

REPRODUCIBILITY OF COACHES' OBSERVATIONS IN RUNNING TARGET SHOOTING PERFORMANCE

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Original scientific paper

UDC 799:796.073

Abstract:

The present study examined the reproducibility of coaches' observations concerning the behavioural performance in running target shooting. The participants of the study were three male shooting coaches. The coaches had different coaching experience and education. At the time of the study one coach worked as Olympic team head coach (twenty years of experience), the other as Olympic team assistant coach (seven years of experience) and the third one as junior elite coach (two years of experience).

The coaches' task was to evaluate the running target shooting technique of 30 novice shooters from video recordings, taken before and after the training program. In addition to the 60 performances, seven of them were duplicated on videotape in randomised order. The coaches observed the performances using a score-based rating scale including 14 different aspects essential in the running target shooting.

The results showed that the reproducibility of observations differed among the three coaches. The coach who was most educated and experienced had the highest intracorrelation between the two evaluations $r = .71$, ($p < .001$). The intracorrelations were $.44$ ($p < .001$) for the Olympic team assistant coach and $.16$ (n.s.) for the junior elite coach, respectively.

It is concluded that the most experienced and educated coach observed the shooting performance most reproducibly among the three coaches. It is also suggested that even if a coach had been an elite rifle shooter in the past, it does not guarantee the ability to observe the shooting performance reproducibly.

Key words: *systematic observation, shooting technique, motor behaviour*

REPRODUZIERBARKEIT VON BEOBACHTUNGEN DER TRAINER BEIM SCHIEßEN AUF SICH BEWEGENDE ZIELE

Zusammenfassung:

Diese Studie analysierte die Reproduzierbarkeit von den Benehmensbeobachtungen der Trainer beim Schießen auf sich bewegende Ziele. Die Teilnehmer in dieser Studie waren drei männliche Schießtrainer. Die Trainer hatten unterschiedliche Erfahrungen und unterschiedliche Ausbildung, nämlich, ein Trainer arbeitete als der Haupttrainer für die olympische Mannschaft (zwanzig Jahre Erfahrung), der zweite arbeitete als Hilfstrainer für die olympische Mannschaft (sieben Jahre Erfahrung) und der dritte als der Trainer für Hochleistungsjunioren (zwei Jahre Erfahrung).

Die Trainer sollten, indem sie die Videoaufnahmen beobachteten, die vor und nach dem Trainingsprogramm gemacht wurden, die Technik von 30 Neulingen beim Schießen auf sich bewegende Ziele bewerten. Zusammen mit 60 Leistungen wurden sieben davon am Videoband dupliziert in der willkürlichen Reihenfolge. Die Trainer beobachteten die Leistungen und verwendeten dabei den sich auf das Resultat basierende Bewertungsmaßstab, der 14 verschiedene für das Schießen auf sich bewegende Ziele wichtige Aspekte enthielt.

Die Ergebnisse zeigten, dass die Reproduzierbarkeit von Beobachtungen bei drei Trainern unterschiedlich war. Der Trainer, der sowohl die höchste Ausbildungsstufe als auch die größte Erfahrung hatte, hatte auch die höchste Intrakorrelation zwischen zwei Bewertungen ($r = 0,71$; $p < 0,001$). Die Intrakorrelationen waren $0,44$ ($p < 0,001$) für den Hilfstrainer für die olympische Mannschaft, und $0,16$ (n.s.) für den Trainer der Hochleistungsjunioren.

Daraus folgt, dass der Trainer, der sowohl die größte Erfahrung als auch die höchste Ausbildungsstufe hatte, die beobachteten Schießleistungen am besten reproduzierte. Die Tatsache, dass ein Trainer früher ein Hochleistungsschießer war, ist kein Garantie seiner Fähigkeit, die Schießleistungen reproduzierbar zu beobachten.

Schlüsselwörter: *systematische Beobachtung, Schießtechnik, motorisches Benehmen*

Introduction

Observation as a technique is a common tool for gathering information about human behaviour. Non-verbal behaviour and tactile skills are particularly amenable to observation. Systematic observation means that the observational situation is structured and the observers know what aspect(s) of performance they have to observe in detail (Coolican, 1990; van der Mars, 1989). Systematic observational methods include video recording and ratings about certain behavioural aspects (Darst, 1989). With these methods it is possible to analyse the examined behaviour after the event at any required pace. It can be assumed that systematic performance observation requires many different skills from the observer, i.e. experience, education and good perceptual skills (see Darst, Zakrajsek, & Mancini, 1989).

Observation is one aspect of the total sport coaching process used both in training and in competitions. Douge and Hastie (1993) state that effective coaching includes the coach's ability to observe, analyse, synthesize and modify the coaching to fit the situation and the needs of those involved. Previous studies have used the systematic observation as a practical tool to influence the instructional behaviour of physical educators and coaches (Coleman & Mitchell, 2000; Heinilä, 1997). Gross and Lyle (1999) state that qualitative analysis (i.e. visual processes and perception) is the main method available to a coach when analysing an athlete's performance in training or competitive situations. Quantitative methods (like motion analysis of performance) on the other hand offer a more reliable and accurate method for performance analysis but are seldom available for everyday coaching.

Systematic observation of the sport performance requires expertise from the coach. Weinstein (1993) states that there is a difference in the nature of expertise: epistemic expertise (what the experts know) and performative expertise (what the experts do). Epistemic expertise is the capacity to provide strong justifications for a range of propositions in a domain, while performative expertise is the capacity to perform a skill well according to the rules and virtues of practice (Weinstein, 1993; Ericsson & Smith, 1991; Chi, Glaser & Farr, 1998). Coaches use more the epistemic expertise.

Knudson (1999) examined the reliability of vertical jump evaluations with basketball coaches, kinesiology students and PE teachers. In his first study six basketball coaches evaluated the knee angle of 12 subjects at normal speed. The tapes in

Knudson's study showed a single jump from each subject repeated five times. The coaches were highly inconsistent in their ratings, with mean rs of .04 and .06. Knudson's (1999) second study included two different groups of observers: a) five PE teachers with considerable teaching and coaching experience and b) 10 kinesiology students. In this study the teachers and students observed the overall range of motion of the vertical jump. Six of 10 kinesiology students ($r = .87$) and one of the five teachers ($r = .69$) could consistently rate the range of motion in the vertical jumps.

Different sports require a different amount of technical analysis and knowledge (Gross, 1995a, b; Gross & Lyle, 1999). Running target shooting is a technically demanding sport that requires good balance, anticipation and eye-hand coordination from the shooter (Viitasalo et al., 1999). In the present study running target shooting performance was examined. Running target shooting is an Olympic event in which a moving target runs at a distance of 10 m through a 2 m-wide area in 5 seconds (slow run) or 2.5 seconds (fast run). The target runs from left to the right and vice versa.

In the current study, running target shooting was chosen for observation for various reasons, i.e. the shooter stays in position during the task, the performance can be divided into different phases, there are no high movement speeds during the performance, and the shooting score indexes the overall shooting performance.

The purpose of the present study was to examine the intra-rater reproducibility of observation, that is, the degree to which one person agrees upon the characteristics of an observation of duplicated measures. The study used a structured rating scale to observe the aspects of the running target shooting among novices.

Method

Participants

The participants of the study were three male shooting coaches. All the coaches had several years of coaching experience and had been at least national level shooters. Inquiries about the coaching experience, education and coaches' own careers as top-level athletes were collected. At the time of the study each coach had at least one athlete under personal coaching. During the study none of the coaches was active as a competitive shooter. The coaches in the present study were named as coaches A, B and C.

Coach A was the head coach of the Finnish national shooting team. He had several years of experience as a national-level shooter and his personal coach education included a third-level coaching degree (according to general European Union classification). He had about twenty years of coaching experience. At the time of the study this coach worked with the Finnish national Olympic team and in addition had five shooters in personal training. His athletes had won gold medals at the European Championships and had been successful in both the Olympics and in the World championships.

Coach B was an assistant coach in the Finnish national shooting team. He had competed at an international level and achieved several national titles. At the time of the study he had seven years of coaching experience, of which three years at national level and two years as a Finnish national team coach. He had an official second-level standard European Union coach education. He personally coached one athlete and worked as a team coach with four shooters of the Finnish national team.

Coach C had been an international level shooter for several years and his competitive career had lasted thirteen years. He had been a member of the Finnish national team and had participated in the World Championships in the running target shooting. He had gone through the European Union standard first-level coaching course. At the time

of the study this coach had two years of coaching experience. This coach's athletes included six shooters of different skill level, from national-level junior shooters to international-level shooters. One of his athletes had won a medal at the European Championships and a few of the athletes held national titles.

Task

The coaches' task was to evaluate the running target shooting of 30 novice shooters. The shooters in the present study were all right-handed male novices with limited experience in running target shooting. Running target shooting is an Olympic event in which a moving target runs at a distance of 10 m through a 2 m-wide area in 5 seconds (slow run) or 2.5 seconds (fast run). The target runs from left to the right and vice versa. In the present study only the slow runs were used. While waiting for the target in the ready position the shooter holds the air rifle so that the butt of the rifle is at his waistline. After the appearance of the target the shooter is allowed to lift the rifle and shoot at the target once in a standing position. The rifle must be held against the body and supported only with hands. The left arm (right-handed shooter) must not rest on the hip or on the chest. Any type of sight is permitted; however the optical sights are limited to a maximum non-variable four-power magnification.

Table 1. Performance evaluation rating scale

PERFORMANCE EVALUATION	1	2	3	4	5	6	7	8	9	10
READY POSITION										
Vertical barrel placement										
Vertical butt placement										
Horizontal barrel placement										
Front hand position										
Body posture										
LIFT PHASE										
Rifle Lift										
Body control										
AIMING PHASE										
Front hand posture										
Back hand posture										
Head posture										
Body control										
TRIGGER PULL										
FOLLOW THROUGH										
TOTAL PERFORMANCE										



Figure 1. Shooter pictured from a right hand camera in ready position.



Figure 2. Shooter pictured from the front camera in aiming position.

The coaches evaluated the performances using a checklist (Table 1) that is a score-based tool including 14 different aspects essential in the running target shooting. An elite shooter from the Finnish national team served as a reference and his performance was rated as 10. The ready position (Fig. 1) included five different aspects for evaluation: vertical rifle placement (barrel up/down), vertical butt placement (butt up/down), horizontal rifle placement (pointing to the target at an angle to the target), front hand position (location related to the rifle) and body posture (weight in front/rear). The lift phase included two aspects: rifle lift (straight or wobbled) and body control (maintenance of good balance). The aiming phase (Fig. 2) included four aspects for evaluation: front hand posture (elbow at side/posture closed), backhand posture (elbow at side/posture closed), head posture (head held upright/no head movements) and body control (stable rotation at ankles, knees and pelvis, upper body and upper extremities a fixed unit with the rifle). In addition to these variables the coaches evaluated the trigger pull (squeezing/plucking/pulling, movements of the gun while trigger pull), follow through (movements of the gun after trigger pull) and total performance. The observation rating scale was designed in collaboration with the experienced running target shooting coaches.

The shooting performances were videotaped using two cameras (JVC GY-X2, Japan), one in front of the shooter (Fig. 2) and another on the right hand side of the shooter (Fig. 1). The coaches saw on a TV screen a split image of the two synchronized cameras. One run to the left and one run to the right were recorded for each shooter. The videotaping was done for each participant, before the training program which lasted for three months and after this training period. In addition to this, the videotape included, in randomised order, duplicated copies of the seven performances. Thus, totally, the videotape included (30+30+7) 67 performances that the coaches analysed. The video was played at normal speed (no slow motion) and the coaches were allowed to rewind and rewatch the performances at their own free will.

Data collection and analysis

The data were collected using an inquiry rating scale (Table 1). The scale used numbers (1-10) to differentiate the good and poor performances - the better the performance, the higher the score. The duplicated seven performances were used to calculate the reproducibility of evaluation for each coach separately. SPSS statistical procedure was

used to calculate the correlation coefficient between the repeated evaluations of the seven duplicates for each coach separately. The Pearson

correlation coefficients were calculated for each item of the checklist separately and over all rated items.

Results

Table 2. Original data for coach A

Coach A	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	6a	6b	7a	7b
Vertical barrel placement	3	1	10	9	9	8	8	7	8	9	9	10	8	9
Vertical butt placement	1	8	5	8	8	6	2	7	8	9	9	10	8	2
Horizontal barrel placement	1	1	4	5	3	7	7	7		9	9	9	1	1
Front hand position	2	1		1	7	6	5	3	2	1	4	2	7	6
Body posture	10	6	9	10	9	10	5	8	8	9	9	10	8	7
Rifle lift	5	1	2	6	4	1	4		1	1	8	4	4	1
Body control	3	1	2		7	4	5		2	2	2	1	2	
Front hand posture	10	7	6	6	9	7	7	6	8	8	9	8	8	7
Back hand posture	9	5	10	8	9	7	7	8	4	4	9	8	7	7
Head posture	2	5	8	6	8	5	1	5	1	3	6	3	7	5
Body control	1	1	2	2	6	4	1	1	1	1	2	2	2	1
TRIGGER PULL	1	1	1	1	1	1	1	1	1	1	1	1	1	1
FOLLOW THROUGH	1	1	1	1	1	1	1	1	1	3	1	1	1	1
TOTAL PERFORMANCE	3	1	3	3	5	6	3		3					

Table 3. Original data for coach B

Coach B	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	6a	6b	7a	7b
Vertical barrel placement	2	1	3	4	3	5	3	5	3	5	4	5	3	5
Vertical butt placement	1	4	3	4	3	5	3	5	3	5	2	5	3	4
Horizontal barrel placement	2	1	3	2	3	5	3	5	3	4	3	2	1	2
Front hand position	3	3	4	2	4	6	3	6	4	5	2	4		3
Body posture	3	5	4	3	2	5	3	5	4	3	3	3	2	5
Rifle lift	2	4	3	4	5	6	3	4	2	3	3	4	3	3
Body control	2	5	2	5	5	6	3	5	3	5	3	5	3	4
Front hand posture	3	3	2	2	2	5	1	5	3	4	3	5	3	4
Back hand posture	2	3	3	5	3	5	3	4	4	5	2	4	3	4
Head posture	1	3	5	6	4	5	3	4	4	5	2	4	4	5
Body control	2	3	3	3	3	5	3	5	3	5	3	4	4	5
TRIGGER PULL	3	2	2	3	2	5	1	2	2	5	2	5	1	2
FOLLOW THROUGH	1	1	1	3	1	3	1	3	2	5	1	3	1	2
TOTAL PERFORMANCE	2	2	3	3	4	5	3	4	3	5	3	4	3	3

Table 4. Original data for coach C

	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	6a	6b	7a	7b
Vertical barrel placement	5	2	8	3	7	7	5	7	4	7	6	6		7
Vertical butt placement	7	2	8	4	4	6	5	7	5	5	5	5		5
Horizontal barrel placement	7	2	8	3	5	7	4	8	3	5	6	6		5
Front hand position	7	4	8	4	7	7	3	7	6	7	7	6		6
Body posture	7	4	8	5	7	8	6	8	7	7	7	7		8
Rifle lift	6	3	8	5	7	8	6	8	3	7	7	7		5
Body control	4	2	8	3	8	8	4	8	6	7	7	8		7
Front hand posture	7	3	4	3	3	6	6	8	4	7	7	7		8
Back hand posture	7	3	8	6	8	8	3	8	3	7	7	7		8
Head posture	5	3	8	5	8	8	3	8	3	4	5	5		5
Body control	6	3	8	5	8	9	2	8	5	7	7	7		7
TRIGGER PULL	7	1	6	3	8	3	3	7	3	6	5	5		4
FOLLOW THROUGH	5	2	4	6	5	5	3	8	4	3	7	7		4
TOTAL PERFORMANCE	6	3	7	4	7	7	5	8	4	6	7	7		6

The results showed that there were significant differences in the intracorrelations of the coaches' evaluations. Coach A (Olympic team head coach) had the highest intracorrelation between the two evaluations ($r = .71, p < .001$). The intracorrelation of coach B ($r = .44, p < .001$) (Olympic team assistant coach) was lower than the respective

value measured for coach A, and coach C (junior elite coach) had the lowest intracorrelation between the repeated evaluations ($r = .16, n.s.$). These intracorrelations were calculated over all rated items. The individual observation marks (observation 1 vs. observation 2) for each coach are presented in tables 2-4.

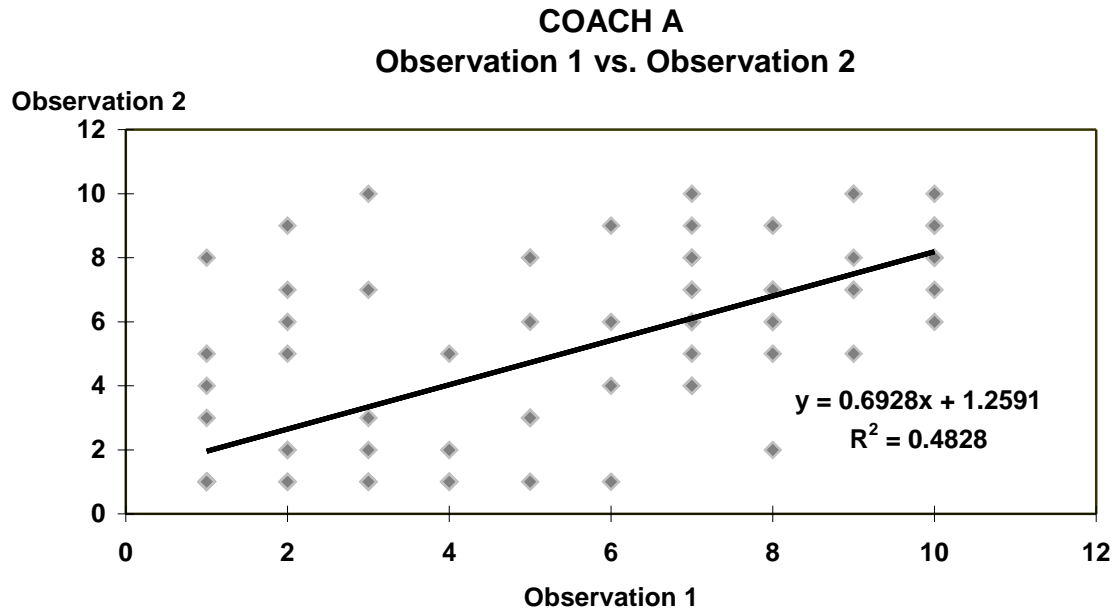


Figure 3. Correlations for the first and second observations for coach A.

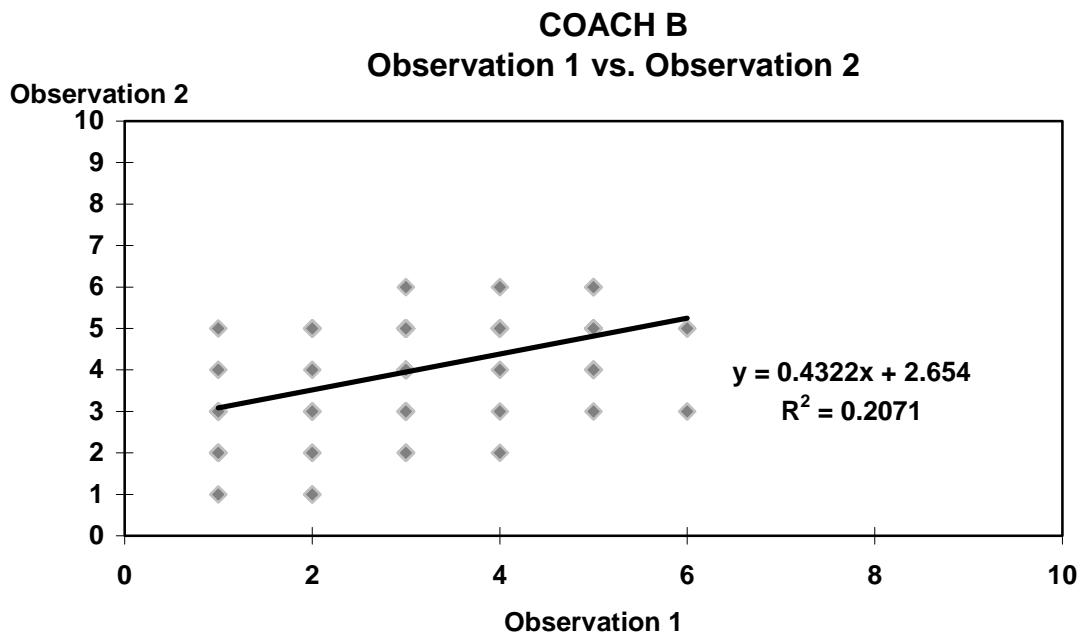


Figure 4. Correlations for the first and second observations for coach B.

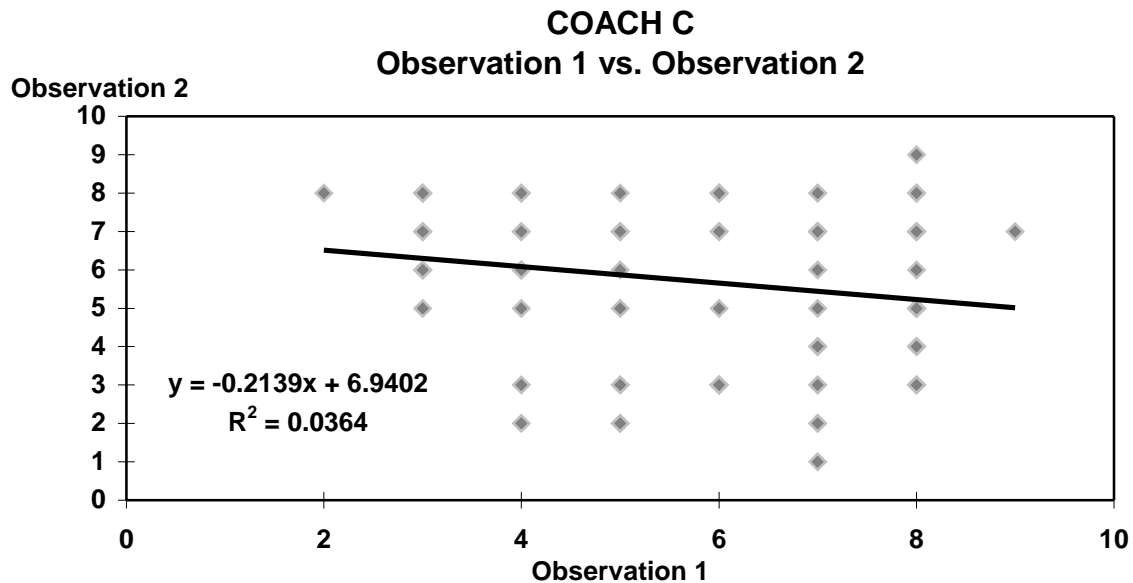


Figure 5. Correlations for the first and second observations for coach C.

Discussion

The coaches' task was to evaluate the running target shooting of 30 novice shooters from video recordings. The coaches observed the performances using a rating scale that is a score-based tool including 14 different aspects essential in the running target shooting. The results showed that the reproducibility of observation differed among the three coaches. Based on the good reliability rating, $.65 < r < .98$ (Knudson, 1999) only one of the coaches in the present study observed the shooting performances reproducibly. This coach was the most experienced and educated one of the three coaches.

In the present study the intracorrelations of coaches' performance observations varied from .16 to .74. Due to the limited number of duplicated evaluations (7 subjects and 14 items in the scale), the results of the present study cannot be generalized.

In the present study the main reason for the observing bias may be the participants' different coaching experience and education. The results of the present study were not in concordance with Knudson's (1999) study in which professional experience did not affect the ability to rate the range of motion in the vertical jump.

The present study found that even if the coach has been an elite rifle shooter in the past, he could not reliably observe the performance of another shooter. A previous career of an elite athlete can give a coach tremendous knowledge about the rifle shooting performance, but not necessarily the right

abilities to work as a coach. For an elite shooter it may be easy to feel the errors in his own shooting performance, but it is not an easy task to see mistakes in other athletes' performances. Today, there are many coaches who have been elite athletes in the past, i.e. nearly seventy percent of the Finnish track-and-field national team's coaches (J. Lämsä, personal communication, August 28, 2001) and over sixty percent of the Finnish national shooting team's coaches (K. Norvapalo, personal communication, October 18, 2001) have previously been athletes at least at a national level.

With a sport-specific scale the coach is able to focus on the primary elements of the sport performance. In the present study the rating scale for observation of shooting performance was used. Sources of the observer's errors may be due to the observer drift (Barlow & Hersen, 1984; Johnson & Bolstad, 1973), that is, the observer's tendency to change, as a function of time, the coding rules and interpret rating scale definitions differently. Observer drift may have affected the reliability of the coaches' observations in the present study. Another issue affecting the observation reproducibility is the rating scale used in the present study. Although the rating scale applied in the present study was designed in co-operation with professional coaches, it may be possible that the scale did not work properly for the required observation situation. The best possible results in the performance observation can be achieved using a rating scale that measures the sport-specific issues (Gross & Lyle, 1999).

Conclusion

Regarding the results of the present study it can be concluded that the most experienced and educated coach could observe the novice shooting performance most reliably. In light of the present study the ability to observe the shooting performance seems to be a difficult process that requires

extensive experience and a high education from the coach. It should be noted, however, that in the present study the separate effects of experience and education were not examined. This being the case, in future studies it would be of importance to examine separately the effects of experience and education.

References

- Barlow, D. H., & Hersen, M. (1984). *Single case experimental designs: Strategies for studying behavior change*. 2nd ed. Elmsford, NY: Pergamon.
- Chi, M. T. H., Glaser, R., & Farr, M.J. (1988). *The nature of expertise*. Hillsdale, NJ: Erlbaum.
- Coleman, M. M., & Mitchell, M. (2000). Assessing observation and conference targets of cooperating teachers. *Journal of Teaching in Physical Education*, **20** (1), 40-54.
- Coolican, H. (1990). *Research methods and statistics in psychology*. London: Hodder & Stoughton.
- Darst, P. W., Zakrajsek, D. B., & Mancini, V. H. (Eds.) (1989). *Analyzing physical education and sport instruction*. 2nd ed. Champaign, IL: Human Kinetics Publishers.
- Gross, N. (1995a). Coaching effectiveness and the coaching process (Part 1). *Swimming Times*, **72** (2), 23-25.
- Gross, N. (1995b). Coaching effectiveness and the coaching process (Part 2). *Swimming Times*, **72** (3), 23-24.
- Gross, N., & Lyle, J. (Eds.) (1999). *The Coaching Process: Principles and Practise for Sport*. Butterworth Heinemann.
- Douge, B., & Hastie, P. (1993). Coach effectiveness. *Sport Science Review*, **2** (2), 14-29.
- Ericsson, K. A., & Smith, J. (1991). *Toward a general theory of expertise*. Cambridge, MA: Cambridge University Press.
- Heinilä, L. (1997). Application of interaction analysis to the teacher education in physical education. *Research Bi-annual for Movement*, **13** (2), 16-56.
- Johnson, S. M., & Bolstad, O.D. (1973). Methodological issues in naturalistic observation: Some problems and solutions for field research. In L.A. Hamerlynck., L.C. Handy., & E.J. Mash (Eds.), *Behavior change: Methodology, concepts and practise* (pp.7-67). Champaign, IL: Research Press.
- Knudson, D. (1999). Validity and reliability of visual ratings of the vertical jump. *Perceptual and Motor Skills*, **89**, 642-648.
- Van der Mars, H. (1989.) Systematic Observation: An Introduction. In P.W. Darst., D.B. Zakrajsek., & V.H. Mancini (Eds.), *Analyzing physical education and sport instruction*. 2nd ed. (pp. 3-17). Champaign, IL: Human Kinetics Publishers.
- Viitasalo, J.T., Era, P., Konttinen, N., Mononen, H., Mononen, K., Norvapalo, K., & Rintakoski, E. (1999). The posture steadiness of running target shooters of different skill levels. *Kinesiology*, **31** (1), 18-28.
- Weinstein, B.D. (1993). What is an expert? *Theoretical Medicine*, **14** (1), 57.

Submitted: November 17, 2001

Accepted: November 11, 2003

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PONOVLJIVOST TRENERSKIH OPAŽANJA O IZVEDBI GAĐANJA U POKRETNU METU

Sažetak

Uvod

Ovaj rad ispituje ponovljivost trenerskih ocjena bihevioralnih aspekata strijelaca tijekom gađanja u pokretnu metu. Pucanje u pokretnu metu tehnički je zahtjevan sport koji od sportaša zahtijeva dobru ravnotežu, sposobnost anticipacije te dobru usklađenost i koordinaciju oka i pokreta ruke (Viitasalo i sur., 1999). Pucanje u pokretnu metu olimpijska je disciplina u kojoj se pokretna meta kreće na udaljenosti od 10m kož 2 m širok prostor u vremenu od 5 sekundi (sporo kretanje) ili 2,5 sekunde (brzo kretanje). Meta se kreće slijeva nadesno i obrnuto. U ovom je radu gađanje u pokretnu metu odabrano za opažanje iz različitih razloga: strijelac stoji u istoj pozi za vrijeme izvođenja zadataka koje se može podijeliti na različite faze. Sama izvedba ne sastoji se od brzih pokreta, a konačan rezultat gađanja odražava kvalitetu cjelokupne izvedbe. Cilj ovog istraživanja bio je ispitati unutar-ocjenjivačku ponovljivost ocjenjivanja, odnosno stupanj slaganja po kojemu se ocjene svakog pojedinog ocjenjivača slažu s njegovim vlastitim ocjenama u ponovljenim mjerenjima. U radu je korištena strukturirana skala za ocjenjivanje pomoću koje su se opažali različiti aspekti pucanja u pokretnu metu kod strijelaca početnika.

Metoda

Ispitanici ovog istraživanja bila su tri trenera sportskog streljaštva. Treneri su imali različito trenersko iskustvo i razinu edukacije. U vrijeme kada je provedeno istraživanje, jedan je trener radio kao glavni trener olimpijskog tima (dvadeset godina trenerskog iskustva), drugi je bio pomoćni trener olimpijskog tima (sedam godina iskustva), a treći je bio trener, i sam nekada juniorski vrhunski strijelac (dvije godine iskustva).

Zadatak trenera bi je vrednovati tehniku gađanja u pokretnu metu kod 30 strijelaca početnika na temelju video snimaka koje su snimljene prije i nakon provedenog trenažnog programa. Uz 60 osnovnih izvedaba, sedam ih je bilo dva puta snimljeno i raspoređeno na ukupnoj snimci prema slučajnom rasporedu. Treneri su

ocjenjivali izvedbe koristeći ocjenjivačku skalu koja je obuhvaćala 14 različitih aspekata važnih za gađanje u pokretnu metu. Brojevi skale od 1-10 razlikovali su dobru od loše izvedbe; viša brojka označava bolju izvedbu. Ponovljenih sedam izvedaba korišteno je za izračun ponovljivosti ocjena svakog trenera zasebno.

Rezultati

Rezultati su pokazali statistički značajnu razliku intra-korelacija trenerskih ocjena. Kod trenera A (glavni trener olimpijskog tima) utvrđena je najviša povezanost između dviju ocjena ($r=.71$, $p<.001$). Intra-korelacija trenera B (pomoćni trener olimpijskog tima) ($r=.44$, $p<.001$) niža je nego vrijednost korelacije trenera A, dok je kod trenera C (bivši vrhunski strijelac) dobivena najniža intra-korelacija između ponovljenih ocjenjivanja ($r=.16$, neznačajno). Sve intra-korelacije računane su za sve čestice skale.

Na temelju dobre pouzdanosti ocjena $.65<r<.98$ (Knudson, 1999) samo je jedan od ispitivana tri trenera pokazao ponovljivost ocjena izvedbe gađanja u pokretnu metu. Taj je trener najeduciraniji i trener s najviše iskustva u odnosu na ostalu dvojicu. Intra-korelacije trenerskih ocjena izvedbe u ovom istraživanju kreću se između $.16$ do $.74$. S obzirom na ograničen broj ponovno ocijenjenih izvedaba (7 izvedaba i 14 čestica na skali) dobiveni rezultat ne može se generalizirati. U svjetlu ovog istraživanja sposobnost ocjenjivanja izvedbe gađanja u pokretnu metu čini se zahtjevnim procesom koji traži vještinu, iskustvo i visoku obrazovanost trenera. Mora se uzeti u obzir, međutim, da u ovom istraživanju glavni učinci iskustva i educiranosti nisu posebno istraživani. To bi bilo važno ispitati u budućem istraživanju.

Zaključak

Može se zaključiti da je najiskusniji i najeduciraniji trener ocjenjivao izvedbu gađanja u pokretnu metu na najkongruentniji način u odnosu na ostala dva trenera, tj. da su se njegove ocjene u ponovljenim mjerenjima slagale u najvećoj mjeri. Također se pokazalo da, iako je trener i sam bio vrhunski strijelac u prošlosti, to ne znači da ima sposobnost opažati aspekte izvedbe gađanja na ponovljivo zadovoljavajući način.