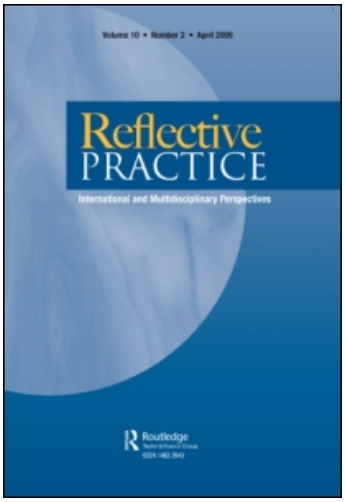

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Reflective practice in the heart of training and competition: the course of experience analysis for enhancing elite acrobatics athletes' performances

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This paper presents a particular form of reflective practice used with elite French acrobatics athletes since 1999. The practice is based on course-of-experience theory, which provides a methodology for analysing athletes' activity in relation to the stream of their situated and pre-reflexive consciousness that emerges during performance. Traces of past activity and self-confrontational interviews provide the elements of this experience, as well as support for the reflective practice in articulation with training. Five orientations for intervening to enhance performance shape the process of learning or help athletes with performance blocks are identified and illustrated.

Keywords: acrobatic; elite performance; self-confrontational interviews; situated activity; enactive cognitive science

Introduction

Learning is an important part of achieving or maintaining elite athletic status. For example, athletes may need to learn new ways to organize their skills, new modes for facing opponents or new routines. They also need to learn from past experience: they need to understand what happens when they win or lose, remaining open to new forms of training and finding strategies to resolve their difficulties. Although most learning occurs during the initial stages of an athlete's development, elite and other more accomplished athletes find themselves engaged in learning at different periods of their careers (Starkes & Ericsson, 2003). Indeed, the learning process is ongoing in sports because elite performance is without fixed limits and thus further enhancement is always seen as the key to greater success.

Learning from experience raises the notions of introspection, first-person analysis, and reflective practice in the process of athletes' transformation. Usually defined as 'a set of abilities and skills, to indicate the taking of a critical stance, an orientation to problem solving or state of mind' (Moon, 1999, p. 63), this form of reflection about experience is paradoxical for the traditional conception of learning and practice in elite sports. This position is linked to the equivalent paradoxical relationship between elite performance and consciousness. Reflective practice implies working at a conscious level on something that was previously experienced. But in sports, working on consciousness is often considered to be at odds with high performance because the dominant cognitive, ecological and dynamical models of motor performance reject

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consciousness as a system of motor control (e.g. Bardy & Laurent, 1998; Schmidt, 1982). Instead, these theoretical perspectives emphasize that elite sport performance should be conceived as an automatic process that does not involve consciousness. Hence, when learning in sport is considered as a motor problem for athletes, reflective practice becomes irrelevant. However, reflection on the experience of performance remains a useful entry point for change, especially when mediated by a professional in sport training. For example, athletes and coaches are engaged in spontaneous forms of reflective practice when they talk about how the athletes felt during performance, how they managed the problems they encountered. This type of reflection-in-action (Schön, 1983) expresses the organization of elite athletes' activity as a form of *Mètis* (Jullien, 1996) or *Kairos* (Schwartz, 2000) that defines part of athletes' craft knowledge (e.g. Hauw & Durand, 2007).

This article is based on the conviction that this form of reflective practice should be developed, enhanced and refined in elite sport, and it shows that the critical entry point for efficient 'reflective practices' in sport is related to the level of consciousness on which the practice is grounded. 'Course-of-experience theory' is presented as a support for this particular form of reflective practice among elite acrobatics athletes from the French national team over two Olympic cycles. Using self-confrontational interviews, this approach involved work on athletes' experiences of past performances at a pre-reflexive level of consciousness (e.g. Hurley, 1998). This first level of intervention permitted a modification in the dynamics of athletes' activity and helped them to pre-experience future performances. Hence, reflection on the pre-reflexive consciousness of past experience showed itself to be the basis for profound intervention that optimized learning from past performance experience and offered possibilities for modifying future experience.

The article is organized in three parts. The first is a presentation of the theoretical foundations that pattern athletes' activity during performance at a pre-reflexive level of consciousness. Next, the reflective practice is described, together with the methods used to collect the information on past performances and to work on the transformation of future activity. Finally, a model of different pathways for developing reflective practice and transforming future activity is proposed and illustrated with examples taken from acrobatic sports.

A theoretical foundation for reflective practice and for re-experiencing past performance at a pre-reflexive level

The theoretical and methodological framework for helping athletes to re-experience a past performance is called 'course-of-experience theory' (e.g. Theureau, 2003). This framework is included in a situated and enactive cognitive science paradigm (Robbins & Aydede, 2009), and provides an original means to put athletes into a dynamic situation so that past experience can be reconstructed. The collected elements of this re-constructed experience are then organized in a form that allows analysis and study. The point of entry is the assumption that activity is a linkage between an athlete and his or her world of meaning. This linkage is conceived as an interaction between actions and situations during a performance at a level that athletes are able to perceive, feel, know and do within the unfolding situation (i.e. at a meaningful level for the athletes). The sensations, feelings and cognitions that surround experience and modify the organization of activity during performance are what emerge during performance at a 'pre-reflexive level of consciousness' (James, 1890; Merleau-Ponty, 1945; Sartre,

1943). Entry at a pre-reflexive level of consciousness reintroduces the connection between the motor conception of elite sport performance and the usefulness of athletes' consciousness of what is happening (McGee, 2005a, 2005b; Varela & Shear, 1999).

Theureau (1992) proposed to pattern pre-reflexive experience on three states that characterized each moment of human activity (i.e. the course-of-experience): (1) potential states, which correspond to the field of possible activities one can undertake. This potential is related to expectations and knowledge drawn from past cognitions that the individual brings to bear in the here and now; (2) actual states, which correspond to meaningful activities (i.e. actions, communications, thoughts, etc.) in relation to judgments about proprioceptive, perceptive or memory-based situations; and (3) virtual states, which correspond to processes of extracting elements of generality from actual activity. From these processes emerge immediate understanding, familiarity or surprise, as well as learning and development in relation to the growth of experience (Figure 1).

For example, the course-of-experience of elite acrobatic skiers during the running phase can be described as 'pick up speed in the descent', which consists of 'slide on the track', while the opened field of possibilities corresponds to 'be aware of the speed increase' by adopting a low tuck position on their skis and focusing on 'the slide of their skis on the snow', 'the atmospheric conditions' and 'the speed with which they arrive at the area they defined before the tremplin'. As the descent unfolds, they also gain knowledge about 'the way they are using the running area' and 'the way they are arriving on the tremplin in relation to the preceding jump' (Hauw, Renault & Durand, 2008).

The course of experience in sport is the flow of these states, which represents the global dynamics of the activity. As shown in Figure 2, this global organization of

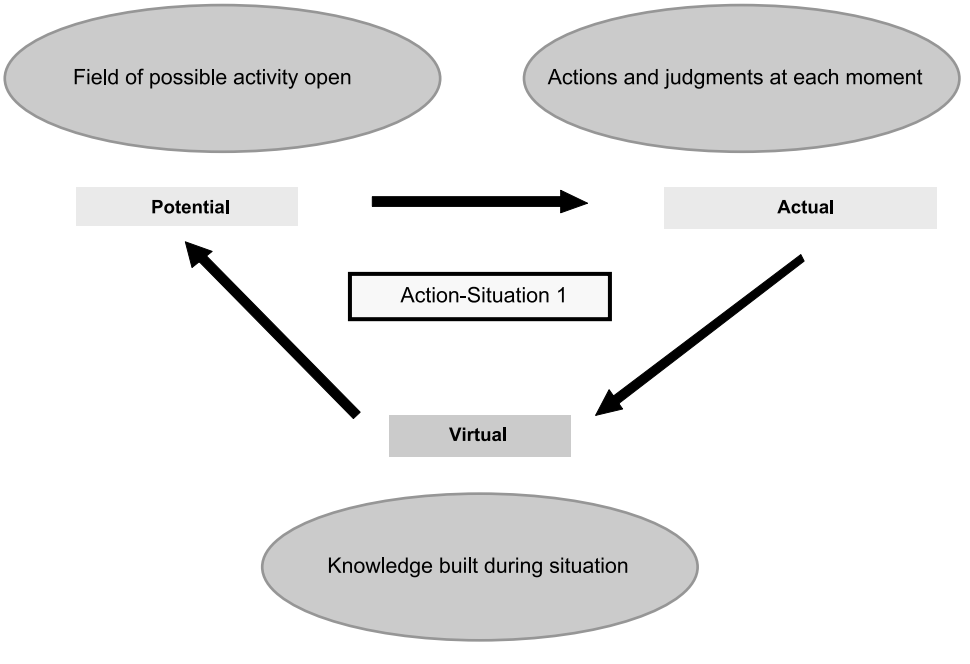

Figure 1. Components of the local organization of activity.

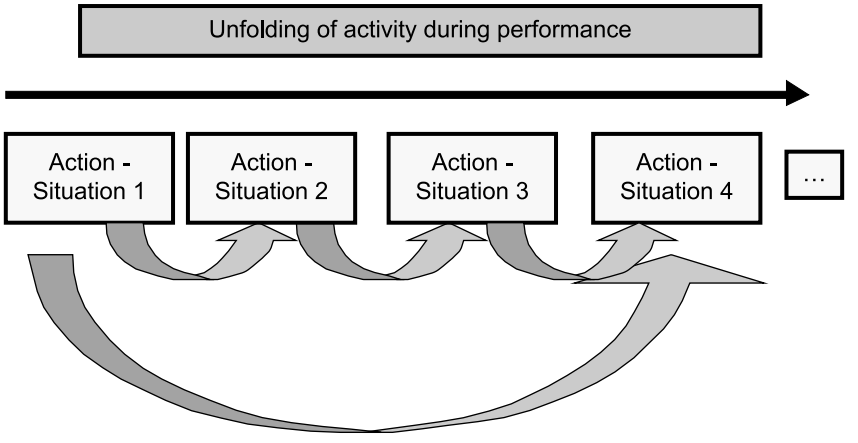

Figure 2. Global organization of activity.

activity is seen in the different types of chaining of action-situation linkages experienced by athletes during performance.

For example, the study by Hauw, Berthelot & Durand (2003) revealed variations in athletes' involvement modes during the execution of whole routines, characterized by a particular chaining of action-situation linkage labelled 'defining an involvement mode for the routine', 'doing straight jumps to get into position', 'performing controlled moves', 'recovering the routine by performing moves', 'enhancing move execution', and 'assessing performance quality'.

The course-of-experience framework has been used in the context of diverse sports (e.g. acrobatic skiing, archery, fencing, rhythmic gymnastics, sailing, table tennis, trampolining). The studies aimed at (1) investigating athletes' activity during competition (e.g. D'Arripe-Longueville, Saury, Fournier & Durand, 2001; Hauw et al., 2003; Hauw & Durand, 2004, 2005, 2007, 2008; Saury & Durand, 1998; Sève, Saury, Theureau, & Durand, 2002); or (2) promoting reflective practice during training or mental preparation before performance (e.g. Clavier, Serrano & Hauw, 2008; Durand, Hauw, Leblanc, Saury, & Sève, 2004; Hauw, Bardy, & Rivoal, 2001; Hauw & Carrière, in press). All pointed out the relevance of this type of analysis for athletes and coaches in the field of elite sports. The level of analysis is useful for describing what type of activity and associated experience seems to work to enhance performance, as well as differences between athletes and among members of a team. The course-of-experience approach provides additional information for coaches because it is based on the athletes' reports of the meaningful experience of performance, which has rarely been considered.

Methods for developing reflective practice in sports

Using this type of analysis for training interventions requires specific organization, as described in Figure 3.

The preliminary step is to collect traces of past activity. In most cases, video-recording, field notes and performance data are used. These data are captured during competition or training. For example, in an investigation of athletes' activity during trampoline competition (Hauw & Durand, 2005), videotapes of the athletes'

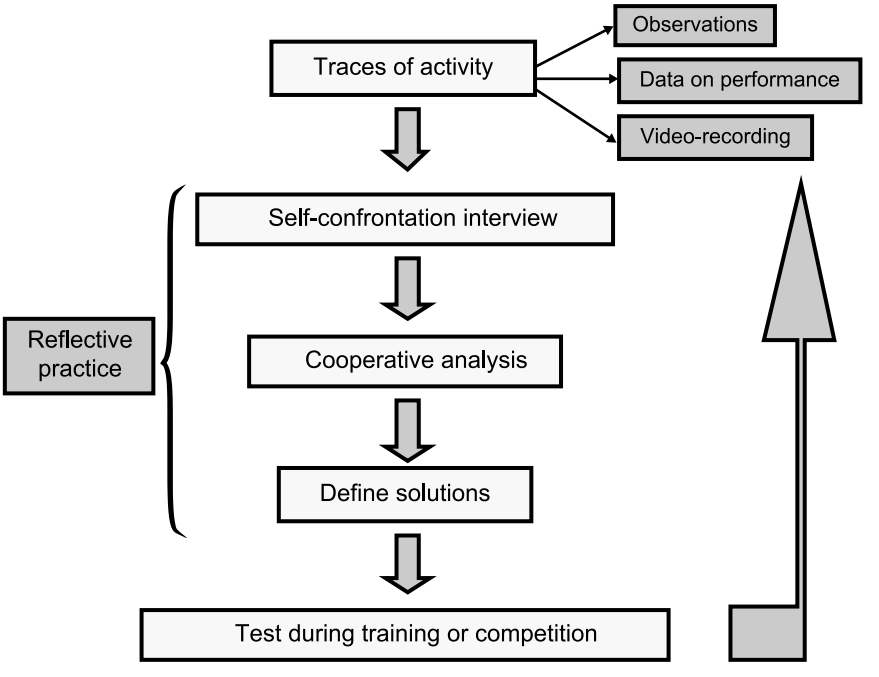

Figure 3. Reflective practice in the sports context.

behaviours recorded from the bleachers were used. Recording began when the athletes entered the gymnasium and stopped when the competition was finished. Observation and field notes provided additional documentation and ensured a precise description of the situations and actions that the athletes experienced. These traces of activity were then presented to the athletes in self-confrontation interviews. During these interviews, the athletes were face-to-face with the traces of their activity, and were asked to show, tell about and comment on their experience. In doing so, they revealed how they handled it on-line by building new meanings or activating pre-existing ones. Verbal prompts were designed to collect further information as the action unfolded. These concerned the following: (1) Field of possible activity (e.g. what is your aim in acting here? What are you concerned about?); (2) Actuality (e.g. what are you doing? What are you thinking about? What is drawing your attention at this moment? What do you see? What are you feeling?); and (3) Virtuality (e.g. are you thinking something right now about this moment in your action? Do you know something new at this moment?). These prompts also elicited descriptions of actions and events as they had been experienced by the athletes. Requests for *a posteriori* interpretations and generalizations were avoided.

Two examples illustrate the experiences that could be collected. Looking at a video showing him at the moment of the take-off, an acrobatic skier explained:

> At this point, it's going really fast. I throw my arms while trying to keep my body as solid as I can. I can feel the pressure but it's going fast so it's OK. At the same time, I start the figure without being 100% sure what will happen. I'll have a fix on it only a little later. I'm not flying blind, I know what I have to do and what should happen, but I'm waiting to see how it turns out.

Another athlete, as he viewed a video of himself entering the gymnasium to appear before the judges and spectators, said:

> There, I'm walking and following the athletes in front of me. I'm looking around, looking at what's happening … I'm not thinking too much about the competition. I'm watching how the crowd is reacting … I'm listening to how they respond to the different names … At the same time, this lets me move around a bit. You stay active and don't have a chance to stiffen up.

This method differs from traditional verbal reporting. The elicited verbalization aims at making the pre-reflexive phenomena of activity appear. Thus, the collected data are not comparable to those obtained with retrospective reports of earlier cognitive processes (Ericsson & Simon, 1993; Theureau, 2003). During the interview, athletes are in a retrospective dynamic situation supported by the presentation of traces of their past activity. They are invited to re-experience and describe the stream of past experience. In doing so, they re-enact their past experience. The traces of activity are used to facilitate this process as well as to situate precisely how experience emerged in relation to the situation. The athletes are expected to adopt a specific stance that consists of reliving the flow of their own past experience while deliberately ignoring the outcome. The major difficulty for athletes is to go beyond the technical conventions without ignoring them. They have to be highly attentive to their physical sensations in relation to what they want or have to accomplish and not the contrary. This was also explained to the coaches, and usually the initial sessions of self-confrontation were carried out without coaches to facilitate the expression of personal experience.

By identifying these elements of activity at a pre-reflexive level of consciousness, difficulties, problems or strange occurrences, as well as original and well-suited ways of acting can be identified. The analysis is collective, because the experience is shared with professionals in sport performance (i.e. sport psychologist, coaches). For example, during a self-confrontation interview a trampolinist claimed that he had had the feeling of falling while performing a triple front somersault. Paradoxically, this feeling was situated during the ascendant phase of the acrobatic move and produced a certain discomfort for the athlete, as suggested in this excerpt:

> [leaving the trampoline bed] I'm taking off, trying mostly not to go too far forward. And, immediately after I hold my legs and try to keep them close to my body, I feel like I'm falling … I had the same sensation as if I had jumped from a high diving board. At this point, I'm not really afraid of falling but I do not exactly know how this move will continue …

Another trampolinist claimed that trembling occurred during critical moments of the exercise. The trembling affected the lower limbs, as described in this excerpt:

> There [finishing the third move], I can feel the trembling start. It's in the legs and thighs. I can feel, right when I start the descent before attacking the bed, that I'm not going to be able to push effectively on the bed. I do what I can because I know that it's like this at this point in the exercise. But, you know, it's hard to be precise and reach good height in these conditions. Then, once I'm in the air it disappears. I can get on with the exercise. But there it really bothered me. I didn't really know what I was doing …

These body perceptions could be characterized as constructed and expected, and yet at the same time, uncertain. The athletes knew that they had already had this type of problem. They had observed the mechanism and had interpreted it: they had certain

beliefs about its emergence (e.g. this never happens to me during the qualifications – only during the finals). This modified their involvement in the situation because they expected the occurrence of these troublesome sensations.

This form of investigation also had an impact on the athletes. Because the self-confrontation is an exercise that asks athletes to speak of past experience (re-experience past performance), they had to look back at it and in doing so, they spontaneously worked on it; this form of reflective practice had consequences on their attitudes. They judged their own experience, they built new understanding of the past, and they also engaged in episodic future thinking (pre-experiencing the future) (Atance & O'Neill, 2005). However, these cognitive processes that allow pre-experience of the future should be framed and shared with professionals of sport training so that performances can be enhanced and the athletes can continue to develop.

When the self-confrontational interview has been done, an intervention based on reflective practice is possible. To understand this, let us examine the above example of the feeling of falling experienced by the elite trampolinist. This feeling occurred during the ascendant phase of the movement, and the relationship between the feeling and action could be analysed. Several solutions were considered and shared: waiting for a longer time in the trampoline bed, pulling up the arm, and pushing more intensively. Making any of these modifications is not easy for the athlete because they entail changes in habit. For example, by pushing harder on the trampoline, the height of the flight and the risk of falling increase. All of these solutions were examined by the trampolinist and discussed with us. The best solution was found to be pushing more intensively on the trampoline bed. The feeling of falling progressively disappeared.

What can we learn from this example? First, self-confrontational interviews can help sports professionals to identify problems encountered by athletes in relation to the stream of actions-situations that characterize performance. Once the problem is identified, indications to orient the process of reflective practice can be given and, in this case, performance was enhanced. Thus we see that the interaction of reflective practice and training practice has positive results for performance, because each level of processing assesses the efficacy of the other. Second, reflective analysis provides the evident advantage of facilitating the processes of learning and transformation. One of the major problems of learning or improving skills is the persistence of entrenched habit, and this form of analysis is a powerful tool for overcoming habit. Third, in this example the intervention was situated in an enacted perspective where the experience emerged in relation to action: what athletes experience is determined by what they do and what they know how to do is determined by what they are open to doing (Maturana & Varela, 1987/92; Varela, Thompson & Rosch, 1993). With self-confrontation, reflective analysis helped us to capture the type of experience that emerged during performance and the dynamics of the activity that could have been responsible for its emergence.

Orientations for reflective practice

The description of the process that guides the analysis of athletes' activity does not define the axis on which reflective practice and training can be done. Using the course-of-experience framework, five points of entry could be identified (Figure 4).

Two major levels of intervention distinguish the global and local organization of activity. The sub-themes are described below.

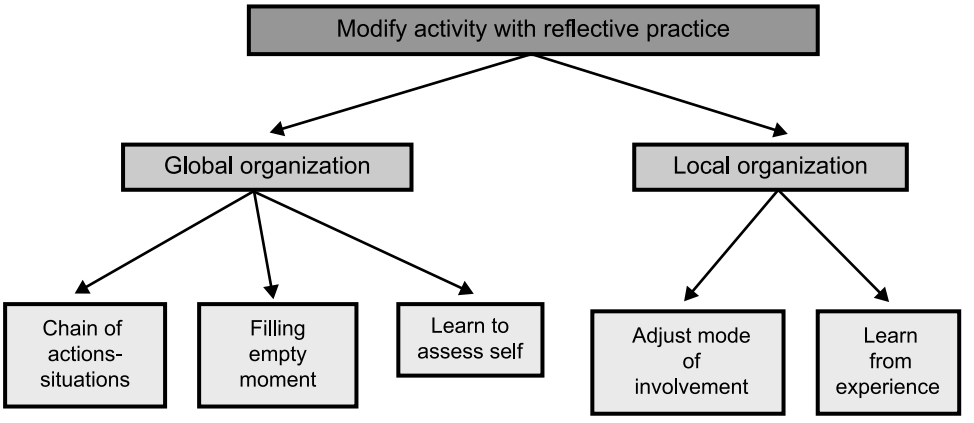

Figure 4. Orientations for reflective practice.

Three focuses could be used to orient the reflexive practice toward the global organization of the activity. To understand the primary focus (i.e. chain of action-situation), let us look at another example in trampoline. During competition, athletes perform routines made up of 10 consecutive acrobatic moves. The athletes can do any of the moves they wish, but they cannot repeat them. Hence, when they are in difficulty, they sometimes perform easier moves than planned or change the order of the planned moves. During the finals for the Sydney Olympic Games (2000), a French athlete permutated the fourth and seventh moves of his routine. But when he got to the seventh, he forgot the permutation, repeated a move, and lost a medal. The error could be explained by an exclusive focus on the activity of 'enhancing move execution' at the end of the routine (Hauw et al., 2003). The experience of this type of activity did not allow for a focus on which move to perform, but instead exclusively concerned the quality of move execution. This observation led us to advise the athletes to shift their modes of involvement in the final part of the routine. When they are engaged in enhancing the quality of their execution, they should also prepare to 'check whether they have maintained a valid routine despite changing moves'. This sad story had positive results for the team after reflective practice: all the French trampolinists began to pre-experience the final period of their future performances as a time for verifying whether and how they had changed the routine in mid-course. Reflective practice promoted a modification in the global activity of preparing athletes to build the experience of linking the beginnings and ends of future routines. This modification led a better global and situated awareness during performance.

A second example, from the experience of acrobatic skiers, illustrates the second focus (i.e. fill the empty moment). Major differences were noted between athletes as they performed the same skills. For example, at the take-off, one athlete immediately assessed how the jump had begun, while others let the movement proceed without assessment and waited for a look at the reception area in order to assess the overall routine. This example illustrates the possibility of enriching athletes' activity: By asking them to focus on the feeling they had at take-off and by working with them to associate feeling and pre-evaluation, we enriched a part of athletes' activity by filling a counterproductive empty place. This transformation modified the global dynamic of the activity and enhanced its efficiency because, henceforward, when the athletes

reached the moment when they were looking at the reception area, they were not in an unknown stance, but rather in a situation of simply checking the expectations built on earlier actions as suggested by this excerpt:

> I see the spot on the track. I'm opening my arms to slow down the twist and I stretch out to try to prepare for blocking at contact. I was good on the last somersault. I made up for what was lost at the start of the figure. I'm careful because this is a critical moment – it looks good but I have to be vigilant so I can keep the timing good. And there! I land, arms out so my hands don't touch the ground. It's good, just at the right moment.

Reflective practice is thus grounded in the possibilities of enriching the global organization of the activity that athletes will experience during future performances.

The third focus concerns the natural assessment that occurs while performing (i.e. learn to assess oneself). Although elite athletes should stay concentrated during their entire performance, no one can prevent them from assessing themselves. In trampolining, as the routines progressed, the trampolinists assessed the overall quality of their performance. The outcome of the assessment process was a judgement that depended on how vividly the previously performed moves were remembered. This triggered a new mode of involvement. For example, a trampolinist made an overall positive assessment of a routine. Overly confident, he then concentrated less well on his moves, which increased the probability of errors, as suggested by this excerpt:

> I'm waiting a while before going to get my legs. I'm being very careful. And there in the move, it was like, wow! I'm really doing well … and for a second, I stopped being aggressive. There was a second there where I told myself I was doing well and I was almost done … and so I relaxed and on the eighth, I made the error.

Reflective practice could here be focused on assessing one's own performance more efficiently during competition. The analysis of specific cases could be focused on the elements that athletes gave importance to during this process and the way they interpreted them. Situated knowledge about identity, performance and competition was operative in these cases because the athletes associated and stabilized the relationship between these assessments and the way they pursued their routines. Hence, reflective practice could be focused on the global dynamic of the activity during performance by working on the possible shift-points that the athletes were able to experience.

Two focuses could be identified at the level of local organization of the activity. According to the course-of-experience theory, the actual experience of athletes is related to the potential activity in which they engage and the virtual activity that they build. The focus of intervention follows the mode of involvement and what is learned.

Intervention on the potential activity corresponds to the field of possible actions in which athletes are engaged in or open to. For example, as suggested earlier, when the athlete pushed more intensively on the trampoline, he opened the possibility of losing the feeling of falling. He also opened the possibility to making more errors because he was jumping higher than usual. The modifications created by potential activity were grounded in the concerns and acts of the athlete at each moment of performance. For each moment of performance, the self-confrontational interviews and associated reflective practice helped to reveal the basic structure of activity. Hence, reflective practice could work on the manner in which the athlete engaged at

those moments. These interventions are well suited in acrobatic sports for tuning the move. For example, one athlete had a problem with stabilizing an important move in a routine. At times, the move did not have enough rotation but had good height and vertical stabilization. At other times, this same move had great rotation but poor height and great and risky horizontal translation. The analysis of experience showed that this athlete engaged in this move by focusing on his hands in an upright position: the athlete felt them go up while they were sometimes observed to go down very rapidly. The combined reflective and training practice aimed at finding another way to engage in the move. Diverse solutions were examined during reflective practice and tested during training: focus on the movement of the elbow in upward directions, on the shoulders and the hip, and so on. The focus on the shoulder produced spectacularly positive results: the move was efficiently performed and stabilized, trial after trial.

The second orientation focuses interventions on the situated knowledge that athletes have built-in reference to the particular form of possible action-situation coupling. An example of a performance block encountered by a trampolinist is useful for illustration. This athlete suddenly was unable to initiate a move during training, although it had previously been executed with success. Reflective practice, including telling the story of how the move had regressed, had revealed that the block began after a succession of errors that were inexplicable to the athlete but that had led to the 'lost move syndrome' (Day, Thatcher, Greenlees, & Woods, 2006). The athlete was in a particular situation in which the perspective for doing this move was associated with a feeling of being lost in space in a situation that seemed too risky. The reflective practice consisted of building new references in order to reorganize the move in such a way that safety and control are ensured. In co-ordination with training, the work consisted of organizing and controlling the process that associated the activity the athlete wanted to initiate during the move and the experienced feelings. Trial after trial, reflections on distortions, abnormal sensations and opportunistic focus were analysed and discussed in order to shape the practical knowledge related to this move. This work built new pre-experienced expectations that allowed the athlete to engage in a situation that remained indeterminate but nevertheless viable.

Conclusion

In a sports context where reflective practice is often considered to be in opposition to physical training practice, the course-of-experience framework facilitates the circulation between third-person analysis (i.e. performance analysis) and the first-person account (self-confrontational interview). This approach helps to locate a specific point of entry for the interventions of coaches and sport psychologists so they can better understand athletes' successes and failures. The form of reflective practice in this approach can shape athletes' activity at several levels over the course of an entire career as experience is never stable and changes with each event. The diverse possibilities herein described illustrate how this practice can complete traditional training and model the learning and development of elite athletes.

Although these examples seem to suggest that solving problems is the route to success, this form of reflective practice can also be used to stabilize and reinforce well-suited activity during performance. Moreover, reflective practice may be a powerful tool for exploring new ways to attain exceptional performances.

Notes on contributor

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