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CHANGES IN COACHES' PSYCHOLOGICAL KNOWLEDGE AND ITS IMPACT ON YOUNG SWIMMERS' PSYCHOLOGICAL FUNCTIONING

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Sport coaches play a major role in the education and preparation of swimmers. Therefore, providing them with sport psychology-related knowledge may improve the mental skills of their athletes. This finding is supported by studies where single skill mental training classes for coaches resulted in better skills of athletes. However, long-term effectiveness of coach mental-skills education has not been systematically examined. This research covered 111 youth swimmers and their 16 coaches. Eight coaches from the experimental group participated in four mental skills workshops dedicated to increasing their swimmers' motivation, concentration, coping with stress and self-confidence. All athletes participated in four measurements, verifying their mental skills. The results revealed a significant increase in coaches' psychological knowledge, and increase in athletes' concentration, coping with stress and sport results, and no significant changes in the control group. We conclude that it is beneficial to complement interventions for athletes with coach education. Providing psychological knowledge to both groups can result in positive changes leading to improved sport results.

Keywords*:* sport psychology; mental skills training; psychological intervention

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Mental Skills Workshops for Coaches as a Way to Support the Performance of Swimmers

The influence of mental skills training on athletes' skills and sport results has increasingly gained researchers' interest (Bertollo & Terry, 2021). The effectiveness of mental skills training has been widely supported with regard to improved sport performance and psychological functioning of amateur and professional athletes (Meggs & Chen, 2019; Thompson & Hilliard, 2021). According to a meta-analysis published by Brown and Fletcher (2017), it can be concluded that self-confidence, motivation, coping with stress and concentration are among the mental skills mostly responsible for improving athletic performance. The literature suggests that athletes are the most frequent recipients of sport psychological services (Martin, 2005). In their literature review, however, Barker et al. (2013) observed a visible lack of mental skills training interventions aimed at improving sport coaches' level of psychological knowledge and ability to execute mental techniques while working with their athletes. The aim of this study was to verify if educating swimming coaches regarding mental skills training techniques would result in an improvement of their swimmers' sport performance and mental skills levels. Another aim was to check whether the changes in measured variables would have a long-lasting effect.

Coaches' Influence on Athlete Development

Sport coaches play a significant role in supporting positive youth development (Santos et al., 2018), as well as their athletes' mental health (Ferguson et al., 2019). They are often responsible for initiating and maintaining cooperation with sports psychology consultants (Feddersen et al., 2021). Coaches influence the frequency of athletes' implementation of mental techniques during sport practice (Sinclair & Sinclair, 1994). Having influence on youth sport performers, it should be essential for coaches to obtain knowledge about sport psychology and mental skills (Harwood, 2009; Maclean & Lorimer, 2016). Such knowledge could significantly affect athletes' functioning (Allan et al., 2018; Villalon & Martin, 2020).

Recent research is focused on the impact that coaches have on positive youth development (e.g., Bruner et al., 2021; Santos et al., 2018) and on coaching characteristics and their influence on athletes' outcomes (e.g., Weinberg

et al., 2018). There is not enough scientific verification of possible ways of improving coaches' knowledge and a repertoire of mental skills techniques. Coaches do realize that mental preparation is a crucial factor affecting sport performance (e.g., Santos et al., 2017). They emphasize the need for educating themselves regarding mental techniques they could use during practice and competition (Cook et al., 2021).

Coach Mental Skills Education

Unfortunately, education in mental skills training is not widely recognized in the existing literature (Barker et al., 2013). However, available research results are optimistic about the benefits of educating coaches about mental skills and ways of developing them among athletes. Smith et al. (1995) taught anxiety-reducing techniques to baseball coaches. A significant decrease in anxiety was noted among the experimental group of baseball players, as well as an increase of practice-related level of satisfaction. Coatsworth and Conroy (2006) educated swimming coaches on how to enhance athletes' self-esteem, which had a positive impact on the swimmers. Feddersen et al. (2020) provided fencing and football coaches with an educational program aimed at teaching them to provide psychological services. Results revealed that such training allowed coaches to analyze their athletes better. However, there was no verification of complex programs that focused on more than one mental skill. What is more, researchers have not verified the long-term effectiveness of such education programs on the level of athletes' mental skills or sports results (Barker et al., 2013).

Due to existing research limitations in this field, we verified the effectiveness of a mental skills educational program for swimming coaches, and its influence on the mental skills of youth swimmers. We focused on four mental skills listed by swimming coaches as the most crucial for successful sport performance: motivation, coping with stress, concentration, and sport-confidence (Johnston et al., 2013). We assumed that as a result of participating in mental skills educational program, coaches' level of psychological knowledge would increase significantly. We also hypothesized that in the experimental group, there would be a significant improvement of all tested variables among the athletes over the course of four measurements.

METHOD

Participants

A total of 16 male coaches, aged 28–52 years (M = 40.44, SD = 7.45) and with 4–28 years of work experience (M = 15.94, SD = 7.03), participated in this study. Nine coaches had experience in working with a sport psychology consultant. A total of 111 swimmers (females = 46%) aged 13–18 years old (M = 15.92, SD = 1.27) working with the aforementioned coaches, participated in the study as well. Their mean swimming experience was 7.18 years (SD = 2.56).

Coaches were randomly assigned to experimental or control group. Eight coaches participated in mental skills educational workshops (experimental group). A total of 61 swimmers, who trained with these coaches, were examined. Eight coaches were in the control group, together with their 50 swimmers undergoing the psychological measurement procedure. A description of the participants in both groups is presented in Table 1.

Table 1

Description of Study Participants in both Groups

			Experimental group	Control group
		N	61	50
Athletes	Gender	Females	33	18
		Males	28	32
	Age	*M* (*SD*)	15.89 (0.61)	15.96 (1.78)
	Swimming experience (years)	*M* (*SD*)	6.98 (2.38)	7.43 (2.77)
		N	8	8
Coaches	Age	*M* (*SD*)	39.88 (8.37)	41.00 (6.93)
	Work experience (years)	*M* (*SD*)	16.63 (8.03)	15.25 (6.34)

Procedure

Our affiliated institution's ethical board approved the study (no. 29/2017). We delivered the program in the form of four in-class, 90-minute-long workshops for coaches, organized between the first and the second measurement. Four measurements of swimmers (mental skills) and their coaches (knowledge level) were organized: a pre-test (measurement 1) and three post-tests – after

1 month (measurement 2), after 3 months (measurement 3), after another 3 months (measurement 4) in order to verify both the instant influence on coach education and the long-term effectiveness of the program.

Measures

Psychological Variables Measurement

The Sport Motivation Scale-6—SMS-6 (Polish adaptation by Blecharz et al., 2015) was used to measure swimmers' motivation (Deci & Ryan, 1985). Participants rated own reasons for sport participation on a 7-point Likert scale (1 = *Does not correspond at all*, 7 = *Corresponds exactly*). SMS-6 measures six forms of motivation: amotivation, external regulation, introjected regulation, identified regulation, integrated regulation, and intrinsic motivation (i.e. "For the excitement I feel when I am really involved in the activity"). In this study, reliability (Cronbach's alpha) of SMS-6 was 0.66 on the Identified Regulation scale, 0.71 on the Internalized Regulation scale, 0.75 on the Integrated Regulation scale, and 0.81 on the Amotivation scale, External Regulation scale, Intrinsic Motivation.

The Brief-Cope Coping Inventory (Polish adaptation by Juczyński & Ogińska-Bulik, 2012) was used to measure participants' coping strategies. Respondents answered 28 statements by determining frequency of own behavior on a 0–3 scale (0 = *I haven't been doing this at all*, 3 = *I've been doing this a lot*). The Inventory categorizes answers into three subscales: Problem Focused Strategies, Emotion-Focused Coping, Dysfunctional Strategies (i.e. "I've been saying to myself 'this isn't real'." The mean reliability (Cronbach's alpha) of the Brief-COPE Coping Inventory in this study was 0.77.

We included another tool for measuring coping strategies due to the fact that swimmers differed in terms of age, namely a coping questionnaire in Polish titled *Jak Sobie Radzisz JSR* (Juczyński & Ogińska-Bulik, 2012), measuring active coping, emotion-orientation, and social support seeking measures dispositional and situational coping strategies (i.e. "I cry or get angry") by determining the frequency of own behaviors on a 5-point Likert scale (0 = *almost never*, 5 = *almost always*). The mean reliability (Cronbach's alpha) of the dispositional scale in this study was 0.72 and 0.68 for the situational scale.

The D2 Test of Attention (Dajek, 2003) was used to measure swimmers' ability and speed of perception and ability to concentrate. Respondents are

tasked with crossing out all letters *d* and *p* accompanied by two lines from 14 rows of different letters. The general reliability (Cronbach's alpha) of the test in this study was 0.91.

We also used another Polish tool, the Attention and Perception Test (*Test Uwagi i Spostrzegawczości* TUS by Ciechanowicz & Stańczak, 2006). Participants have 3 minutes to cross out as many 3's and 8's from 3 pages with 3,726 numbers. The test measures the speed of perception and fallibility of perception and attention. In our study, the mean reliability (Cronbach's alpha) of the test was 0.93.

The Sources of Sport-Confidence Questionnaire SSCQ-PL (Polish adaptation by Gazdowska et al., 2016) was used to measure the eight sources of sport-confidence: mastery, demonstration of ability, mental and physical preparation, physical self-perception, support, vicarious experience, environmental comfort, and leadership (Vealey et al., 1998). Respondents rate on a 7-point Likert scale (1 = *not at all important*, 7 = *of highest importance*), how important different aspects are in building own self-confidence in sport, based on 41 statements (i.e. "Keep my focus on the task"). The mean reliability (Cronbach's alpha) of the SSCQ-PL subscales was 0.81 (Environmental comfort), 0.82 (Support & Physical self-perception), 0.83 (Mental and physical preparation), 0.86 (Demonstration of ability), 0.87 (Mastery), 0.94 (Leadership).

Coaches' Psychological Knowledge Measurement

We measured coaches' psychological knowledge with a test comprised of 12 multiple-choice questions based on the content of the mental skills educational program (i.e. "Match the answer that best defines what a well set goal should look like"). There were 3 questions for each of the discussed mental skills. The test had a satisfactory level of reliability ($\alpha = 0.91$). The original Polish version of the test is presented in the Supplementary Materials.

Mental Skills Educational Program

A mental skills educational program was created based on existing literature (e.g., Healy et al., 2018; Orlick, 2016). The aim of the workshops was to present the theoretical background behind each mental skill and show how these skills can be developed during practice and competition. During each workshop, a mini-lecture was conducted, and then a set of exemplary exer-

cises was presented. Coaches were taught how they could apply the practical knowledge in their professional practice to support athletes' mental skills. Detailed program of the workshops is presented in Table 2.

Table 2

Mental Skills Educational Program

Subject	Content
Motivation	▪ Motivation in sport (Deci & Ryan, 1985) – determinants of motivation, differences between intrinsic and extrinsic motivation ▪ Performance profile, setting goals for the upcoming season (Beckmann & Elbe, 2015; Healy et al., 2018)
Coping with stress	▪ Stress, sources and coping strategies (Crocker et al., 2015) ▪ Diaphragmatic breathing, five-breath technique, centering (Karageorghis et al., 2011)
Concentration	▪ Concentration in sport (Moran, 2016) – how it can be improved, what are the main distractors in swimming, Nideffer's (1976) two-dimension model of concentration ▪ Concentration grid, thought stopping, routine, rituals (Beckmann & Elbe, 2015)
Sport-confidence	▪ Sport-confidence, its sources (Vealey, 2001), self-talk (Donahue et al., 2009) ▪ Defining own strengths and weaknesses, sources of feedback (Orlick, 2016); affirmations (Hatzigeorgiadis et al., 2011)

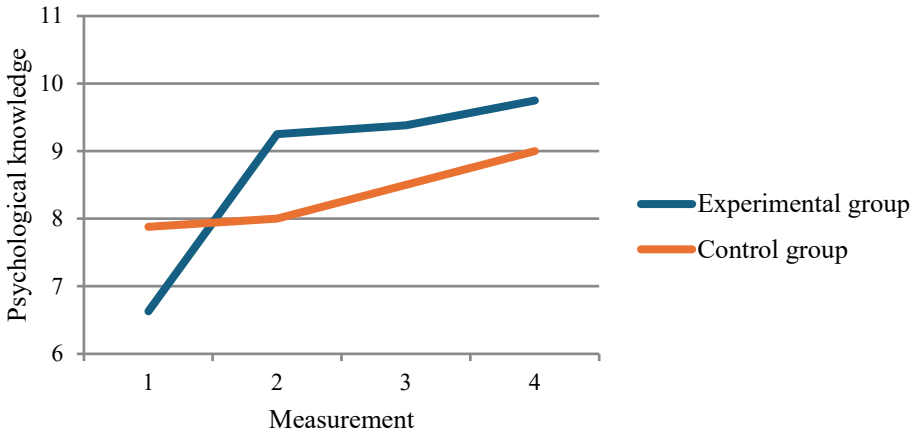
RESULTS

Coaches' Psychological Knowledge Increase

We conducted a two-way mixed-design ANOVA 2x4: 2 (workshops vs. control group) x 4 (measurement: pre-test vs. post-test vs. three months after the workshops follow-up vs. six months after the workshops follow-up). No statistical outliers were reported among coaches. We observed a statistically significant interaction effect between group and measurement, $F(3,42) = 5.71$; $p < .01$; $\eta^2 = .290$. Post hoc comparisons showed an increase of knowledge among coaches from experimental group between measurement 1 ($M = 6.63$, $SD = 0.89$) and 2 ($M = 9.25$, $SD = 0.74$), $F(3,12) = 10.23$; $p < .001$; $\eta^2 = .719$ (Figure 1).

Figure 1

Interaction Effect Between Group and Measurement



We observed a significant main effect of measurement, $F(3, 42) = 15.23$; $p < .001$; $\eta^2 = .521$. *Post hoc* comparisons showed an increase of knowledge between measurement 1 ($M = 7.25$, $SD = 0.63$) and 2 ($M = 8.63$, $SD = 0.52$). We did not observe a significant main effect of group. We may conclude that due to participation in the educational workshops, swimming coaches' psychological knowledge has increased immediately after the workshops.

Table 3

Descriptive Statistics for Psychological Knowledge by Group and Measurement

Measurement	Group	*M*	*SD*	*N*
pre-test	workshops	6.63	2.07	8
	control group	7.88	2.90	8
	total	7.25	2.52	16
post-test	workshops	9.25	1.67	8
	control group	8.00	2.45	8
	total	8.63	2.13	16
three months after the workshops follow-up	workshops	9.38	1.30	8
	control group	8.50	2.14	8
	total	8.94	1.77	16
six months after the workshops follow-up	workshops	9.75	1.28	8
	control group	9.00	2.07	8
	total	9.38	1.71	16

Effect of Mental Skills Workshops for Coaches on the Mental Skills of Their Athletes

The collected data have a nested structure; due to that, we used multilevel modeling (Nezlek, 2011) and HLM software (Raudenbush et al., 2011) to verify our hypotheses. No statistical outliers were reported among athletes. We tested a three-level model, in which four measurements were nested in the athletes, and the athletes were nested in the coaches. We verified if there was an increase of tested variables in four measurements, we tested linear trend (coded: −3, −1, 1, 3) and whether it was stronger in the experimental group (variable Group coded: −1 control, 1 experimental). A sample model for the Intrinsic Motivation variable is presented below:

Level 1: Measurement
Intrinsic motivation = $\pi_0 + \pi_1*(TREND) + e$

Level 2: Athletes
$\pi_0 = \beta_{00} + r_0$
$\pi_1 = \beta_{10} + r_1$

Level 3: Coaches
$\beta_{00} = \gamma_{000} + \gamma_{001}(Group) + u_{00}$
$\beta_{10} = \gamma_{100} + \gamma_{101}(Group) + u_{10}$

Motivation

A series of multilevel modeling analyses was conducted to examine whether the mental skills program for coaches influenced athletes' motivation (SMS-6). No statistically significant main effects of group or group × time interaction effects were observed for any of the SMS-6 motivation dimensions. Thus, there is no evidence that the mental skills program significantly influenced either the level or the change over time in athletes' motivation.

Across the whole sample, integrated regulation significantly decreased over time (β = −.05, SE = 0.02, t = 2.77, p = .015). Additionally, identified regulation (β = −.04, SE = 0.02, t = 1.80, p = .094) and intrinsic motivation (β = −0.04, SE = 0.02, t = 1.75, p = .103) showed marginally significant decreasing trends (a p-value in the range $.05 < p < .10$ is treated as significance

at the level of statistical tendency). A marginally significant increasing trend was also observed for amotivation (β = .06, *SE* = 0.03, *t* = 1.87, *p* = .081).

None of these temporal trends were significantly moderated by group, indicating that the intervention did not affect the trajectories of motivational regulations over time. Descriptive statistics for all motivation subscales are presented in Table S1 in the Supplementary Materials.

Coping With Stress

Multilevel modeling analyses for coping with stress outcomes (JSR and Brief-COPE) revealed no statistically significant main effects of group. Therefore, the mental skills program did not significantly influence the average level of athletes' coping strategies.

However, significant group × time interaction effects were observed for specific coping dimensions (active coping: γ = .03, *SE* = 0.01, *t* = 2.13, *p* < .05; problem-focused coping: γ = 0.02, *SE* = 0.01, *t* = 2.68, *p* < .05). The increase in dispositional active coping (JSR) was significantly stronger in the experimental group compared to the control group (γ = 0.03, *SE* = 0.01, *t* = 2.13, *p* = .05). Similarly, a stronger increase was found for the problem-focused coping strategy (Brief-COPE) in the experimental group (γ = 0.02, *SE* = 0.01, *t* = 2.68, *p* = .02).

These results indicate that although the program did not affect overall coping levels, it facilitated more positive coping trends in the experimental group. Descriptive statistics are provided in Table S1 in the Supplementary Materials.

Concentration

The multilevel models indicated a significant group effect for the number of omissions (TUS). Athletes in the experimental group showed significantly fewer omissions than those in the control group (β = −3.04, *SE* = 1.09, *t* = 2.79, *p* = .014).

Moreover, group effects were observed on all three scales of the D2 Test: Total number of items processed (β = 23.07, *SE* = 9.16, *t* = 2.52, *p* = .025), General perception ability (β = 29.95, *SE* = 9.47, *t* = 3.16, *p* = .007), and Concentration performance (β = 15.48, *SE* = 4.76, *t* = 3.25, *p* = .006). The

mental skills workshops for the coaches significantly improved athletes' concentration and attentional performance.

Regarding time effects, Perceptiveness (TUS) increased linearly over the four measurements ($\beta = 23.66$, $SE = 2.75$, $t = 8.60$, $p < .001$), and this trend was significantly stronger in the experimental group ($\gamma = 6.95$, $SE = 2.75$, $t = 2.53$, $p = 0.024$). A trend-level interaction was observed for the decrease in omissions ($\gamma = -0.67$, $SE = 0.33$, $t = 2.07$, $p = 0.058$).

Trend analyses for the D2 Test further confirmed a significant linear increase in Items processed ($\beta = 16.54$, $SE = 1.34$, $t = 12.34$, $p < .001$), General perception ability ($\beta = 17.08$, $SE = 1.41$, $t = 12.08$, $p < .001$) and Concentration performance ($\beta = 8.89$, $SE = 0.74$, $t = 12.04$, $p < .001$).

A significant group × time interaction effect was found for concentration performance ($\gamma = 1.65$, $SE = 0.74$, $t = 2.24$, $p = .042$), indicating that improvements in attention control were more pronounced in the experimental group.

Sport-Confidence

A significant group effect was found for mental and physical preparation, a subscale of sport-confidence ($\beta = .20$, $SE = 0.08$; $t = 2.45$, $p = .028$), indicating higher average scores in the experimental group.

At the same time, the following subscales exhibited significant decreases over time across the entire sample: Mental and physical preparation ($\beta = -0.06$, $SE = 0.02$, $t = 3.93$, $p = .002$), Support ($\beta = -0.07$, $SE = 0.02$, $t = 3.95$, $p = .001$), Vicarious experience ($\beta = -0.06$, $SE = 0.03$, $t = 2.17$, $p = .048$) and Leadership ($\beta = -0.06$, $SE = 0.02$, $t = 2.31$, $p = .037$).

However, the decreasing trend in mental and physical preparation was weaker in the experimental group ($\gamma = 0.03$, $SE = 0.02$, $t = 2.05$, $p = .060$), indicating a marginally significant buffering effect of the intervention. Similarly, a trend-level interaction was observed for environmental comfort ($\gamma = 0.05$, $SE = 0.03$, $t = 1.87$, $p = 0.082$).

Descriptive statistics for all sport-confidence subscales are included in Table S1 in the Supplementary Materials.

DISCUSSION

The aim of this study was to investigate whether participating in a mental skills educational program would translate into higher levels of swimming coaches' psychological knowledge and improvements in their athletes. Coaches' test results improved significantly immediately after participating in the workshops, supporting a positive influence of the intervention.

Differences Between Experimental and Control Groups

In this section, we will discuss how both groups differed in terms of all dependent variables. For the motivation scales, it turned out that swimmers from the experimental group did not differ significantly from the control group in terms of their results on the motivation scales and coping with stress scales. We observed statistically significant differences with regard to concentration between the mean results on the scales of the TUS Test and the D2 Test achieved by the athletes from the experimental group and the control group. Therefore, it may be assumed that the mental skills workshops for the coaches translated into the level of concentration in their athletes. The sport-confidence results indicated a significant difference between the studied groups on the scale of mental and physical preparation. This source means that athletes perceive an important effect of their own preparation in these two areas on their sports results, and that the feeling of being prepared has a positive effect on building their sport-confidence (Vealey, 1986).

Differences in the Levels of All Dependent Variables Across the Four Measurements

A decrease of the level of intrinsic motivation, integrated regulation, and identified regulation and an increase of the level of amotivation were observed throughout the measurements. It is not possible to conclude whether the changes in the motivation levels can be potentially connected to the improvement of coaches' psychological knowledge. It is natural that over the course of each sport season, the athlete's motivation changes as it is a dynamic construct (Smith et al., 2016). However, we made an assumption that in this case it may have translated into an overall reluctance to put the psychological

knowledge received from the coaches into practice; it may also have affected the level of engagement in swimming practice. Therefore, it is possible that as a result, the level of mental abilities will improve significantly (e.g., Theodorakis, 1995; Vealey, 1986).

We noted a significant increase in the use of task-focused strategies (active coping with stress (JSR) and the problem-focused strategy (Brief-COPE) in the experimental group, which is an expected result. The mental skills workshops, therefore, can be considered as one of potentially helpful factors leading to the improvement of the level of coping with stress among the athletes from the experimental group; however, we did not note any significant differences between the studied groups at the mean level. This might be due to weak statistical power, ceiling effects among highly advanced athletes, or improvements in control groups due to naturally occurring maturation or expectancy effects (Röthlin et al., 2020).

We observed a significant increase on the perceptiveness scale, the total number of items processed, general perception ability, and concentration performance (D2 Test), as well as a significant decrease in the number of omissions in the TUS Test in the experimental group. The results support the hypothesis that the mental skills educational program for the coaches was effective. The results of previous studies (e.g., McNevin et al., 2003) indicate that a higher level of concentration translates into mastering the trained discipline faster, as well as obtaining better sports results. Therefore, it may be expected that the swimming results of the athletes in the experimental group would be significantly better than the results of the athletes in the control group due to the favorable effect of the mental training focused on concentration.

Analyses indicated a general decreasing tendency of the athletes' evaluation of mental and physical preparation as important in the entire group of participants. However, we observed an increase on this scale in the experimental group, yet at the statistical tendency level. It is a satisfying outcome, because the results of previous studies (e.g., Demaine & Short, 2007) indicate that the athletes consider this source as key in building an optimal level of their own sport-confidence.

We observed a decreasing trend effect with regard to support, vicarious experience and leadership, and an increase in the scores on the environmental comfort scale in the experimental group, but only at a statistical tendency. Environmental comfort is an uncontrollable source of self-confidence that is significant in building athletes' sport-confidence in face of upcoming competitions (Vealey, 1986). However, researchers emphasize that in athletes' opinions,

it is not a key source of self-confidence, similarly to leadership and vicarious experience (Kingston et al., 2010). Therefore, the decreasing results may be caused by a general opinion among the athletes that these sources of sport-confidence do not play an important role. On the other hand, an unfavorable result is the decreasing results on the support scale, which the athletes consider as a key source of sport-confidence (Rees & Freeman, 2007).

To sum up, the results of the measurement of sport-confidence in athletes should be considered as only partially satisfying. We did not observe significant effects of the training for the majority of sources, therefore further improvement of the content of the workshops within the topic of sport-confidence should be considered.

Limitations and Future Directions

The results observed in the study constitute a basis for reflection on the potential limitations, as well as the possibility of replicating the experiment. The first limitation was the lack of monitoring whether or not—and in what manner—the coaches shared their knowledge with their athletes. The increase in the coaches' psychological knowledge was supposed to affect the quality of their contact with the athletes and how they conducted swimming practice; however, these variables were not monitored. A possible solution would be to invite independent observers or measure coaches' perception on how often they felt they shared their psychological knowledge with the swimmers (Porter & Magill, 2010).

The program of the mental training covered four 90-minutes sessions. Gilbert et al. (2009) suggest that a single workshop session improving coaches' abilities has a short-term chance to be effective. In this situation, it is recommended to narrow down future programs to a single mental skill and dedicate multiple sessions to one particular topic with strategies and techniques discussed in a more detailed manner.

Another possible limitation of the conducted study was a small number of participating coaches. Researchers (e.g., Edvardsson et al., 2012) emphasize that conducting studies with small groups of participants is typical for sport psychology. However, it may be expected that increasing the number of coaches could provide more robust result.

In general, the results of the study indicate a partial effectiveness of the mental skills educational program for coaches. It led to a greater increase in

the psychological knowledge of the coaches taking part in the workshops, compared to the coaches from the control group. The results suggest that the level of knowledge among the coaches from the experimental group increased directly after taking part in the program. The measurement of dependent variables obtained by the athletes revealed partially significant differences between measurements in concentration, coping with stress, and sport results.

In the future, it might be worth determining what mental skills certain coaches perceive as most important and educating them about these skills. In psychological practice, the emphasis is most often placed on working on the most severe deficits (Poczwardowski et al., 2004). Also, the swimmers were preparing for the Polish Championships when the measurements took place, therefore it is understandable that a decrease in the levels of intrinsic motivation or task-oriented coping strategies could be observed (Gaudreau et al., 2002; Mouratidis & Michou, 2011). It could be potentially useful to put more emphasis on mental skills training programs aimed at helping athletes during microcycles, mesocycles, as well as macrocycles (Holliday et al., 2008).

Conclusion

To sum up, mental skills educational program for coaches showed partial effectiveness, because we noted significant positive difference in coaches' psychological knowledge, as well as expected results in terms of concentration and coping with stress of the swimmers. However, the level of swimmers' motivation has not improved because of the intervention. We also noted a decrease in the level of four sources of self-confidence. Nevertheless, we agree with the conclusions from the literature review conducted by Barker et al. (2013), stating that the presence of coaches as recipients of mental training should be maximized in studies. Sports training itself constitutes an indispensable element of mental training according to the structure proposed by Vealey (2007). Therefore, introducing sports coaches into the entire process may improve the transfer of the content related to mental training, supplement mental training for athletes, improve the quality of functioning and effectiveness of sports coaches (Cook & Fletcher, 2017; Giges et al., 2004).

CRediT Author Statement

ZUZANNA GAZDOWSKA (50%): conceptualization, methodology, formal analysis, resources, writing (original draft), writing (editing).

IZABELA KREJTZ (40%): methodology, formal analysis, supervision, writing (review and editing) formal analysis, resources, writing (original draft).

DARIUSZ PARZELSKI (10%): methodology, supervision, writing (review).

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