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Research article

The Effects of Self-Talk on Shooting Athletes' Motivation

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Abstract
Self-talk is helpful in motivating shooting athletes and promoting effortful behavior. This study aimed to examine how the degree and intensity of self-talk of shooting athletes during matches affects their actual internal motivation and careers. In particular, the primary objective was to determine the effects of the level and intensity of self-talk on the effort value, fun and interest, tension and anxiety, and competence of intrinsic motivation for different levels of achievement and athletic performance. One hundred seventy participants who were shooting athletes registered with the Korea Shooting Federation (national team, n = 55; high performance team, n = 62; general team, n = 53). The self-talk questionnaire was developed to measure the Test of Performance Strategies (TOPS). The intrinsic motivation scale developed and applicable to sports situations was used to measure the motivation of the shooting athletes. Significant differences were observed using MANOVA as well as the basic statistics of intrinsic motivation by self-talk. The intrinsic motivation self-talk was correlated to effort value, fun and interest, and competence. There was a significant relationship between shooting athletes' self-talk and intrinsic motivation. This study indicated that athletes using self-talk experienced more fun and interest, and they perceived higher effort value and competence. Further, the multiple regression analysis revealed that self-talk affected the intrinsic motivational factors of effort value and fun and interest.

Key words: Athletes, motivational, performance, self-talk, shooting.

Introduction

Maintaining the best athletic performance in sports is a crucial goal for athletes, coaches, and sports scientists (Parks et al., 2016). Given similar athletic skill levels, players with greater physiological and psychological skill levels generally emerge victorious (Cooke et al., 2011). Mental strength and psychological skills become important factors determining the outcome of a match for elite players who have reached the pinnacle of performance physical and skills (Radcliffe et al., 2013). Thus, it is essential that athletes possess physical fitness, psychological skills, and motor skills abilities in order to achieve their best athletic performance during the competition.

Athletes devise and utilize various strategies of maximizing and maintaining their personal abilities in order to deliver their best athletic performance during the competition (Hoffmann and Loughead, 2016). One such behavior is self-talk, a subcomponent of sports performance strategy that has been considered effective in fostering athletes' psychological stability during competition (Hagan et al., 2017a). In a sport environment, positive self-talk may include phrases such as "I can do it," or "Yes!" and negative self-talk include statements that are negative or reflect anger, frustration, or discouragement (i.e., "you are slow!" or "It's horrible.") (Van Raalte et al.,). The acquisition of self-talk does not require long mental training, a set form, or a complex coaching regime, and it can easily be used consciously or unconsciously by anyone, regardless of expertise, gender, and nature of sporting event (Kruk et al., 2017). Instructional self-talk is more advantageous for tasks characterized by accuracy, as the practice of these skills can help as interest in the technical part of the execution increases, whereas, on the contrary, motivation self-talk is more advantageous for tasks characterized by strength and endurance, because the implementation of such skills can help through increased effort (Hatzigeorgiadis, 2006).

Psychological stability is of utmost importance in shooting, a sport that requires a high level of psychological focus (Ortega and Wang, 2017). Self-talk is helpful in motivating and promoting effortful behavior (Blanchfield et al., 2014). Research on the relationship between participants and athletes' self-talk with their athletic performance and self-control abilities has recently been expanding. These include the study on positive and negative self-talk on athletic performance (Van Raalte et al., 1995) and the examination of the use of self-talk and the effects thereof based on its contents (Hardy, Gammage and Hall, 2001). Furthermore, research has expanded to the examination of the efficiency of self-talk in the acquisition and performance of exercise techniques (Landin and Hebert, 1999). A study found that negative effects on athletic performance can be removed by reducing the use of negative self-talk through cognitive restructuring or thought stopping (Rogerson and Hrycaiko, 2002).

Therefore, the present study examined how the level and intensity of self-talk of shooting athletes during competition affects their actual internal motivation and careers. In particular, the primary objective was to determine the effects of the level and intensity of self-talk on the effort value, fun and interest, tension and anxiety, and competence of intrinsic motivation for different levels of achievement and athletic performance.

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Methods

Participants

Participants included currently active shooting athletes registered with the Korea Shooting Federation. First, in order of sample appropriate participants, 55 athletes from the Korea national team (NT) and 62 athletes from the high-performance team (HT) were selected. Further, in order to investigate the level of self-talk based on the level of athletic performance, 53 athletes with somewhat low athletic performance from the general team (GT) (those with scores below the Korea national team and high-performance team) were added, to achieve a final sample of 170 participants. All participants who agreed to participate had the study explained to them to ensure a complete understanding of its purpose and methods used. The study was approved by Korea Institute of Sport Science Review Board, and conducted in agreement with the Declaration of Helsinki. Subjects signed an informed consent form before participation.

The general characteristics of the participants are presented in Table 1.

Measurement of self-talk

The self-talk factor in the Test of Performance Strategies (TOPS), developed by Thomas et al. (1999) was used to examine the level of self-talk of the shooting athletes during matches. The TOPS consists of 5 sub-factors including self-talk, conditioning, imagery and goal-setting, relaxation, and emotional control, which are assessed using 24 items that are measured on a 5-point Likert scale: 1 (Not at all), and 5 (very much). Among these sub-factors, self-talk consists of 4 items, and it was measured as a single factor after confirming its reliability using the Cronbach's α coefficient, which was .898.

Measurement of motivation

The intrinsic motivation scale developed by McAuley et al. (1989) which was adapted from the intrinsic motivation inventory for labor workers developed by Ryan (1982) and applicable to sports situations, was used to measure the motivation of the shooting athletes. The intrinsic motivation scale consists of 4 factors and 18 items that are assessed on a 5-point Likert scale: 1 (Not at all), and 5 (very much). The Cronbach's α coefficient used to verify the reliability of the motivation scale revealed the following values: fun and interest factor: 0.772, competence factor: 0.749, effort value: 0.755, and tension and anxiety factor: 0.511.

Research procedure

To ensure effective research participation, the participants of this study were limited to a sample group of currently active athletes registered with the Korea Shooting Federation (NT, HT, GT). Each athletes' team residence or athletes' village was visited to explain the goal of the study, distribute the questionnaire, explain the purpose and content of the questions, and provide any additional instructions. The distributed questionnaires were answered via self-report taking about 30-minutes, and they were collected immediately after. Statistical analyses were conducted according to the data analysis procedures and research design that were set during the coding process.

Data analysis

The SPSS statistical package version 19.0 for Windows (SPSS, Inc., Chicago, IL, USA) was used to perform all statistical evaluations.

Basic statistics were calculated for self-talk and intrinsic motivation with reference to varying levels of athletic performance and self-talk. Self-talk by characteristics (affiliation and career) was verified through a one-way analysis of variance (ANOVA), and multivariate analysis of variance (MANOVA) was processed for analyzing the relation of intrinsic motivation such as fun and interest, competence, effort value, and tension and anxiety based on the level of self-talk (via the quartile deviation method based on the median split procedure). In order to verify the difference in internal motivation according to the level of self-talk in the competition, the self-talk group was classified. The group classification was based on the median-split method developed by Sperce et al. (1975), and the semi-interquartile range is selected to select the top 25% as the group that using the greatest self-talk. 25% were selected as the group using the least self-talk. The centrally median 50% of the population was excluded from the differential verification analysis to discriminate the group. Correlation analysis and a multiple regression analysis were conducted to examine the effect of the level of self-talk on intrinsic motivation. Statistical significance was accepted at the 0.05 level.

Results

Differences in level of self-talk and the one-way ANOVA by affiliation

The one-way ANOVA results for self-talk by affiliation are presented in Table 2, and no significant differences were observed for self-talk by affiliation.

Table 2. Differences in level of self-talk and the one-way ANOVA by affiliation.

	n	mean	F-value	p-value
National team	55	3.9091		
High performance team	62	4.0282	1.231	.295
General team	53	3.8019		

Table 1. The characteristics of participants.

		Age(years)	Gender (male / female)	n (%)
Affiliation	**National team**	25.0 ± 3.92	28 / 27	55 (32.3)
	High performance team	26.1 ± 4.72	35 / 27	62 (36.5)
	General team	24.8 ± 3.80	26 / 27	53 (31.2)
Career	**Under 5 years**	24.1 ± 3.97	5 / 5	10 (5.9)
	5 ~ 10 years	24.7 ± 4.53	18 / 36	54 (31.7)
	10 ~ 15 years	25.3 ± 3.83	39 / 31	70 (41.2)
	Over 15 years	25.2 ± 4.00	27 / 9	36 (21.2)

Table 4. Multivariate analyses of intrinsic motivation based on self-talk.

	mean	standard deviation	Type III Sum of Squares	F-value	p-value
Fun and interest	4.0459	.59676	8.640	32.019	.000
Competence	3.3316	.67329	4.150	10.005	.002
Effort value	3.8673	.76393	11.389	24.178	.000
Tension and anxiety	2.8537	.75538	.017	.030	.864

Differences in level of self-talk and the one-way ANOVA by career

The one-way ANOVA results for self-talk by career have been listed in Table 3, and no significant differences were observed for the differences in self-talk by career.

Table 3. Differences in level of self-talk and the One-way ANOVA by career.

	n	mean	F-value	p-value
Under 5 years	10	3.6000		
5 ~ 10 years	54	3.8102	1.468	.225
10 ~ 15 years	70	3.9750		
Over 15 years	36	4.0625		

Multivariate analyses of intrinsic motivation based on self-talk

A multivariate analysis (MANOVA) was conducted with self-talk as an independent variable (fun and interest, competence, effort value, and tension and anxiety), to verify the difference in shooting athletes' intrinsic motivation by self-talk. The MANOVA results for intrinsic motivation by self-talk have been shown in Table 4. As indicated in Table 4, significant differences were observed according to the differences in the MANOVA as well as the basic statistics of intrinsic motivation by self-talk.

Correlation analysis and multiple regression analysis between self-talk and intrinsic motivation

The relationship between shooting athletes' self-talk and intrinsic motivation was examined through correlation and multiple regression analyses. Findings on the correlation analysis have been presented in Table 5. As indicated in Table 5, with reference to intrinsic motivation, self-talk was correlated to effort value, fun and interest, and competence. Specifically, it showed an especially high correlation with the effort value factor.

Subsequently, a multiple regression analysis was conducted based on the above correlations. These results are presented in Table 6. As indicated in Table 6, there was a significant relationship between shooting athletes' self-talk and intrinsic motivation. Thus, shooting athletes' self-talk is suggested to increase effort value and promote fun and interest.

Table 5. Correlation coefficients between self-talk and intrinsic motivation.

	Self-Talk	Fun and interest	Competence	Effort value	Tension and anxiety
Self-Talk	-	.383**	.170*	.422**	-.006
Fun and interest	.383**	-	.366**	.475**	-.228**
Competence	.170*	.366**	-	.260**	.084
Effort value	.422**	.475**	.260**	-	-.078
Tension and anxiety	-.006	-.228**	.084	-.078	-

* $p < 0.05$, ** < 0.01, *** $p < 0.001$

Table 6. Multiple regression analysis between self-talk and intrinsic motivation.

Criterion variable	Predictor	R^2	R^2C	β	F-value	p-value
Self-Talk	**Effort value**	.178	.178	.310	36.432	.000
	Fun and interest	.212	.043	.236	23.727	.003

Discussion

This study was conducted with the objective of examining the changes in intrinsic motivation by the level of self-talk used by shooting athletes during competition.

No statistically significant differences were observed from examining the difference in self-talk by career. This result differs from that of a study by McCormick et al. (2015) which claimed that thinking and self-talk change as the participants' abilities improve. Specifically, while participants engage in self-disciplinary talk to assist the acquisition of exercise skills in the beginning of their training by reminding themselves of important training situations, the study claimed that self-talk becomes briefer and less frequent as they gain proficiency. This discrepancy can be attributed to the fact that any athlete in the teams regardless of past experience has the potential of winning with a slight difference in skill level. However, Highlen and Bennet (1983) reported that experienced wrestlers use considerably more self-talk as compared to inexperienced athletes, and Rushall et al. (1988) confirmed that positive self-talk was effective in improving performance in sports tasks such as basketball, tennis, and skiing. Ming and Martin (1996) reported that beginner figure skaters using self-talk showed improved performance, and Mallett and Hanraha (1997) confirmed that self-talk had a consistent effect on better times in 100 m sprinting. This is because positive self-talk improves performance-related motivation and increases self-confidence, and is thereby effective in performing, preparing for performance, triggering desirable movements, providing self-compensations, improving effort, controlling attention, regulating anxiety and wakefulness, and assisting rehabilitation (Sellars, 1997).

Further, in the present study, a statistically signifi-

cant difference was observed for the differences in intrinsic motivation by self-talk used by shooting athletes. This indicates that athletes using self-talk experience more fun and interest, and perceive higher effort value and competence. This result is identical to a study by Weinberg et al. (1992) which claimed that, while self-talk helps performance, it also has a considerable effect on increasing motivation and self-confidence, as well as preparing the user for future performances. In particular, self-talk in the context of exercise tasks increased self-control, such as self-confidence and motivation (Van Raalte et al., 1994), and positive self-statement was found to a) increase self-compensation and effort, b) heighten attentivity and wakefulness, c) regulate anxiety and affect recovery from injury, and d) have a great effect on the psychological preparation for future performances (Hardy et al., 1996).

Conversely, a study by Hatzigeorgiadis and Biddle (2008) noted that self-talk generally causes anxiety and may reduce sports performance. Similar to the present study results, it has been found that psychological obstacles that affect the athletic performance of athletes in competition include anxiety, lack of confidence, distraction and failure to control emotions, pressure, game situation, interpersonal situation, physiological condition, aggression, stress, goal setting, level of desire, self-conception, form of attention, mental strength, cohesiveness, and observation, and that if the above factors are not controlled adequately, athletic performance deteriorates markedly (Hagan et al., 2017b). In additional several studies reported psycho-physiological relationship, Haufler et al. (2000) noted that relative economy in the cortical processes of shooters, relative to controls, during the specific challenge with which they are highly practiced. Deeny et al. (2003) also demonstrated compared to experienced shooters experts are less involved in psychological communication, especially between the left temporal association and motor control areas, which means that cognitive participation in the motor process is reduced. This relationship highlights significant cortico-cortical communication differences between competition and practice conditions during aiming period for shooting (Woo and Kim, 2017).

Finally, the relationship between self-talk and intrinsic motivation was investigated through a correlation analysis and multiple regression analysis. From the relationships in the correlations between self-talk and intrinsic motivation, statistically significant relationships were observed in self-talk with reference to effort value, fun and interest, and competence, but there was no significant relationship in self-talk with to tension and anxiety. Further, by investigating the relationship between self-talk and intrinsic motivation through a multiple regression analysis, self-talk was found to affect the motivational factors of effort value, and fun and interest. Therefore, while the correlation between self-talk and motivational factors are relationships, increased positive self-talk was found to affect athletes' effort value, and fun and interest factors.

Conclusion

In this study indicated that athletes using self-talk experienced more fun and interest, and they perceived higher effort value and competence. And from examining the difference in the correlations between self-talk and intrinsic motivation, statistically significant differences were observed in the correlation of self-talk with effort value, fun and interest, and competence, but there was no significant difference in the correlation of self-talk with tension and anxiety. Further, the multiple regression analysis revealed that self-talk affected the intrinsic motivational factors of effort value and fun and interest.

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Key points

- Self-talk greatly affects sports performance.
- Correlation of self-talk with effort value, fun and interest, and competence.
- The relationship between self-talk and intrinsic motivation.
- Increased positive self-talk was found to affect athletes' effort value.

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