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Decision Training: An Innovative Approach to Coaching

Decision Training (DT) has been taught since 1994 at the National Coaching Institute - Calgary (NCIC) as the foundation course for coaching effectiveness. Over the years, DT has gained recognition as a valuable method of building confidence in the many women coaches who instinctively steer their athletes towards independent thinking.

Cyndie Flett, director of the Coaching Association of Canada's Women in Coaching program, believes that DT has particular relevance for women coaches because of the validation it provides. "In my experience in dealing with women coaches, I have come to realize that one reason some tend to lack confidence in their coaching abilities is because they see few other coaches using the empowering approach. Self-doubt creeps in when you don't see that modelled by the coaches around you. And it doesn't help when athletes, not used to being asked for an opinion, question your knowledge. DT shows women coaches that they should have confidence in this style of coaching, that it is effective, and that they should pursue every opportunity to develop the DT skills."

In this issue of the Journal, DT's creator, **Dr. Joan Vickers**, provides a comprehensive explanation of the DT approach. In doing so, she demonstrates its value in enabling coaches to train their athletes to be more self-reflective, make their own decisions, become more self-reliant, and thus be better prepared for training and for the decisions required to ensure great performances in the competitive setting. She shows how DT contrasts sharply with the traditional approach in which the coach focuses mainly on training the skills and capacities needed to perform - with little emphasis on the development of independent action and thinking on the part of the athlete. She takes the reader through the "3 Step DT Planning Process" and "7 DT Tools" that form the core of DT.

According to the testimony of many of the women NCI graduates who have been trained in DT, including **Moira Marshall**, coach of Olympic long track speed skating bronze medallist **Cindy Klassen**, and **Melody Davidson**, an assistant coach with Canada's Olympic champion women's ice hockey team, DT is readily transferable from the classroom to implementation in their daily coaching practices. These two very successful coaches consider DT an essential element of their coaching, increasing their self-confidence and enhancing their ability to develop self-reliant athletes.

As a proven, powerful tool in teaching coaching effectiveness, DT, we suggest, is essential learning for all committed women coaches. - Sheila Robertson

Coaches Laud Decision Training

Moira Marshall is a speed skating coach on staff at Calgary's Olympic Oval. She is the former national development coach and was a member of the coaching staff for the Canadian speed skating team at the 2002 Olympic Winter Games. She is a former U.S. Olympic speed skater, who competed at the 1988 Games in short track and 1992 and 1998 Games in long track. She attended the National Coaching Institute - Calgary from 1998 to 2000.

"I took Joan's class on Decision Training in my second year at the NCI. The nice thing about the class was it reinforced what I already believed was the best way to coach - I was already doing some of it.

One of the ways that Joan's work helped me was in how I wrote my training programs. Of course all training programs need to be physiologically sound, but they also need to include the technological and tactical aspects, and this is really where Decision Training came in. I needed to design the training program so that the athletes really had to think about their skating. For example, tactically, one of the

many things a speed skater needs to be knowledgeable about is how he or she enters and exits a corner. I would build a different aspect of the skill for each interval, so that was "random practice." Equally importantly, I would ask each of the athletes, as we discussed a technical aspect, to tell me what that means, how they would go about doing that. It began the process of getting them to think about their own training and not to rely solely on me.

One of the biggest aspects of this Decision Training model is giving feedback, trying to get the athletes to think and take responsibility, asking them, How did that feel? Why did it happen that way? In the beginning, I gave lots of feedback so the athletes would know that I knew what I was talking about. I didn't really like doing that, so when I took Joan's course it reinforced what I thought was better - vary the feedback so they think for themselves, take control of their own training, don't always look to you, the coach, for the answer. Certainly some athletes take time to learn how to do this - to be able to effectively analyse their racing and training - but it is so important.

Video feedback is also really useful. It's so important for athletes to see their performance and think about what they are doing well and what they need to correct. I can tell an athlete that they need to get lower, but often, until they actually "see" that they are quite high, they don't believe it. Video feedback is so effective in helping them see it for themselves. Again, when I use video feedback after an interval in training or a race performance, I don't tell them what I think. Rather, I ask them, What do you see? What do you think? Some athletes are just better learners with the visual cues, so that is another reason video feedback works so well.

Finally, Joan's tool of "hard-first" is huge. Even with young athletes, I get them racing fast, doing the whole thing, without breaking the race down too soon. Technique is so very different at a slow speed than it is at racing speed. So we start with the speed, and then we may go back and work on an early part of the push or a later part of the push, but not at the beginning."

Melody Davidson is head coach of Cornell University's women's ice hockey team at Ithaca, N.Y. She was assistant national coach of the Canadian women's hockey team at the 2002 Olympic Winter Games and 2002 world championships and head coach at the 2000 world championships. She was also head coach of the 1998-1999 women's under-22 team. She graduated from the National Coaching Institute - Calgary in 1997.

"When I first learned about Decision Training from Joan while studying at the NCI, I wasn't really sold. I had some doubts. But I began to see it as the course progressed, and it is now quite natural in my coaching. It really did two things for me as a coach.

First, it widened my viewpoint on how to teach skills. Random practice, integrating different skills into a single practice setting, as opposed to the steady progression of skills, has been very useful. Certainly for this to be effective, the athletes have to have some basic skills and some playing experience. With random practice, you don't see a lot of success at the beginning, particularly with younger, less skilled athletes, so it does take some patience. With my players now, at the university level, I do basic skill development on Monday and Tuesday, and on Wednesday and Thursday we do more random practice, with lots of questions from me on what they are seeing, and how they will execute a particular strategy. Working with the national team, we did a lot of random practice so that we were continually creating situations where the women had to think about how to play effectively together in new situations.

The second way that Decision Training really helps me is in my practice planning. It taught me how to create a lot of different situations where the athletes need to think about how they would execute a certain strategy. It taught me to ask a lot of questions of my athletes, rather than always telling them what to do and how to do it. It is so natural for me to do this now. Decision Training has given me a lot of confidence as a coach."

FEBRUARY 2003 FEATURE

Decision Training: An Innovative Approach To Coaching

By Dr. Joan N. Vickers

What Are The Roots Of Decision Training?

Decision Training (DT) is a new, research-based approach to coaching that increases the opportunities your athletes have to make decisions in training similar to those encountered in competition. DT takes its impetus from changes in research emanating from cognition and motor learning. From the early 1990s, a number of researchers began to report a paradoxical reversal that occurred when certain types of practice and feedback conditions were used (Christina & Bjork, 1991; Farr, 1987; Lee, Swinnen & Serrien, 1994; Schmidt, 1991; Vickers, 1994). Figure 1 presents an overview of these findings and compares the effects of using primarily behavioural methods and those reflective of the newer literatures. Within these studies, behavioural methods included blocked practice where the same skills were practised over and over in order to create automaticity, high levels of direct feedback, and instruction delivered and drilled through the use of simple to complex progressions. In contrast, the newer methods included the use of variable and random practice, delayed and reduced feedback, and the use of top-down, tactically oriented instruction.

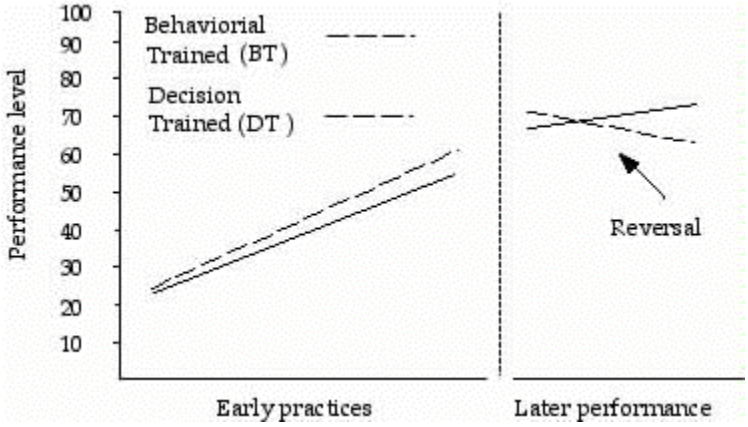

Figure 1. An overview of research findings from cognition and motor learning showing a reversal in long-term performance when behavioural (BT) and decision training (DT) methods are used in training motor skills.

Figure 1 shows that when behavioural methods are used, gains in performance do occur in the short term; however, these do not transfer later on to the competitive setting as well as the newer methods, which collectively we call DT. Behavioural training does work in the short term, and this is one of the reasons these methods are attractive to coaches and athletes - the immediate experience within the practice environment is that of success. But Figure 1 shows that when athletes are trained exclusively with these methods, they are unable to maintain or improve their performance in the long term, especially under conditions of competition and stress. In contrast, when using the newer DT methods of random and/or variable practice, delayed and/or reduced feedback, and whole instruction, a reversal occurs. Progress may be slower at first, but in the long term, athletes achieve a higher level of performance. As Schmidt and Lee (1999, p. 274) state, it is important for coaches to know that "a practice variable can have opposite effects on temporary performance levels versus the relatively permanent levels that must be assessed." In other words, what you see in practice is not necessarily what you get later on. A deeper understanding of how athletes optimally acquire skills is necessary to avoid the reversal in performance that occurs when too much behavioural training is used.

How Did DT Evolve?

In the early 1990s, experienced coaches at the NCIC were introduced to the DT techniques. To date, over 150 high-level coaches have been involved, either NCI students or their master coaches. DT is also an integral part of the training of coaches at the NCIs in Vancouver, Victoria, and Montreal. Through a process of praxis, where researchers, coaches, and sport leaders work together, DT has evolved to include the necessary research foundations, but also the insights needed to apply these new methods in the field. At the same time, a number of studies, theses, and developmental projects were carried out that support the overall thesis of the methods used (Chambers, 2001; Morey Sorrentino & Vickers, 1998, in press; Ota

& Vickers, 1999; Reeves, 1999; Vickers, 1990; Vickers, Livingston, Umeris, Holden, 1999; Vickers & Bales et al., 1996 a, b, c; Vickers, 1999; Vickers, 2000; Vickers, 2001).

At the heart of DT is an extensive research base that, when applied to coaching, leads to a change in the coach's behaviour. This, in turn, creates practice environments where athletes learn to make decisions under conditions very like those experienced in competition. Instead of leaving the training of critical decision-making skills to the unpredictable events of competition, DT moves this aspect of athlete preparation overtly into the daily practice setting. When coaches, athletes, and sport leaders adopt DT, positive gains appear to occur not only in athletic performance, but also in the training environment itself. Collectively, DT brings the athlete into the training process through changes in how practices are run, and this process creates a more dynamic and effective coaching environment. The underlying assumption is that effective decisions can be trained within the practice environment in much the same way as technical and tactical skilled are developed.

How Is DT Taught?

The content of DT (Vickers, 2000; Vickers, in press) is taught during a one-week 40-hour micro-coaching course. The first two days are spent covering the research underlying DT in a workshop setting, followed by micro-coaching sessions where each coach assumes three roles: as the coach (on one occasion), as an athlete (on two occasions), and as an observer/adviser of peer coaches (on two occasions). By experiencing these three critical roles, coaches are provided with the opportunity to 1) learn to implement DT as a coach, 2) experience the reception of DT as an athlete, and 3) interact with peer coaches as an observer and adviser providing feedback and guidance.

DT is taught through a 3 Step Planning Process.

In Step 1, the coach is asked to define the decisions the athlete has to make while performing. Each decision is described within the context of a cognitive skill important in the sport - for example, to increase attention to specific cues, to anticipate a specific event, to retrieve from memory the correct solution, to solve a problem under time constraints.

The decisions to be trained are derived from three sources. One source is from motor learning and control research that defines the cognitive, temporal, and spatial constraints under which all athletes perform such as reaction time (auditory, visual, and haptic).

A second source is gaze control research, which describes the attentional cues used by athletes when they perform at a high level (Adolphe, Vickers & LaPlante, 1997; Harle & Vickers, 2002; Holland, Patla & Vickers, 2002; Janelle, Hillman, Apparies, Murray, Meili & Hatfield, 2001; Martell, 2002; Patla & Vickers, 1997; Patla & Vickers, in press; Rodrigues, Vickers & Williams, 2002; Vickers & Patla, 1999; Vickers, 1992; Vickers, 1996; Vickers & Crews, 2002; Vickers & Williams, 2002; Williams, Singer & Frehlich, 2002; Vickers, Rodrigues & Williams, 2002). Gaze behaviour research is a new area of motor learning and control, and provides a unique insight into how athletes attend to cues when performing. For example, one finding is that of a "quiet eye" (Vickers, 1996; Janelle et al., 2001; Williams et al., 2002), which occurs when the gaze is directed to a specific location in the sports environment prior to the execution of a skill. Research by Wulf, McConnell, Gartner & Schwarz (2002) follows on this theme and provides direction in terms of coaching athletes to use an internal versus external attentional focus. Since we are beginning to understand what athletes see when they perform well, this new knowledge makes the defining of decisions a more objective process.

The final source of the decisions trained is derived from the knowledge that has been developed in each sport by coaches, technical directors, and sport scientists. This type of knowledge is commonly reflected in technical, certification, and other materials associated with coach education. Much of this knowledge is passed down anecdotally from coach to coach over the years. Step 1 is the most challenging of the three steps as it is requires that the coach understand how the athlete thinks when performing. Anecdotally, we have found that elite athletes who are now coaching find this step much easier than coaches who have not had a similar high level of athletic experience.

In Step 2, the coach selects a drill or sequence of drills that best trains the decision in the context of simulated competition. This step tends to be easier for coaches as they adapt existing drills and activities, or develop completely new training activities they feel will be more effective in training specific decisions.

Step 3 requires the decisions to be trained using one or more of the seven decision training tools (variable practice, random practice, bandwidth feedback, questioning, video feedback, hard-first tactical instruction, and modelling). Each of these tools has its own research base and thus provides a solid foundation for the entire method as they each promote a higher level of cognitive effort during training while at the same time maintaining a high level of physiological and technical and tactical performance. The seven decision

training tools also provide coaches with a wide range of methods they can use. Each tool, when used in the context of daily practice, increases the mental workload of your athletes - and is a key to successful coaching. A similar amount of physical work is therefore maintained, but the cognitive effort expended in each practice is greatly increased.

The 7 DT Tools

Each of the DT tools is now explained. Collectively they expand the repertoire of skills used by the coach.

DT Tool 1 - Variable Practice: Variable practice occurs when a single class of skills is trained using variations typically found in competition (Shea and Morgan, 1979; Hall, Domingues, and Cavazos, 1994; Ota & Vickers, 1999). A single class of skills is defined using the biomechanical characteristics of the skills and tactics in each sport. We call these "smart-variations" (Vickers, 2000) as they are specific to the sport and appropriate for the athletes involved and competitive challenges present.

DT Tool 2 - Random Practice: Random practice occurs when different classes of skills are combined that simulate the tactical conditions found in the sport (Magill and Hall, 1990; Lee & Magill, 1983). The objective is to practise biomechanically different skills in simulated drills that simulate the events of competition. These are called "smart-combinations" (Vickers, 2000) as they take into account the tactical requirements of the sport, the characteristics of the athletes, and competitive requirements of the season. Rather than following a simple to complex progression of isolated skills, the key to implementing random practice is to combine different skills in meaningful contexts. Two and three skills are combined in tactical settings without, and then with, defence or other contextual elements. In this way, your athletes have the opportunity to learn DT under increasing levels of pressure.

DT Tool 3 - Bandwidth Feedback: Instead of providing feedback at every opportunity, it is important to reduce and delay feedback or bandwidth feedback as skill develops. Bandwidth feedback (Lavery, 1962; Sherwood, 1988; Weeks & Kordus, 1998) means you intentionally leave your athletes to solve problems on their own when their performance falls within a bandwidth of acceptable performance as set by you. Feedback is always provided when performance falls outside this area and is based on the science of the sport, your own experience, objective standards, and other criteria. In order to make the bandwidth concept work, it is beneficial to tell the athletes, in advance, that an absence of feedback means their performance is near to what is expected. Gradually delaying and reducing feedback promotes self-reliance and lower levels of dependency on the coach.

DT Tool 4 - Questioning: Questioning probes the athletes' understanding of the decisions being trained and the physical skills that enact them. Questioning fills the feedback delay that is created when bandwidth feedback is used and is essential in maintaining effective coach - athlete communication (Chambers, 2001; Knight, Gunze, and Feel, 1997). Because coaches are verbal people, they often find it difficult to withdraw, delay, and reduce feedback; therefore, the use of questioning maintains a level of communication that is more comfortable for most coaches. Questions should be asked that probe the athlete's understanding of the drill, tactic, and skills being trained. This is one of the most rewarding of the DT tools and opens new and rewarding communication channels between the coach and athlete.

DT Tool 5 - Video Feedback: Video feedback occurs when the athletes view their performance on videotape and engage in a self-analysis and correction of their performance. Video feedback allows athletes to view, analyse, interpret, and evaluate their own performance as well as that of teammates and opponents (Rothstein and Arnold, 1979; Janelle, Barba, Frehlich, Tennant and Cauraugh, 1997). Video feedback is first and foremost feedback, so everything said above about reduced delayed bandwidth feedback applies. In the beginning, video feedback should be led by the coach, who identifies critical cues and makes suggestions for improvement. Within a session or two, the athletes should be asked to do this more and more on their own. They should learn to respond to the coach's questions about their own, teammates', and opponents' performance. Finally, athletes should learn to analyse their own performance and that of their peers without the coach being present.

DT Tool 6 - "Hard-First" Tactical Instruction: This form of instruction requires the technical and tactical concepts of the sport be taught early in the season rather than later, as is often the case in traditional coaching (Ausubel, 1968; Doane, Alderton, Sohn, and Pelligrino, 1996). Doane et al. showed that participants who received "easy first" visual discrimination training (where they learn to discriminate "easy" visual information before complex information) performed at a lower level than those who experienced "hard-first" training from the outset. During hard-first training, your athletes are taught how to see complex skills and formations right from the start using video models, on field demonstrations, live models, simulations, lead-up games, and small sided and full games. Hard-first instruction should be conceptual more than physical when lower skilled performers are involved. Even though their bodies cannot perform hard-first skills, there is no reason their minds cannot appreciate what is involved as early as possible in training.

DT Tool 7 - Modelling: Modelling occurs when the coach demonstrates a skill or tactic using a live demonstrator, a video of an elite or peer performer, or other model derived from a textbook, photograph, computer, kinematic, or other illustration. Modelling is used as a method of developing analytical and cognitive skills that are sport-specific (Morey Sorrentino and Vickers, 2001; McCullaugh & Caird, 1990; McCullaugh & Meyer, 1997; Sidaway and Hand, 1993; Vickers, Livingston, Umeris, and Holden, 1999). It is important for your athletes to learn how to analyse the performance of not only the best athletes in their sport, but also those who are not as highly skilled, such as teammates and competitors. They should know how to detect what is good and not so good in all levels of performance. Video models used continually, first by the coach and later independently by the athlete, are a critical coaching aid.

When Is DT Needed?

DT should be used continually in coaching. Watch for several useful signposts. First, if performance is high during practices, but days, weeks, and months later, there seems to be limited transfer to game situations, DT may be the answer. Second, if your athletes continually make it to the quarter- and semifinals, but the championship always seems to get away, DT may be what is needed. Third, if communication between the coach and athletes seems to go downhill over the course of a season, DT may be a way to increase the very necessary high levels of interaction between coaches and athletes required in sport today. DT appears to improve the training environment by fostering improved communication between the athlete and the coach (Chambers, 2001).

Does DT Create A Different Coaching Environment?

When DT is used, the coaching environment changes in ways that need to be anticipated by coaches, athletes, parents, and athletic administrators.

First, because the level of complexity in practices is higher early in the season, performance levels may be lower than what is found using more traditional methods (see Figure 1). Everyone involved in the training process needs to appreciate that the athletes are learning more complex aspects of the sport and therefore the training is more difficult than under traditional methods.

Second, delays in physical improvement in skills and tactics may occur; therefore, other means of assessing improvement must be found, such as the athletes' ability to think and answer questions, to be self-motivated during training, to rise to the occasion in competition more so than in practices, and other improvements that are not solely based on physical performance observed during practices.

Third, because your athletes are mentally engaged at higher levels as they train, you have to learn to deal with their greater cognitive involvement in the game. Some coaches find this very challenging because an athletic mind, once unleashed, is creative, challenging, and often over-motivated.

Fourth, when you use bandwidth feedback, some athletes may feel they are being neglected. It is especially difficult for those who are dependent on the coach to develop self-reliance, and coaches need to develop strategies for this eventuality. One solution is to simply explain to the athletes the scientific foundations of DT and the fact that a reduction in feedback from the coach is an indication performance is improving.

Fifth, DT leads to more being expected of the athletes in terms of being responsible for their own development. Some athletes resist this, preferring to be dependent on their coaches. Teaching athletes the benefits of being self-reliant is one of the challenges of DT. Finally, parents, technical directors, and others new to the approach need to be informed of your new practice methods. The key, in our experience, is education. At the NCIC, we have developed a number of publications to help in this process (Vickers, Bales, et al., 1996 a, b, a; Vickers, 2000; Vickers, 2001). DT provides a number of new skills that help you train the decision-making skills of your athletes. DT, at its highest level, seeks to improve the performer's ability to solve problems, both independently and in a group setting, and make effective decisions even under the most challenging of competitive conditions.

Do Coaches Use DT?

A study has just been completed (Vickers, Reeves, Chambers & Martell, in press) in which we followed 13 NCIC coaches through one year of practices. The four females and nine males were full-time coaches and all were endorsed by their sport to obtain their 3M Level 4 certification as well as the NCI diploma in high performance coaching. The sports represented in the study were badminton, cross country skiing, short and long track speed skating, squash, men's and women's ice hockey, track and field, and wrestling. Thus, a singular approach was applied to a number of diverse sport forms. The athletes ranged in age from 11

to 25 and varied in skill level from developmental athletes in the club setting to national/international competitors.

We videotaped three of their regular practices - one prior to learning about DT (P1), one during which the coaches had to apply the DT approach and were evaluated (P2), and a final practice where there were no pressures of evaluation (P3). The coaches were evaluated on the extent to which they used the seven DT tools.

We found significant changes from P1 to P2 in 27 of 49 categories (55 per cent) and from P1 to P3 in 15 categories (31 per cent), a very positive result. The greatest improvements were found in the areas where the research foundations are the most established (variable practice, random practice, feedback), heightening the value of research in effecting coaching change. There was also a change in the coach's adoption of questioning, which increased significantly from P1 to P2 and again from P2 to P3. Of all the tools, this was the one that coaches consistently commented on as most valuable. Overall, the coaches appeared to be able to implement the practice, feedback, and questioning tools more easily than the video feedback, hard-first instruction, and modelling ones. One reason this may have occurred is that video feedback, hard-first instruction, and modelling tools should be used early in the season, rather than later. It might be that coaches used them, but in earlier practices that were not observed.

Of the 13 coaches in the study, four coached athletes at the Salt Lake Olympics, two to medals, even though they were relatively junior coaches at the time of being enrolled in the NCI. Eight have gone on to coach national-level teams, three are head coaches at universities or colleges, and two are the head professionals at a training club. Many have coached athletes to high levels of success since the study was conducted.

In conclusion, DT places the training of decision-making skills on an equal footing with that of physical training. The 3 Step Planning Process and 7 Tools are the same for all sports and together provide a unified approach to increase athlete cognitive involvement in the training process. The end goal is to enhance the athlete's ability to make decisions under stressful competitive conditions. DT recognizes that the emerging profession of coaching requires the use of a universal set of principles derived from research, while at the same time accommodating the diversity found in each sport.

Joan Vickers

Joan Vickers, PhD, has taught in public schools, coached at the university and school level, and was a women's athletic director at two universities before making the move into academia. After completing her doctorate in cognitive/educational psychology at the University of British Columbia, she returned to the University of Calgary where she is a professor in the faculty of kinesiology and founding director of the Neuro-Motor Psychology Laboratory. The main focus of her research is to develop new insights into how we can help people acquire and use motor and cognitive skills more effectively. In addition to carrying out research on decision training in sport, she and her team study the eye movements and motor behaviour of athletes and other participants in motor skills.

Joan has published more than 60 papers and books on these topics and been invited to speak internationally on many occasions. She has taught at the NCIC since its inception in 1994 and is committed to the development of coaches and athletes in Canada. Decision Training is an integral part of the education of high-level coaches at the national coaching institutes in Calgary, Vancouver, Victoria, and Montreal. Joan has two sons, **Robert** and **James**, who are both graduates of the faculty of kinesiology, University of Calgary, and professionals in the field.

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