The role of selected intrapsychic factors in alpine skiing instruction

Krzysztof Makowski
Gdansk University of Physical Education and Sport in Gdansk, Poland

Piotr Aschenbrenner
Gdansk University of Physical Education and Sport in Gdansk, Poland

Bartosz Krawczynski
Gdansk University of Physical Education and Sport in Gdansk, Poland, bartosz.krawczynski@awf.gda.pl

The role of selected intrapsychic factors in alpine skiing instruction

Authors' Contribution:
A – Study Design
B – Data Collection
C – Statistical Analysis
D – Data Interpretation
E – Manuscript Preparation
F – Literature Search
G – Funds Collection

Krzysztof Makowski [ABDEFG], **Piotr Aschenbrenner** [ABCDEF], **Bartosz Krawczynski** [ABCDEG]

Gdansk University of Physical Education and Sport in Gdansk, Poland

Abstract

Background: This research was aimed at describing the influence of selected intrapsychic factors related to "low" and "high" mountain conditions upon the efficiency of alpine skiing instruction.

Material/Methods: Research participants were 48 people without skiing skills. Altitudes from 770 to 1,741 metres above sea level were chosen for "high" groups. A STAI questionnaire was chosen in order to carry out the research. The skiing level achieved by the end of the instruction was assessed expertly with the three essential evolutions, i.e. ploughing curves, slanting slide, and half-ploughing turn, taken into consideration.

Results: The anxiety level after the instruction of the "high" group exceeded that in the "low" group ($p<0.0895$). Significant negative correlations were observed between the mean score for technical evolutions and the accompanying anxiety in the "high" group of subjects.

Conclusions: The lower the characteristic anxiety, the better the technical test results. Whenever skiing evolutions are taught, it is necessary to take into consideration both the students' anxiety levels and their physical effectiveness levels. Contributions to the awareness of skiing instruction participants can increase their mental resistance and result in a better final effect of such an instruction.

Corresponding author:
Bartosz Krawczynski
Gdansk University of Physical Education and Sport
80-336 Gdansk, K. Gorskiego Str. 1
Phone: + 48 (58) 55 47 150
E-mail: bartek@awf.gda.pl

Introduction

Alpine skiing instruction for physical education students at winter camps is an important element of teacher training. Such an instruction contributes to making the study itself more attractive and adds to the students' competences. A very intense instruction as well as the environment (being in the mountains) require corresponding psycho-physical dispositions from the students.

It is now easy to establish the real influence of anxiety on the instruction results [1]. Many research reports indicate a similar influence of anxiety and activating, i.e. either a hindering or a mobilizing one [2]. The situation of an instructed skier is, in fact, difficult, being one which provokes genuine anxiety and does sometimes result in an improved condition of the psyche [3]. The sources of anxiety in alpine skiing instruction are manifold [4].

One can claim, however, that a diagnosis of the role of anxiety may become extremely difficult as well. There are several earlier theories explaining the "anxiety level – efficiency" relationship [5]. Those well-known include a drive theory, a reversed U hypothesis (i.e. the Yerkes-Dodson law), a multidimensional theory of anxiety, a reversal theory and one referring to individual zones of optimum stimulation (the IZOF theory) [5].

The teachers'/coaches' becoming acquainted with students' levels of personality traits can lead to a selection of adequate didactic means and methods as well as result in a more efficient instruction [6, 7, 8, 9].

The present research was aimed at establishing the influence of selected interpsychic factors related to "low" or "high" mountain conditions upon the efficiency of alpine skiing instruction.

The practical and theoretical experience became a basis for the following hypothesis: students with higher levels of manifested anxiety are less efficient physically and need more time to grasp the skiing evolutions. In "high" mountains, the relation is more evident than in "low" mountain conditions.

Material and methods

The first-stage research, carried out prior to the winter camps, involved a total of 185 (63 female and 122 male) students. Four twelve-person research groups (i.e. 48 people) were selected basing on their ICSPFT – tested physical efficiency and the lacking skills in skiing. The same groups were subject to research during the second stage of the experiment, at a winter camp. The research participants had no skiing skills and identical equipment. The skiing instruction took 7 days (54 hours) between 8.30 a.m. and 3.30 p.m., with a break of 45 minutes. "Low" and "high" groups were distinguished, whereby the following abbreviations were used: LF for the "low" female and LM for the "low" male ones as well as HF for the "high" female and HM for the "high" male ones. The altitudes agreed upon were, respectively, from 770 to 1,741 metres above sea level and from 2,456 to 3,029 metres above sea level. In order to eliminate an influence of the coach upon the skiing instruction level, there was a change of a coach after each instruction day, combined with as much discussion focused on the instruction level.

The average age in the researched groups was 22.37 (± 0.84) years, within 21 and 25 years. A STAI questionnaire was chosen as suggested by a sport psychologist. This instrument can be applied both in individual and group research. The research in question was carried out on the first day of the skiing instruction, took about 15 minutes, and, being easy, did not cause any serious problems. A final expert assessment of the skiing level achieved consisted in a careful consideration of three crucial skiing evolutions, namely ploughing curves, slanting slide, and half-ploughing turn.

The Polish Anxiety Inventory (the Polish abbreviation – ISCL, i.e. Inwentarz Stanu i Cechy Lęku) is a variation of the American State-Trait Anxiety Inventory (STAI) introduced by Spielberger, Strelan, Tesarczy, and Wrzesniewski [10, 11]. ISCL is an instrument for the research of an anxiety interpreted as a temporary and situationally conditioned state of individuals, and that focused on an anxiety perceived as relatively permanent personality trait. ISCL includes two subscales, one (X-1) measuring the state anxiety and the other one (X-2) being applicable in trait anxiety measurement. There are 20 items in each subscale and the subject has to choose one of the four categorized

answers. The accuracy and reliability of the STAI questionnaire as well as its diagnostic and research application options have been frequently confirmed [11].

The data underwent a standard statistical analysis. Their distribution normality was checked, using histograms and the Shapiro-Wilk test, with positive effects for each group, these having facilitated a calculation of mean values and standard deviations. The psychological test results were standardized within groups and recalculated, basing on stens. Subsequently, the frequency distribution difference was assessed by means of a chi-square test, whereas, for parametric variables (efficiency tests), the relevance of mean value differences between the groups was evaluated using a T-student test. The efficiency test results were recalculated as points according to the ISCPFT physical fitness tables for youth [12, 13], and ranged. Furthermore, the Pearson coefficient, referring to the correlation between skiing evolution results and state anxieties, was calculated [14].

Results
Anxiety level

While comparing the HF group results to those of the LF group (Table 1), one difference could be distinguished as close to the statistical relevance, i.e. that referring to state anxieties measured after the instruction. In the cases of the other measurements, focusing on trait anxieties both before and after the instruction as well as on state anxieties preceding it, no statistically relevant differences were revealed. Thus, the female anxiety level after the "high" group instruction exceeded the one measured in the "low" group (tendency: $p < 0.0895$; cf. Table 1); as to the male group, no statistically relevant differences were found (cf. Table 2).

Table 1. Arithmetic means, standard deviations and difference relevance for the T-Student test of the ISCL (State and Trait Anxiety Inventory) results, referring to female groups

Test	HF	LF	HF (SD)	LF (SD)	t	p
STATE ANXIETY, SA1	41.4	38.1	23.3	27.6	0.2545	0.8028
TRAIT ANXIETY, TA1	30.4	15.6	22.4	8.7	1.7332	0.1050
STATE ANXIETY, SA2	46.6	24.8	24.8	23.2	1.8241	0.0895
TRAIT ANXIETY, TA2	27.3	11.9	26.6	10.9	1.5125	0.1526

(HF for "highland" female group, LF for "lowland" female group)

Table 2. Arithmetic means, standard deviations and difference relevance for the T-Student test of the ISCL (State and Trait Anxiety Inventory) results, referring to male groups

Test	HF	LF	HF (SD)	LF (SD)	t	p
STATE ANXIETY, SA1	43.40	47.70	27.37	25.66	0.3624	0.7212
TRAIT ANXIETY, TA1	40.10	41.60	30.63	22.74	0.1243	0.9022
STATE ANXIETY, SA2	42.00	41.70	29.08	26.14	0.0242	0.9810
TRAIT ANXIETY, TA2	38.00	34.70	31.39	14.82	0.3006	0.7617

(HM for "highland" male group, LM for "lowland" male group)

In order to establish a correlation between anxiety levels and instruction results, the calculated data were: Pearson coefficients as well as difference relevances for state and trait anxieties before and after the instruction. The other values taken into consideration were mean sums of points resulting from technical evolution assessments in the groups researched (Table 3).

Table 3. Correlation coefficients referred to mean point sums for technical evolutions and to mean anxiety levels in the groups researched before and after the instruction

SUM	SA1	TA1	SA2	TA2
LF	-0.29	-0.45	-0.20	0.02
HF	0.32	**-0.73***	-0.05	-0.65
LM	-0.18	-0.30	-0.06	-0.35
HM	**-0.73***	-0.49	**-0.80***	-0.53
ALL	-0.23	**-0.48***	-0.26	**-0.45***

Statistically relevant p<0.05

Relevant negative correlations were those between mean point sums for technical evolutions and state anxiety levels before and after the instruction imparted to the "highland" male group. The trait anxiety levels measured prior to the instruction had a similar relevant negative correlation in the "highland" female group as well as in the entire researched group, while the levels measured after the instruction also had such a correlation in the entire group. Significantly, no relevant correlations were revealed as to the "lowland" groups (Table 3).

Discussion

Among different factors affecting the learning/teaching of mobility elements, personality dispositions seem to be highly important. Anxiety, having its specific origin, object, intensity, frequency, symptoms, correlations with other factors, and exerting an influence upon the performance level of real mobility elements or upon the result achieved, is such a disposition [15]. Anxiety is usually associated with an unpleasant emotion, which can be viewed as a response of the system to a subjective or objective stimulus coming from the external or internal environment.

Being anxious, people become restless, fearful, and "nervous". They tend to be highly excited and experience an intense activity of the involuntary central nervous and the endocrine systems [16].

In his research on anxiety, Ch. Spielberger distinguished a phenomenon which he called state anxiety and another variation, named trait anxiety. As a personality condition, anxiety is characterized by "subjective and consciously perceived emotions, i.e. fears and tensions resulting in activation or stimulation of the autonomic nervous system" [11]. As a state, anxiety is highly variable, which equals a subjection to threatening factors. In opposition to that, trait anxiety (apprehension, susceptibility to anxiety) is defined by Spielberger as "a motive or acquired behavioral disposition that makes an individual perceive a great many objectively harmless situations as threatening ones, and respond by anxiety conditions, which are disproportionate to the extent of the objective danger" [11]. The above suggests a close relation between anxiety and the personality traits pre-disposing an individual to respond in a special manner to a specific dangerous situation.

Anxiety mobilizes the body potential, activates the accumulated energy, adapts an individual to a permanent struggle for life, disposes him or her to face both extraordinary and minor dangers [2]. An issue deserving a special consideration is the influence of anxiety upon mobility of alpine skiing instruction. Any difficult situation diminishes an individual's equilibrium by signaling a danger or by a perceived existence of the latter [3]. Difficult situations are also new ones, "clearly different from those in which the individual in question has achieved a given result up to now" [17]. The truth of this statement is confirmed by other descriptions of difficult situations, including the one presented in Tyszkowska and Lazarus' papers. Tyszkowska claims that "a difficult situation can be interpreted as a combination of external stimuli (conditions) causing a jeopardy to an individual's actions, needs, aims or appreciated values, resulting in characteristic behaviour alterations" [18].

The above features of difficult situations correspond to certain elements observed in those experienced by novice alpine skiers, It is, however, highly subjective to perceive skiing instruction as a difficult situation. Whatever seems very complex to one individual does not always have such a qualification in another person's opinion [19].

In earlier papers, there have been many descriptions of the learning effect dependence on the anxiety level [18, 20]. Authors point out that it is a personality trait exerting a heterogeneous influence upon the grasping of the necessary movements (a slight anxiety mobilizes; a stronger one disorganizes) [19] and depending on the situation complexity, i.e. it is predetermined by task and activity types as well as by a subjective approach to what is a difficult or an easy task [18, 20]. Alpine skiing is a sport in which "the difficulty and complexity level of the situation resulting in the grasping of the movements expected is higher than the difficulty.

As regards the research results focused on anxiety, it can be observed that, despite a lack of clear differences between "highland" and "lowland" groups with respect to state and trait anxiety levels both before and after the instruction (there was but one difference close to relevance, i.e. between the value of the anxiety level in the "highland" female group and the lower value established for the "lowland" group), a correlation analysis revealed a relevant connection between anxiety and achievement levels, the latter being defined by mean sums of points for technical evolutions. The obtained research results indicate that the lower the trait anxiety, the better the scores of technical checkings. The state anxiety (characterizing the "highland" male group only) is also related to scores, which means that the lower such anxiety is, the better the technical test scores are.

An unambiguous assessment of the research results is hardly possible. Most papers dealing with anxiety in skiing were casuistic [3, 22, 23]. But a few based on empirical research. Wieczorek and Lesiewski [19] claimed, for instance, that the anxiety level had affected "the grasping efficiency in alpine skiing instruction" and those with low anxiety levels had "achieved more indeed than highly anxious people", while Baka and Aschenbrenner [24] suggested a certain consideration of "the students' anxiety levels in the teaching of skiing evolutions". The quoted authors' research instruments were different. It seems reasonable to assume that our research based on the Polish version of STAI is a precedent worth being imitated.

Furthermore, Künzell and Müller [25, 26], who used the German variation of STAI, proved a positive influence of four-day short ski ("bigfoot") instruction cycles upon an anxiety level decrease in novice skiers. The observation of Cigrovski's research team [27] is as follows: experienced participants of technical skiing competitions manifest a lesser state and trait anxiety. In other researchers' opinion, such emotional conditions as worry, fear or lack of certainty as to individual efficiency are not psychological obstacles in the imparting of alpine skiing techniques to young people [27].

While interpreting the mean values for state and trait anxiety, it is also advisable to remember that but a scarce number of people would be taken into consideration in the final data analysis, which did affect a subsequent assessment of the variability and differences of psychological research results. This limitation arises from alpine rules and regulations, imposing an instruction for no more than twelve people in a group (the Salzburg Law on Skiing and Snowboard Instruction, LGB1, No. 83/1989).

Conclusions

The anxiety analysis carried out here indicate a significant influence of the anxiety level upon instruction effects in female groups. No such influence was observed in male groups.

In a recapitulation of the anxiety research results, it is possible to point out a crucial connection between anxiety and achievement levels, with the latter defined by mean sums of points awarded for technical evolutions. This relation could be established in spite of the lack clear differences between "highland" and "lowland" groups as to state and trait anxiety levels both before and after the instruction (with but one nearly relevant difference found between two anxiety level values, i.e. a relatively high one in the "highland" female group and a lower value measured in the "lowland" group). Basing on the research results, it can also be concluded that the lower the trait anxiety, the better the technical checking scores. The state anxiety (only in the "highland" male group) is also related to scores. Better technical test scores are effects of lower anxiety.

Practical recommendations

Not only the students' anxiety levels but also their fitness levels should be taken into consideration in the assessment of the instruction in skiing evolutions A similar contribution of the two factors to group results is to be aimed at.

It is advisable to use the above observation conclusions while dividing into instruction groups and planning the methodology. A skiing instruction programme for a winter camp should be more adjusted to the students' psychic dispositions and their earlier specialized preparation for skiing (this recommendation applies to practical classes).

Those instructed must be warned in an adequate manner, if they are not aware of highland dangers, i.e. probable fears or prejudices related not only to acrophobia but also to an anxiety resulting from a lack of previous stays and practice in higher mountains. The coaches need to be an aware of this problem.

A person instructed in skiing, who does know how different anxiety types can arise, might be able to increase his or her psychic resistance and achieve more in the course of the skiing instruction. The present authors understand that the above recommendations cannot be implemented without real difficulties.

References

1. Juraszczyk- Stolecka A, Danczyk R. Lek i doznania organiczne w narciarstwie zjazdowym [Anxiety and organic experiences in alpine skiing]. Trening. 1993;4(20):109-115. Polish.
2. Stawska L. Psychologia roznic indywidualnych dzieci i mlodziezy [Psychology of personality differences between children and andolescents]. Katowice: AWF; 1983. Polish.
3. Gracz J. Lek i odwaga w narciarstwie [Anxiety and courage in skiing]. Narty. 1989;7-8.
4. Ziemilski A. Eliminowanie leku a skutecznosc nauczania narciarstwa [Anxiety elimination and skiing in-struction efficiency]. Kultura Fizyczna. 1977;1:31-35.
5. Krawczynski M. Poznawcze i somatyczne komponenty leku sportowego [Cognitive and somatic compo-nents of sports anxiety]. In: Tlokinski W, editor. Lek. Roznorodnosc przezywania [Anxiety. The varied experiencing]. Warszawa: Arx Regia; 1993, 123-130. Polish.
6. Krasicki Sz. Narciarstwo jako jeden ze sportow calego zycia [Skiing as a lifelong sport]. In: Krasicki S, Chojnacki K, eds. Sporty zimowe u progu XXI wieku oraz tradycje i perspektywy Zakopanego [Winter spor-ts in the early 21st century and the traditions and prospects of Zakopane]. Krakow: AWF, 2001. Polish.
7. Terelak JF. Zrodla stresu. Teoria i badania [Sources of stress. Theory and research]. Warszawa: ATK; 1999. Polish.
8. Terelak JF. Czlowiek w sytuacjach ekstremalnych. Izolacja antarktyczna [Man in extreme situatuions. The Antarctic isolation]. Warszawa: Wydawnictwo MON; 1982. Polish.
9. Vysata K. Sporty zimowe w turystyce i rekreacji [Winter sports in tourism and recreation].Warszawa: WSTiR; 2004. Polish.
10. Wrzesniewski K, Sosnowski T. Inwentarz Stanu i Cechy Leku (ISCL). Polska adaptacja STAI. Podrecz-nik [Inwentarz Stanu i Cechy Leku (ISCL). A Polish version of STAI. A Handbook]. Warszawa: Pracow-nia Testow Psychologicznych Polskiego Towarzystwa Psychologicznego; 1996. Polish.
11. Wrzesniewski K, Sosnowski T, Matusik D. Inwentarz Stanu i Cechy Leku (ISCL). Polska adaptacja STAI. Podrecznik. Wydanie drugie, rozszerzone. [Inwentarz Stanu i Cechy Leku (ISCL). A Polish version of STAI. A Handbook. Second extended edition]. Warszawa: Pracownia Testow Psychologicznych Polskie-go Towarzystwa Psychologicznego; 2002. Polish.
12. Pilicz S, Przeweda R, Trzesniowski R. Skale punktowe do oceny sprawnosci fizycznej polskiej mlodzie-zy, wartosci wynikow Testu Miedzynarodowego aktualne do roku 2000 [Point scales for the fitness ass-esment of Polish andolescents: International Test results up to the year 2000]. Warszawa: AWF; 1993. Polish.
13. Pilicz S, Przeweda R, Dobosz J, Nowacka-Dobosz S. Punktacja sprawnosci fizycznej mlodziezy polskiej wg Miedzynarodowego Testu Sprawnosci Fizycznej. Kryteria pomiaru wydolnosci organizmu testem Co-opera [Point scales for the fitness assesment of Polish youth Cooper test criteria for body efficiency me-asurment]. Warszawa: AWF; 2003 Polish.
14. Brzezinski J, Siuta J. Metodologiczne i statystyczne problemy psychologii [Methodological and statistical problems in psychology]. Poznan: Wydawnictwo Zysk i s-ka; 2006. Polish.
15. Krawczynski M. Reinera Martensa koncepcja leku wspolzawodnictwa sportowego [The Reiner Martens concept of sport competition anxiety]. In: Tlokinski W, editor. W kregu psychofizykalnych zagadnien pro-filaktyki i terapii w sporcie [Psychological prevention and therapy issues in sport]. Gdansk: Wyd. AWF; 1993, 63-68. Polish.

16. Czajkowski Z. Czy strach musi miec zawsze wielkie oczy? [Must fear always be "big-eyed"?]. Sport Wyczynowy. 2000;11-12:83-91. Polish.

17. Tomaszewski T. Wstep do psychologii. [An introduction to psychology]. Warszawa: PWN. 1971. Polish.

18. Tyszkowska M. Zachowanie sie dzieci szkolnych w sytuacjach trudnych [Schoolchildren's behhaviour in different situations]. Warszawa: PWN. 1986. Polish.

19. Wieczorek M, Lesiewski J. Wplyw leku na zmiany sprawnosci narciarskiej osob doroslych, uczacych sie jazdy na nartach [Anxiety as a factor of skiing efficiency alterations in adult learnes]. In: Konferencja „Dydaktyka wychowania fizycznego" [Physical education didactics: An academic conference]. Olejnica; 1997. Polish.

20. Reykowski J., Funkcjonowanie osobowości w warunkach stresu psychologicznego. [Personality functioning in psychological stress]. Warszawa: PWN; 1996. Polish.

21. Niebudek T. Uczenie sie czynnosci sportowych w sytuacji trudnej [Acquisation of sport skills in different situations]. In: Czabanski B, editor. Uczenie sie techniki sportowej. Z warsztatow badawczych. [Sport technique acquisition. Research workshops]. Warszawa: AWF; 1991. Polish.

22. Augustynek A. Lek w narciarstwie zjazdowym i sposoby jego przezwyciezenia [Anxiety in alpine skiing and its elimination]. In: Szczesny J, editor. Narciarstwo wspolczesne [Present-day skiing]. Krakow: Art.-projekt; 2001. Polish.

23. Ziemilski JA. Narciarstwo a cywilizacja wspolczesna [Skiing and the present-day civilization]. In: Zaton M, editor. Teoretyczne podstawy narciarstwa zjazdowego [The theoretical foundations of alpine skiing]. Wroclaw: AWF; 1987. Polish.

24. Baka R, Aschenbrenner P. Intrapsychical correlates of skiing training efficiency. In: Mueller E, Lindinger S, Stoeggl T, Fastenbauer V, eds. Abstract book of the 4th International Congress on Science and Skiing. December 14-20, 2007. St. Christoph a. Arlberg, Austria; 2007, 165.

25. Kuenzell S, Mueller J. Does the use of bigfoots reduces anxiety in anxious novice skiers? In: Mueller E, Lindinger S, Stoeggl T, Fastenbauer V, eds. Abstract book of the 4th International Congress on Science and Skiing. December 14-20, 2007. St. Christoph a. Arlberg, Austria; 2007, 123.

26. Kuenzell S, Mueller J. The use of bigfoots reduces state anxiety in novice skiers. J Appl Sport Psych. 2008;20(2):253-260.

27. Cigrovski V, Matkovic B, Matkovic B, Ivanem D. The role of psychological factors in the alpine skiing learning process of the ski beginners. In: Mueller E, Lindinger S, Stoeggl T, Fastenbauer V, eds. Abstract book of the 4th International Congress on Science and Skiing. December 14-20, 2007. St. Christoph a. Arlberg, Austria; 2007, 142.