

Research article

The Effectiveness of Psychological Workshops for Coaches on Well-Being and Psychomotor Performance of Children Practicing Football and Gymnastics

Dominika Wilczyńska ¹✉, Anna Łysak-Radomska ², Magdalena Podczarska-Głowacka ², Wojciech Skrobot ², Katarzyna Krasowska ², Ewelina Perzanowska ², Tomasz Dancewicz ³, Patrycja Lipińska ⁴ and Will G. Hopkins ⁵

¹ Faculty of Physical Education, Gdansk University of Physical Education and Sport, Poland; ² Faculty of Rehabilitation and Kinesiology, Gdansk University of Physical Education and Sport, Poland; ³ Faculty of Finance and Management, WSB University in Gdansk; ⁴ Institute of Physical Education, Kazimierz Wielki University in Bydgoszcz, Poland; ⁵ Institute for Health and Sport, Victoria University, Melbourne, Australia

Abstract

Coach workshops based on seven principles (inspiration, explanation, expectation, support, reward, appreciation, growth and winning) enhance the sport experience of adult athletes. Therefore, we have investigated the effects of such workshops with coaches of child athletes. Study participants were coaches of 57 9- to 12-year old girls (practicing gymnastics) and boys (practicing football). Three coaches of 28 children attended three workshops over 12 weeks, while a control group of 5 coaches of 29 children attended no workshops. Measures of well-being and psychomotor performance were taken on the children before and after the intervention; differences in mean changes between intervention and control groups were adjusted for baseline, standardized, and assessed with a conservative magnitude-based decision method. There were clear substantial effects of the workshop on motivation averaged across several dimensions (girls, large, most likely beneficial), on a decision test (boys, small-moderate, very likely beneficial), on state anxiety self-reflection (girls, moderate, likely harmful), and on reaction time (boys, small, possibly harmful). The beneficial effects of the workshop in this pilot study are encouraging, but the unclear and potentially harmful effects and the roles of presenter- and coach-specific effects need to be investigated further with a representative sample of coaches and more children before the workshop is recommended for implementation.

Key words: Psychology, motivation, youth, testing, coaching.

Introduction

There is a relationship between well-being and successful performance in sport (Grenville-Cleave and Brady, 2018a). Positive emotions that support resilience, creativity, and adaptivity when facing difficulties underlie this relationship (Fredrickson, 2009; Bao and Lyubomirsky, 2013), and positive emotions are linked to sport success (Grenville-Cleave and Brady, 2018a) through their capacity to generate greater self-efficacy, motivation, attention, problem-solving and coping with adversity (McCarthy, 2011). Well-being can be also considered from the perspective of self-determination (Uusiautti et al., 2017; Kipp et al., 2019). Ryan and Deci (2000) state in their self-determination theory (SDT) that social context influences well-being through the satisfaction of three psychological needs: autonomy, competence, and

relatedness. Self-determination theory is generally used to explore the nature of positive emotional states in research on sports and physical education (Wang et al., 2002; Chatzisarantis and Hagger, 2007). Well-being can be also viewed from the perspective of engagement (Uusiautti et al., 2017; Schimschal et al., 2020). Larkin et al. (2016) showed that sport-specific engagement depends on the athlete's "grit", which is characterized by passion and perseverance (Duckworth, 2016). In her studies on children, Duckworth (2016) found that high achievers are characterized by high levels of these two ingredients of grit, which influence well-being (Uusiautti et al., 2017). However, these concepts and studies focus on selected correlates of happiness (positive emotions, relatedness, autonomy, competence, achievements, grit-engagement), and a larger theoretical framework for well-being in sport and physical activity is needed. Such a framework has been provided by Lundqvist (2011).

The Lundqvist model consists of two central theoretical concepts of well-being: hedonic ('feeling good') and eudaimonic ('functioning well'). Hedonic well-being is subjective and is experienced as positive emotions and satisfaction with life in the sports domain. Eudaimonic well-being refers to functional relationships with others (for example, coach and teammates), autonomy in sports practice, purpose in sport, as well as social well-being (for example, social acceptance in sport, social coherence in sport) (Lundqvist, 2011; Grenville-Cleave and Brady, 2018b). Macdougall et al. (2016) extended this model, adding the physical well-being dimension in their study of psychological and social well-being of para-athletes.

Another theoretical framework considered to be highly relevant in the sport and exercise setting is the PERMA model, which conceptualizes well-being according to the following five dimensions: positive emotions, engagement, relations, meaning, and accomplishments (Seligman, 2012; Uusiautti et al., 2017; Grenville-Cleave and Brady, 2018b). Positive emotions refer to hedonic feelings of happiness like joy, excitement, satisfaction, pride, cheerfulness. Engagement refers to complete preoccupation in activity as being absorbed, interested, and fully engaged in life. Relationships refer to positive and satisfying connections with other people, being supported by others, and feeling integrated with

society. Meaning refers to the belief that one's life is valuable and the feeling of being connected with something greater than oneself. Accomplishments concern making progress toward goals, the capability to do daily activities, and having a sense of achievement. The positive emotions and achievements are hedonic, while engagement, relations, and meaning are eudaimonic. These five dimensions can be defined and measured independently of one another (Seligman, 2012; Kern et al., 2015).

Most studies of well-being have focused on adults (Slavin et al., 2012; Hone et al., 2014; Butler and Kern, 2016; Coffey et al., 2016; Lambert D'raven and Pasha-Zaidi, 2016), but adolescents and children should also be of special interest (Kern et al., 2016), because psychological well-being is one of the determinants of proper development and long-term engagement in sport (MacDonald et al., 2011, 2020; Duda, 2013b; Uusiautti et al., 2017). The PERMA model for measuring adolescent student well-being was investigated by Kern et al. (2016), but there have been no PERMA studies in child or youth athletes, although Uusiautti et al. (2017) described the PERMA model as the groundwork for psychological training with Finnish junior ice-hockey players. In the present study, we have followed procedures similar to those of Edwards and Steyn (2008) and Kern et al. (2015), using the PERMA model as an organizing framework for measuring well-being in children practicing football (soccer) and gymnastics. We have included assessment of coping strategies, which are important psychological skills for youth athletes. Successful coping allows young athletes to regain composure, establish proper psychological readiness to respond to external stimuli, and maintain optimal arousal and concentration level during stressful situations (Pons et al., 2017).

Coaches have a substantial effect on the development of young athletes (Vella et al., 2013). The coaches' reactions and responses to performance can affect children's perception and evaluation of their competencies and general self-worth (Horn, 2019). Duda et al. (2013) assert that the quality of social environment created by significant others is probably a determinant of whether sports engagement is long-term and leads to enhanced physical and psychological well-being. Nevertheless, coaches do not always use positive, empowering coaching strategies, especially under the pressure of competitions (Smith et al., 2017). Interventions aimed at improving the coach-athlete relationship are, therefore, worth investigating.

Group interventions in the form of workshops or encounter groups can be an efficient approach in clinical psychology, but there have been few studies of the effects of such approaches with coaches on the well-being or other psychological aspects of their child athletes. Mertens et al. (2018) highlighted the beneficial effect of instructions for coaches on how to provide competence support for athletes. De Muynck et al. (2017) found that positive feedback and autonomy-supportive communication style of coaches on athletes have beneficial effects via greater competence satisfaction and decrease of negative self-talk

as well as the increase of autonomy satisfaction. Duda (2013) developed the Promoting Adolescents' Physical Activity (PAPA) project to customize and evaluate the empowering coaching education program to educate and help coaches maximize the motivational climate and make the sport more enjoyable and engaging for youth athletes. MacDonald et al. (2020) examined Positive Youth Development (PYD) coach education courses to increase positive developmental experiences perceived by athletes and of participant coaches.

Those findings suggest that coach education programs have the potential to influence coach behavior. Therefore, the aim of the current pilot study was to implement psychological workshops for coaches and investigate its impact on PERMA components of well-being of children practicing football and gymnastics.

Methods

Participants

Participants of the study were children at the age of nine to 12 years practicing football, and gymnastics. Twenty-eight children from the experimental group practiced with three coaches (two coaches with 15 footballers; one coach with 13 gymnasts) while 29 children from the control group practiced with five coaches (four coaches with 19 footballers; one coach with ten gymnasts). The study began with 30 children in the experimental groups and 31 in the control groups. Four children were excluded from the study because they did not attend the laboratory for the post-test (two because of illness). Written informed consent from coaches and from parents or guardians of the children was a prerequisite to participate in the study, which was conducted in accordance with the Helsinki Declaration and approved by the AWFis bioethics committee (project KB-13/17).

We chose gymnastics and football because of their early specialization and the exclusion of other sports, which means participants could not practice other sport disciplines. Malina (2010) and Waldron et al. (2020) define early specialization as participation in a single sport discipline at or before the age of 12, with a high volume of training.) In the current study, children from the control and experimental groups had similar ages (10.3 ± 0.9 and 9.6 ± 1.1 years respectively, mean \pm SD), similar experience in their sport (4.4 ± 1.6 and 4.5 ± 1.5 years), and similar experience with their current coach (3.1 ± 2.1 and 2.3 ± 1.6 years).

Design and procedures

The workshops were based on i7W model of Poczwardowski et al. (2015). The activities in this model focus on the coach-player relationship to promote psychosocial development and sports achievement. The model is based on principles, which form the Polish abbreviation i7W. Those principles are "i" and seven "w"s": inspire (Inspiruj), explain (Wyjaśnij), expect (Wymagaj), support (Wspieraj), reward (Wnagradzaj), and appreciate (Wyróżnij), which are expected to have a positive effect on athletes, and thereby contribute to growth

Table 1. Workshop topics (selected dimensions from i7W concept) and examples of the tools and activities introduced during the workshop.

Workshop; topics	Tools and activities
First workshop; inspire, explain	<p>“Pump them up” – Prepare positive coach speech before your athletes' competition.</p> <p>“Strengthening analysis” – Conduct a post-match analysis with the athletes, focusing on the positive aspects of the game.</p>
Second workshop; expect, support	<p>“Show your hand” – At the end of each week analyze simple goals that youth athletes formulated at the beginning of the week. Stimulate and help them to find answers to the following questions: How did I reach my goal? If not, what should I do differently in the future?</p> <p>“Positive bakes” – During training divide children into pairs. Each child from the pair is tasked throughout the training to provide verbal and non-verbal support to the teammate; e.g., giving high-five after a good performance, or a good word when teammate made a mistake. At the end of the training, ask the pair whether they felt the support of the teammate.</p>
Third workshop; reward, appreciate	<p>“Good mistake” – Praise athletes despite them making mistakes. Show other youth athletes that creativity and courage is more important than making a single mistake. Highlight the fact that the biggest mistake one can make is not looking for the solution.</p> <p>“Master T-shirt” – Introduce a special T-shirt for player who has shown the greatest commitment during training sessions.</p>

(Wzrastać) and winning (Wygrywać). The workshops aimed to increase the coaches' ability to use the behavioral dimensions of the i7W model: inspire, support, explain, expect, reward, and appreciate. All of the activities of the workshops can develop the factors of the PERMA model of well-being. There were three workshops, each lasting 6 hours. The topics of the workshops are summarized in Table 1. For more information about the workshops, please contact the corresponding author.

Each workshop described a few dimensions to contribute to “I grow and I win” of youth athletes. During each workshop the coaches were taught practical applications and were provided with activities and a timetable to implement the i7W model. They were also provided with a template to record the activities they implemented. The workshops were organized in 6-hours meetings over a 9-weeks period (one workshop every 3 week). Coaches sent the template to the coordinator of the study the day before the second and the third workshop, and 3 weeks after the last workshop.

Coaches were recruited by email contact with football and gymnastics clubs in Pomeranian and Warmian-Masurian region of Poland. Eight coaches from four clubs who expressed interest in participation were then sent an email with detailed information about the i7W workshop and date of the first meeting. After the first meeting the two coaches of gymnastics and six coaches of football were randomly assigned to the control and experimental groups separately (for the football coaches, randomization was stratified by club). The coaches in the experimental group were presented with more detailed information about the workshops, while those in the control group were told they would receive assessments of the well-being and psychomotor characteristics of their athletes. After the coaches finally confirmed their participation to the study, they received information for parents and guardians of the children about the aim, nature, and practice of the study.

The initial meeting with children took place in a research laboratory, where children were familiarized with all the tests required for the study. The implementation of the study was then divided into three phases. In the first

phase prior to the experiment (workshops), the experimental and control groups underwent well-being and psychomotor tests (listed below) in the laboratory. The second phase was the experiment itself. The workshops for experimental group coaches took place 3 times in the time of 9 weeks, and for 12 weeks coaches practiced exercises during training with the participants. Prior to the second and third workshop and after the last workshop the coaches gave feedback on practicing the i7W model (template). The control group of coaches received no workshop at that time. The final phase took place in the laboratory, where the children underwent the same tests as prior to the intervention. Coaches were then sent anonymized reports based on a preliminary description (descriptive statistics) of well-being and psychomotor performance of each child.

Psychological tools

Selected methods were used by the authors to estimate well-being and psychomotor performance of participants. To assess accomplishments (the last from the PERMA factors) the authors used two psychomotor tests of the Vienna Test System (VTS): the Determination Test for Kids (DTKI) and the Reaction Time test (RT). Both tests are appropriate for children (Zisi et al., 2009). The DTKI measures reactive stress tolerance, reaction speed and attention deficits in situations requiring responses to rapidly changing stimuli while the RT test measures multifaceted reaction time (Wilczynska, 2016).

The questionnaires to assess other factors of the Seligman model of well-being as positive emotions, engagement, relations and meaning are listed and described below. However, we did not estimate meaning as a separate factor. According to Kern et al. (2015) meaning has a pro-social character in adolescence. Therefore, relations factor and meaning factor were considered as one. According to developmental psychology, in late childhood, the pro-social aspects and relationships with peers are significant for children at 9-12 years old (Siegler, DeLoache and Eisenberg, 2005). All the questionnaires were appropriate for children and completed by children in the presence of a psychologist.

Sport Competition Anxiety Test (SCAT) and Competitive State Anxiety Inventory-2 (CSAI-2RD)

These tests were used to measure trait and state sports anxiety and its intensity (Martens, 1977; Martens et al., 1990). Both methods were adapted for Polish conditions by Borek-Chudek (2007, 2012). The SCAT is a 15-item questionnaire containing statements about somatic anxiety (e.g., my body feels tense), worry (e.g., I worry that I will not play my best), and concentration disruption (e.g., I lose focus on the game). All items are rated on a 3-point scale. The CSAI-2RD consists of a 14-items scale containing cognitive anxiety statements (e.g., I was confident because, in my mind, I pictured myself reaching my goal) and somatic anxiety statements (e.g., my heart was racing). The competitive state anxiety is rated on a 4-point scale, and anxiety intensity (state anxiety self-reflection) is estimated on the 5-point scale. Both tests have shown to have acceptable psychometric properties (Borek-Chudek 2007, 2012). In the current study the alphas for the footballers and gymnasts (respectively) were as followed: trait anxiety 0.74, 0.64; state anxiety 0.76, 0.89; state anxiety self-reflection 0.87, 0.88. The SCAT and CSAI-2RD were used to measure the first component of PERMA – positive emotions (the absence of anxiety).

Sport Motivation Scale-6 (SMS-6)

A Polish adaptation of the SMS-6 by Blecharz et al. (2015) was used to measure intrinsic and extrinsic motives for sport activity. There are six kinds of motivation measured: intrinsic motivation (e.g., For the excitement I feel when I am really involved in the activity), and four types of extrinsic motivation (e.g., Because it is one of the best ways to maintain good relationships with my friends, To show others how good I am at my sport), and amotivation (e.g., I do not seem to be enjoying my sport as much as I previously did). For the purpose of the study, the authors modified the test and shortened the performance time of the test, taking into consideration the fact that children's concentration of attention is weaker than that of adults. The participants did not assess the motives with a 7-point Likert scale but instead chose the motives they preferred. We opted for to do this modification when we found during familiarization to the study the children selected either the first or the seventh point of each scale. Each of the five motivations in each of the six subscales was scored as zero or one, and the score for each subscale was the mean of its five values. Correlations amongst the intrinsic and the four extrinsic subscales for all the data (pre- and post-tests for footballers and gymnasts combined) ranged from 0.39 to 0.55, while the correlations of these subscales with the amotivation scale ranged from -0.21 to 0.12. The intrinsic and extrinsic subscales were, therefore, averaged to provide a measure of mean motivation. The scale has been shown to be valid and reliable in a sample of Polish athletes (Blecharz et al., 2015). In the current study, the Cronbach alpha for the footballers and gymnasts (respectively) for mean motivation was 0.73, 0.84. The SMS-6 was used to measure the second component of PERMA – engagement.

The Polish Coach Athlete-Relationship Questionnaire –

version for Athlete (PICART-Q Athlete)

A Polish adaptation of the coach-athlete relationship questionnaire was used. The questionnaire has 11 items and consists of three subscales: closeness (e.g., I trust my coach), commitment (e.g., my coach is close to me), and complementarity (e.g., When I practice with my coach I am ready to do my best) estimated on the 7-point Likert scale. The scales have shown acceptable Cronbach alpha (Michalak and Poczwardowski, 2015). Correlations amongst the three subscales for all the data (pre- and post- tests for footballers and gymnasts combined) ranged from 0.67 to 0.80. Therefore, the subscales were averaged to provide a measure of mean athlete-coach relationship. The alphas for the footballers and gymnasts for the mean coach-athlete relationship were 0.91 and 0.95 respectively. The PICART-Q was used to measure the third and fourth components of PERMA – relations, and meaning.

How You Cope

This questionnaire was used to study coping skills of children and youth. It consisted of two scales, dispositional coping strategies and situational coping strategies. Each scale has 9 items questionnaire containing statements about active coping (e.g., I wonder how to deal with this problem), focusing on emotions (e.g., I am very concerned about it), and support seeking (e.g., I tell my closest friend what happened). In studies of children and adolescents aged 11 to 17 years, Cronbach's α coefficient was 0.86 (Juczyński and Ogińska-Bulik, 2009; Talik and Król, 2014). The score of each subscale was the mean of its three to four values. Correlations amongst the three subscales for all the data (pre- and post- tests for footballers and gymnasts combined) for dispositional coping ranged from 0.43 to 0.53 and for situational coping 0.32 to 0.45. Therefore, the subscales were averaged to provide a measure of mean dispositional and situational coping. The alphas for the footballers and gymnasts (respectively) were 0.65 and 0.48 for situational coping, and 0.74 and 0.73 for dispositional coping.

Statistical analysis

Mixed linear modeling, realized with Proc Mixed in the Statistical Analysis System (University Edition of SAS Studio, version 9.4, SAS Institute, Cary NC) was used to evaluate effectiveness of workshops on the measures of well-being and psychomotor performance. Separate analyses were performed for the footballers and gymnasts. The dependent variable in the mixed model was the change score (post-test minus baseline) for the given measure. The predictors were group (workshop, control) to estimate the difference in mean changes in the groups, and group interacted with baseline score to adjust for and estimate the modifying effect of baseline, which was evaluated as the difference in the effect of two standard deviations of baseline (Hopkins et al., 2009). The random effect was the residual error, allowing for a different variance in each group. There were insufficient coaches in each sport to allow for nesting (clustering) of children within coaches by including a random effect for coach identity. Qualitative magnitudes of observed effects were assessed via standard-

ization with the following scale for Cohen's *d* (fractions and multiples of the baseline standard deviation): <0.20, trivial; 0.20–0.60, small; 0.6–1.2, moderate; 1.2–2.0, large; >2.0, very large (Hopkins et al., 2009).

Uncertainty in the estimates of effects is presented as 90% compatibility limits. Probabilistic decisions about true (large-sample) magnitudes accounting for the uncertainty were based on one-sided hypothesis tests of substantial magnitudes (Cohen's *d* >0.20) followed by Bayesian inference. The *p* value for rejecting a hypothesis of a given substantial magnitude was the area of the sampling *t* distribution of the effect statistic of that magnitude (Lakens et al., 2018). For the modifying effect of baseline, hypotheses of substantial decrease and increase were rejected if their *p* values were less than 0.05. For the adjusted effect of the workshop compared with control, hypotheses of harm and benefit were rejected if the respective *p* values were less than 0.005 and 0.25. If neither hypothesis was rejected, the magnitude of the observed effect was considered to be unclear. If one hypothesis was rejected, the *p* value for the other hypothesis was interpreted as evidence for that hypothesis, since the *p* value corresponds to the posterior probability of the magnitude of the true (large-sample) effect in a reference Bayesian analysis with a minimally informative prior (Hopkins and Batterham, 2018; Hopkins, 2019). The *p* value is reported qualitatively using the following scale: 0.25–0.75, possibly; 0.75–0.95, likely; 0.95–0.995, very likely; >0.995, most likely (Hopkins, et al., 2009). To reduce inflation of error arising from the large number of effects investigated, effects of the workshop were considered decisive with more conservative *p*-value thresholds (*p*<0.001 for harm, *p*<0.05 for benefit) and are shown in bold.

The Cronbach alpha reliability of each measure was estimated with the correlation procedure (Proc Corr) in SAS by including pre- and post-tests as if they were for different participants, to improve the precision of estimation.

Results

Table 2 shows baseline and change-score means and standard deviations in the workshop and control groups, and the comparison of the mean changes, with dependent variables ordered approximately from most evidence of benefit of the workshop through most evidence of harm. With conservative hypothesis testing, mean motivation was the only variable showing a beneficial clear effect of the workshop for gymnasts, although the effect was due to a smaller reduction in motivation in the workshop group. Determination Test for Kids (DTKI) omitted responses was the only variable showing a beneficial clear effect of the workshop for the footballers, and there was also a clear beneficial effect on mistakes in the DTKI with the less conservative test of harm. Outcomes for the remaining variables ranged from beneficial and unclear through harmful and clear. Most of the net modifying effects of baseline score were unclear. For several measures with a clear modifying effect (dispositional coping for soccer players; sport state anxiety, sport state anxiety self-reflection and situational coping for gymnasts), scatterplots showed that children with poor pre-test scores could benefit, while children with good pre-test scores could experience harmful changes. For two measures (DTKI mistakes for soccer players and reaction time for gymnasts) scatterplots showed that children could benefit regardless of the pre-test score.

Table 2. Baseline values, changes, and a comparison of the changes (workshop minus control, adjusted to mean baseline value) for the children in control and workshop groups who completed assessments at the end of the study.

		Baseline		SWE	Observed change		Comparison (mean, ±CL; decision)
		Control (mean ± SD)	Workshop (mean ± SD)		Control (mean ± SD)	Workshop (mean ± SD)	
Mean motivation (0-100)	B	81 ± 9	74 ± 15	3	-24 ± 22	-6 ± 20	12, ±13; moderate, benefit
	G	69 ± 23	66 ± 21	4	-42 ± 27	-6 ± 25	33, ±13; large, benefit****
DTKI omitted responses	B	24 ± 15	18 ± 12	-3	5 ± 12	-2 ± 6	-8, ±5; moderate, benefit***
	G	15 ± 8	14 ± 8	-2	2 ± 13	1 ± 8	-2, ±8; small, benefit
DTKI mistakes	B	23 ± 15	30 ± 25	-4	14 ± 24	-3 ± 21	-20, ±13; moderate, benefit***
	G	17 ± 14	11 ± 9	-2	1 ± 19	4 ± 10	-2, ±10; small, benefit
Dispositional coping (0-100)	B	35 ± 14	37 ± 18	3	-3 ± 12	0 ± 19	4, ±9; small, benefit
	G	33 ± 18	33 ± 15	3	3 ± 21	10 ± 25	8, ±10; small, benefit
Sport state anxiety (0-100)	B	25 ± 10	29 ± 18	-2	7 ± 11	-1 ± 17	-6, ±8; small, benefit
	G	41 ± 12	45 ± 22	-4	-11 ± 11	-7 ± 20	4, ±10; small, harm*
Sport state anxiety self-reflection (0-100)	B	59 ± 17	65 ± 17	3	-7 ± 21	2 ± 19	14, ±11; moderate, benefit
	G	50 ± 5	47 ± 17	3	17 ± 19	2 ± 26	-12, ±14; moderate, harm**
Sport trait anxiety (0-100)	B	33 ± 20	39 ± 29	-5	1 ± 20	-6 ± 25	-2, ±12; trivial
	G	54 ± 25	57 ± 28	-5	7 ± 42	-3 ± 27	-9, ±27; small, benefit
Athlete-coach relationship (0-100)	B	86 ± 7	82 ± 14	2	-6 ± 14	-4 ± 16	0, ±9; trivial
	G	87 ± 5	75 ± 12	2	-12 ± 30	1 ± 10	-6, ±37; small, harm
Motor reaction time (ms)	B	182 ± 62	173 ± 36	-11	-15 ± 45	3 ± 35	14, ±19; small, harm*
	G	220 ± 28	230 ± 44	-8	-20 ± 64	-37 ± 33	-18, ±40; small, benefit
Reaction time (ms)	B	485 ± 84	473 ± 74	-16	-44 ± 84	-19 ± 59	19, ±34; small, harm*
	G	536 ± 71	484 ± 61	-14	-46 ± 92	-30 ± 56	-13, ±48; trivial
Situational coping (0-100)	B	47 ± 19	47 ± 11	3	5 ± 16	3 ± 16	-2, ±10; trivial, harm*
	G	50 ± 15	45 ± 13	3	8 ± 15	10 ± 20	-2, ±9; trivial, harm*

SWE, smallest worthwhile effect for benefit. B, boys (footballers); G, girls (gymnasts); CL, 90% confidence limits; DTKI, Determination test for kids. Sample sizes: footballers control 15-19, workshop 13-15; gymnasts control 8-10, workshop 12-13. Clear comparisons (*p*<0.005 or *p*<0.25 for rejecting hypotheses of harm or benefit respectively) are shown with the following likelihoods for benefit or harm: *possible, **likely, ***very likely, ****most likely. Comparisons in bold are clear with more conservative hypothesis tests (*p* < 0.001 or *p* < 0.05 respectively).

Discussion

Children of the coaches who attended the workshop showed a considerable range of changes in psychometric and psychomotor measures compared with children of the coaches who did not attend the workshops. The range of these effects of the workshop is undoubtedly due at least in part to the small sample size of the children, resulting in considerable uncertainty in the estimates of the effects. The small number of coaches could also account for some of the differences. A detailed discussion of the changes is, therefore, not appropriate in this pilot study. We will briefly discuss only the most important effects.

The beneficial effect of the workshop on motivation is reasonably conclusive for the gymnasts, even though it was due to a less harmful decline in the workshop groups than in the control groups. The declines in motivation were possibly due to the children in this age group experiencing a more formal coaching style or more demands on their time than in their previous season.

There were also reasonably clear beneficial changes in both aspects of psychomotor performance assessed with the Determination Test for Kids, at least for the footballers. The workshop did not directly address psychomotor performance, but the effects may be related to the improvements (albeit unclear) in the two measures of state anxiety in the footballers.

At this stage in the development of the workshops, the potentially harmful effects are not of particular concern. Given the uncertainties in the estimates, all these effects could turn out to be trivial, and some of the unclear effects could turn out to be beneficial to child athletes' well-being. Equally, they could turn out to be harmful, and more research needs to be done. More research is also needed for the effects on coping strategies, where the trivial-small and generally unclear effects are potentially due to the lower alpha reliabilities. A larger sample size of children and coaches would clarify these outcomes and provide more decisive conclusions about the modifying effects of baseline scores.

Future research should address various aspects of design and implementation. A PERMA profile for children and youths practicing sport should be created, using selected questions from the questionnaires used for this study: SCAT, CSAI-2RD, SMS-6, and PICART-Q. Questions to estimate the relations with peers and parents should also be included, along with open-ended assessment of young athletes' well-being. Observing coaches during training sessions and sports competitions, and meeting with them one-on-one, could reveal how well coaches implement the principles of i7W. A reasonable sample of coaches would permit an analysis that accounts for the nesting of children within coaches; coach characteristics could then be assessed and included in the analysis to allow for estimation of coach factors that modify the success of the workshops. Such factors might include personality, coaching style, and especially prior experience with the i7W model, since it is reasonable to expect that some coaches in Poland have become familiar with the principles. The personality and experience of the psycholo-

gists who lead the workshops could also be investigated as modifying factors, if a sufficient sample of psychologists can be recruited. Finally, future research should include follow-up in the post-intervention period to determine the long-term effects of the workshops on child athletes' well-being.

Conclusion

There were clear substantial effects of the workshop on motivation, decision test, state anxiety self-reflection and on reaction time. The beneficial effects of the workshops in this pilot study are encouraging, but the unclear and potentially harmful effects and the roles of presenter- and coach-specific effects need to be investigated further with a representative sample of coaches and children.

Acknowledgements

We greatly appreciate the financial support of Gdansk University of Physical Education and Sport and the opportunity to conduct the study there. We also would like to thank coaches and children, the participants of the study for their time and commitment to this project. The experiments comply with the current laws of the country in which they were performed. The authors have no conflict of interest to declare. The datasets generated during and/or analyzed during the current study are not publicly available, but are available from the corresponding author who was an organizer of the study.

References

- Bao, K. J. and Lyubomirsky, S. (2013) The reward of happiness. In: *Oxford Handbook of Happiness*. Eds: David, S., Boniwell, I., and Ayers, A. C. United Kingdom: OUP Oxford. 119-133.
- Blecharz, J., Horodyska, K., Zarychta, K., Adamiec, A. and Luszczynska A. (2015) Intrinsic motivation predicting performance satisfaction in athletes: further psychometric evaluations of the Sport Motivation Scale-6. *Polish Psychological Bulletin* **46**(2), 309–319. <https://doi.org/10.1515/b-2015-0037>.
- Borek-Chudek, D. (2007) Level of anxiety and sport achievements in badminton players according to Martens multifactorial theory of anxiety. *Polish Journal of Sports Medicine* **23**(3), 140-148. (In Polish: English abstract).
- Borek-Chudek, D. (2012) Intensity and estimation of sport competitive anxiety in the context of the level of sport achievements. *Psychological Review* **55**(1), 59-77. (In Polish: English abstract).
- Butler, J. and Kern, M. L. (2016) The PERMA-Profiler: A brief multidimensional measure of flourishing. *International Journal of Well-being* **6**(3), 1–48. <https://doi.org/10.5502/ijw.v6i3.526>.
- Chatzisarantis, N. and Hagger, M. (2007) Intrinsic motivation and self-determination in exercise and sport: Reflecting on the past and sketching the future. In: *Intrinsic motivation and self-determination in exercise and sport*. Eds: Hagger, M., Chatzisarantis N. Champaign, Illinois: Human Kinetics. 281–296.
- Coffey, J. K., Wray-Lake, L., Mashek, D. and Branand, B. (2016) A multi-study examination of well-being theory in college and community samples. *Journal of Happiness Studies* **17**(1), 187–211. <https://doi.org/10.1007/s10902-014-9590-8>.
- De Muynck, G.-J., Vansteenkiste, M., Delrue, J., Aelterman, N., Haerens, L. and Soenens, B. (2017) The effects of feedback valence and style on need satisfaction, self-talk, and perseverance among tennis players: An experimental study. *Journal of Sport and Exercise Psychology* **39**(1), 67–80. <https://doi.org/10.1123/jsep.2015-0326>.
- Duckworth, A. (2016) *Grit: The Power of Passion and Perseverance*. Scribner, New York.
- Duda, J. L. (2013a) Introduction to the special issue on the PAPA project. *International Journal of Sport and Exercise Psychology* **11**(4), 307–310. <https://doi.org/10.1080/1612197X.2013.839415>.
- Duda, J. L., Quedest, E., Haug, E., Samdal, O., Wold, B., Balaguer, I., Castillo, I., Sarrazin, P., Papaioannou, A., Ronglan, L.T., Hall, H. and Cruz J. (2013) Promoting adolescent health through an intervention aimed at improving the quality of their participation

- in physical activity (PAPA): Background to the project and main trial protocol. *International Journal of Sport and Exercise Psychology* **11**(4), 319–327. <https://doi.org/10.1080/1612197X.2013.839413>.
- Duda, J. L. (2013b) The conceptual and empirical foundations of empowering coaching. Setting the stage for the PAPA project. *International Journal of Sport and Exercise Psychology* **11**(4), 311–318. <https://doi.org/10.1080/1612197X.2013.839414>.
- Edwards, D. and Steyn, B. (2008) Sport psychological skills training and psychological well-being. *South African Journal for Research in Sport, Physical Education and Recreation* **30**(1), 15–28. <https://doi.org/10.4314/sajrs.v30i1.25978>.
- Fredrickson, B. (2009) *Positivity*. Harmony, United States.
- Grenville-Cleave, B. and Brady, A. (2018a) Contemporary findings about the value of well-being and positive psychology in sport and physical activity settings. In: *Psychology in Sport and Physical Activity. An Introduction*. Eds: Grenville-Cleave, B. and Brady, A. New York: Routledge/Taylor & Francis Group. 35–49.
- Grenville-Cleave, B. and Brady, A. (2018b) The components of well-being. In: *Psychology in Sport and Physical Activity. An Introduction*. Eds: Grenville-Cleave, B. and Brady, A. New York: Routledge/Taylor & Francis Group. 20–34.
- Hanin, Y. L. (2012) Emotions in sport: Current issues and perspectives. In: *Handbook of Sport Psychology*. Eds: Tenenbaum, G. and Eklund, R. C. Hoboken, New York: John Wiley & Sons, Inc. 31–58. <https://doi.org/10.1002/9781118270011.ch2>.
- Hone, L. C., Jarden, A., Schofield, G. and Duncan, S. (2014) Measuring flourishing: The impact of operational definitions on the prevalence of high levels of well-being. *International Journal of Well-being* **4**(1), 62–90. <https://doi.org/10.5502/ijw.v4i1.4>.
- Hopkins, W. G., Marshall, S.W., Batterham, A.M. and Hanin, J. (2009) Progressive statistics for studies in sports medicine and exercise science. *Medicine & Science in Sports & Exercise* **41**(1), 3–13. <https://doi.org/10.1249/MSS.0b013e3181818cb278>.
- Hopkins, W. G. (2019) A spreadsheet for Bayesian analyses. *Sportscience* **23**, 5–7.
- Hopkins, W. G. and Batterham, A. M. (2018) The vindication of Magnitude-Based Inference. *Sportscience* **22**, 19–29.
- Horn, T. S. (2019) Examining the impact of coaches feedback patterns on the psychosocial well-being of youth sport athletes. *Kinesiology Review* **8**(3), 244–251.
- Juczyński, Z. and Ogińska-Bulik, N. (2009) *Stress Measurement and Stress Management Tools*. Warsaw: Psychological Test Laboratory of the Polish Psychological Association. (In Polish).
- Kern, M. L., Waters, L.E., Adler, A and White M.A. (2015) A multidimensional approach to measuring well-being in students: Application of the PERMA framework. *The Journal of Positive Psychology* **10**(3), 262–271. <https://doi.org/10.1080/17439760.2014.936962>.
- Kern, M. L., Benson, L., Steinberg, E.A. and Steinberg, L. (2016) The EPOCH measure of adolescent well-being. *Psychological Assessment* **28**(5), 586–597. <https://doi.org/10.1037/pas0000201>.
- Ki, L. E., Bolter, N. D. and Phillips Reichter, A. (2019) Motivational climate profiles, pubertal status, and well-being among female adolescent aesthetic sport athletes. *Pediatric Exercise Science*, **31**(4), 458–464.
- Lakens, D., Scheel, A. M. and Isager, P. M. (2018) Equivalence testing for psychological research: A Tutorial. *Advances in Methods and Practices in Psychological Science* **1**(2), 259–269. <https://doi.org/10.1177/2515245918770963>.
- Lambert Draven, L. and Pasha-Zaidi, N. (2016) Using the PERMA model in the United Arab Emirates. *Social Indicators Research* **125**(3), 905–933. <https://doi.org/10.1007/s11205-015-0866-0>.
- Larkin, P., O'Connor, D. and Williams, A. M. (2016) Does grit influence sport-specific engagement and perceptual-cognitive expertise in elite youth soccer? *Journal of Applied Sport Psychology* **28**(2), 129–138. <https://doi.org/10.1080/10413200.2015.1085922>.
- Lundqvist, C. (2011) Well-being in competitive sports—The feel-good factor? A review of conceptual considerations of well-being. *International Review of Sport and Exercise Psychology* **4**(2), 109–127. <https://doi.org/10.1080/1750984X.2011.584067>.
- MacDonald, D. J., Côté, J., Eys, M. and Deakin, J. (2011) The role of enjoyment and motivational climate in relation to the personal development of team sport athletes. *The Sport Psychologist* **25**(1), 32–46. <https://doi.org/10.1123/tsp.25.1.32>.
- MacDonald, D. J., Camiré, M., Erickson, K. and Santos, F. (2020) Positive youth development related athlete experiences and coach behaviours following a targeted coach education course. *International Journal of Sports Science & Coaching* **15**(5/6), 621–630.
- Macdougall, H., O'Halloran, P., Sherry, E. and Shields, N. (2016) Needs and strengths of Australian para-athletes: Identifying their subjective psychological, social, and physical health and well-being. *The Sport Psychologist* **30**(1), 1–12. <https://doi.org/10.1123/tsp.2015-0006>.
- Malina, R. M. (2010) Early sport specialization: roots, effectiveness, risks. *Current Sports Medicine Reports* **9**(6), 364. <https://doi.org/10.1249/JSR.0b013e3181fe3166>.
- Martens, R. (1977) *Sport Competition Anxiety Test*. Human Kinetics Publisher, Champaign.
- Martens, R., Burton, D., Vealey, R. S., Bump, L. A. and Smith, D. (1990) Development and validation of the Competitive State Anxiety Inventory-2. In: *Competitive Anxiety in Sport*. Eds: Martens, R. S. Vealey and D. Burton. Champaign: Human Kinetics Publishers. 117–178.
- McCarthy, P. J. (2011) Positive emotion in sport performance: current status and future directions. *International Review of Sport & Exercise Psychology* **4**(1), 50–69.
- Mertens, N., Boen, F., Broek, G.V., Vansteenkiste, M. and Fransen, K. (2018) An experiment on the impact of coaches and athlete leaders competence support on athletes motivation and performance. *Scandinavian Journal of Medicine & Science in Sports* **28**(12), 2734–2750. <https://doi.org/10.1111/sms.13273>.
- Michalak, A. and Poczwadowski, A. (2015) Questionnaire for coach-athlete relation (CART-Q): polish adaptation. *Psychological Tests for Practice and Research* **1**(1), 62–75. (In Polish).
- Poczwardowski, A. Serwotka, E., Radomski, K., Pogorzelska, A., Zienowicz, A. and Krukowska, A. (2015) Coaching in positive sport: theoretical bases of i7W model. *Studies in Sport Humanities* **18**, 6–16.
- Pons, J., Viladrich, C. and Ramis, Y. (2017) Examining the big three of coping in adolescent athletes using network analysis. *Revista de Psicologia del Deporte* **26**(3), 68–74.
- Ryan, R. M. and Deci, E. L. (2000) Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *The American Psychologist* **55**(1), 68–78. <https://doi.org/10.1037//0003-066x.55.1.68>.
- Schimschal, S. E., Visentin, D., Kornhaber, R. and Cleary, M. (2020) Grit: A concept analysis. *Issues in Mental Health Nursing* **37**(7), 1–11. <https://doi.org/10.1080/01612840.2020.1814913>.
- Seligman, M. (2012) *Flourish: A Visionary New Understanding of Happiness and Well-Being*. Simon & Schuster, New York.
- Siegler, R. S., DeLoache, J. S. and Eisenberg, N. (2005) *How Children Develop*. 2d edition. New York: Worth Publishers.
- Slavin, S. J., Schindler, D., Chibnall, J.T., Fendell, G. and Shoss, M. (2012) PERMA: A model for institutional leadership and culture change. *Academic Medicine* **87**(11), 1481. <https://doi.org/10.1097/ACM.0b013e31826c525a>.
- Smith, N. et al. (2017) Observing the coach-created motivational environment across training and competition in youth sport. *Journal of Sports Sciences* **35**(2), 149–158. <https://doi.org/10.1080/02640414.2016.1159714>.
- Talik, E. and Król, K. (2014) The school anxiety and coping strategies. The moderating effect of the general self-efficacy. *Developmental Psychology* **19**(3), 85–99. <https://doi.org/10.4467/20843879PR.14.020.2307>.
- Uusiautti, S., Leskisenoja, E. and Hyvärinen, S. (2017) PERMA-based perspectives on sports – designing new ways to sport well-being in Finnish junior ice hockey players. *Global Journal of Human Science* **17**(2), 30–39.
- Vella, S. A., Oades, L. G. and Crowe, T. P. (2013) The relationship between coach leadership, the coach–athlete relationship, team success, and the positive developmental experiences of adolescent soccer players. *Physical Education & Sport Pedagogy* **18**(5), 549–561. <https://doi.org/10.1080/17408989.2012.726976>.
- Waldron, S. DeFreese, J., Pietrosimone, B., Register-Mihalik, J., and Barczak, N. (2020) Exploring early sport specialization: associations with psychosocial outcomes. *Journal of Clinical Sport Psychology* **14**(2), 182–202.
- Wang, C., Chatzisarantis, N., Spray, C. and Biddle S. (2002) Achievement goal profiles in school physical education: differences in self-determination, sport ability beliefs, and physical activity. *The British Journal of Educational Psychology* **72**(Pt 3), 433–445.

<https://doi.org/10.1348/000709902320634401>.

Wilczyńska, D. (2016) Correlations between psychomotor abilities and selected personality variables in rowers. *Baltic Journal of Health and Physical Activity* 8(2), 42–54.

<https://doi.org/10.29359/BJHPA.08.2.04>.

Zisi, V., Giannitsopoulou, E., Vassiliadou, O., Pollatou, E., & Kioumourtzoglou, E. (2009). Performance level, abilities and psychological characteristics in young junior rhythmic gymnasts: The role of sport. *International Quarterly of Sport Science* 4, 1–13.

Key points

- Coaches of girls practicing gymnastics and boys practicing football took part in a pilot controlled trial of workshops based on principles of positive psychology.
- There were some beneficial effects and some potentially harmful effects on well-being and psychomotor performance of the children. Some effects were unclear.
- A larger study is justified to clarify more outcomes and to investigate modifying effects of presenter, coach and child characteristics.

✉ Dominika Wilczyńska

Faculty of Physical Education, Gdansk University of Physical Education and Sport, Poland

AUTHOR BIOGRAPHY



Dominika WILCZYŃSKA

Employment

Psychologist, Ass. Prof. at Gdansk Univ. of Physical Education and Sport, Social Science Department.

Degree

PhD

Research interests

Sport psychology of children and youths, effectiveness of selected psychological interventions on well-being of children and youth athletes.

E-mail: domiwilczynska@gmail.com



Anna LYSAK-RADOMSKA

EMPLOYMENT

Ass. Prof. at Department of Physical Culture, Gdansk University of PE and Sport.

Degree

PhD

Research interests

Post-mastectomy therapy, posttraumatic therapy, health promotion, and auxology

E-mail: anna.lysak-radomska@awf.gda.pl



Magdalena PODCZARSKA-GŁOWACKA

Employment

Ass. Prof. at the Department of Health and Natural Sciences, Faculty of Physical Culture, Gdansk Univ. of Physical Education and Sport in Gdansk, Poland

Degree

PhD

Research interests

The use of soft tissue techniques, post-isometric muscle relaxation, stretching, in patients with osteoarthritis as well as youth athletes.

E-mail: magdalena.podczarska-glowacka@awf.gda.pl



Wojciech SKROBOT

Employment

Ass. Prof. at Department of Functional Diagnostics and Kinesiology at Gdansk Univ. of Physical Education and Sport

Degree

PhD

Research interests

Posture and balance control in patients with spine and limb dysfunctions.

E-mail: wojciech.skrobot@awf.gda.pl



Katarzyna KRASOWSKA

Employment

PhD Student, Teaching Assistants at Department of Functional Diagnostics and Kinesiology at Gdansk University of Physical Education and Sport.

Degree

MSc

Research interests

Rehabilitation and kinesiology.

E-mail: katarzyna.krasowska@awf.gda.pl



Ewelina PERZOWSKA

Employment

Teaching Assistants at Depart. of Functional Diagnostics and Kinesiology at Gdansk Univ. of PE and Sport.

Degree

MSc

Research interests

Physiotherapy, spine and health

E-mail: ewelina.liedtke@awf.gda.pl



Tomasz DANCEWICZ

Employment

WSB University in Gdansk

Degree

Ph.D

Research interests

Physical education and sport

E-mail: tomeddancewicz@wp.pl



Patrycja LIPINSKA

Employment

Assoc. Prof., Kazimierz Wielki University in Bydgoszcz, Institute of Physical Education, Poland

Degree

PhD

Research interests

Pacing, biomechanics, sport performance, statistical analyses

E-mail: patlipka@gmail.com



Will G. HOPKINS

Employment

Prof., Victoria Univ., College of Sport and Exercise Science, Melbourne, Australia; Shandong Sport Univ., Jinan, China

Degree

Ph.D.

Research interests

Research design and analysis; statistics; factors affecting sport performance

E-mail: willthekeiwi@gmail.com