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COMPETITIVE STRATEGIES AMONG ELITE FEMALE GYMNASTS: AN EXPLORATION OF THE RELATIVE INFLUENCE OF PSYCHOLOGICAL SKILLS TRAINING AND NATURAL LEARNING EXPERIENCES

CLAIRE CALMELS¹, FABIENNE D'ARRIPE-LONGUEVILLE^{2,1}, JEAN F. FOURNIER^{1,3}, AND AMÉLIE SOULARD⁴

¹*Institut National du Sport et de l'Éducation Physique, Paris, France*

²*Université de Nice Sophia-Antipolis, France*

³*Université de Paris 10-Nanterre, France*

⁴*École de Psychologie, Université d'Ottawa, Ontario, Canada*

ABSTRACT

The purposes of this qualitative study were, (a) to compare the competitive strategies developed by national and international female gymnasts through natural learning experiences, (b) to compare the competitive strategies used by national gymnasts who benefited from a psychological skills training (PST) program to those developed by international gymnasts via natural learning experiences, and (c) to investigate the functions these strategies served in the two aforementioned cases. Individual in-depth interviews were conducted with three international and six national gymnasts. Three of the six national gymnasts followed a PST, whereas the other three did not. The international gymnasts never benefited from PST neither before nor during the study. The results indicated that the strategies developed through natural experiences over time by the international gymnasts were wider and more elaborate than those of their national counterparts, but akin to those used by the national gymnasts who had benefited from a PST. The specific consequences of the characteristics of the international context and psychological skills training on the strategies gymnasts elaborated were also highlighted. Results are discussed relative to research on deliberate practice and sport talent development (Ericsson, Krampe, & Tesch-Romer, 1993).

Key Words: competitive strategies, elite gymnasts, psychological skills training, natural learning experience

Correspondence concerning this article should be addressed to Claire Calmels, Laboratoire de Psychologie du Sport, Département des Sciences du Sport, Institut National du Sport et de l'Éducation Physique, 11 Avenue du Tremblay, 75012 Paris. E-mail: ccalmels@hotmail.com

It is always disconcerting and frustrating to note that certain athletes perform better during an event than others who are more physically talented, and that some athletes perform brilliantly during practice and less well in competition. Coaches and athletes generally agree that mental states often explain the differences observed in competitive performance. Based on investigations of the psychological characteristics and the strategies used by high level performers, many studies in sport psychology literature have examined the attributes associated with athletic success. Two kinds of research can be identified, depending on the methodological approach adopted, quantitative or qualitative. In research based on quantitative methods, the influence of the athletes' personal characteristics (e.g., age, level of expertise) on different psychological skills has been examined through questionnaires. For instance, successful athletes have been characterized by a higher level of commitment, motivation, self-confidence, more positive self-talk, more daily thoughts and dreams related to their sport, superior concentration skills, and fewer thoughts of failure than their less successful counterparts (see Williams & Krane, 1998 for a review). Such athletes were also found to be better able to cope with competitive mistakes (Mahoney & Avener, 1977), and to manage competitive anxiety efficiently (Hanton & Jones, 1999). More recently, Thomas, Murphy, and Hardy (1999) reported that, compared to athletes of a lower standard, international athletes used more psychological skills in training and had more varied competitive strategies. Furthermore, older performers reported less use of imagery and activation strategies, in competition or in practice, better use of emotional control strategies, in practice, and more automaticity, in competition, than their younger counterparts.

To get a deeper understanding of elite athletes' experiences, and since there are very few high-level performers, other investigations have tended to turn to a qualitative interview approach (Patton, 1990). Thus, the psychological skills used by elite athletes in favorable situations have been explored through the recall of the best-ever performance (e.g., Cohn, 1991; Hollander & Acevedo, 2000), or of a memorable event (e.g., Dale, 2000). The flow experience (e.g., Jackson, 1992) has also been described. Other studies have investigated the sources of stress (e.g., Scanlan, Stein, & Ravizza, 1991), or the difficulties faced by elite athletes (e.g., Jackson, Dover, & Mayocchi, 1998). Finally, some research has compared the mental strategies used by successful and unsuccessful athletes (e.g., Orlick & Partington, 1988), expert and novice athletes (McPherson, 2000), in their best and worst matches (e.g., Gould, Eklund, & Jackson, 1992a, 1992b). The information collected through in-depth interviews is broadly in line with the results of quantitative studies (see Gould, Guinan, Greenleaf, Medbery, & Peterson, 1999, for a review). Overall, the results stress that high level performance requires common psychological skills, such as rational thinking, mental readiness, use of a competitive routine and plan, high levels of motivation, commitment, concentration, self-confidence, goal-setting skills, skills for dealing with distractions and unexpected events, the ability to regulate arousal, to control performance imagery, and a degree of automaticity in coping strategies.

While the favorable role of mental skills on expert performance in sport is now well documented, little is known about how these successful skills are acquired and developed. Research pertaining to this topic suggests that two types of experiences could allow athletes to acquire and develop mental skills: educational intervention experiences via psychological skills training programs (Vealey, 1994; Weinberg & Comar, 1994), and natural learning

experiences (Gould, Dieffenbach, & Moffet, 2002; Hanton & Jones, 1999; Weiss, 1991). In the case of psychological skills training (PST), intervention programs are offered to athletes by applied sport consultants. These PST programs are generally aimed at helping athletes acquire and strengthen mental skills to improve sport performance and generate a positive approach to the competitions. The techniques most used include goal setting, relaxation, arousal regulation, imagery, and thought control (self-talk and affirmation) (e.g., Defrancesco & Burk, 1997; Gould, Tammien, Murphy, & May, 1989; Taylor, 1995). Numerous studies have reported the favorable effects of psychological skills training programs on competitive performance (e.g., Cogan & Petrie, 1995; Garza & Feltz, 1998; Grouios, 1992; Kendall, Hrycaiko, Martin, & Kendall, 1990; Li-Wei, Qi-Wei, Orlick, & Zitzelsberger, 1992), and on particular psychological indexes such as states of somatic and cognitive anxiety (Bakker & Kayser, 1994; Cogan & Petrie, 1995; Terry, Mayer, & Howe, 1998), self-confidence (Bakker & Kayser, 1994; Garza & Feltz, 1998; Terry, Mayer, & Howe, 1998), imagery ability (Rodgers, Hall, & Buckholz, 1991), and team cohesion (Savoy, 1997).

Furthermore, psychological skills appear to develop through natural learning experiences and social influences. Based on her involvement with children and adolescents practicing in recreational contexts, Weiss (1991) found that natural environmental influences (i.e., appropriate practice methods, coach's and parents' behaviors, feedback and reinforcement, and peer modeling) might enhance psychological skills such as self-perception, intrinsic motivation, positive attitude, enjoyment, skills for coping with anxiety, and sportsmanship. More recently, d'Arripe-Longueville, Fournier, and Dubois (1998) found that, within the particular French judo system, tough coaching styles were responsible for building mental skills, such as athletes' commitment and development of a "winning spirit." This study also outlined that elite judo athletes were highly self-determined, and had developed their own coping strategies that helped them override the often unpleasant attitudes of the coaches, and perform well within the system. Hanton and Jones (1999) specifically explored how elite swimmers, aged between 19 and 27, had acquired and developed effective cognitive skills and strategies that enabled them to interpret pre-competitive anxiety as facilitative for performance. They reported that this acquisition had been elaborated over time through natural learning experiences. This process, unfolding throughout the swimmer's career, was composed of different components such as listening to parents, coaches, and more experienced competitors, taking their advice into account, and performing at different competitive standards and against different opponents. Very recently, Gould et al. (2002) confirmed the importance of the social background (i.e., family, coach, and exposure to elite athlete models) in the development of talent in elite athletes. For instance, Gould reported that being exposed at an early age to high-level competitors in the same discipline was one factor among others, which "provided both inspiration and various forms of vicarious learning" (Gould, 2001, p. 58).

On the whole, these studies suggest that some elite athletes acquire and develop successful mental skills over the years through various experiences and social influences, without any involvement in an educational psychological skills training program. They also suggest that athletes need to engage actively in this development. The concept of deliberate practice outlined in research pertaining to expertise in different domains (e.g., Ericsson, Krampe, & Tesch-Romer, 1993) illustrates this long and high engagement.

Because the influence of these "natural" learning experiences (i.e., without any structured PST) on the development of psychological skills has not been frequently explored in the sport psychology literature, several issues deserve further investigation. First, in order to extend Hanton and Jones's (1999) study, which only focused on pre-competitive anxiety, it would be of interest to consider all the mental skills and strategies used by athletes during competitions. Furthermore, because previous research mainly concerned adults, the question of the applicability of the results to younger participants is raised. In fact, young athletes might not possess enough maturity to develop, without the help of an educational intervention (PST), the same kind of competitive skills and strategies as their older counterparts.

Therefore, the purpose of the present study was threefold. First, to compare the competitive strategies developed by national and international gymnasts through natural learning experiences. The term *strategies* designates the procedures used by the athletes to develop mental skills (Vealey, 1988). Second, to compare the competitive strategies developed by national female gymnasts who benefited from a PST to the strategies developed by international athletes through natural learning experiences. Third, to understand through a careful investigation the reasons for the use of each strategy (i.e., what functions these strategies served) in the two aforementioned cases. Because these investigations were exploratory in nature, no a priori hypotheses were offered. The discipline of gymnastics was chosen because of its competitive environment which is demanding (e.g., requirement of a display of diverse skills, no right to make a mistake, risk of injury, evaluations by others), and therefore requires the use of strategies.

METHOD

PARTICIPANTS

The participants were nine French elite female gymnasts aged 12 at the time of the study. None of these participants had any previous experience in psychological skills training before the beginning of the study. All gymnasts had 25 hours of physical training per week and had regularly participated in national competitions. Three of these gymnasts, ranked between the 1st and 3rd places. They were selected for international tournaments and were preparing for the European junior championships in 2002. The six other gymnasts were ranked between 10th and 20th. Among these six athletes, three followed a PST program, whereas the other three did not benefit from this program. We therefore distinguished three categories of participants. The first was composed of international gymnasts (N = 3) with physical training, the second of national gymnasts (N = 3) with physical training, and the third of national gymnasts (N = 3) with physical training and PST. To guarantee anonymity, a coding system was used to identify the participants. International and national gymnasts with physical training were identified as International and National participants with Natural Learning Experiences and were respectively assigned the acronym INLE and NNLE. National gymnasts with PST program were attributed NPST initials.

PROCEDURE

The procedure involved two stages: (a) a ten-month PST program, and (b) in depth-interviews.

PST program

In addition to their physical training, three national gymnasts from sport center X followed a 10-month PST program at a rate of half an hour per week. This program involved five stages: relaxation (8 sessions), self-talk (5 sessions), goal setting (3 sessions), focusing (4 sessions), and visualization (5 sessions) (see Appendix). This psychological skills training was supervised by a consultant who had a rich background in gymnastics and in sport counseling. The other six gymnasts (three nationals and three internationals) from sport center Y did not benefit from this psychological skills training; they only trained physically. The fact that the participants belonged to two different sport centers avoided any risk of "experimental contamination," such as exchange of information between the participants. Even though the procedure had shortcomings (i.e., imperfect equivalence between the national participants), all the athletes trained an equivalent amount of time per week and training sessions and climate followed the same patterns.

In depth-interviews

In depth-interviews were undertaken with the nine gymnasts. The parents of the athletes gave written consent prior to study procedures. At the beginning of each interview, the investigator explained the purpose of the study and the format of the interview to the participants, and asked permission to make an audio recording of the interview. Information about the participant's age and background (e.g., when they began gymnastics, if they belong to a club, how many hours they train) was collected. Confidential retrospective interviews, ranging in duration from 60 minutes to 100 minutes, were then conducted. To make the gymnasts feel at ease and trust the interviewer, a neutral site was chosen: a lecture room outside the gymnasium.

The interviewer followed a structured interview guide composed of two parts. In the first part, the interviewer asked the gymnast to consider the major stages of her career and to think for a few minutes about her best competition. The gymnast was then invited to give general information about this event (i.e., where, when, and with whom it occurred) and to explain why she considered this event was her "best" competition. In the second part, the gymnast was asked to identify the strategies she had used during this competition and to explain her reasons for using them. To list the strategies and their functions, the gymnast was invited to recall and describe her activity during this event chronologically and in details. To help the participant reconstruct her experience accurately, Rubin and Rubin's (1995) guidelines for in-depth interviews were followed. Three types of questions were used: main questions, probe questions, and follow-up questions. The main questions consisted of asking the participant to describe her activity before, during, and after the competition. The probe questions allowed the interviewer to have a better understanding and to enrich the gymnasts' answers. For instance, questions about specific behaviors, thoughts, emotions, communication with the coach or the family were systematically asked to identify the strategies the participant had used during the event. Finally, follow-up questions were asked to get information about the reasons

for using the strategies (i.e., the functions). When a function was mentioned, new issues in the participants' responses were explored. In many cases, the questioning began in an open-ended way and became increasingly focused and even directive because the participants were too young and had difficulty in verbalizing their behaviors and thoughts. Moreover, the topics to be covered (relaxation, activation, imagery, self-talk, communication/isolation, preparatory behaviors, planning, and assessment of the event) were listed in the interview guide but the interviewer adapted to the gymnast's point of view. The final part consisted in thanking the participants for having spared the time for the study, and in making an appointment to check the researchers' transcripts and interpretations of the interviews.

INTERVIEWER

The interviews were conducted by a female researcher with a Ph.D. in exercise and sport psychology. The interviewer was experienced in qualitative methods, had 15 years of experience as a gymnast and as a coach, and seven years of experience in sport psychology consultancy.

DATA ANALYSIS

The data was transcribed from the audio tapes to 130 single-spaced pages with a margin of 6 cm on the right side for coding the quotes. Three investigators, trained in qualitative methods, were involved in the data analysis process. Two investigators read each interview transcript carefully and the third investigator, considered as a "disinterested peer" (Lincoln & Guba, 1985, p. 308), was asked to check the relevance of the categorization process. The first investigator, who conducted the interviews, listened to all the tape-recorded interviews to check if the re-transcription corresponded to what the gymnasts said, and to gather additional information, such as the tone of voice, the pauses, and the laughter. The other two investigators were deliberately kept in the dark as to the goal of the study.

After the reading stage, the interviews were analyzed using the procedures inspired by grounded theory principles (Strauss & Corbin, 1990). First, the interview transcripts were divided into meaningful pieces of information called *meaning units* (MU). Second, MU were compared and grouped together according to common features into increasingly more complex categories (Tesch, 1990). Finally, the last step of the analysis consisted of identifying categories of similarities and differences between the NNLE and INLE gymnasts and between NPST and INLE gymnasts. Frequency counts were not reported because they were not deemed relevant to the characterization of the effectiveness of gymnasts' strategies, and also because of the relatively small sample.

CREDIBILITY

In this study, credibility was achieved in four ways (Lincoln & Guba, 1985). First, investigator triangulation consisted of independent coding of the data, comparison, and discussion of the codes until a consensus was reached. Second, six of the participants verified the researchers' scripts and interpretations of the interviews to make sure that the information collected was authentic. Third, one expert researcher in qualitative research was asked to check the

relevance of the categorization process. Finally, gymnasts were observed in various settings such as training sessions and competitions to enhance the methodological rigor by providing the researchers with a deeper understanding of the participants' behaviors.

DEPENDABILITY

According to Lincoln and Guba (1985), several procedures were respected to establish dependability. The two investigators were trained in qualitative research by an expert on the subject: Methodological and data analysis procedures were described in depth, and pilot-interviews were conducted with former elite performers, who had participated either in the Olympic Games or in the World Championships. Additionally, one of the investigators had good knowledge of gymnastics, while the other two were deliberately unaware of the purpose of the study. This last choice was made to control an eventual bias in the interpretation of the data.

RESULTS

The nine interview transcripts were analyzed on a line-by-line basis by two coders who reached consensus that there were 55 MU for the three NNLE participants, 73 MU for the three INLE participants, and 81 MU for the three NPST participants. MU were then assembled into categories that were named according to the common features their MU shared. These categories described the strategies used by the gymnasts. A final level of analysis consisted of identifying the main functions of the strategies, and of organizing them into major categories. Thus, for the NNLE gymnasts, the 55 MU were abstracted into 23 categories and 7 major categories. For the INLE athletes, the 73 MU were assembled together to make up 41 categories and 8 major categories; and for the NPST group, the 81 MU coalesced into 35 categories and 7 major categories. Table 1 reports the major categories and categories that emerged from the analysis for each group. The results are presented in two parts: (a) the comparison of the strategies used by the NNLE and INLE gymnasts, and (b) the comparison of the strategies employed by the NPST and INLE gymnasts.

COMPARISON OF THE STRATEGIES USED BY THE NNLE AND INLE GYMNASTS

The findings of the content analysis revealed similarities and differences in the type and function of the strategies used by the NNLE and INLE gymnasts (see Table 1).

Table 1
Gymnasts' strategies and their perceived functions

Function of the strategies	NNLE Strategies	INLE Strategies	NPST Strategies
Decrease anxiety	Breathing slowly and deeply Giving social support to their peers Imagery	Breathing slowly and deeply Giving social support to their peers Self-talk Imagery Transformation of the moves	Breathing slowly and deeply Giving social support to their peers Self-talk Establishment of landmarks
Decrease fear of injury	Imagery Self-talk Preparatory movements	Imagery Warming-up efficiently	
Accept pain		Imagery Self-talk	
Increase activation	Self-talk Jumps	Self-talk Hyperventilation Slaps Breathing associated with self-talk	Self-talk
Stereotyped behavior coupled with self-talk			
Decrease activation			Breathing slowly and deeply Stereotyped behavior coupled with breathing
Increase engagement	Imagery	Imagery Self-talk Breathing associated with self-talk Looking at the competitors' routines Slaps Glance towards the family Comparison of her marks to those of her direct opponent	Breathing associated with self-talk Looking at the competitors' routines
Maintain attentional focus	Self-talk Imagery Isolation Thought stoppage	Self-talk Imagery Isolation Preparatory movements	Self-talk Imagery Thought stoppage Imagery associated with self-talk Looking at the judges
Increase self confidence	Self-talk Imagery Simulation of movement Looking for coach encouragement Avoiding looking at the judges	Self-talk Imagery Simulation of movement Looking for coach's encouragement and congratulation Thought stoppage Preparatory movements Simulation of movement combined with self-talk Rehearsal of strategies that were efficient in training sessions	Self-talk Imagery Looking for coach encouragement and congratulation Simulation of movement associated with self-talk Rehearsal of strategies that were efficient in training sessions Stereotyped behavior Check of apparatus characteristics Looking for an acquaintance among the judges

Function of the strategies	NNLE Strategies	INLE Strategies	NPST Strategies
Look for excellent performance	Self-talk Imagery Listening to the coach's technical advice Preparatory movements to reduce the warming-up decrement Imagery associated with self-talk	Self-talk Imagery Listening to the coach's technical advice Preparatory movements to reduce the warming-up decrement Charming the judges to get a good mark Simulation of movement associated with self-talk Setting self-referenced goals & checking their fulfillment Warming-up efficiently Self-assessment at the end of the competitive routine and the event	Self-talk Imagery Listening to the coach's technical advice Preparatory movements to reduce the warming-up decrement Charming the judges to get a good mark Simulation of movement Setting self-referenced goals Warming-up efficiently Self-assessment at the end of the competitive routines and at the end of the event Establishment of landmarks Adaptation to competitive apparatus Breathing associated with imagery

Similarities in the type and function of the competitive strategies used by the NNLE and the INLE gymnasts

Eight strategies have been identified as being used both by the NNLE and INLE gymnasts: breathing, isolation, simulation of movement, listening to the coach's advice, looking for the coach's encouragement and congratulations, giving social support to their peers, imagery, and self-talk. The functions of these strategies were similar in the two groups. (a) breathing slowly and deeply allowed the gymnasts to reduce anxiety; (b) isolation, which consisted in distancing oneself from significant others, helped the gymnasts to maintain attentional focus; (c) the simulation of movement, defined as miming the movement, allowed them to increase self-confidence, as illustrated by the following quote:

I did some twists at the same spot and also little moves, but that, but that helped me a bit. Well I felt like I was doing my tricks... Well I don't know, it helps a little bit, it gives me confidence (INLE 2);

(d) listening to the coach's technical advice was actively sought by NNLE and INLE gymnasts in order to stimulate their desire to excel; (e) looking for the coach's encouragement and congratulations helped the gymnasts enhance their self-confidence; (f) giving social support to their peers (observing teammates, chatting with them, encouraging them, and counseling them) allowed both groups to decrease anxiety. Moreover, imagery served to decrease anxiety, decrease fear of injury, increase engagement, increase self-confidence, maintain attentional focus and, look for excellent performance. For example, one NNLE gymnast indicated, "I was doing my routines again in my head...Er, it gave me confidence "(NNLE 3), and (g) self-talk was reported by both groups of gymnasts to increase activation, increase self-confidence, maintain attentional focus, and look for excellent performance.

Differences in the type and/or function of the competitive strategies used by the NNLE and INLE gymnasts

Four types of differences emerged: (a) differences in the type of strategies, (b) differences in the degree of elaboration of the strategies, (c) differences in the functions fulfilled by similar strategies, and (d) differences in the number of functions fulfilled by similar strategies.

Differences in the type of strategies. The following nine strategies were employed solely by the INLE gymnasts and were not identified among their national counterparts: looking at the competitors' routines, setting self-referenced goals and checking their fulfillment, rehearsal of strategies that were efficient in training sessions, transformation of the moves, warming-up efficiently, glancing towards the parents, charming the judges, self-assessment at the end of the competitive routine and the event, and comparison of the gymnast's own marks to those of her direct opponent. (a) looking at the competitors' routines allowed INLE gymnasts to increase their engagement. "I was watching the others, I saw they were very good. I wanted to do even better" (INLE 3); (b) setting self-referenced goals and checking their fulfillment helped INLE gymnasts to look for excellent performance; (c) rehearsal of strategies that were efficient in training sessions helped the gymnasts increase their self-confidence; (d) the transformation of the moves was one solution found by an INLE gymnast to cope with anxiety. Either she emphasized them in the routine, or she speeded them up in the warm-up; (e) warming-up efficiently decreased one INLE gymnast's fear of injury, and enabled INLE gymnasts to use the short warm-up time efficiently. For example, as soon as the judges gave the starting signal, gymnasts rushed to the starting point to begin their warm-up in first position; (f) glancing towards the family allowed INLE gymnasts to increase their engagement. This was apparent in the following quote: "After that I looked a bit my dad and my mum and they told me 'Go on, keep going,' and then, well, I was even more motivated" (INLE 1); (g) INLE gymnasts also displayed behavior to charm the judges (hairdo, smile, eye contact), while NNLE gymnasts avoided looking at the judges. After a brief eye contact, they stared at their papers. Moreover, INLE gymnasts carried out a self-assessment of their performance at the end of the competitive routine and event, as shown below:

Well, I try to warm-up for my vault, and to try to see one more time in my head all I have done... I keep that in my head, I follow his (coach) advice, and while I walk to, while I go to my vault mark, er then I think again about what I've done, about his advice, and try to, to think about it globally, to put together everything I said, and everything he told me and I try to make a better vault (INLE 1);

and finally, (i) the comparison of her own marks with those of her direct opponent was a means for one INLE to increase her engagement.

Differences in the degree of elaboration of the strategies. The degree of elaboration of the strategies (i.e., imagery and self-talk) used by the INLE gymnasts was higher than their national counterparts. Imagery used by INLE gymnasts was more elaborate, controlled, and vivid than the imagery of their national counterparts (see Figure 1). In fact, the majority of INLE participants was able to use a combination of internal and external imagery associated with kinesthetic modality, whereas NNLE gymnasts employed solely either external or internal perspective. INLE gymnasts were also able to visualize positive outcomes in color, while NNLE

gymnasts visualized them in black and white, and from time to time with negative outcomes. For example, a NNLE gymnast said, "Well sometimes, I saw I was too far forward or I hit, I nearly hit my feet against the bar" (NNLE 2).

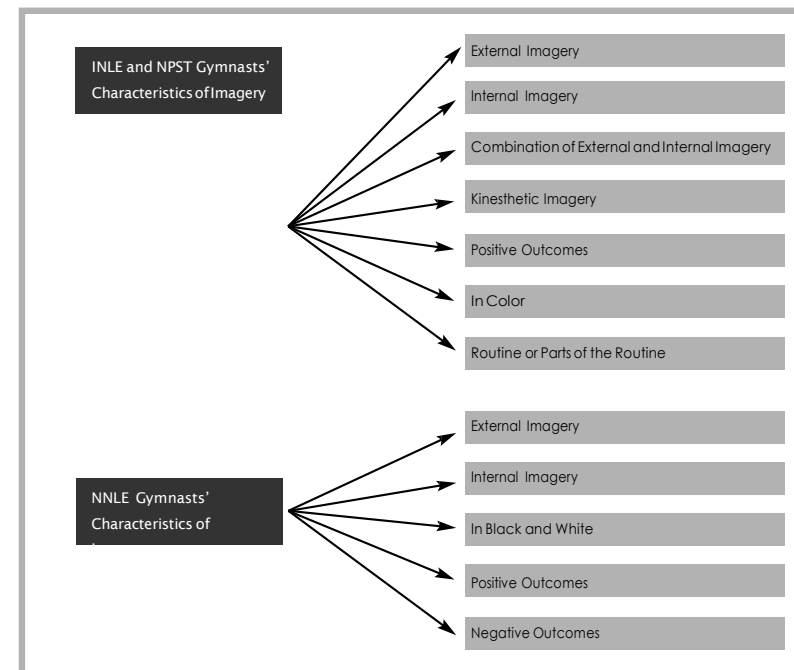


Figure 1. Hierarchical trees illustrating the characteristics of imagery used by INLE, NNLE, and NPST gymnasts.

The manner in which the INLE gymnasts talked to themselves was also more diversified (see Figure 2). Indeed, the nature of INLE gymnasts' thoughts consisted of (a) encouragement, (b) similarities with training, (c) technical advice, (d) psyching-up thoughts, (e) challenge, (f) obligation to compete and to engage, (g) self-efficacy beliefs, (h) emotional states, and (i) evaluative assessments. Conversely, NNLE gymnasts' self-talk content was restricted to three categories referring to (a) similarities with training, (b) technical advice, and (c) self-efficacy beliefs.

Furthermore, INLE gymnasts associated strategies together, in more varied ways than NNLE gymnasts did. INLE gymnasts combined self-talk with movement simulation to enhance self-confidence and to look for excellent performance; they also associated breathing with self-talk to facilitate the implementation of activation and engagement. NNLE gymnasts only formed a combination of imagery and self-talk for the research of excellent performance.

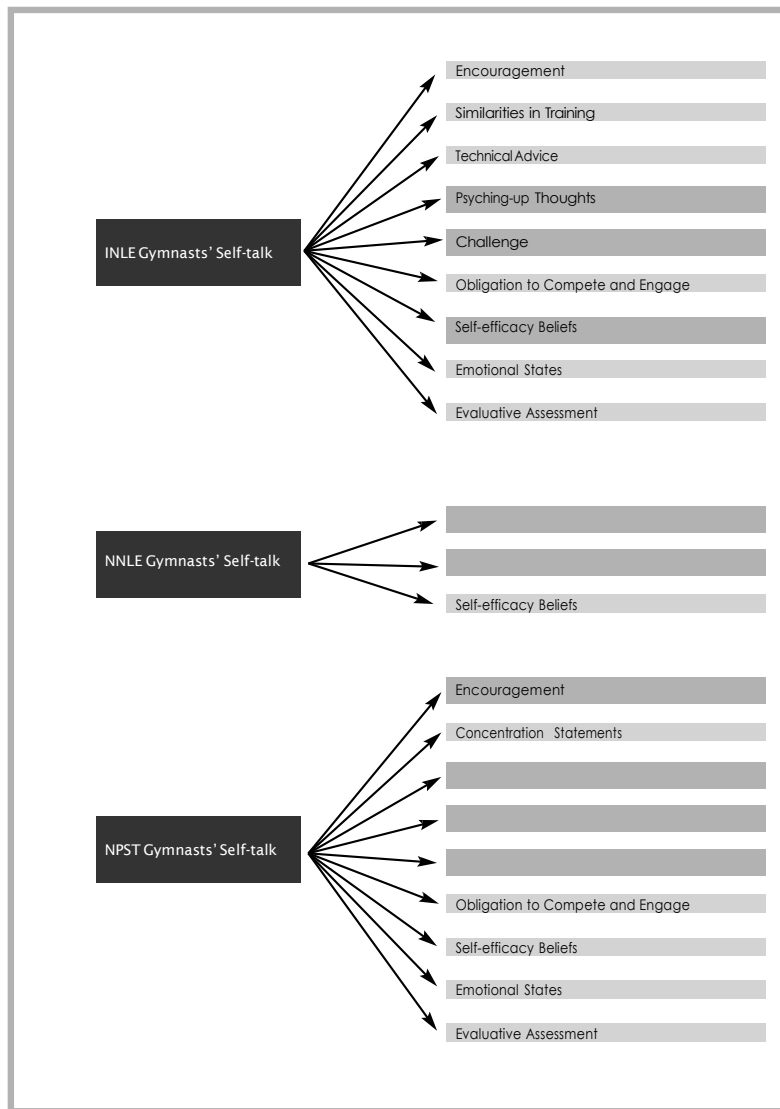


Figure 2. Hierarchical trees illustrating the nature of the self-talk used by INLE, NNLE, and NPST gymnasts.

Differences in the functions fulfilled by similar strategies. Two strategies (i.e., thought stoppage, and preparatory movements) were used independently by the NNLE and the INLE gymnasts to fulfill different functions. Thought stoppage enhanced self-confidence for INLE gymnasts, while this helped NNLE gymnasts maintain attentional focus. For example, one INLE gymnast stopped thinking about success and redirected this unproductive thought towards technical advice, and this helped her to be more self-confident, as is apparent in the quote below:

Between routines, I asked myself questions, I asked myself, 'Am I gonna do well? Am I'? Then, I told myself not to think about that and to remember what the coach tells me, his advice and all that. (INLE 1)

Preparatory movements, which are the execution of movements to prepare the gymnast for doing her routine (e.g., simple movements, handstands, jumps), were used by the INLE gymnasts to maintain attentional focus, increase self-confidence, whereas NNLE did them to decrease the fear of injury.

Differences in the number of functions fulfilled by similar strategies. Some strategies (i.e., preparatory movements, imagery, and self-talk) were used by the INLE gymnasts to fulfill more functions than those of their national counterparts.

Preparatory movements were used by the INLE gymnasts to maintain attentional focus, increase self-confidence, and look for excellent performance, whereas NNLE used them to decrease the fear of injury and to look for an excellent performance. Though the two groups used imagery to serve common functions, imagery was also exclusively applied by INLE gymnasts to cope with pain. Because of the importance of particular competitions for their career, INLE gymnasts sometimes competed in spite of injury, and without informing their coach. Therefore, in order to forget their feelings of pain, they visualized their routine or part of it. Finally, though self-talk was used by both groups of gymnasts to fulfill common functions, NNLE gymnasts also employed self-talk for decreasing the fear of injury, whereas INLE gymnasts used it for reducing anxiety, coping with pain, and increasing engagement.

COMPARISON OF THE STRATEGIES USED BY THE NPST AND THE INLE GYMNASTS

The findings of the content analysis revealed similarities and differences in the type and function of the strategies used by the NPST and INLE gymnasts (see Table 1).

Similarities in the type and function of the NPST and INLE gymnasts

Eleven strategies used both by the NPST and INLE gymnasts for fulfilling similar functions were identified: warming-up efficiently, listening to the coach's technical advice, looking for the coach's encouragement, looking at the competitors' routine, giving social support to one's peers, imagery, self-talk, preparatory movements, rehearsal of strategies that were efficient in training sessions, adapting behaviors to charm the judges, and self-assessment. (a) warming-up efficiently to manage the warm-up time constraints was sought to look for excellent performance. In order to manage the short warm-up time and to optimize its efficiency, as soon as the judges gave the signal to begin the warm-up, gymnasts rushed to the diagonal to execute, in the first place, their tumbling pass. The same scenario was observed for the vault: Gymnasts ran as quickly as possible to be the first at the starting point on the run way to

execute their first acrobatic jump attempt in first position. Another example for the beam consisted, during the 30 second-warming-up, in doing the elements of the routine in a different order than the order planned in the routine. This re-organization helped the gymnast not to lose valuable time by moving needlessly forward and back; (b) listening to the coach's advice was perceived as a means to reach technical excellence; (c) looking for the coach's encouragement enhanced the gymnasts' self-confidence; (d) looking at the competitors' routines was sought by NPST and INLE gymnasts to increase their engagement. A gymnast said:

I was watching the girl performing, and also my opponents, it motivated me, er well, let's say I see a girl with the same move, and she is doing well, well. I tell myself that I will have to do better (NPST 2);

(e) giving social support to their peers allowed the gymnasts to decrease their anxiety; (f) imagery was used in many similar ways by NPST and INLE gymnasts (see Figure 1). All the gymnasts visualized the routine, or part of it, in color and with positive outcomes. Some of them even used a combination of internal and external imagery associated with kinesthetic modality. Both groups felt that imagery enabled them to maintain attentional focus, increase self-confidence, and look for excellent performance (see Table 1). The following example reflects the use of external imagery with a positive outcome for an element of the routine, with the aim of looking for an excellent performance:

To try to correct, to modify, well I do it with imagery, I would see myself from behind so that I would see the axis. It tells me what to do, how I should be. I shouldn't lower my shoulder, got to jump properly (NPST 3);

(g) for both groups, self-talk was perceived as a means to several ends, such as decreasing anxiety, increasing activation, maintaining attention focus, enhancing self-confidence, and looking for excellent performance; (h) preparatory movements allowed the two groups of gymnasts to look for excellent performance; (i) The rehearsal of strategies that were efficient in training sessions was repeated by NPST and INLE gymnasts to increase their self-confidence during the event; (j) adapting behaviors to charm the judges, such as hairdo, smile, and eye contact, constituted one of the means NPST and INLE gymnasts used to get a good mark; and finally, (k) self-assessment was applied by INLE and NPST gymnasts for the purpose of looking for excellent performance. At the end of the competition, they spotted their mistakes, analyzed the reasons for having made them and developed solutions to be more successful in the following event.

Differences in the type and/or functions of the competitive strategies used by the NPST and INLE gymnasts

Four types of differences emerged: (a) differences in the type of strategies, (b) differences in the degree of elaboration of the strategies, (c) differences in the functions fulfilled by similar strategies, and (d) differences in the number of functions fulfilled by similar strategies.

Differences in the type of strategies. Five strategies were employed solely by the INLE gymnasts, whereas six strategies were identified only among their NPST counterparts. As far

as the INLE gymnasts were concerned, the transformation of the moves reduced anxiety; painstakingly going through the warm-up decreased the fear of injury; slaps enhanced activation and engagement; glancing towards the family increased engagement; and comparing one's marks to those of one's direct opponent enhanced engagement.

With regard to the NPST gymnasts, looking for an acquaintance among the judges enhanced self-confidence, as reflected in the following quote:

I looked to see who was part of the jury, to see if I knew, er to see if I knew someone, there was XX. It reassures me because I told myself, there, I know someone in the jury, er, they know how we work, and if we fall off, he knows how we usually compete (NPST 2).

Looking at the judges also allowed one NPST gymnast to maintain her attentional focus. NPST gymnasts displayed strategies of adaptation to competitive equipment to do an excellent performance. They added movements in their routine, they modified the technique of the acrobatic moves, and they even elaborated different technical advice according to the trademark of the apparatus. Checking the characteristics of the equipment increased NPST gymnasts' self-confidence. For this purpose, they checked that the equipment was set properly and that it was well adjusted. They also tested the intrinsic quality of the beam, such as its stability or its slipperiness, by performing easy moves. Stereotyped behavior also helped NPST gymnasts increase their self-confidence. Finally, the establishment of landmarks (visual and kinesthetic) had the function of decreasing anxiety and looking for excellent performance.

Differences in the degree of elaboration of the strategies. More than displaying behaviors to charm the judges, NPST gymnasts even calculated where to begin the routine in order to do the most outstanding part in front of the judges and to conceal its shortcomings. Despite a common behavior of self-assessment, what differs between the two groups is that INLE gymnasts systematically waited for their marks at the end of each competitive routine. One INLE gymnast's major concern was to know, after having executed her routine, if she scored higher than her most dangerous opponent. Whilst waiting for her mark, she analyzed her routine, calculated her departure mark, compared it with her opponent's, considered her chances of being above her in the class and kept an eye on the electronic scoreboard that displayed her mark. Finally, the manner in which INLE and NPST gymnasts talked to themselves took common and different forms (see Figure 2). INLE and NPST gymnasts' similar thoughts consisted of, (a) encouragement, (b) technical advice, (c) challenge, (d) obligation to compete, (e) self-efficacy beliefs, (f) emotional states, and (g) evaluative assessment. Self-talk about psyching-up thoughts and similarities with training was used exclusively by INLE gymnasts, whereas self-talk focused on concentration statements and the recital of the components of the routine were only employed by NPST gymnasts.

Furthermore, NPST gymnasts associated strategies, in more varied ways than INLE gymnasts did, to complete multifarious goals. Indeed, gymnasts who received a training in mental preparation combined breathing with self-talk to increase engagement, imagery with self-talk to maintain attentional focus, simulation of movement with self-talk to enhance self-confidence, stereotyped behavior with self-talk to enhance activation, stereotyped behavior with breathing to decrease activation, and breathing with imagery to look for excellent performance.

In contrast, INLE gymnasts only associated self-talk with simulation of movement or breathing. The combination of self-talk with breathing was a way of increasing activation and engagement, whereas self-talk associated with a simulation of the movement served to enhance self-confidence and to look for excellent performance.

Differences in the functions fulfilled by similar strategies. Three strategies (i.e., breathing, simulation of movement, and thought stoppage) were used independently by the NPST and the INLE gymnasts to fulfill different functions. First, breathing was one possible way of handling anxiety and activation. Taking a few deep breaths helped the two groups of gymnasts to decrease their anxiety. However, this strategy specifically helped NPST participants to reduce their activation, while taking deep and pumped-up breaths increased INLE gymnasts' activation. Second, the simulation of movements was perceived by the INLE gymnasts as a means of enhancing self-confidence, and for the NPST gymnasts as a means of reaching technical excellence. Examples of the two groups' strategies included the following:

By doing little moves that help me a bit... I feel that I am doing my tricks well. It helps a little bit, it makes me more confident (INLE 1).

In fact, I was only miming. It gives me the feelings I should have, good feelings, in fact the feelings I must normally get (NPST 3).

Finally, thought stoppage appeared to be one way of enhancing self-confidence for INLE gymnasts and of maintaining attentional focus for NPST gymnasts. For example, to get rid of mistake(s) made in the previous routine by replacing this thought with some productive thoughts (e.g., focus on technical advice, encouragement, looking at teammates) was perceived as efficient by NPST gymnasts to maintain attentional focus.

Differences in the number of functions fulfilled by similar strategies. First, preparatory movements allowed the two groups of gymnasts to look for excellent performance, while they were used to enhance self-confidence and maintain attentional focus by INLE gymnasts only. Second, as evidence from the INLE gymnasts' testimonies, imagery could also have other functions, such as decreasing anxiety, decreasing the fear of injury, increasing engagement, and coping with pain. Finally, among INLE gymnasts, self-talk could also have other functions, such as coping with pain and increasing engagement.

DISCUSSION

The first purpose of the present study was to compare the competitive strategies developed by national and international gymnasts through natural learning experiences (i.e., without any participation in PST programs). Second, the study aimed at comparing the competitive strategies that had been acquired by national female gymnasts who benefited from a PST with those developed by international athletes through natural learning experiences. Third, a careful investigation was made to understand why these strategies were used (i.e., what functions these strategies served) in the two aforementioned cases.

The comparison of data on the INLE and NNLE gymnasts revealed that these athletes used a panel of basic and similar strategies to fulfill similar functions. For instance, breathing slowly and deeply, imagery, and giving social support to their peers were strategies commonly used among the two groups to decrease anxiety. Imagery was also a shared strategy used to decrease fear of injury, increase engagement, maintain attentional focus, increase self-confidence, and look for excellent performance. Finally, self-talk helped both kinds of gymnasts to increase activation, maintain attentional focus, increase self-confidence, and look for excellent performance. These strategies and the functions they fulfilled are well-known within the sport psychology literature and the coaching literature (e.g., Gould et al., 2002; Vealey, 1994; Weinberg & Comar, 1994).

However, the findings also revealed several differences between INLE and NNLE gymnasts. First, INLE gymnasts set up strategies to cope with pain whereas their national counterparts did not. Elaborating strategies to deal with pain is unfortunately a widespread habit encountered among elite athletes who are used to competing even with injuries. The need to satisfy the coaches and the fear of losing their status as elite athletes could be put forward to explain their participation in an event with injuries, as already outlined by Krane, Greenleaf, and Snow (1997) in their qualitative case study of a former elite gymnast. Some of the verbalizations of the INLE gymnasts suggest that they were afraid to inform their coaches about their pain, because the coaches would have taken out difficult moves from their routine, and this would have reduced their chances to integrate into the national team, and therefore, to take part in international competitions. They preferred quiet elaborate strategies, such as imagery and self-talk to overcome the pain. For instance, to forget the pain, they focused on things to do by visualizing their routine or part of it. This strategy, labeled dissociation in the classical literature pertaining to the cognitive control of pain (e.g., Masters & Ogles, 1998), consists of ignoring strenuous physiological states. NNLE gymnasts were not worried by this type of problem, less was at stake in the situations they had to handle.

Most of the reasons mentioned by NNLE and INLE gymnasts for using self-talk and imagery were shared, and corroborate recent studies in the sport psychology literature on imagery (e.g., Jones & Stuth, 1997; Martin, Moritz, & Hall, 1999) and on self-talk (e.g., Hardy, Gammage, & Hall, 2001). However, these strategies were also implemented for specific reasons by the two groups. For instance, INLE gymnasts used self-talk to decrease anxiety and increase engagement, whereas their national counterparts used it to decrease fear of injury. This observation underlines the complex relationship between strategies and functions, as shown in earlier research (e.g., Eklund, Gould, & Jackson, 1993; Vergeer & Hanrahan, 1998), and stresses the validity of having used an idiosyncratic procedure. In addition, the degree of complexity of imagery and self-talk used by the INLE gymnasts was higher than that of their national counterpart. Specifically, INLE gymnasts used imagery in various forms (i.e., internal imagery, external imagery, kinesthetic modality, and auditory modality) by controlling, adapting, and combining every component of each strategy, while NNLE gymnasts did not. The use of kinesthetic imagery by INLE gymnasts and their report of well-developed imagery skills confirm earlier studies which have compared the use of imagery among successful and less successful athletes (e.g., Mahoney & Avener, 1977).

Along the same lines, INLE gymnasts' self-talk was also more diversified than that of their national counterparts. Specifically, though national and international gymnasts both used similar types of self-talk referring to technical advice, similarities with training, and self-efficacy beliefs, INLE gymnasts also mentioned using self-talk including encouragement, psyching-up thoughts, challenge, emotional states, and evaluative assessments. These characteristics are broadly consistent with those identified in the previous self-talk literature (e.g., Hardy et al., 2001; Rushall, 1984). For instance, Hardy and colleagues noticed that varsity athletes competing in various sports used mainly positive and negative self-talk, single cue words, phrases, or full sentences, and specific or general task instruction. Our findings add some interesting information to the self-talk literature by providing an accurate description of the type of self-talk used by national and international athletes.

Furthermore, the results showed that INLE gymnasts' social networks were more widespread than those of national gymnasts. Indeed, international gymnasts' social interaction strategies involved the coach, the family, the judges, and the competitors, whereas social relationships of their national counterparts only included the coach. Turning to the coach for encouragement, congratulations, and for technical advice was actively sought by all the gymnasts to increase their self-confidence and to reach an excellent performance. However, contrary to the national gymnasts, INLE gymnasts also glanced towards their family (parents and siblings) to enhance their engagement. These results are consistent with previous findings which have shown that coaches are the most clearly identified for providing support requiring expertise in sport, whereas the parents give another kind of support not necessitating such expertise (Rosenfeld, Richman, & Hardy, 1989). Moreover, the positive influence of older siblings corroborates Côté's (1999) findings which showed that in some families, during the specializing years, this kind of influence was frequently observed. In addition, INLE gymnasts deliberately sought to charm the judges, whereas NNLE gymnasts avoided looking at them to increase their self-confidence. Consistent with this is the study by Duda and Gano-Overway (1996) which pointed out that young elite female gymnasts knew they were being watched by the judges and perceived this as a source of anxiety. On the other hand, the INLE gymnasts deliberately faced the judges to influence their judgment positively. Smiling, make-up, and eye contact were employed for that purpose. Finally, INLE gymnasts also looked at the competitors' routines, and one of them systematically compared her marks to those of her direct opponent. These attitudes based on social comparison were aimed at increasing engagement, as shown by Gould et al. (2002). These attitudes suggest that INLE gymnasts were ego-involved (Nicholls, 1989) in the competitive situation described. This is consistent with previous studies which found that elite athletes were more ego-oriented than people practicing sport at a lower standard (e.g., White & Duda, 1994), and with qualitative inquiries in elite gymnastics (Krane et al., 1997).

Besides, the qualitative analysis of the interview transcripts also revealed that only INLE gymnasts were involved in a process of self-assessment of their performance. They set up self-referenced goals, systematically checked whether their goals had been attained, self-assessed their performance at the end of the competitive routine and at the end of the event in order to self-regulate their performance. These findings substantiate previous research in other sports, such as professional golf (McCaffrey & Orlick, 1989) and team sports (Dagrou, Gauvin, & Halliwell, 1991). They are also consistent with the recent study by Gould et al. (2002) which pointed out that performance of experts was enhanced by what they called the "sport intelligence" and more specifically by their "ability to analyze."

To sum up, the comparison between INLE and NNLE gymnasts showed that the international gymnasts used a wider range and more elaborate strategies than those of their national counterparts. Specifically, INLE gymnasts' imagery and self-talk displayed a greater degree of complexity, their social networks were more widespread, and they also got involved in a process of self-assessment of their performance, whereas their national counterparts did not. These findings raise the question about the manner in which INLE gymnasts have developed these strategies without following a mental skill program. According to previous studies on mental skills development (Côté, 1999; Hanton & Jones, 1999; Gould et al., 2002; Weiss, 1991), three types of factors could be put forward: (a) favorable social influences, (b) various sport experiences, and (c) deliberate practice. First, significant others, such as coaches, parents, and teammates, might have helped the gymnasts to develop strategies to handle the competition efficiently. Second, it can be hypothesized that the opportunities offered to these international gymnasts (e.g., traveling abroad, meeting different people, experiencing new places, taking part in demanding and long periods of competition) allowed them to experience such proficient strategies. Third, it can be assumed that the international gymnasts engaged in deliberate practice (Ericsson et al., 1993). This would be consistent with the recent findings of Cumming and Hall (2000) who reported that the higher the level of expertise of an athlete, the more he/she had accumulated hours of deliberate imagery practice.

The competitive strategies used by INLE and NPST gymnasts were compared in the second stage of this study, and similarities in the type and function of the strategies were found. Most of the strategies reported involved the social environment of the athletes and more specifically the coach, the teammates, and the competitors. The relationships between the gymnasts and these significant others helped the athletes: (a) to increase their self-confidence when looking for the coach's encouragement, (b) to look for excellent performance when listening to the coach's technical advice, (c) to decrease their anxiety when giving social support, and (d) to increase their engagement when looking at the competitors' routines. These results support the recent findings of Gould et al. (2002) who underlined the prime importance of "sport environment personnel" to help elite athletes achieve a good performance.

The findings also revealed some differences between INLE and NPST gymnasts. First, INLE gymnasts set up strategies to decrease the fear of injury and to cope with pain, whereas the national gymnasts who benefited from a PST program did not. For that purpose, INLE gymnasts used imagery to reach both goals, while warming-up efficiently served to decrease fear of injury and self-talk to accept the pain. As pointed out by Magyar and Chase (1996), the fear of injury occurs when a gymnast is not confident in his/her ability to perform successfully in a taxing context. It can be hypothesized that thanks to the PST program, the NPST gymnasts were confident in their ability to execute their routine properly, and thus did not have to deal with the fear of injury. Indeed, as already outlined, NPST gymnasts did not fight to integrate into the national team to pursue an international career, whereas INLE gymnasts did.

Second, some strategies were used both by the INLE and the NPST gymnasts, but their content or the function the strategy served were different. For instance, one NPST gymnast's self-talk was made up of technical advice to maintain attentional focus, whereas her international counterpart's thoughts consisted of encouragement used to increase engagement. This can be

explained by the multiple functions a strategy can serve (Rushall & Lippman, 1998), and by the specific needs of each athlete and their personal cognitive styles (e.g., Madigan, Frey, & Matlock, 1992). Third, NPST gymnasts combined strategies in a more complex way than their INLE counterparts. One can assume this may be due to the adherence of the NPST gymnasts to the training program which included two specific sessions where thought stoppage was associated with self-talk. It can also be hypothesized that this involvement helped the gymnasts to develop other combinations of strategies, such as breathing with self-talk or imagery with self-talk. Finally, the results showed that only the NPST gymnasts used specific procedures to become familiar with the competitive equipment. Making slight and appropriate adjustments in their routine, checking the characteristics of the apparatuses and establishing landmarks made up the elements of this process. Although the content of the mental program did not specifically focus on the planning of an event, one can assume that the participation of the gymnasts in psychological skills training procedures could have favored cognitive processes such as planning, reasoning, analyzing, and anticipating (Orlick, 2000).

Taken together, these findings indicate that NPST and INLE gymnasts used a wide range of similar strategies, even if variations between the two groups of gymnasts in the content of some strategies could be observed. NPST gymnasts displayed a higher ability to combine strategies, and also demonstrated a panel of strategies to become familiar with the competitive environment, whereas their international counterparts did not.

In conclusion, the present study suggests that international gymnasts have developed over time and used a set of more complex competitive strategies than their national counterparts. This development might be due to their sport experiences, to favorable social influences, and to deliberate practice (e.g., Ericsson et al., 1993; Gould et al., 2002). The findings also revealed that national gymnasts who benefited from a psychological skills training program were able to use strategies as complex as those used by international gymnasts. These findings point to the fact that mental skills, developed through natural learning experiences by elite athletes, could be anticipated and learned via a psychological skills training program on condition the participants adhere to this intervention (Bull, 1991). Another interesting point is that NPST gymnasts appeared to build on the strategies they were taught (e.g., association of strategies or strategies to get familiarized with the competitive environment). Notwithstanding, it should be noted that some strategies used by international gymnasts to reduce fear of injury and accept the pain could not easily be taught to their national counterparts who did not have to deal with the same context and stakes.

It should be recognized that this study suffers from several important limitations. First, the sampling size in each group leads us to draw cautious conclusions. Second, concerns related to the retrospective nature of the interviews must be mentioned. Even if the experience of the gymnasts' best event was emotionally intense and significant to them, and thus easy to recall (Conway, 1990), limitations related to memory loss and thus the risk of giving a distorted version have to be considered or acknowledged. Methods approaching concurrent verbal reports and retrospective reports (e.g., Von Cranach & Harré, 1982; Ericsson & Simon, 1993) could be recommended to reduce the effects of memory loss. Therefore, in future research, athletes could be video-taped during their practice performance, so that they could give better retrospective reports on all their thoughts and feelings during the preparation and the

execution of their performance, as already done for the study of coach-athlete interaction (d'Arripe-Longueville, Saury, Fournier, & Durand, 2001).

Another limitation comes from the nature of the event that was recalled: the best competition. Remembering only one event, which was different for each participant, might not have highlighted precisely all the strategies used by the gymnasts. The act of recalling more than one event, such as successful versus unsuccessful competitions, should also be investigated in the future. More research is therefore needed to identify the sources of development of elite athletes' competitive strategies and mental skills, and the relative influence of significant others in that development. Future research could further examine how high level athletes are able to maximize the effectiveness of their competitive strategies and mental skills through deliberate practice.

Despite its limitations, this study presents important practical implications for coaches in charge of elite athletes. First, because mental skills seem to develop through sport experiences and the athlete's social network, coaches should try to contribute to the creation of a positive environment. Tools such as the Ottawa Mental Skills Assessment Tool (OMSAT-3, Durand-Bush, Salmela, & Green-Demers, 2001) or the Test Of Performance Strategies (TOPS, Thomas et al., 1999), and in depth-interviews could allow the athletes to improve their awareness and understanding of the strategies they use. It would also enable the coaches to support them more efficiently by being aware of the types of social influences they react or are sensitive to, and by fostering positive peer interactions. Second, this study suggests that teaching mental skills appears to help coaches to speed up the process of getting athletes to the highest level and would help athletes to accomplish more. Despite these interests, sport psychology finds little recognition in the French culture, and national sport teams are slow in asking for such services. The close athlete-consultant relationship required to deliver psychological skills training often frightens coaches, who are afraid of losing power and control over their athletes. Implementing workshops for novice and expert coaches would help them trust psychological skills training interventions.

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Note

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APPENDIX: PROGRAM OF THE PST

The 25 sessions of the PST program consisted in learning the following basic skills: (a) relaxation, (b) self-talk, (c) goal setting, (d) focusing, and (e) imagery.

Relaxation training was composed of eight sessions where the gymnasts were introduced to: (a) an awareness of normal abdominal breathing, (b) a muscular relaxation from head to toes with the evocation of a "mental picture", and (c) a simplified version of the Jacobson progressive relaxation. Relaxation was presented as a way of controlling emotions.

Self-talk was identified, transformed from negative to positive, and used during training. It was delivered during five sessions and was presented as a way of coping with the fear of producing a new acrobatic skill without spotting and of refocusing after making a mistake or falling during a competition.

Goal setting was presented during three sessions. Gymnasts were taught the purpose of setting goals, the distinction between final and intermediate goals, and outcome and mastery of goals. Characteristics of goals, such as specificity, attainability, and measurability were explained and the notion of having fun during the practice was emphasized.

Focusing consisted of four sessions. Gymnasts learned to focus on one thing (breathing, object, sound, thought, emotion) and to shift their focus between a large and narrow external focus, between objects, thoughts, and emotions. Applied exercises were suggested, such as the simulation of a fall and the refocusing on positive thoughts.

The program on imagery was made up of five sessions, in which gymnasts learned to use external and internal imagery. The visualization from an external perspective was done with or without the help of drawings of the entire routine or part of it. Imaging the major difficulty from an internal perspective, both halves of the routine, or the entire routine, was done mainly by associating the kinesthetic modality. All these imagery exercises were completed first in a calm place, and then in the training gymnasium.