COURS DE THÉORIE DES JEUX 6

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(ii) The taste for risk in sportspeople How do they play a "chickie run" game?

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A love of danger?

When I was a young P.E. teacher, my colleagues and I used to organise every year a high-risk sports camp for our highschool classes. The pupils were unruly teenagers having scholar problems. The program was : outdoor climbing, rafting, canoeing, bungee jumping. All these years long and despite (non easy going), we never had a single accident. Nevertheless one day, our headmaster asked us to stop these high-risk activities for this kind of public. It was necessary to stop offering potentialy dangerous sports to these « hotheads ». According to him, they needed to learn how to control themselves, and not to become risk takers, what they already were… I've never been convinced by this point of view. This is the reason why I've choosen to write my thesis about the educational interest of high-risk sports. Unfortunately, scientific literature was concuring with my headmaster's arguments…

In the literature, some athletes are often accused of irresponsible behavior and have been compared to risk-taking deviants – drug and sex addicts, delinquents – who are revolting against established norms (Assailly, 1992, Peretti-Watel, 2000). Thrill-seeking in sport has been linked with the psychological trait of impulsiveness, "fleeing from self-consciousness" (Lafollie, 2007) and the quest for a state of euphoria. Given the lack of reference points from society, the player in search of meaning in his/her life supposedly poses the ultimate question: life or death? By abandoning themselves to sensory exhilaration, unhesitatingly agreeing to put themselves through a life-threatening ordeal (Le Breton, 2002) and adopting an extreme attitude, specialists in dangerous outdoor sports are sometimes described as being blinded by their love of danger (Donnelly, 2004). Despite their realistic judgments regarding their higher probability of being seriously injured while participating in their sport (in comparison with the average sportsperson), dangerous sportsmen believe in their abilities to cope with risk, inducing lower feelings of vulnerability (Martha, Laurendeau, Griffet, 2010).
Even though the interviews or questionnaires used in these studies provided information on how high-risk sports specialists' say (or think) they behave, these tools did not assess the sportspeople's' true behavior.

Hence, given the lack of *in vivo* validation, we decided to assess the hypothesis relating to a "thirst for risk" by observing the actions of 66 sportspeople during a game that enabled true risk-taking. We sought to establish how these extreme sports specialists would behave and whether or not they would take more risks than specialists in other sports.

The novelty of this approach relates to the consideration of physical games or sports as a laboratory for human behavior in general (Parlebas, 2002). Depending on the type of

game, one can witness drama, inhibition, pleasure, aggressiveness, inventiveness and humor (Parlebas, 1975).

In order to measure risk-taking, one can use a "paradoxical" game in which the protagonists must position themselves with respect to a dual constraint: (i) the need to protect themselves from the worst-case scenario by obtaining little reward and (ii) the prospect of obtaining greater reward by becoming dependent on the other player's benevolence. Players are thus subjected to a dilemma which they resolve according to their risk-averse or risk-taking nature.

Game theory provides many models for which one can calculate the ideal behavior if players play perfectly rationally in order to maximize their gains and minimize their losses (Von Neumman, Morgenstern, 1944, Shubik, 1982). Thus, one is able to estimate the ideal behavior and compare it with the players' true behavior in a motor situation. In fact, this approach enables subjectivity to be objectively measured. The combination of rationality and reality within a play activity is the domain of behavioral game theory (Kagel, Roth, 1995, Nagel, 1995). There are many literature reports of deviations between ideal behavior and what is actually observed in practice. These deviations are related to several different factors, ranging from "reasons to believe" (e.g. erroneous perception of probabilities, related to the player's level of experience of games in which chance has a role) (Condorcet, 1785, Allais, 1953)) and individual preferences for risk-taking (as in the private value auction game)) to compliance with a moral stance (as in the coordination game, Harsanyi, 1995). However, to the best of our knowledge, none of the experiments to date has involved the physical resolution of this type of game.

How to play "chickie run" and survive?

"Chickie run" takes its name from the famous car challenge in the film "Rebel Without a Cause" (Figure 1), starring James Dean (1955). It is similar to the famous "prisoner's dilemma" game developed by Tucker (1950), in which the summing of individual interests does not necessarily lead to a collective optimum (Harsanyi, 1977).

Figure 1. Sequences of the movie “Rebel whithout a cause” (1950) – with James Dean – when playing a dangerous chickie run game. The principle of the chickie run: "We are both heading for the cliff, who jumps first, is the Chicken".

Starting from opposite ends of a sports hall (20 meters apart), two players (Player L, the "line" player, and Player C, the "column" player, by reference to the score matrices presented below) run straight towards each other (Fig. 2a). If the two players collide {*Continue*, *Continue*}, they each lose 2 points (Figure 2) (Fig. 2b). If both "chicken out" at the last moment {*Defect*, *Defect*}, each player scores 2 points (Fig. 2c). If one defects and the other continues {*Defect*, *Continue*}, the defector scores nothing and the non-defector scores 4 points (Fig. 2d).

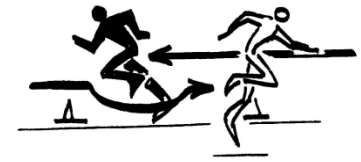
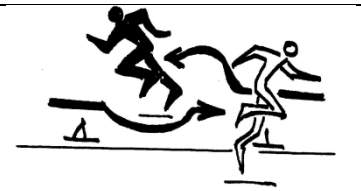
	*a.* Starting from opposite ends of the sports hall, the two players run straight towards each other.
	*b.* If both players continue straight on, they collide in the 3-meter-long central and each loses 2 points.
	*c.* If the white player "chickens out" before the central zone and the black player crosses the line without deviating, the white player scores 0 points and the black player scores 4 points.
	*d.* If both players deviate from the line, each scores 2 points.
	*e.* At the end of the match, the players enter their score in a summary table and then go on to play against each of the remaining players. Players are able to consult their future opponents' results on the summary table.

Figure 2. Scenarios in the game "chickie run"

The following additional rules and safety measures were implemented:

- In order to avoid a collision when both players defected, the latter were told to always deviate to their right.
- Any contact whatsoever between the players was counted as {*Continue*, *Continue*}.
- To ensure that the players ran at roughly the same speed, they had to arrive within a 3-meter central zone (marked out with cones) at the same time.
- Each participant played only once against each of the other players (i.e. 65 matches per player). The personal payoffs in each match (-2, 0, +2 or +4) were noted on a summary table. Before each match, players were able to consult information on their opponent's past strategy. Hence, this was a full-information game, since each player was aware of (i) his/her possible actions, (ii) the actions that could be adopted by the other player, (iii) the full range of possible outcomes and the corresponding gains and losses and (iv) the other player's motives and reputation, as well as his/her own. To gain time, six matches took place simultaneously within a number of parallel tracks in the sports hall. Each match lasted an average of one minute (from meeting the opponent until the outcome). The need to organize 2145 matches during three half-day sessions and the

recording of the results in a double-entry table did not enable us to take account of the order of the matches; each player chose an opponent when one was available, without worrying about his/her position in the "league table". Once the table had been completed, it was impossible for the investigators to assess the "reputation" effect - even though the players would have taken account of the latter in the heat of the action.
- Each player had to note their name, sport and bodyweight on the table, so that this information was available to their opponents. Indeed, bodyweight may be a potential confounding factor by inciting lighter players to defect more readily when faced with heavier players.

We studied 66 adult sports students (25 young women and 41 young men). The mean ± standard deviation (SD) age was 20.3 ± 1.2. All players participated voluntarily in the study. Thirteen participants weighed under 55 kg, 36 weighed between 55 and 70 kg and 17 weighed over 70 kg.

We sought to compare the behavior of the high-risk sports specialists (climbing, diving, etc., coded as *ClimbDive*; n=9) with that of three other categories of sportspeople: specialists in individual sports which take place in highly predictable physical and human environments (gymnastics, swimming, etc., coded as *GymSwim*; n=14), players in team sports that take place in a partly controlled environment (coded as *SoccerRugby*; n=32) and indoor combat sports specialists (wrestling, boxing, martial arts, coded as *Combat*; n=11). Of course, all the students were experts in their respective sports. They trained several times per week and played competitively.

From a rational point of view

The dilemma in "chickie run" is explained by the absence of dominant tactics. Neither *Continue* nor *Defect* tactics dominate in absolute terms (Figure 3).

		Player C	
	↗	*Defect*	*Continue*
Player L	*Defect*	(+2, +2)	(0, +4)
	Continue	(+4, 0)	(-2, -2)

Figure 3. Score matrix for the game "chickie run".
The 1st figure between brackets corresponds to the score (payoff) for player L ("Line") and the 2nd corresponds to the score for player C ("Column"). With this payoff matrix and in an iterated game (65 matches), taking risks ("Continue") is not better than playing cautiously ("Defect").

The best of a bad thing corresponds to the "best possible worst case" scenario. Playing *Maximin* equates to playing {*Defect*, *Defect*} all the time. Even if the opponent changes his/her tactics (by playing *Continue* to move from +2 to +4, see Figure 3), playing *Maximin* guarantees at least 0 (instead of +2 if the opponent also plays *Maximin*), which is always better than -2. The worse is avoided. If each player plays *Maximin*, the chance of reward is {+2, +2} each time. On a scale from -2 to +4, this score is satisfactory. However, this situation is not balanced. If one player maintains his/her chosen tactics, the other will gain by changing tactics.

There is a second solution: the Nash equilibrium. In this type of game, playing the equilibrium consists in "*minimizing the opponent's maximum*" (Barbut, 1967, p. 857), so that neither of the players is tempted to change tactics if the other maintains his/hers (Nash, 1950, 1951). This solution has been offered by the famous John Nash whose life as been described in a movie: "The beautiful mind" (2001) that received 4 oscars.
From a purely strategic standpoint, this game has two Nash equilibriums: {*Continue*, *Defect*} and {*Defect*, *Continue*}; {+4, 0} and {0, +4}. However, these are suboptimal for the player scoring 0. Since the game is iterated against all the other players, there is

a mixed-strategy Nash equilibrium that can improve the overall outcome for the two players (L and C). This one consist in playing safe one every other time (p=0.5).

When considering the results, we used the term "Maximin profile" to refer to players who deviated in more than 75% of the matches (since this value corresponds to the average of the probabilities for the Maximin and Nashian strategies). In contrast, a player who deviated less than 50% of the time was classified as reckless (the "Risk-taker" profile). A player adopting the intermediate, balanced position (independently of the opponent's reputation) was referred to as "Nashian".

Nice guys finish first

None of the subgroups of sportspeople played exactly as it should have done. However, for the population as a whole, the 2145 matches generated 2166 points, i.e. a score per match E_{real} of +1.01 Pt/m - almost exactly what a mixed strategy Nash equilibrium would yield. The tactical combination {*Defect*, *Defect*} was observed in 30.2% of cases, instead of 25% (i.e. of half of 50%) for a *Nashian* strategy and 100% for *Maximin*. The {*Continue*, *Continue*} combination occurred in 21.3% of matches (instead of the 25% expected for *Nashian* and 0% for *Maximin*).

		Other players	
	N=728 ↗	*Defect*	*Continue*
GymSwim players	*Defect*	35% (254)	38% (277)
E*=+0.88	*Continue*	12% (88)	15% (109)

		Other players	
"High-risk sports"	**N=513 ↗**	***Defect***	***Continue***
***ClimbDive* players**	***Defect***	**46% (236)**	**27% (139)**
E*=+1.34	***Continue***	**16% (82)**	**11% (56)**

		Other players	
	N=605 ↗	*Defect*	*Continue*
Combat players	*Defect*	24% (145)	19% (115)
E*=+0.9	*Continue*	26% (157)	31% (188)

		Other players	
	N=1088 ↗	*Defect*	*Continue*
SoccerRugby players	*Defect*	23% (250)	26% (282)
E*=+1,01	*Continue*	26% (284)	25% (272)

* E= expected gain per match; ** The three other subgroups of sportspeople (column) confronted with the "line" subgroup.
Figure 4. Percentage of tactical combinations in each subgroup (lines) versus the other sportspeople (columns).
As with the GymSwim players, the ClimbDive players defected in 75% of cases (the Maximin profile). They were more cautious than the Combat players, who continued in more than 50% of the matches. The SoccerRugby players were at the equilibrium (the Nashian profile). The "thrill-seekers" obtained the best aggregate score per match (+1.34). (The scores in intra-subgroup matches were not taken into account)

Since the goal of the present research was to measure the appetite for risk in extreme sports specialists, Figure 4 compares the latter's strategies with those of the other types of sportspeople (with a total of 513 matches = 9 *ClimbDive* x (14 *GymSwim* + 11 *Combat* + 32 *SoccerRugby*) and displays the strategies of each subgroup vis-à-vis the three others. Even though all the head-to-head matches took place (2145), the presentation in Fig. 4 excludes the 678 matches between players from the same sporting subgroup; we wanted to accentuate any differences by opposing the various subgroups. The *GymSwim* subgroup played 728 matches again the three other subgroups (14 x (9 + 11 + 32)), the *Combat* played 605 matches (11 x (9 + 14 + 32)) and the *SoccerRugby*

group (the largest population) played 1088 matches (32 x (9 + 11 + 14)). The detailed results show that the high-risk sports specialists (*ClimbDive*) tended to play cautiously (the *Maximin* profile). This phenomenon was also observed in the *GymSwim* subgroup, with one difference: the latter only obtain 0.88 Pt/m, compared with 1.34 Pt/m for the *ClimbDive* subgroup (with a significant difference in Student's T test, T=2.9, Degrees Of Freedom (DOF) =21, $p<0.01$). Not only were the dangerous sports specialists the most cautious, they also minimized their losses. The fact that caution can maximize gains is one of the characteristics of this type of *n*-player, no zero-sum game (Harsanyi, 1977). In practical terms and when the game is repeated, cooperative (cautious) strategies tend to dominate egocentric (risky) strategies (Axelrod, 1980a, 1980b, Axelrod, Hamilton, 1995). This was this case for the *ClimbDive* subgroup but not for the *GymSwim* subgroup.

The *Combat* subgroup was the most reckless and played "*Continue*" in over 50% of matches (Figure 4). This appetite for risk did not pay off and yielded only 0.9 Pt/m (i.e. a significantly ($p<0.05$) lower score than *ClimbDive* (T=2.44, DOF=18)). The *SoccerRugby* subgroup adopted a mixed equilibrium strategy (*Nashian*), enabling an average score of 1 Pt/m.
An analysis of the 678 intra-subgroup matches showed that the members of each family of sports specialists played against each other in the same way as they did against the members of other subgroups (Chi-squared=1.44, DOF=3, ns).

Given that the four sports subgroups were not matched in terms of sample size, gender and bodyweight, it was necessary to refine the results. In order to see whether cautiousness (*Maximin*) is indeed related to the sport practiced and not (via a linkage effect) to other explanatory factors (gender or weight), we performed a logistic regression using the TRI2 software developed by Cibois (2007). All 2145 parties (i.e. including the 678 intra-subgroup matches) were taken into account.

Let us take a reference situation: *MALE MIDDLEWEIGHT SOCCERRUGBY* (with MAXIMIN as the dependent variable, Figure 5), accounting for 14.3% of the population. For each of the other modalities, we calculated the marginal effects, all other things being equal. Female gender (Female) increased the likelihood of cautious behavior (MAXIMIN) by 8.1% (odds ratio (OR)=1.73). Being heavy (HEAVYWEIGHT) or light (LIGHTWEIGHT) had the same, negative effect (OR=0.43 and 0.64, respectively) and individuals in these subgroups were 4.7% and 7.6% more likely to take risks, respectively. However, these three aspects were only trends and did not achieve statistical significance. Only belonging to the CLIMBDIVE and GYMSWIM subgroups appear to be significantly explanatory at $p<0.01$ (OR=7.67, +41.8% and OR=6.94, +39.4%). Hence, the high-risk sports specialists were more cautious than the other sportspeople because of their sporting background and not because of their gender and bodyweight characteristics. Indeed, they shared these characteristics with the *GymSwim* subgroup.

Dependent variable: **MAXIMIN**					
		Coeff.	Chances	Percent.	
Reference situation:		-1.7916	0.1667	14.3	
			Odds ratio	Marg. effect	Test
Gender	*MALE*	Ref.			
	FEMALE	0.5467	1.73	8.1	ns
Bodyweight	LIGHTWEIGHT	-0.4477	0.64	-4.7	ns
	MIDDLEWEIGHT	Ref.			
	HEAVYWEIGHT	-0.8395	0.43	-7.6	ns
Sport	COMBAT	-0.0003	1.00	0.0	ns
	SOCCERRUGBY	Ref.			
	CLIMBDIVE	2.0369	7.67	41.8	***
	GYMSWIM	1.9378	6.94	39.4	***

Figure 5. Logistic regression for identifying explanatory factors for cautious behavior (Maximin).

The dependent variable is MAXIMIN *and the reference situation is MALE MIDDLEWEIGHT SOCCERRUGBY. Some characteristics are more important than others in the explanation of the prudent behavior (*MAXIMIN*). They are evaluated in terms of the odds ratio and the corresponding marginal effects (as a percentage). The most strongly explanatory elements are the CLIMBDIVE and GYMSWIM (***, p<0.01) specialties. The other factors did not have a statistically significant influence (*ns*)).*

High-risk sports specialists are not risk-takers

Given the current state of our research, it is impossible to say whether the observed correlations were causal. Why did the high-risk sports specialists play the game more cautiously than the others and this end up with a better overall score? Are there psychological factors which predispose certain people to take up extreme sports? Or does the intensive performance of extreme sports tend to modify attitudes when playing "chickie run"?

One possible explanation can be found by looking at the physical (motor) relevance and novelty of the "chickie run" dilemma. A mathematical game is an abstract system which is entirely controllable by abstraction: once a player has decided on his/her strategy, he/she can simply note it on a piece of paper and then leave the room - the game is over before it has begun! In the "chickie run" game described here, the player's choice of his/her strategy (*Maximin/Nashian/Risk-taker*) is just the start; regardless of the underlying, abstract plan, the game consists of a motor act. When the two players face off, there is only one imperative: to make the opponent deviate, or at least try to make that happen. To this end, the players must use "motor intelligence ", that is to say intimidation (making the opponent comply with my demands) and persuasion (preventing the opponent from believing that he/she has dominated me). How, then, can this motor intelligence be implemented? By waiting until the last moment to take a deviate/continue decision and by counting on the opponent's fear of collision - this is the basic principle behind a game that, regrettably, was made even more famous when James Dean died in a head-on car crash.

Depending on their particular sporting experience (in training and competition), participants may vary in their ability to decipher and mask behavioral patterns without panicking. The low score in the *GymSwim* group appears to bear this out. The absence of a direct opponent and the standardization of gymnastics equipment are unlikely to prompt frequent "motor decisions". However, in this strategic game, is it not strange that sportspersons used to dealing with uncertainty generated by other players (i.e. the *Combat* and *SoccerRugby* groups) had lower scores (Figure 4) than sportspersons confronted only with the unpredictability of the natural environment (i.e. *ClimbDive*)? Were the team sports and combat sports specialists victims of their familiarity with two-player and null-sum games? In the world of sporting duels where one player's loss is the other's gain, only antagonistic behavior (holds, punches and shots) changes the score. In "chickie run", things are different: strategies are conditional and an overly high frequency of aggressive interactions {*Continue, Continue*} resulted in lower gains for the *Combat* and *SoccerRugby* groups. The transfer of sporting behavior patterns to inappropriate motor situations has already been observed (Collard, 2004, Oboeuf, Collard, 2008, Collard, Loyer, 2009).

A second explanation relates to the reputation that the sportspersons built up, blow-by-blow. Since the game is always played against different players and full information is available, each player can identify their future opponent's past behavior and adjust their strategy accordingly: "defect" when faced with an opponent known to "continue" more than 50% of the time and "continue" when the opposite is true. Our experimental protocol did not enable us to take this variable in account, since the order of the matches was not recorded. It doubtless had an impact. However, with over 2000 matches, would extreme sports specialists have exhibited greater cognitive abilities in odds estimation

and anticipation (i.e. taking into account how their opponent had played in his/her previous matches) than the other subgroups did?

The results nevertheless suggest that people who are often described as "extreme sports" specialists are far from extreme in terms of their behavior.

This conclusion confirms two surveys performed 10 years apart (Collard 1998, Mariani 2011). Briefly, the surveys were based on indirect questionnaires and examined the participants' statements about risk - making the surveys less robust but easier to administer than measurements of motor behavior. By comparison with standard psychometric tests and interviews, the two surveys were novel in as much as the respondees did not have total control over their responses. To this end, we used the Condorcet method (1785), in which pairs of items are submitted to a ballot by the respondees. In our survey (1998) and that performed by Mariani (2011), the ballot items were characteristic traits in high-risk sports: "control" (over a tricky situation), "nature" (syntony, being in harmony with the wildness of the natural milieu), "novelty" (the use of novel equipment and movements), "risk" (potential danger that could lead to an accident) and "thrill" (a strong emotion that disrupts the usual equilibrium). These items are presented in pairs; for each of the ten distinct pairs, the respondees must circle the item that motivates them most. The 2011 survey was based on a sample of 61 surfers, 98 windsurfers, 148 kite surfers and 48 multiple sports specialists (surf + kite surf or surf + wind surf), all of whom performed at an international level. The 1998 work surveyed 91 French sports students who were national-level high-risk sports specialists.

With this type of arrangement, the respondees' memory cannot totally condition the choice made (in logical terms). Although the question is not ambiguous and demands an immediate judgment, it can reveal some absurd rankings known as "cursed triplets". For example, it is possible for an answer to highlight an illogical ranking such as thrill > nature > risk > thrill (where ">" means "preferred to"). The presence of an intransitive triplet (a famous "cursed triplet ") is symptomatic of the Condorcet effect (CE). In a 5-item ballot such as this, a given response can have 5 intransitive triplets. The greater the CE (i.e. the higher the number of intransitive triplets), the more the difficult it becomes to differentiate between the items.
The result given most frequently by the 91 sports students was transitive and the collective choices were apparently homogeneous. Strikingly, "risk" was ranked in last place as a motivating factor in "high-risk" sports. This confirms the "chickie run" findings and contrasts with the supposed "passion for risk" and "suicidal violence" described in the literature. Mariani's results (2011) are similar in all respects to our 1998 findings.

What motivates our specialists above all are strong emotions and the mastery of imbalance (the "thrill" trait) in syntony with the natural milieu (the "nature" trait) and the "novelty" associated with the use of new techniques. In the wild, these sportspeople are seeking unhindered adventure, which requires significant self-control. The "thrill" trait is the most captivating: it attracted 70 out of 91 votes when paired with the novelty trait, 77 votes when paired with "control", 65 votes when paired with "nature" and 51 votes (i.e. five more than the majority of 46 votes) when paired with "risk". In other words, the inversion of six "thrill vs. risk" votes (6.5% of the total) would be enough to change the shape of the majority ballot and increase the CE to the maximum level possible. In fact, the majority of respondees preferred the "nature" trait to "risk" (66 votes), "novelty" (84 votes) and "control" (72 votes). The "novelty" trait won twice, against "risk" (68 votes) and "control" (54 votes). The control trait only received one majority vote (against "risk", with 75 votes nevertheless). By inversing the six votes between thrill and risk, three intransitive triplets would appear in the majority ballot: thrill > novelty> risk > thrill, thrill > nature > risk > thrill and thrill > control > risk > thrill. Three intransitive triplets (out of a possible maximum of five) correspond to a CE of 60%… The group’s apparent homogeneity is illusory. It masks latent heterogeneity suggesting that is difficult to determine the underlying, motivating factors in high-risk sports.

Processing the individual data reveals a 10% CE, with only one "cursed triplet". For these respondees, the intransitive triplets were always related to the "risk/thrill/nature" triplet (6 as "thrill > risk > nature > thrill" and 3 as "thrill > nature > risk > thrill"): for example, "risk" is preferred to "thrill", "thrill" is preferred to "nature" but then "nature" is preferred to "risk"! This sign of incoherence (found nine times in the survey) is doubtless due to subjective overlap between the judgment criteria: dangerousness is associated with a radical change in the internal equilibrium and is characteristic of the wildness of the natural milieu. These three traits (with similar connotations) probably explain the confusion expressed by our young respondees.

The presence of a CE in individual data and for 6.5% of the votes in the group ballot testifies to the respondees' difficulty in expressing their attraction for high-risk activities in a purely cognitive mode (i.e. by verbalization). This may explain the disparity between the literature findings on risk-taking sportspeople on the basis of interviews and psychometric tests (i.e. the attraction of danger and disdain for death) and what is observed here "in the flesh" with game theory applied to the "chickie run" experiment (i.e. securitizing behavior and an aversion for deliberate risk-taking). This mismatch between words and acts appears in the extraordinary narrative by Douglas Robertson in "S*urvive the Savage Sea*" (1973). On board their 43-foot schooner *Lucette*, the Robertson family set sail from the south of England in January 1971. Eighteen months out, in the middle of the Pacific, *Lucette* was holed by killer whales and sank. Four adults and two children survived the next 38 days adrift in a 9-foot dinghy before being rescued by a Japanese fishing vessel. The author describes the day-by-day hell that he and the other survivors endured and the self-control they needed to perform acts such as drinking their own urine (or that of others) or injecting sea water via the rectum. However, Robertson remembered this odyssey with nostalgia and reported the comments made by two of his children after they had been rescued:

Douglas told me even before we had reached Panama that he would thank me every day of his life for giving him such an adventure, and Neil stated in a moment of shipboard boredom that he preferred it on the raft" (p. 348).

However, the reader knows better: neither of the two children said as much when adrift after the sinking. It is what is called "making a virtue of necessity". Today's television programs exploit this vein: ex-Special Forces soldier Bear Grylls deals slickly with high-risk situations in *Man vs. Wild*. The show often forgets to mention that that Grylls is surrounded by a whole safety team: yes to risk-taking, as long as there is no danger!

Not so rebel and with a cause…

High-risk sports (motocross, sea diving, kitesurfing, etc.) have a number of identifiable characteristics that set them apart from other social activities. Indeed, high-risk sports are the only legal, life-threatening social activities that are apparently practiced for their own sake. What do we expect and what do the participants expect from the "roll of the dice" in these situations?

Sportspeople are often stereotyped as suicidal, behavioral deviants who are revolting against the norm. As surprising as it may seem, our observations strongly indicate that high-risk sports participants have an especial distaste for risk. If our findings turn out to be correct, one could reasonably include high-risk sports into physical education programs in which the ultimate objective is… safety. To this end, it may be valuable to throw learners into motor situations with high levels of subjective risk but low levels of objective risk. This situation works as a paradox. To be safe, one must avoid danger. However, by always avoiding danger, one is deprived of the opportunity to confront it with confidence.

The main utility I see in my erstwhile mountaineering days was this education of my composure, which enabled me to sleep upright on the narrowest ledge while overlooking an abyss", wrote Marcel Mauss in 1934 before adding (with respect to education): "It consists especially of education in composure. And the latter is above all a retarding mechanism, a mechanism inhibiting disordered movements; this retardation subsequently allows a coordinated response of coordinated movements setting off in the direction of the chosen goal. This resistance to emotional seizure is something fundamental in social and mental life. (p. 385).

This quality also enabled the players to maximize their gains in the "chickie run" game.

This fundamental aptitude is an important issue in our educational system. The balance of the skier, the skillfulness of the motorcyclist and the confidence of the climber are not the sole determinants of sporting success but constitute its main objective. Physical education can help acquire this "*resistance to emotional seizure*" by offering schoolchildren the opportunity to perform sporting activities with an aura of risk and adventure.

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