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Judgment and Decision Making in Sports: Techniques for Tactic Training, Tactics for Technique Training

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What Does Research tell us about how to Learn Decision Making in Sports?

Coming from an adaptive and domain-specific approach, the best answer we are able to give to elite athletes and coaches is that decision making is very situation (sport) specific and depends on both athletes' abilities and the task at hand. We will provide two examples, both in the area of ball games (table tennis and handball), from our lab to illustrate our concept.

1. Example: Research strategy "Practices for practice" in table tennis

A German Government Agency finances research in elite sports in which the following project is funded. The research strategy discovers problems in elite sports through meetings and questionnaires, and transforms them together with national coaches to a research question. For instance, in table tennis, national coaches train players from different states in an Olympic Centre. Different state coaches train players with two different strategies: 1) to switch from a forehand to a backhand swing, 2) to switch from a backhand to a forehand swing. Within the national coaching staff there was a lack of agreement on whether to train a neutral technique (after each stroke, bring the bat back to a neutral ready-position) or to train a direct technique (go direct from one stroke to the other).

Here we developed a diagnostic tool to provide feedback on the technique of stroke transitions. Furthermore we improved stroke efficacy, and guided development through interventions and competitions within a two-year project time frame. An evaluation of land marks of the project helped us to meet goals from the national coaches. A final meeting resulted in a decision to choose one of these techniques that was then integrated within coaches' seminars as well as the syllabus for elite training programs in Germany (Raab, et al., in press).

2. Example: Research strategy "From theory to practice" in handball

This program differs from the previous example in the sense that we had a theory about why “fewer options generated within an attack situation in ball games results in better choices”. We asked the German handball association to evaluate this for elite athletes of different expertise and age. The theory provides guidance on how to search for information (search rule), how to generate options and stop this process (stop rule), and how to decide between the alternatives (decision rule). We call the strategy TAKE-THE-FIRST-Heuristic implying that searching for only a few options and picking the first that came to mind is a good strategy. Because we did not know how this strategy develops, we applied a longitudinal research program (3 years, with diagnostic every half a year) to evaluate different search rules of athletes (via eye-tracking), their stop rules (number and type of options generated), and their decisions rules (intuitive or deliberative decisions). We found that spatial-oriented (e.g., options on the left side first) are better than functional search strategies (e.g. what are my pass alternatives). Second, we found that these different search rules resulted in a different number and type of generated options. The more options generated, the less effective were the decisions. Third, the intuitive decisions following the TAKE-THE-FIRST-Heuristic outperform other more deliberate strategies to decide (Johnson & Raab, 2003).

Decision Tools

Research can often not answer specific questions without knowing situational, task-specific, and personal conditions. This is the case in decision research. One way to address this problem is to provide athletes and coaches with a Decision Aid. Decision Aids present strategies for making smart choices.

Most of the Decision Aid techniques available in the judgment and decision making literature are to our knowledge not yet applied to the sports domain. We will therefore provide two popular Decision Aid tools that can be judged in their applicability on an individual basis. In addition, we developed and tested a model called SMART. The model increased decision making of athletes of intermediate skill level in basketball, handball, and volleyball.

STICC (Situation, Task, Intention, Concern, and Calibration) is a format used to present problems and was originally developed by Karl Weick at the University of Michigan, School of Business. It was re-framed into the shortcut STICC by Gary Klein (2003). The main message is that if you have a group of coaches making a decision between alternatives or athletes that are involved in a decision, than STICC provides a presentation form to discuss and decide.

Situation (Here's what I think we face): Define the conditions in which a decision needs to be made. Be sure that everyone sees the problem the same way.

Task (Here's what I think we should do): A brief description of the task and potential alternatives.

Intention (Here's why): The coach group or coach-athlete group needs to get the reason why this task needs to be performed to resolve the situation.

Concerns (Here's what we keep our eye on): Concerns about potential problems should be mentioned here. Especially tricky parts of the task need to be evaluated so the group can prepare for them.

Calibration (Now talk to me): The allocation of responsibilities or any questions that may arise how to reach the intended task solution are part of the last aspect of STICC.

PrOACT (Hammond, Keeny, & Raiffa, 1999) is a Decision Aid that provides a roadmap to develop and reach a smart choice within four steps.

Problem: To choose well, you need to state your decision problems carefully. Defining the problem includes avoiding unwarranted assumptions and option-limiting prejudices.

Objectives: A decision is a means to an end, therefore your decision should lead you where you want to go.

Alternatives: Decisions can't be better than your best alternative, therefore considering all the alternatives or at least a wide range of creative and desirable ones is requested.

Consequences: How well do your alternatives satisfy your objectives? Assessing frankly the consequences of each alternative will help to decide among them.

Trade-offs: In most complex decisions there is no single perfect alternative; therefore you need to balance conflicting objectives.

One Decision Aid that was applied to sports is SMART: Search, Movement possibilities, Attention and demands, Rules, Tactics (Raab, 2001). SMART gives coaches and players strategies in two ways. First, we introduce how to build situations to improve the learning of decision making and second, how to present information by instruction or feedback to orient players to satisfying outcomes.

Search: Build situations with task demands that have indirect, implicit attentional guidance to reduce the memory load. Guide your players to "information-rich-areas" in which they can pick-up the relevant information to decide a course of action.

Movement possibilities: Train a small number of alternatives, which movement to select, and how to execute the selected movement. It is important to select the alternatives by their importance but also to train a search rule that results in better choices. Players often cannot reproduce statistical information in the format of probabilities. Coaches should instruct players indirectly by manipulating specific alternatives that appear to be better in specific situations with different degrees of uncertainty and frequency.

Attention and demands: How much you rely on implicit acquisition of if-then rules depends on the complexity of the situation. If the situation is easy, let them find their own if-then rules, however in complex situations guidance through instruction and feedback to information-rich areas seems warranted.

Rules: Combine training forms of implicit and explicit learning by first setting a base of experience within the array of alternatives in a class of situations and then structuring them by explicit instructions to map situation components to specific choices.

Tactics: Pure if-then rule learning doesn't help to become creative. Therefore convergent (one-to-one-mapping of a situation to an alternative) needs to be combined with divergent (many

alternatives within a situation) training. Instructions that encourage creative solutions are warranted.

Summary

Far from providing a full toolbox of Decision Aids we rather present two research strategies as well as metacognitive instruction on how to think about choices. We hope that the adaptive approach provides a fruitful way of bridging theory and practice.

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