the relaxation and visualization exercises by himself every evening before retiring. No logbook was requested because it was deemed to be too restrictive and demanding at that time.

**Sessions 8 and 11: Injury management.** When reflecting on the competition of a few days before, T.L. underlined once more his second objective: progress on
his ability to overcome his fear of falling and getting hurt. Water-skiing requires the skier to maximize his speed while performing the slalom and jumps. When emotional barriers like fears override the athlete’s mental state, he may reduce speed while performing or even brake at times; for example, when he becomes afraid that his speed might cause an accident and injury, he slows down and therefore restricts his specific (in the particular skill) and overall performance. A two-part plan based on coping strategies (Brewer, 2010) was created. First, the consultant explained that the visualization exercises could be used also to improve coping techniques and prevent injuries by diminishing the fear of unpredictable problems, illogical stress, and panic that might induce potential accidents (Butler, 2000). Second, as injury is practically inevitable in sport (Moran, 2004), an adapted reaction was developed by working directly on injury management to help the athlete feel more confident in dealing with the consequences of an accident. Following the effective parameters of coping (Butler, 2000), T.L., with the support of the consultant, chose to plan two rehabilitation programs for two kinds of anticipated injuries: one for slight injuries that allowed training to continue and the other one for serious injuries that required temporary training cessation.

**Session 12: Strengthening motivation and determination.** The first step was to identify T.L.’s motivational orientation. Understanding what pushes an athlete to perform will enhance his or her ability to exert mental and physical effort in the pursuit of excellence (Moran, 2004). The semistructured interviews revealed that T.L., like many elite athletes, pursued both task and performance goals (Mallett & Hanrahan, 2004). However, he found that personal performance goals (e.g., “improve his score during competition” or “succeed at a new trick”) were more efficient to motivate him than social comparison and competitive performance goals (e.g., “defeat this specific opponent”). As T.L. did not have a coach, he had to rely mainly on his own support and developed self-talk strategies in that aim. In the second step, the consultant therefore helped him to find several positive, short, and personal self-talk sentences or words able to motivate him before (e.g., “I can do it, I know I can”) and during (e.g., “Here we go!”) competition. The GO FOR IT exercise developed by Butler (2000) gave him some examples of statements that he could choose to keep in mind and use as self-talk inspiration. This session was expected to be useful for strengthening his self-confidence and helping him to cope with his emotional barriers and fears by improving concentration and thus reducing the risk of injury.

**Session 13: Final session.** The PST program concluded with the last semistructured interview. T.L. was asked to describe how he felt at the end of the program and if he thought he had met his two main objectives. Detailed comments about his perceived performance improvements and his results on the last PP and PPI scores, as well as a debriefing about his new performances scores, medals, and titles, were also requested. He also specified how the PST program could have been improved. Last, he was asked if he had changed anything in his usual training during the season, other than the PST program. He confirmed that his training was completely similar to that of the previous season, except that he had fewer occasions to work specifically on physical strength.
Data Analysis

The repeated measures of psychological skills were analyzed by inspection of graph data (Kazdin, 1982), and the scores were compared with the norms for the PPI (see Table 3 and Figure 1). Changes in means were considered as practically significant, without using statistical tests. Based on talent development models (e.g., Ericsson, 2007), small mean differences in performances at an elite athletic level were deemed important. As mental abilities are fully part of performance improvement (Martin, 2012), this consideration was extended to psychological skills. In addition, qualitative data were analyzed as follows. First, verbalizations from the semistructured interviews were transcribed verbatim by the first author onto paper or electronic files. Then, the consultant and a second researcher, familiar with sport psychology, analyzed T.L.’s responses. First independently and then together, they selected several themes that emerged from the interviews. Both inductive and deductive content analyses were adopted to analyze the interview transcripts, as recommended by Patton (2002). Last, a realistic approach for qualitative research (Maxwell, 2012) was adopted to assess the program effectiveness. From a positivist point of view, we could not rule out the possibility that the observed changes in psychological skills and performance were due to the PST program, because of the internal validity threats of the current study. However, according to the realist approach for qualitative research, direct observation of causal processes (as reflected by the participant’s perceptions of the effectiveness of the PST program during competitive events) was considered to be a valid indicator (Putnam, 1999). Last, quantitative and qualitative information were combined when changes in the means of psychological skills could be related to self-reported progress in the same skills.

Table 3  Participant’s Psychological Performance Inventory Scores at Pre- and Postintervention Compared With International Athletes’ Means

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Total mental toughness</td>
<td>150</td>
<td>193</td>
<td>171.17</td>
<td>114–201</td>
</tr>
<tr>
<td>Self-confidence</td>
<td>22</td>
<td>30</td>
<td>26.26</td>
<td>17–30</td>
</tr>
<tr>
<td>Attention control</td>
<td>18</td>
<td>24</td>
<td>23.81</td>
<td>11–30</td>
</tr>
<tr>
<td>Visualization</td>
<td>22</td>
<td>29</td>
<td>22.97</td>
<td>8–30</td>
</tr>
<tr>
<td>Motivation</td>
<td>26</td>
<td>30</td>
<td>25.73</td>
<td>13–30</td>
</tr>
<tr>
<td>Positive energy</td>
<td>23</td>
<td>27</td>
<td>25.44</td>
<td>18–30</td>
</tr>
<tr>
<td>Attitude control</td>
<td>22</td>
<td>28</td>
<td>25.36</td>
<td>15–32</td>
</tr>
</tbody>
</table>
Wheelchair Water-Skiing Athlete Case Study

Results

Performances Observation and Self-Assessment

At the end of the PST program, T.L.’s best scores were: 4/43 in slalom (i.e., he gained +12 in boat speed), 700 points in tricks (i.e., he gained +130 points), and 16.3 m in jump (i.e., he gained +3.3 m). Furthermore, his mean scores was 620 points in tricks (i.e., he gained 102.5 points) and 13.75 m in jump (i.e., he gained 1.52 m). Overall, the scores he obtained the year of the PST program were better than those of the year before (see Table 1 for details). Furthermore, he placed second in slalom (i.e., he gained +2 places), first in tricks (i.e., he gained +2 places), and first in jump (i.e., he gained +1 place) at the European championship. T.L. became the French champion in three disciplines (jump, tricks, and combined sports), and he dramatically improved the French record in jump.

At the last session, T.L. evaluated his “overall level of performance” at 8.5, which is a gain of 2.5 points compared with the first evaluation.

Questionnaire Completion

Mental training appears to have improved all aspects of mental toughness and all scores became higher than the norm-related means (Table 3). Before the program, T.L.’s first score on total mental toughness (150) was lower than the norm for an international athlete (171.17) given by Golby and Sheard (2004), but when training ended, his scores had improved dramatically (193). Similar increases were found for the six subscales, except motivation, which was already higher than the means found by Golby and Sheard (2004).
Subjective Mental Skills Evaluation

The means for the four subdomains (i.e., mental, technical, physical, and external/material factors) chosen by T.L. in the PP are presented in Table 2 for each time of measure (PP1: first session; PP2: sixth session; PP3: last session). The PP1 indicated T.L.’s fluctuating profile, consisting of both substantial strengths (i.e., scores of 9) and considerable weaknesses (i.e., scores of 3). He rated himself highly on several psychological skills (i.e., visualization, humility, and sense of analysis) and on one physical attribute (physically trained); fairly highly on calmness and some technical aspects (trained in sport, jump technique); and moderately on concentration, pugnacity, and management of external conditions. This first evaluation also revealed a striking lack of confidence and several difficulties with injury management, as well as low scores on technical aspects like slalom braking, wave passage in slalom, and entrance on the wave in slalom.

The scores in most categories increased in the PP3, indicating that T.L. felt he had a more harmonious profile, with no real weaknesses (i.e., no scores under 5) at the end of his PST program. Positive change in nearly every subdomain (except physical) can be observed, especially in most of qualities he selected as essential to work on during the PST. Details of these improvements are described below.

Mental qualities. Interestingly, major improvements were observed in the mental ability skills worked on during the mental training session (see Table 2). First, we noted an enhancement in concentration (+2) and calm attitude (+0.5). T.L. perceived these improvements to be the result of the development of a routine and the relaxation practices. The exercises on motivation and determination were believed to be relevant, as pugnacity improved (+1). Injury management (+3) and self-confidence scores (+3.5) also noticeably improved. Interestingly, the humility score decreased (-1.5), paralleling the change in self-confidence. When asked for more details about this point, T.L. said that he felt an athlete could be both confident and humble. Several times in his explanation, however, he confused confidence with arrogance and humility with modesty, which might be a limitation for future self-confidence improvement and further analysis. To summarize, T.L. perceived progress in several important mental skills covered by the PST program. In comparison, qualities for which there was no intervention (e.g., being analytical) did not improve. However, one exception was noted, as T.L. reported a slight decrease in visualization (-0.5) despite the investment of time and resources during the PST program. Further explanation of this finding will be furnished in the analysis of the semistructured interview.

Technical abilities. T.L. perceived major technical improvements (see Table 2) for two abilities: slalom braking (+3) and slalom entrance on the wave (+3), for which he had practiced visualization exercises.

Physical attributes. T.L. did not practice any training focused on strength during the last 2 months, which would explain why the variable physically trained decreased (-0.5). However, even with few occasions to specifically work it, T.L. improved his perception of physical strength (+1; see Table 2).

External conditions and equipment management. T.L. was certain that the improvement he felt in managing external conditions (+2) and equipment preparation (+1; see Table 2) was a positive consequence of the use of his mental routine.
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Semistructured Interviews

Discussion between the researchers suggested four themes divided into two main topics as relevant to answering the research question. The first topic focused on the particularity of conducting a PST program with a single wheelchair athlete through (a) the negative and positive mental consequences linked to physical disability and (b) the adaptations required for his physical disability. The second topic adds further knowledge on the perceived effectiveness of this PST program for T.L.’s (c) mental skills and (d) performances.

**Negative and positive mental consequences of physical disability and the required adaptations.** First, physical disability had negative and positive consequences in the life of this athlete. T.L.’s answers indicated that the handicap was sometimes felt as a disturbing limitation impacting his self-confidence, especially when related to his perceived control. “There’s an external factor that can have a negative effect on my self-confidence. I always have a hard time coping with the unknown.” It was sometimes hard for T.L. to be unable to manage everything. However, there are many unpredictable parameters associated with disability (e.g., transportation, accommodations, materials issues, and competition sites ill-adapted to wheelchair use). T.L. therefore lacked confidence when he did not have the time to analyze and prepare everything in advance. Another issue also impacted his self-confidence: He stated that before his disability he was “probably too confident” but that now he was “thinking more before acting, maybe too much.” Having a disability probably modified his confidence, making him more “serious.” This psychological consequence of his disability could become a problem for performance enhancement by creating useless fears and reducing motivation. On the other hand, the disability was also a “motor” for T.L., in terms of motivation (“I’ve always enjoyed challenges, but my disability pushes me to move forward even more.”) and injury management (“Like I did for dealing with my disability, I know what is okay and what is not. So, I am focusing on what is still functional and I deal with it.”). He finally added: “Once you deal with disability, you can deal with anything else!” The second theme of this topic focused on the adaptations required by this particular wheelchair athlete in the PST program. Indeed, the adaptations needed for T.L.’s disability were underlined in his answers concerning relaxation (“I would have preferred to relax my whole body rather than only the functional parts.”) and visualization (“I always included my wheelchair in any visualization.”).

**Perceived impact of the PST program on T.L.’s mental skills and performances.** First, T.L. expressed several positive consequences concerning the mental skills worked on during the mental training. He seemed more confident (“I believe even more in my abilities. It’s not a dream anymore, now I know I can achieve.”) and more equipped to deal with potential injuries (“Planning how to deal with injuries was a good thing to do, I now feel more confident about the future.”). He added that he was no longer afraid to jump, at least not enough to negatively impact his performances (“I use my fear as a positive motor, a strong boost. Jumping is again becoming a good thrill.”). He also reported a better level of visualization at the end of the PST program (“Thanks to visualization, I’ve improved the link between feelings and techniques.”), despite his lower score in the PP3 explained
by a first evaluation probably somewhat overestimated (“My visualization is not as perfect as I first thought.”). Furthermore, he noticed that the PST program had an overall positive impact that went beyond mental skills. Indeed, he perceived improvements in the following:

- Physical abilities (“I feel stronger in my acts and it is probably in part due to greater self-confidence.”)
- Technical skills (“I think that visualization helps me to improve my entrance on the wave as I’m better, even if I don’t practice this point a lot.”)
- Feelings of control over external factors and material (“I’m at ease with my new routine; it gave me a better feeling of control over my environment, which also improves self-confidence on the day of the event.”)

Second, T.L. expressed his conviction that the PST program had helped him to improve his performances (“This new general positive feeling about myself and competing helps me to express my real abilities and perform at my true level.”). He added that he was happy about his performances in the current season, especially in jump at the European championship (“The competition was severe, and I’m quite proud of my results.”).

Combination of Qualitative and Quantitative Data

Visual inspection of the quantitative psychological data and the objective performances revealed global improvements in T.L.’s scores. These observations were consistent with T.L.’s perceptions, as he also reported progress in nearly every mental quality he selected to specific attention in the program. Furthermore, T.L.’s objectives were all successfully achieved. His performances improved in the European championship and he overcame his fear of jumping to such an extent that he broke his own and the French record in this discipline. In addition to the improvement in his mental abilities, his physical, material, and technical qualities were also enhanced.

Discussion

Perceived Progress and Performances

The results of this single-case study suggest that T.L. made real progress in mental skills and performances. As nothing was added in his usual training schedule compared with the previous season, except the mental training exercises, this progress can be attributed to the PST program. These encouraging findings indeed indicate that a PST program including several appropriate mental techniques may improve both performances and psychological skills of a wheelchair athlete, providing support to the research question. This result is also a good practical illustration of previous research findings on the subject (Hanrahan, 1995; Setyadiputra & Ievleva, 2001).

Clearly, the results of a single PST program cannot be generalized and our observations should be considered as specific to T.L. (Si & Lee, 2008). However, the systematic way of collecting quantitative and qualitative data, analyzing information, and reporting the results may provide insight into how PST programs can...
be adapted to work for wheelchair athletes and which issues need to be examined more extensively in future research (Flyvbjerg, 2006). Two important points that emerged in this case study are the following. First, this PST program is an encouraging example of a wheelchair athlete taking advantage of working on mental skills and techniques to improve his sporting performances, with positive results. This transfer from an improved ability in one area (e.g., mental ability) to other aspects of the athlete’s life (e.g., physical and technical performances) is consistent with previous research (Reeves, Nicholls, & McKenna, 2011). In the current study, the imagery technique, which is a mental skill, was found to benefit the role of skill, which is a technical consequence (Munroe et al., 2000). The impact of a PST program may thus be broader than expected. Second, this PST program underlines the need for consultants to talk with wheelchair athletes when beginning a PST program (Hanrahan, 1995). Understanding how T.L. was coping with his disabilities was a key element in adapting the tools, techniques, and vocabulary to his personal requirements. His disability emerged as a feature of his life but not as the main thing. This finding emphasizes the importance of paying attention to disability, by being at ease in discussing personal points of view and perceptions related to it, but not focusing on it (Setyadiputra & Ievleva, 2001).

Adaptations and Similarities to Athletes Without Disabilities

Performances and mental skills can be improved with an adapted PST program. However, it might be instructive to focus on the specificities of the athlete in the current study: his physical disabilities and their relative consequences for the PST program. Overall, T.L. needed no major adaptations: the exercises and methods for working on self-confidence, visualization, injury management, relaxation, and motivation were for the most part identical to those used for athletes without disabilities. There were, however, some particular adaptations and slight differences in the application of these techniques, which are important to describe.

Concerning visualization, if the aim is to improve the performance of a particular movement, athletes with disabilities need to visualize themselves in a real competitive situation. For wheelchair athletes, the chair needs to be part of the visualization if it is a necessary piece of equipment (Hanrahan, 1995), just as any other piece of equipment needs to be part of the visualization process for people without disabilities (a tennis player needs to visualize his racket to improve his smash).

During the relaxation sessions, the consultant first focused only on the functioning muscles. After a discussion, however, T.L. indicated that it was important for him and would have been more interesting to relax the whole body, even the nonfunctional muscles, using sentences like, “Imagine that you are whole; you feel comfortable and you are relaxed.” This point of view may certainly be individual and personal, but it reflects Hanrahan’s (1995) finding that some participants prefer whole body methods and others prefer relaxing only the controllable muscles.

No particular adaptations for injury management were needed during these sessions. However, having a disability probably was an important element, as T.L. automatically drew a parallel with his own. He naturally adopted the three successful attitudes described by Butler (2000): (a) put the injuries in perspective, (b) adopt an attitude of taking control, and (c) work on what is available rather than merely
complaining about what is lost. Apparently, this coping style helped him to easily integrate ways to deal successfully with injury. He had already performed the most difficult task in accepting his disability, so dealing with an injury appeared less threatening. In this specific case, the disability appeared to be more of an advantage than a hindrance to achievement. Keeping in mind that this is a personal point of view, this perception of disability provides an interesting example of how some disabilities can be helpful in a PST program.

T.L. began his mental training with a low level of self-confidence due to his excessive prudence and his feeling of being unable to control external parameters. Once more, these beliefs are personal, but this finding underlines the need to be aware of such potential difficulties—perhaps specific to physical disabilities—to find appropriate ways to deal with them. For example, athletes with low self-confidence are encouraged to create routines (Banks, 1992). In the current study, no particular adaptations were carried out when creating routines, except for two points that the sport psychologist kept in mind. First, as the amount of material specific to his disability (wheelchairs, protections, and special skis) was greater than that for nondisabled water-skiers, appropriate times for transportation were included in the routine. Second, as adapted sites are required for wheelchair athletes (e.g., no stairways), the routine also included a longer preparation time to avoid any unpleasant surprises on the day of competition. These particular complications need to be acknowledged and included in the athlete’s routine.

Regarding motivational aspects, T.L. once again considered his disability as an advantage and not a limitation. His current status had taught him to take any sports situation as a challenge and he considered his disability as a way to push himself to his limits. As with sports injury management, this was another occasion for T.L. to use his disability as inspiration and motivation for improving his mental strength. This interesting way of coping gave him another view on his disability, breaking with the social and physical barriers linked with his situation. By thinking about his handicap as a personal characteristic that could help him develop aspects of his mental strength, he found an efficient and personal way to perform.

**Limitations and Perspectives**

T.L.’s performances and mental skills appear to have improved with the PST program, although several points may be considered as potential limitations. For example, the consultant’s relative lack of experience in water-skiing and the friendly relationship between the consultant and athlete may have influenced the results (Pope, 1996). T.L. even argued that the PST program would have been more useful if he had paid for it, because he would have been even more involved. Furthermore, despite the originality of a mixed-method approach in the current study, the tools selected to measure performances and mental skills could be improved in the future. First, it would have been interesting to include a coach’s or teammates’ observations of T.L.’s progress as well as video analysis; however, this was not possible because the athlete did not have a coach or regular training partners to observe or record his performances. Second, although the PPI is an interesting tool to measure mental toughness on the field, its validity needs to be further examined. In addition, because earlier studies using this tool focused on team sport with nondisabled
athletes, more study on individual sport with athletes with disabilities is required. Third, post hoc discussions with T.L. and several experienced sport psychologists suggested that it would have been more beneficial to choose an initial objective of 9 rather than 10 in the skills rated by the PP, as an achievable and realistic goal is more inclined to improve the athlete’s motivation and performances (Mallett & Hanrahan, 2004). Last, a follow-up study would have determined whether T.L.’s progress was consistent across time.

Although it is difficult to demonstrate a cause and effect relationship between the reported changes and the PST program, and although our study suffers from threats to its internal validity, the use of triangulated measures and mixed methods in this single-case study provided consistent findings that suggest the effectiveness of the PST program for a wheelchair athlete. The beneficial effects on performance and well-being observed by the athlete himself can be interpreted as an encouragement for greater use of PST programs. Further qualitative studies adopting a realistic approach (Maxwell, 2012) with individuals with physical disabilities are needed, as are case studies mixing quantitative and qualitative evaluation of athletes with different types of disability, levels of performance, age, gender, and sport type. Furthermore, longitudinal studies with repeated and various measures of the targeted mental skills and performances (e.g., video-taping and post-training analysis of the videos, coach ratings, external observations) over long periods of time are required.

Despite these limitations, the current study is the first to provide a complete report on a PST program with an athlete with physical disability. It is hoped that the results will encourage sport psychologists, coaches, and athletes to better understand the importance of providing psychological services to athletes with physical disabilities. Furthermore, this case study confirms the importance of using a mixed-method approach to obtain a wide range of results and keener insight. Last, although there are many similarities between athletes with and without disabilities, the present findings underline some of the specificities of the disabled status. Interestingly, T.L. gave an example of how a disability can be interpreted as strength in the pursuit of sporting objectives (specifically on motivation and injuries management). It is hoped that this finding will be a basis for future innovative research and scientific development of the field of applied sport psychology with athletes with disabilities.

References


