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The value of participating in British exploring society expeditions: a three year multi-cohort study

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ABSTRACT

A primary aim of many expeditions is to facilitate personal development of young people and while there is much anecdotal evidence to support this aim, there is limited empirical work of varied quality that explores the specific nature of such benefits. This research examined nine summer BES expeditions (Norway, Namibia, & Amazon in 2012; Finnmark, Ladakh, & Namibia in 2013 and 2014) involving 58 young people (aged between 15 and 22) who completed three on-line questionnaires to collect qualitative (open ended questions) and quantitative (Likert scale) data. Measurement of four psychological attributes associated with effective character development were used: mental toughness, coping skills, GRIT and leadership skills. Surveys were completed at three stages; 1) pre-expedition, 2) immediately post expedition and 3) three months post expedition. Results indicated that the expeditions impacted positively on the psychological attributes of young people, with lasting short terms effects (three months after expedition). For the 58 participants, there were statistically significant improvements and small positive effect sizes in mental toughness ($P = 0.006$; $\eta^2 = 0.167$), leadership skills ($P = 0.004$; $\eta^2 = 0.18$), and GRIT ($P = 0.001$; $\eta^2 = 0.218$). There was no significant difference ($P > 0.05$) or effect size for the application of coping strategies. Qualitative data provided insights into how the learning took place and individual perspectives on the overall value of the expedition in relation to narrative understanding.

KEYWORDS

expeditions; personal and social development; wilderness; youth development; adventure; experiential learning; values education; British Exploring Society

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INTRODUCTION

A primary aim of many expeditions is to facilitate the personal development of young people, and while there is much anecdotal evidence to support this aim, there is limited empirical work of varied quality that explores the specific nature of such benefits. The purpose of this research was to measure constructs associated with personal and social development on expeditions. This may be related to the challenge of measuring changes that are developmental in short time periods. This complexity plagues literature in outdoor experiential education, nonetheless, it is worth briefly reviewing the historical context and summarising pertinent literature in this area.

History of expeditions

Expeditions have been increasingly used as an educational tool in the UK which aim, to varying degrees, to provide positive experience, promote young people's personal and social development (PSD), or conduct research into the places that are being visited (Allison, Stott, Felter, & Beames, 2011). Even though expeditions have a long tradition in the UK (the first youth expedition took place in 1932 to Finland when the Public Schools Exploring Society was established; Allison & Higgins, 2002), it was not until recently, when the field became regulated to enhance safety and minimise significant danger to young people (British Standard 8848 first drafted in 2007; Royal Geographical Society, 2017), that numbers participating really began to grow (Jones, 2004). However, there is no commonly agreed definition of *expedition* among practitioners and researchers; this study adopted Allison, Davis-Berman and Berman's (2011) definition of expeditions which "involve physical journeys (e.g. walking, sailing), have some degree of uncertainty involved (e.g. of destination) and some self-sufficiency (e.g. carrying personal equipment and food supplies)" (p. 2). Note that these expeditions are of a different culture to Outward Bound™ courses which have a specific Hahnian philosophy. The youth expeditions researched here come from a geographical heritage concerned with science and adventure for the purposes of youth development, and embody a complexity of British cultural heritage.

Expeditions have become recognised by many as valuable educational experiences for young people (16–25) as they promote overall development and employability and are commonly supported by parents, teachers, potential university admissions and even employers (Allison et al., 2011). Such growth in potential educational value has caused stakeholders and programme organisers to demand empirical evidence to justify the cost and effectiveness of such expeditions (Scrutton & Beames, 2015) as more funds and bursaries have been established to make expeditions more accessible to a wider range of young people across the UK (Allison & Beames, 2010). This study addresses the demands for more robust evidence on the value of youth expeditions and presents findings from the largest study on youth development expeditions to date. Nevertheless, Allison and Von Wald (2010) noted that expeditions have received limited attention within educational research in trying to understand the underpinning concepts of character development and long-term benefits for young people after return from expeditions, especially through self-reflection, understanding of self, and recognition of values.

Emerging gaps in existing knowledge

Expeditions are thought to enhance young people's PSD such as resilience (e.g., Ewert & Yoshino, 2011), leadership skills (e.g., Stott & Hall, 2003), teamwork (e.g., Beames, 2005), coping skills (e.g., Sheldon, 2009), or self-confidence (e.g., Beames & Stott, 2008). These skills and attributes are understood to be developed through an increased ability to effectively manage our emotions, thoughts and behaviours – particularly through challenging circumstances (Allison & Von Wald, 2012; Department for Education, 2015; Public Health England, 2015; Stott, Allison, Von Wald, & Fakunle, 2016). A useful systematic review of research on youth expeditions was undertaken by Stott et al. (2015) which confirms the need for research using larger samples than the proliferation of anecdotal studies. This work is timely in light of increasing attention in education to character and terms such as perseverance, resilience, grit, confidence, optimism, motivation and drive. Critics have pointed out that such terms should be placed alongside values such as tolerance, respect, community spirit and neighbourliness (Alexander, 2015). Notwithstanding these debates, it is these capabilities that enable us to make the most of situations which offer opportunities for personal growth and development and have been referred to by Oevermann (1998) as structural optimism.

However, little is known about young people's self-awareness and self-reflection which has been argued to be crucial in making sense of the expedition experiences and meaningful learning beyond the experience 'in the field' (Allison, 1998; Stott et al., 2015). Stott et al. (2015) argue that positive change and increase in PSD may be triggered by the expedition itself and may not be immediately evident. Sayer (2011) argues that fundamental change in the world view does not happen immediately. Similarly, Petitpas, Cornelius, Van Raalte and Jones (2005) noted young people's inability to transfer life skills learnt through sport into their everyday lives due to lack of self-reflection and failure to internalise positive outcomes.

Furthermore, Allison et al. (2011) noted that some expedition participants experienced expedition reverse culture shock (ERCS). This recognition that some young people have difficulties in returning to their normal life and experience negative post-expedition outcomes such as isolation or even depression implies that there may be a more complex transfer into everyday life than initially assumed (Allison, 1998). As such, there is an emerging need to conduct longitudinal research following young people for a prolonged period of time on their return from expeditions. This challenges dominant assumptions that programmes have causal relationships with positive outcomes which inevitably continue into daily life in a simplistic or mechanistic manner rather than seeing change, learning and development as sophisticated and nuanced concepts which happen over extended time periods in complex ways.

To summarise, research on youth expeditions is in its infancy and there is a range of methodological and substantive issues in need of attention. Methodologically, it remains unclear as to the best times to undertake empirical work and what inferences can reasonably be made from data collected, for example, on the last few days of an expedition when spirits are typically 'running high'. There are multiple substantive issues requiring further work such as learning processes, environmental conditions, length of expeditions, motivations for expeditions, need for wilderness, and community visits.

Current study

This study aimed at investigating the longer-term benefits of extended expeditions (i.e. 3 or 5 weeks) to different locations (i.e. Amazon, Namibia, Norway, Finnmark, Ladakh and Namibia). This research particularly focused on the way in which young people understand and make sense of their experiences on British Exploring Society (BES) expeditions (previously the Public Schools Exploring Society and British Schools Exploring Society) and the ways in which the experiences might translate and inform their everyday lives after the return. There were three purposes for undertaking the research:

1. To gain a better understanding of the experiences of young people on BES Expeditions with specific regard to mental toughness, leadership, coping and GRIT – used as proxies for personal and social development.
2. To identify any evidence relating to expedition outcomes in relation to mental toughness, leadership, coping and GRIT.
3. To identify any themes emerging from data in relation to three and five week expedition differences and differing views with reference to science and adventure components of BES expeditions.

METHODS

Participants

Two hundred and fifty three young people took part in six summer expeditions. All young people who volunteered to participate in the research were aged between 15 and 22 years old ($M = 17.47$; $SD = 1.50$), and had chosen to take part in a summer expedition before agreeing to volunteer for the research project. The expeditions lasted either three or five weeks, and took place in either jungle, desert, polar or mountain environments. Of the 253 participants, 140 were female and 113 were male. Ninety-five chose to participate in a three-week expedition and 158 in a five-week expedition. One hundred and one young people chose a polar environment; 81 a desert environment; 38 jungle environment and 32 a mountain environment.

While 219 of the participants were used for the cross-sectional analysis, only 58 participants completed all three surveys at pre, post and delayed time points. These 58 participants were used for the main analysis. The demographics for these 58 participants were similar to the whole sample. Specifically, the mean age was 17.09 years ($SD = 1.13$), with the age range of participants between 15–21 years old. There were 36 females and 22 males; 18 participated in a three-week expedition and 40 in a five-week expedition. Twenty-six chose a polar environment; 21 a desert environment; six a mountain environment and five a jungle environment.

Materials

A survey was developed from four questionnaires to measure leadership skills, GRIT, coping strategy use, and mental toughness. Specifically, leadership skills were measured using Northouse's (2009) leadership skills questionnaire. This questionnaire consists of 18 items and included items such as "I am effective with the detailed aspects of my work"; "I usually know ahead of time how people will respond to a new idea or proposal" and "I am effective at problem solving". The LSQ uses a 5-point Likert scale

ranging from 1 – not true, to 5 – very true. The validity of the LSQ has been shown in previous work (e.g., Strong et al., 2013). Copies of the questionnaires are available from the corresponding author.

Second, GRIT was measured using Duckworth and Quinn's (2009) Grit Scale. This questionnaire consisted of 12 items and included items such as "I often set a goal but later choose to pursue a different one" and "I have overcome setbacks to conquer an important challenge". Items are rated on a 5-point Likert scale from 1 – not at all like me to 5 – very much like me. The validity and reliability of the Grit Scale were demonstrated by Duckworth and Quinn (2009).

Third, coping strategy use was measured using the brief COPE inventory (Carver, 1997). This questionnaire consists of 28 items and included items such as "I take action to try to make the situation better" and "I accept the reality of the fact that it has happened". Items are rated on a 4-point Likert scale from 1 – I don't do this at all to 4 – I do this a lot. The validity and reliability of the brief COPE inventory are demonstrated by Carver (1997).

Fourth, mental toughness was measured using the MT-18 questionnaire (Clough et al., 2002). This questionnaire consists of 18 items and included items such as "I generally feel in control" and "However bad things are, I usually feel they will work out positively in the end". Items are rated on a 5-point Likert scale ranging from 1 – strongly disagree to 5 – strongly agree. Clough et al. (2002) demonstrated that the MT-18 has adequate psychometric properties.

In addition to the Likert scale responses, text boxes were provided for respondents to enter textual comments to allow richer more in-depth responses. These qualitative data were used to provide insight and complement the quantitative Likert scale data. Three prompts were provided for the open-ended questions relating to motivation to go on an expedition and location choice; learning on and from the expedition; and which aspects of the expedition they considered to be the most valuable.

Procedure

Ethical approval was sought and received through respective academic institutions. All the young people who were going on expeditions with BES were invited to complete the survey pre-expedition (June 2012, 2013, & 2014), post expedition (August–September 2012, 2013, & 2014) and three to four months after returning from expedition (December–January 2012/13, 2013/14, & 2014/15). It was made clear to them that the survey was voluntary and they did not have to take part, and that they could withdraw without consequence from the research at any time during the data collection period. It was also made clear that confidentiality would be maintained at all times.

As participants come from all over the UK an online questionnaire was designed for use with Bristol Online Survey (BoS) tool. This is a secure system that can be accessed via the Internet. To facilitate engagement, reminders via email, letter and social media were directed to all involved in the nine summer expeditions at each of the three data collection points. Furthermore, those who completed all three surveys were entered into a raffle for various prizes. From the possible 253 participants, 219 young people completed the pre-expedition survey, and a total of 58 completed all three surveys – pre, post and delayed over the three-year period. The remaining 34 participants completed either post or delayed-post only, or post and delayed-post surveys, but not pre.

Analysis

The impact of the expeditions in relation to leadership skills, coping strategy use, GRIT and mental toughness were evaluated over time (pre, post, delay) using four repeated measures ANOVAs. This allowed the main effect of the expedition intervention to be examined over time, and also the potential interaction effect of age, gender, cohort, and expedition length and type.

While it was not possible to have a parallel control group, a cross sectional analysis of the pre-expedition baseline scores across age groups was carried out. This analysis acted as a control by providing an understanding of the possible effects of age and maturation on leadership skills, coping strategy use, GRIT and mental toughness. For this analysis four between group ANOVAs were carried out.

Qualitative data were analysed using thematic analysis. All data were coded and themes identified by two of the researchers. The initial intention was to present the quantitative and qualitative data in an entirely integrated format in this paper but this proved impractical. Data are presented separately but connections between the two are highlighted which we anticipate readers will find useful.

RESULTS AND DISCUSSION

Overall

Fifty-eight young people completed the pre-expedition, immediately post expedition and three months post expedition questionnaires during 2012–13, 2013–14 and 2014–15. Eighteen of these young people were involved in a three-week expedition and 40 were involved in a five-week expedition. The results have been presented as graphs for each cohort separately and also combined. For the combined group, there were statistically significant improvements and small positive effect sizes in mental toughness ($P = 0.006$; $\eta^2 = 0.167$), leadership skills ($P = 0.004$; $\eta^2 = 0.18$), and GRIT

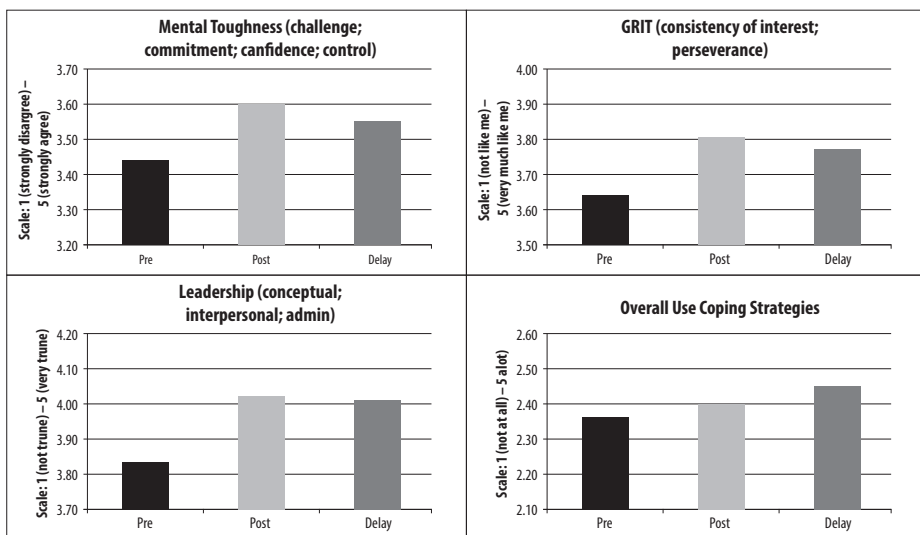


Figure 1 Impact of expeditions across time in the four domains from the 58 respondents

($P = 0.001$; $\eta^2 = 0.218$). There was no significant difference ($P > 0.05$) or effect size for the application of coping strategies. Results are summarised in Figure 1.

Consistency across cohort, age, expedition type and gender

Interestingly, there were no significant interaction effects for the impact of age (U18, 18+), expedition type (jungle, desert, polar, mountain), cohort (12–13, 13–14, 14–15) and gender (female, male), with the exception of leadership for ‘cohort’ and GRIT for ‘gender’. Specifically, there was a significant interaction effect of gender for GRIT ($P = 0.032$; $\eta^2 = 0.117$), where it appeared that the impact of GRIT was more lasting into the ‘delayed’ phase for females. Similarly, the ‘14–15 cohort’ showed a statistically significant reduction in leadership score into ‘delay’ where the other cohorts did not. The small numbers in some of the groups means that interpretation of the results of these interaction analyses needs to be taken with caution. Overall it is reasonable to conclude from the evidence that the expedition experiences studied here were consistent – it does not matter which year you go and where you go – the benefits reported are consistent.

Cross sectional control group

Finally, while there was no control group tracked alongside the young people who went on expedition, a cross-sectional analysis between age groups was carried out. Specifically, pre-expedition scores for GRIT, mental toughness, leadership and application of coping skills were examined across age groups (15–22 inclusive). This analysis revealed no significant differences for any of the psychological attributes at the pre-expedition stage for 15–22-year-olds – GRIT ($P = 0.490$; $\eta^2 = 0.03$), mental toughness ($P = 0.346$; $\eta^2 = 0.036$) leadership ($P = 0.633$; $\eta^2 = 0.024$) or application of coping strategies ($P = 0.904$; $\eta^2 = 0.013$). This implies that these psychological variables may not alter naturally over time. Put another way we are confident that the changes we have measured can be attributed to the expedition experience and are not a result of natural maturation (i.e. the changes would not have occurred without participating in the expedition).

Three or five weeks?

Overall, there were no statistically significant interactions or effects for ‘length of the expedition’ on any of the variables measured – GRIT ($P = 0.876$; $\eta^2 = 0.00$), mental toughness ($P = 0.453$; $\eta^2 = 0.02$) leadership ($P = 0.491$; $\eta^2 = 0.02$) or application of coping strategies ($P = 0.368$; $\eta^2 = 0.03$). This implies no differential effects between three and five-week expeditions on these psychological attributes. However, even with three cohorts, the results related to the impact of different length expeditions do need to be taken with caution due to the small group numbers involved, particularly as the trends for leadership, mental toughness and GRIT show greater positive change in the five-week cohort. Trends for the combined cohorts are presented in Table 1, with mean values, standard deviations and total numbers for pre, post and delay for three- and five-week expeditions, across the four attributes measured. In other words, while there are no statistically significant differences, there are some subtle indications in the trends that five weeks may lead to more change than three weeks.

Table 1 Mean values, standard deviations and total numbers for pre, post and delay for 3 and 5 week expeditions, across the four attributes measured (2012, 2013, & 2014 Expeditions)

| | Leadership | | GRIT | | Mental Toughness | | Coping Strategies | |
|--------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| | 3-Week (n = 18) | 5-Week (n = 40) | 3-Week (n = 18) | 5-Week (n = 40) | 3-Week (n = 18) | 5-Week (n = 40) | 3-Week (n = 18) | 5-Week (n = 40) |
| PRE | 3.83 (0.39) | 3.84 (0.37) | 3.74 (0.63) | 3.60 (0.50) | 3.41 (0.43) | 3.47 (0.48) | 2.37 (0.21) | 2.37 (0.26) |
| POST | 3.97 (0.40) | 4.04 (0.33) | 3.89 (0.49) | 3.78 (0.53) | 3.52 (0.41) | 3.63 (0.37) | 2.41 (0.27) | 2.39 (0.25) |
| DELAY | 3.91 (0.38) | 4.05 (0.32) | 3.82 (0.60) | 3.74 (0.56) | 3.41 (0.44) | 3.61 (0.41) | 2.52 (0.27) | 2.42 (0.30) |

Qualitative themes

Thematic analysis identified two themes from the qualitative responses: Life changing experiences, science and adventure. Each theme is briefly summarised followed by two illustrative quotations.

Life Changing experiences: This cliché was evident at all stages of data collection suggesting that there is a connection to marketing and wider media/social expectations for expedition experiences. Participants talked prior to going about their expectation and anticipations – sometimes referring to friends who had gone on expeditions in previous years. Post and delayed post comments suggested that individuals had enjoyed a ‘life changing experience’ although we consider this to be an over statement and perhaps better characterised as an important transition experience which tends to happen at a time which young people are often maturing into adults and taking increased responsibilities such as leaving home. Aspects of this theme connect to leadership, mental toughness and GRIT in particular.

“It’s passions I’ve had since a child – one being in nature, one being in mountains and one being in cold, snowy environments. It’s the best thing I’ve ever done by a long way.”

“I expected to come back a different person, and the expedition did not disappoint in that respect. I have much more of a ‘can-do’ outlook now, and I don’t shy away from things, I just deal with them and get on with the task.”

Science and Adventure. This theme was not surprising given the expeditions are composed of these two elements. However, interestingly in the second quote below a third component is highlighted which relates to the four Likert scales used in this research. Perhaps most importantly we believe these two quotes illustrate the interdisciplinary way in which people learn on expeditions and connections between science, adventure and development of interpersonal skills.

“I really wanted to make the most of my last proper summer before university. I have within the last year really enjoyed going hiking in the Brecon Beacons, etc. I have also always loved being active by climbing and being a lifeguard on the beach. The arctic expedition looked very attractive to me because it mixed together these two things with science which is my favourite subject area particularly biology which my fire did.”

“The science and community work have been really useful with university application, but the most valuable aspects of the expedition were the teamwork, leadership and confidence boost.”

CONCLUSIONS

This research aimed to consider expeditions in the light of four categories (leadership, coping, GRIT and mental toughness). Qualitative and quantitative data were collected and analysed pre, post and delayed post summer 2012, 2013, & 2014 expeditions. Throughout the research we looked for themes relating to current issues in expedition research – motivation to participate, the role of science and adventure and the differences between three- and five-week expeditions.

We found that there were changes reported both quantitatively and qualitatively with regard to personal development and can conclude that for most people the experiences are significant in positively influencing mental toughness, GRIT and leadership to succeed and ability to work as part of a team. The latter appears to be influenced positively by the recruitment of individuals rather than intact groups on to the expeditions. The trends of change, as summarised in Figure 1, indicate that these capacities are changing in different ways. Mental toughness and GRIT appeared to increase through the expedition, then decline over three months, albeit remaining higher than at pre-expedition levels. Leadership appeared to increase through the expedition and then remain stable, and the application of coping strategies appeared to keep increasing over time. Although, for coping there was no significant difference found.

While there were no statistically significant changes with relation to three- and five-week expeditions, some of the trends *may* suggest more advantage of the five-week, however the numbers are too small to be conclusive. We could detect no differences or patterns between ages or gender as to the benefits gained. None of the expeditions reported greater or lesser benefits than others. While no control group was possible to track alongside the expedition group, cross sectional analysis on the pre-expedition revealed no differences across age.

Motivations to go can be characterised as being about science, adventure and wanting a challenge. Interestingly very few were motivated to learn about leadership but were attracted to the country (e.g. glaciers, biodiversity). However, several reported that their leadership skills had developed after returning and having opportunity to reflect.

There are some wider implications of this work which merit consideration for the field of research in outdoor education and experiential learning. Many of the concepts that are measured in research such as this are related to character in some way. Different researchers conceptualise these concepts in different ways – whether they be traits or states, nature or nurture, character, behaviour, skills. Regardless of subject background and associated conceptions we believe that these are slow things to change and should ideally be studied over a lifetime. Studying them over a 6 month period (post expedition) is a start but the ideal approach for such work is to collect data either longitudinally or retrospectively for extended time periods. There are a host of methodological and logistical challenges to such approaches but we believe that the repeated pre-post and delayed post research design in outdoor experiential learning is unlikely to render any more meaningful findings than are already evident in the extant literature. The potential of mobile devices (e.g. Smart phones, iPads, etc.) for collecting these data before, during, after and delayed after expedition is an

exciting possibility in future, as is longitudinal design and creation of large databases. Methodological learning from other fields such as ‘big data’ can provide useful tools for analysis of such databases.

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Body ecology: a new philosophy through cosmotic emersiology

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ABSTRACT

Body ecology is a micro-ecology. It is a discipline derived from philosophical naturism, deep ecology and holistic body-mind practices developed since 1850 in the corporeal experience of body recreation, outdoor living, and body awakening techniques using emersiology. It is because we transform the practices of individuals that ecology is transformed. This paper seeks to explain the new discipline of body ecology, and its focus on the significance of micro-situations and micro-experiences.

KEYWORDS

awareness; body ecology; cosmotic emersiology; philosophy of body

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INTRODUCTION

Body ecology – a sustainable philosophy

Body ecology (Andrieu et al., 2018) corresponds to the emersion of new sensible data during leisure. In ecologising, the body seems to undergo the effects of the environment in a passive way, whereas in the emersive leisures (Andrieu & Loland, 2017), ecologisation is described by what is activated in emotions, affects and internal sensations such as empathy (Nobrega et al., 2017).

With pollution and climate change, the search for sustainable sports has become an ethical and aesthetic pursuit. Outdoor sports and sports in nature are now perceived as providing a genuine education for regulating the behaviours of leisure and adventure (Ewert & Davidson, 2017). Outdoor adventure activities are becoming an increasingly popular part of physical education programmes. Practicing sustainable leisure is based on reconnecting with nature, as we see, for example, in surfing (Borne & Ponting, 2017). The problem here is that the degree of commitment is more of a recreational kind than a prolonged contact with nature: the developers of outdoor adventure activities have to relate (and will have increasingly to relate) to a 'tainted' nature that does not always encourage healthy practices.

By immersing oneself in nature, practicing new forms of leisure and sport seems to prompt a feeling of belonging to the natural elements just as much as a feeling in the body of new emotions and sensations. Ecology is not just a discourse, but also a practice that engages our daily responsibility; it connects to body awareness through reflection on our actions and their consequences. Body ecology is a practice of self-care that extends to a sense of responsibility for caring for others through our lifestyle choices. This is not about a return to an ideal state of nature, but an observation of our lifestyle and our ways of production and consumption. From this perspective on body ecology, the material elements, namely the air, water, sun and the earth itself, penetrate our bodies so that we also become ecological at the very moment in which we breathe, feel the warmth or the depth of the water, for example, in naturist or artistic practices.

If we do not know the ecology of our own bodies, we look to nature for a harmony that is actually within us: our microcosm no longer corresponds with the macrocosm. We look to the mountains, beaches or countryside landscapes and find a mismatch between the body and nature. To walk, take in the air, transform solar energy, sink into the earth, find pleasure in water, take the products of the earth and relish their taste: all are ways to green our bodies on a daily basis. If the body feels the effects of the elements without suffering them, then interactions with nature can no longer insulate us from the necessary ecological restoration of the environment.

The challenges of a cosmic emersiology against the necessary ecological restoration of the environment consists in a more immersive practice of the body in its contact with nature: the body is thus modified by its prolonged immersion by finding the strength and the vital energy of the cosmos in a more holistic framework of the understanding of the interactions between its body and the natural elements. Thus ecologized sensations are awakened in the body, such as feeling alive and feeling the vitality of nature.

Body ecology is a micro-ecology. It is a discipline derived from philosophical naturism, deep ecology and holistic body-mind practices developed since 1850 in the cor-

corporeal experience of body recreation, outdoor living, and body awakening techniques. It is because we transform the practices of individuals that ecology is transformed. The idea is to create micro-micro-situations, such as the contemplation of a landscape, the observation of the elementary life of plants and insects and the experiencing of sensations of the elements – the wind, the air or the sun. Within body ecology, cosmotics is a cosmology that relates each natural element with the production of an internal effect in the body.

It must be said here that the new study of *body ecology in sport and leisure studies* is a description, embraced by philosophy, sociology, sports studies and ecology, of the living body's activity as a living body, and its effect on the perception of self, knowledge of the environment, and the ecologisation of the body. With body ecology, we describe how the implicit information processing below the threshold of consciousness determines the action modality, emotions and ecologisation of our body with nature, with others and with space.

A new philosophy: an ecology of sport

The ecology of sport (Andrieu & Loland, 2017), along with body ecology and emersive leisures, is a new way of using bodily techniques when immersed in nature, in the elements, and inside one's body through the power of awareness. Leisure becomes emersive when it involves the production of new emotions in the body – new emotions are induced by emersive leisures. If we have never had these experiences previously, they are the new effect of the activation of the living body by body ecology; emersion is the activation and emergence of what is living in the body. With environmental ecology, the ecological conscience finds a way of preserving and fitting into ecosystems by using restorative and recycling techniques: ecological immersers may penetrate the wild and see the signs of human degradation, but they do so by defining a philosophy of aesthetics and of aesthetical immersion in the elements. The criticism of technical civilization has as its counterpart a description of the benefits of immersion in the cosmos of wildlife.

Emersive leisures are corporeal experiences of interaction with the world, as well as with the emotions that emerge in the course of corporeal engagement (Pepper, 1996). Playful recreation, when it is carried into sporting activity, finds a source of well-being and satisfaction: the aim seems to put motor control intentionally in the service of the non-competitive objectives of leisure. Arne Naess (2008, p. 19), like Thoreau, opened the way by ecologising himself during regular stays in his high-altitude Tvergastein hut. He asked: 'How can we explain that we are a part of this place when we were not raised here and have not always lived here?' By allowing emotions and sensations to emerge in the very place of body ecology, the milieu fosters modes of self-realisation as leisure unfolds.

Playful leisure procures pleasure that ends once it has been achieved, whereas emersive leisure pursues the effects of knowledge and sensory afterglow. In our recent book (Andrieu et al., 2018), we show how emersion in leisure occurs as a cosmic experience of nature (first section of the book), as a sensibility to echoes of the world in oneself (second section), and as the awakening of the living body in activities that elicit acute attention and meditation (third section). In corporeal engagement, emersive leisures activate unsuspected resources in the living body. An awakening by cor-

poreal practices is the immersion of consciousness in bodily experience whose effects are not controlled by the act of becoming conscious. In order for the awakening of the living being to emerge – that is, to emerge unbidden into consciousness – the living body has to be activated to produce capability resources, until then unsuspected and unknown to consciousness, through its dynamic and spontaneous ecologisation.

We present here the sensory, emotional and symbolic processes that reflect the vast field of research that has often been presented as a ‘blind spot’ in the history of the human and social sciences. Immersers testify by the feeling of their flesh and the impression and imprint of the elements in their everyday struggles, as in Sigmund Loland’s (1996) sports ecosophy, inspired by Arne Naess. Unlike nudists and naturists, who master their bodies by purifying them through reinvigoration, immersers plunge into nature to allow their bodies to feel modifications uncontrolled by the will, through sensory ecology. Examples might be the advance of the ice that forced Ernest Shackleton’s (1874–1922) hibernation or Alexandra David-Néel’s encounters with other cultures in far-away Tibet (1868–1969). When the will is not present, virtues allow a person to develop ‘new’ feelings in embodiment, respect for nature and acceptance of the man’s belonging, as part of the cosmos.

Body ecology (Andrieu, 2008–2011; Andrieu & Loland, 2017) is also based on philosophies of awakening and consciousness. These immersers into consciousness favour transcendental meditation and reflexivity in action through physical practices of consciousness. Although we might distinguish these techniques, the holistic context of each can cause confusion because the action on one part of the body would immediately be related to that of other parts. Only the subject in his or her physical, real-life experience can establish this correspondence, making efficient perceptions of health unverifiable but not improbable, although we do know that yogic meditation is able to modify the levels of cognitive activity. In causing a shift from a postural hyper-consciousness to a liberating consciousness, these emergent techniques are based on different levels of awareness.

The connections between body ecology and emergent leisure are the effects of ecologisation: immersed in the body, the living body activates unprecedented capability resources and thus encourages an involuntary emergence, going so far as to the awareness of new emotions. This activation is a new mode of self-knowledge in the very experience of body immersion. By awakening previously unknown internal sensations, we can observe thrills, osmosis with the elements, and the pain of injury – leisure allows the activity of the living body to emerge all the way toward the level of consciousness. Our great surprise at the vitality of our bodies suggests that this kind of leisure is less a sense of relaxation and more a sense of discovery and enhanced knowledge of ourselves and the world.

Olivier Sirost (2016), an ecological sociologist, has described this relation as separately gardened natures, culturalised natures, identified natures and the depletion of nature. The ecological sociology of sport reflects socio-historical progress: the possible release of an environmental nature by humans and, at same time, a refusal of the wilderness despite the desire for immersion. The search for emotion reflected in the new leisure falls short of the true nature that we still yearn for in interpreting the myth of Eden. The new body ecology, defined by Bernard Andrieu (2016), is a way of living in the corporeal world and the cosmos. This cosmic leisure must be understood as

arising from the myths of an Edenic nature (rural and wilderness landscapes) and the utopias of returning to nature (body experiences, Monte Verità, youth movements, adventure novels, explorers' clubs, etc.).

The influence of the emotional geography of sport

The geography of sport and recreation was first described in 1962 by Terence M. Burley Hunter (1962, pp. 46–55). At the Valley Research Foundation in Australia, he had studied a means of locating body practices before they became a reflection upon the effects of territory and land on the practitioners' corporeal experience. He defined five aspects of the geolocalisation of sport: economic impact, social models, effects on society, cultural origins of practitioners and geographical distribution.

In 1969, John Rooney (Rooney & Pillsbury, 1992) advanced the idea of sports regions with the publication of an atlas of American sports. Under the influence of Edward Relph, who introduced the term 'placelessness' in 1976, Karl Raitz (1995, IX) demonstrated how the interaction between the sports landscape and the game itself contributes to the bodily experience. This mapping approach to sports practice is not only quantitative and tourist-oriented for an economic market, but we can also understand it as emotional maps, like Yi-Fu Tuan's use of the term *topophilia* (Tuan, 1974). Tuan founded the study of environmental perception, attitudes, and values according to a humanistic model of geography, stressing the emotional connection between a place and a leisure practice.

Socio-spatial studies of territorial changes in the type of sports practices and their spatial patterns of distribution reveal how much embodied places and local spaces are changing the bodily experience of practitioners, as Bernard Jeu described (1977). However, using land for the purpose of personal entertainment does not follow the logic of sensory immersion in nature (Augustin, 1999). The feeling of space is built through contact with the earth and its elements on a given territory.

The emotional geography of sport has produced new questions: How are sports facilities built at the regional level? What is the spatial behaviour of the various practitioners? How can the geographical expression of a sport be characterised across a district? Territorial analysis of embodied sports practices is a way to analyse the influence of practitioners' life story curricula on their choices.

An ecology of perception in the first person

In the *New History* project of Marc Bloch and Lucien Febvre, one also finds the idea of body ecology. Invited by the *Henri Berr International Centre for Synthesis*, Lucien Febvre prepared *Earth and Human Evolution*, which clearly showed the influence of geography in the analysis of Humboldt's 'habitable earth' and Ratzel's *ecumene*. The difficulty of the undertaking lies in the limits of human geography, which remains deeply physical at its core, and those of social morphology and its Durkheimian coldness. If geography remains the science of places and not of people, if sociology remains the cold study of social facts, it is nevertheless true that 'people are geographical agents' (Febvre, 1970, p. 75).

For Marc Bloch, this last remark makes the historian a researcher of traces, residues deposited by experience, footprints left behind: "What do we mean by a document, if not a trace – that is, the mark – perceptible to the senses, that has left a phenomenon

that is in itself impossible to grasp?" (Bloch, 1997, p. 71). Although Bloch distances himself from the body to a certain extent, as it is not the trace, the residue, or the imprint, Lucien Febvre has sought to develop a geography of the body, asking about what people once experienced through their senses, emotions and imaginations. In short, the historian's project is to examine the body through time and to specify the various different perceptions of the body. The recent work of Alain Corbin has mostly followed this perspective.

The rooting of symbolism in a matrix, a mother earth, is a reference to the philosophy of nature developed by Hölderlin. His poem provided the inspiration for the circle of the Munich Kosmiker – which included the poet Stefan George and the philosopher Ludwig Klages – that proposed an ecology of the body, reminding us that the body is part of the matrix of the earth from which symbols arise and from which it draws its power. This cosmic circle became closely connected with the pioneers of Monte Verità in Ticino, experimenting with vegetarianism, naturism and free movement in nature. The work on the poetics of habitation developed by Bachelard and his students has continued the analysis of myths and symbolism via the *Eranos* circle built on the traces of Monte Verità. There have been exciting developments in the geopoetics of Kenneth White and the travel literature of Michel Le Bris.

These different themes still provoke considerable international debate on body ecology. For example, for the psychologists of the movement, one might cite the controversy between James J. Gibson and E. Panofsky. In the Kantian tradition, Panofsky developed the idea of the *Kunstwollen*, where an artwork presents itself to us with a particular form and meaning that guides our judgement. Gibson dismissed this differentiation between vision and representation and defended the idea of an ecology of perception, with perception being an affordance or a pole of interactions accessible to exploration. Through the ecology of perception, the body mobilises and reveals itself as much as the environment that surrounds it.

It is this intuition that Augustin Berque addressed in an original way with the concept of mediancy, in which he shows that humans and their environments (natural and social) reveal themselves reciprocally, creating 'holds' that give the other the possibility of grabbing hold. In this way, he founded the relational logic of ecology: 'Phenomenological matrices (the schemes of perception and interpretation of the environment) thus cease to generate physical impressions (modes of environmental management), which in turn influence these matrices, and so on' (Berque, 2000, p. 44).

A recent disagreement concerns David Howes, a pioneer in sensory studies, and Tim Ingold, who developed an anthropology of habitation. According to Howes, the language of the senses is revealed in different ways, depending on the epoch and culture. Thus, there are ways to feel by mobilising the body differently, as proposed by art, medicine, legislation, politics or marketing (Howes & Classen, 2014). On the contrary, Tim Ingold proposes a more transversal anthropology of the textual relations that people maintain with their beliefs or with nature. Ingold, like Gibson, emphasises affordances that he particularly analyses in an ecology of existence, habitation and skill.

Wellbeing through Cosmotics

Another route is possible (D'Andrea & Sirost, 2017). As proposed by Michel Maffesoli, this is ecosophy, where one returns to animal passions, where the figure of Atlas does

not merely bear the burdens of the world, but is also the *Kosmokrator* (sovereign of the Cosmos) (Maffesoli, 2017, p. 124). Beyond discourse that is plausible and rationalising, he has discovered a tone to the lived experience of space that is rather awkward to integrate into the modern worldview: the immediate sensation of incommensurability that makes humans feel minuscule and inert, lost in the immensity of nature. At the imaginal level, this primordial emotion prevents us from taking seriously the possibility of the direct interference of human actions on global equilibrium, which is in any case rejected because it is too close to an awareness of the essential frailty of our species.

In Austria, Germany and Switzerland, communities of Kosmikers (Sirost, 2016b) were founded. These poets, painters, architects, dancers, writers and academics from European Bohemia plunged into naturism, vegetarianism, nature cures, new forms of dance, new pedagogies, new music, *Jugendstil*, depth psychology, Eastern meditation, Bauhaus architecture, nature hikes and urban rambling. In Paris, Munich, London, New York, Vienna, and Darmstadt, artist communities and colonies flourished. One might audaciously cite Barbizon, Chicago, Monte Sol, and Esalen, as well. Just as scientific ecology explores plant communities, it is clear that similar explorations have driven the communities of bodies that have settled in a number of geographically limited places and radiated through European culture. Geographers were among them, like Elisee Reclus in connection with anarchist networks and Alpine clubs (Ferretti, 2014).

To become one with nature, the hermit/anchorite seeks refuge in a cave, Thoreau (1854) retired to his wooden hut in Walden, and John Muir (1954) found peace in a canyon of the Sierras, as did Sylvain Tesson (2014) in Siberia. Enclosure in nature intensifies the immersive effect. In the late 1970s, Thomas Rain Crowe returned to the Appalachians and lived for several years as a hermit. As he said about this experience of living deep in nature, in the wilderness: only the present moment exists. In the universe of desert-style nomadism, the criss-crossing of an entire continent, for full-time voyagers, is like the domestication of a wild territory. Kenneth White, in his cosmopoetic laboratory, found the ecospiritual description in Rimbaud, Gauguin and Victor Segalen as a temptation to surpass the West in an orientalism that is nevertheless still colonial.

Leaving behind the colonisation of nature and living beings, retreating into the woods – before it was the lot of the homeless, living and dying of cold and exhaustion in the open air – might have appeared as an attitude of physical, social and mental aeration. Solitude in nature can thus be understood as an immersion in living and vivifying air. Nonconformist Christians and utopian socialists shared this anti-modernist stance and embraced the romanticism of John Ruskin and William Morris: as early as 1820, hikers organised to discover nature (Harvey, 1997, p. 55).

Yet the *wilderness* may not exist and might never have existed because the pioneers never crossed virgin nature: it was always inhabited by natives. Although the earth has not always been for humanity, we should not consider it as an object or as a subject but as a transject – a journey of subjectivity in nature. The path of our planet finds in the ecologisation of our living bodies an infinite dynamics that surpasses us. Immersed in the earth, good cosmicists that we are, we cannot deconstruct the earth to make it our property. As mobile tenants, earthlings are never entirely earthly. In a modern acosmic world, Michel Collot's body cosmos defines itself, finds itself and deepens itself

in nature: “Far from enclosing me within myself, this living and vibrant microcosm reveals that I belong to the macrocosm; I find, at the heart of my intimate coenaesthesia, the memory and the source of the emotions that lead me to an encounter with others and the universe” (Collot, 2008, p. 9).

Immersive experience

For Barry Lopez (1986), this earth, which we conceive through geography, pursues an existence perfectly independent in the arctic nature: nature is not a landscape organised for our gaze, but a power that can overwhelm, as we know from stories of crossing the Arctic. The oceanic feeling, dear to Chateaubriand (2014), is found in Theodore Monod’s desert crossing as an experiment of freedom in confinement (2017). This long period of cosmic immersion is that of the fluxes of the living in its processes of creation and the possibility of the death would be a permanent risk. The temptation is great to merge with nature, its spirits, its elements and its living beings. The cultures that are so empathic with nature express an ‘insertive’ lifestyle by immersion-insertion in the animal, in the force of the elements like an aboriginal dream: leaving one’s own body to become the body of an animal or giving up the ego of one’s own body in order to experience an ‘other’ body.

Inserted, cosmicists must ecologise their living bodies, otherwise they will undergo the otherness of nature as a fatal alteration of the fundamental rhythms. By transforming oneself from within, the cosmicists become part of the cosmos without reducing it or reducing themselves whenever they maintain a homeostasis between the inner environment and the external environment. An imbalance between the two produces dismosis with nature, others or technique. In nature rather than from nature, we would all like to awaken our deepest nature in an ideal unity and harmony between the inner cosmos and the infinite universe. This illusion, which may be mystical, naturalist and anarchistic, also reveals an intuition and a sensitivity to nature. The desire to become one with wolves by living with them, as Shaun Ellis (2009) did, is not simply revisiting *The Jungle Book* or *Greystoke: The Legend of Tarzan, Lord of the Apes*. The universe cosmotises us by revealing its grandeur relative to our presence and actions, whereas our inner world is intensified by the echoes of the elements, of others and of the techniques within us. This intensification is the geography of the instant: the presence of the body is a direct incorporation of the qualities of the element.

The survivors of extreme environments are sometimes hailed as heroes, with their narratives reconstructed in fictional documentaries that render both the real and the false aspects of immersion in an illusory way: the camera is always at hand to serve the adventurer who wants to scare himself. Survival guides in hostile environments are proliferating in the name of survivalism: the need to have both physical techniques and adapted equipment so as to avoid dismosis and succeed at the trials of nature as proof, if not of one’s virility, of one’s flexibility. Extreme solo walks, like that of Sarah Marquis (2016), are a way to exalt nature as a whole: ‘you have to be aware of the environment at all times’ by discovering the limits of one’s own body in full nature.

The experience of openness to space is thus tragic, which explains why current rhetoric is moving away from it, denying any correlation between vital activities and the places where they take place. In this way, humans are losing their place in the

world, which is not only an environmental problem but also a crucial issue for the understanding and meaning of all existence. Humans renounce consciousness of the finitude revealed by their own corporeality, but at the same time they lose the possibility of belonging, of *being part* of something that this consciousness could give them. Only a new ecological thinking can balance the destabilising effect of knowing the boundaries inscribed in the flesh: *another* way of thinking, committed to surmounting the Cartesian separation between body and mind and recovering the richness of experience from an active relationship with matter and space, whether it be one's own body or the lost skill of inhabiting a place.

Emersive recreation

Emersive recreation does not encompass only those physical practices that are carried out at the heart of the geographical and institutional spaces of modern sport. Faced with urbanisation and polluted cities, Le Corbusier founded his playful revolution on the emergence of emersive leisure, starting from his own bodily experiences and from the idea of sports carried out in proximity to buildings. Emersive leisure must offer the possibility of a playful attitude to urban spaces, and in the 1930s this attitude found little favour. Le Corbusier's criticism of the architecture of industrial cities, particularly as he travelled through Brazil, Germany, and the United States, was based on the remoteness from natural conditions and the individual's distant relations to nature. With sports played close to buildings, leisure should be directly available from the ground floor to the roof terrace, where hydrotherapy, heliotherapy, and naturism are guaranteed and free.

Living in the air high up in the trees is not just a protection against predators,¹ but an arboricultural lifestyle, like that of the Korowai people in Indonesia, whose homes are sometimes perched 35 metres above the understorey of the Irian Jaya rainforest. Between the sky and the earth, the canopy has become a place for exploring flora and fauna: Francis Hallé, Professor of Tropical Botany; Dany Cleyet Marrel, inventor, designer and aerostat pilot; and Gilles Ebersolt, inventor-architect of the *Radeau des Cimes*,² lived in the canopy from 1986 to 2003. This access to the treetops, at an altitude of about 50 metres, was accomplished with an airship that could land on the canopy and an inflatable raft (the *Radeau des Cimes*) functioning as a laboratory.

The ecological homes of green architecture offer the possibility of immersing oneself in nature while inhabiting one's body, as with Le Corbusier's shed in Cap Saint Martin, through the facilitation of interactivity with the sun and air. Inspired by the post-'68 Rousseau-ist dream, the wooden house, no longer standing alone in the meadow, defines an interactive architecture. In France, until the 18th century, wood was omnipresent in popular construction. After World War II, economic constraints, the urgent need to rebuild, and the fashion of 'all concrete' – considered the most modern of materials – left wood as a building material far behind in second place.

With the *Instituto Terra*, Sebastião Salgado and his family began to combat deforestation and its accompanying run-off, which makes land infertile, and they did so by replanting spaces in the native forest of Minas Gerais. The ecosophy of Félix Guattari

¹ www.opentreeclimbing.org

² www.radeau-des-cimes.org

finds here its three registers: “the environment, social relations and human subjectivity” (Guattari, 2018, p. 14). If the Earth is a living being, which is the Gaia hypothesis of James Lovelock (2000), it would be appropriate for Guattari to extend the ecosophy to other living, human, social and cultural systems.

Now the body is experienced as a conscious perception of the activity of the living body. Indeed, the living body is the biological activity of an organism through its body schema and aesthesiological systems, and it adapts informed consciousness. The living body became a central focus of philosophy when Lamarck examined the internal link between the biological transformations of the living body, forging the study of zoological philosophy. More than just a body, the living body is a philosophy of ecological and zoological import because of the interactions of its matter with the internal body through its porosity and its elasticity (Steigmann, 2017). Without this permeability, adaptation would not foster the greening dynamic that changes internal qualities towards a neuronal plasticity (Seil, 2000).

Access to the living body is difficult because one’s activity is under the level of consciousness. Emersiology (Andrieu, 2018) is a method for perceiving movement: it is a re-knowing of the emotional information in the consciousness of the lived body even if this information was activated by the living body during its ecologisation. To make a reconnection with our living body, we can recosmise though body ecology to produce emersive leisures: this fully awakening implies a deepening of living through non-representationalist techniques for emergence. The immersive scheme that can be deliberately organised produces involuntary emersive effects outside of the subject’s control. Emersion is here an awakening of consciousness by involuntary movements, reflexive thrusts and direct feelings

The passage from phenomenology to cosmic emersiology is a new step in describing the internal activation of the living body. The methodological difficulty and yet the interest of this research arises in great part from the need for a language of the living body: the emersion of internal sensation without conscious control is produced involuntarily through interactions with our environment and contact with other people. It might be better to rein the mind in, so that we can wholeheartedly welcome the activation of our brain and the ecologisation of the living body.

Emersense, the emersion of new meanings, awakens the living body in order to activate the production of novel unconscious meanings for the subject. Awakening the body means making it conscious through its own understanding. For although body emersions are unconscious, they are not inactive, because activation implements scenarios of decisions and emotions in the living body before even a single action is consciously realised. The living body incarnates meaning before it can express it in a linguistic structure likely to be recognized by a community during proxemic interaction. The difference between bodily intention and bodily consciousness of intention is useful for understanding the unconscious anticipation of the living body in relation to the voluntary action of the body. Between the two, affects, emotions and associative memory all nurture and stimulate the semantic production of the body, yet without consciousness always being able to reach it. The living narrative of emersive leisure begins before the ego knows it as such through the narrative form.

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Sports mega-events in Brazil: an account of the Brazilian government's actions

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ABSTRACT

During the period from 2007 to 2016, Brazil hosted a number of major sporting events, including the 2014 FIFA World Cup and the Rio 2016 Olympics. The planning and organization of these sporting events, from the bidding process to the monitoring of the legacy, required a great involvement of the Brazilian government. The purpose of this study is to present an account and an assessment of the Brazilian government's actions in relation to these events. The research involved an analysis of government documents in particular those produced by the Ministry of Sport. The results indicated that, apart from the implementation of a policy to promote sport in the country and achieve high-level results in international competition, the engagement of the Brazilian government in such sports mega-events was part of a broad policy focused on international relations, urban change and economic and social development.

KEYWORDS

Olympic Games; FIFA World Cup; sport policy

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INTRODUCTION

The major sporting events that took place in Brazil from 2007 to 2016, especially the 2014 FIFA World Cup and the Rio 2016 Olympics, aroused the attention and interest of different segments of Brazilian society and abroad. Sports organizations (Fédération Internationale de Football Association, 2014a, 2014b), international agencies (Banco Interamericano de Desenvolvimento, 2013), public institutions (Fundação Instituto de Administração, 2009; Instituto de Pesquisa Econômica Aplicada, 2008), private consulting firms (Ernst & Young Terco, 2011), the business sector (Sport Business, 2011), and community associations (Comitê Popular da Copa e das Olimpíadas do Rio de Janeiro, 2015), among other groups and organized sectors, examined and discussed the implications of these events in their spheres of interest.

Analyses and interpretations of the planning, organization and implementation of these events, and their economic and social impacts and legacies, were carried out by research studies of various areas and, just to mention the issues that received most attention, focused on tourism, urban planning, sport facilities, environment and sustainability, volunteering, and evictions and displacements of low income communities (Mataruna-dos-Santos & Pena, 2017; International Council of Sport Science and Physical Education, 2016; Boykoff, 2016; Deslandes, Dacosta, & Miragaya, 2015; Santos Júnior, Gaffney, & Ribeiro, 2015; Mascarenhas, Bienenstein, & Sánchez, 2011; Da Costa, Corrêa, Rizzuti, Villano, & Miragaya, 2008).

There is, however, a dearth of studies on the role played by the Brazilian government in such events, especially the actions carried out to support the candidacy for and to engage in the organization of the FIFA World Cup and the Rio Olympics. By consulting governmental documents, this study attempts to provide an account and an assessment of the Brazilian government's actions in respect to such events, particularly those of the Ministry of Sport, the main protagonist at the federal level, in the bidding for and the organization and implementation of the sports mega-events held in the country.

THE DECADE OF SPORTS MEGA-EVENTS IN BRAZIL

It is difficult to state with certainty when the Brazilian government decided to fully engage and support the bid and organization of these mega-events carried out in the country from 2007 to 2016, a period of time that became known in Brazil as the decade of sports mega-events. In this period, the city of Rio de Janeiro and other large Brazilian cities hosted several large-scale sport events: the Pan American Games and Parapan American Games in 2007, the Military World Games in 2011, the Confederations Cup in 2013, the FIFA World Cup in 2014, and the Olympics and Paralympics in 2016.

Even though some initiatives were already under way in previous years, it was in 2000, during the bidding for the 2007 Pan and Parapan American Games (Brasil, 2003), that the Brazilian government started to play a more important role in the decision making process on such sport events.

The initiative for hosting the 2007 Pan American Games was taken by the Brazilian Olympic Committee (COB) in conjunction with the Municipality of Rio de Janeiro. It was part of a long-term plan to bring the Olympics to the city. Rio de Janeiro

had already unsuccessfully applied to host the Olympics on two occasions (1936 and 2004). Concerning the latter, the city was eliminated at the preliminary stage. In 1999, after the bid failure for the 2004 Olympics, the COB decided to change its strategy (Brasil, 2008a, p. 14). The focus was now on hosting the Pan American Games, since success in organizing a major continental sport event would show to the international sport community that the city was in a good condition to hold great sporting events. As a consequence, the COB gave up the idea of bidding for the 2008 Olympics. An important step in this new direction was made in 2000 when the COB and the Municipality of Rio de Janeiro announced a strategic plan for the candidacy of the 2007 Pan American Games and 2012 Olympics. Some months later, at a meeting of the Pan American Sports Organization (PASO), Carlos Arthur Nuzman, President of the COB, officially presented the city's bid for the 2007 Pan American Games.

The idea to host the Pan American Games received support from the Brazilian government. In May 2000, at the Opening Ceremony of the General Assembly of the Association of National Olympic Committees (ANOC), held in Rio de Janeiro, Fernando Henrique Cardoso, Brazilian President at the time, expressed his support for the 2007 Pan American bid, also stating that the Federal Government would back Rio de Janeiro's candidacy for the 2012 Olympics, should the city decide to submit a bid (Brasil, 2000, p. 405).

In August 2002, in Mexico City, when Rio de Janeiro was granted the right to host the event, Fernando Henrique Cardoso had agreed with the conditions set by PASO, and had guaranteed the Brazilian government's financial support for the Games according to the budget proposed by the COB. The estimated cost of the Pan was US\$186.2 million for the organization of the event and for infrastructural work, including the renovation and construction of sports facilities. Of the total cost, US\$41.3 million (22%) was the responsibility of the Brazilian government (Brasil, 2008a, p. 21).

The bid took place in a year of presidential elections in Brazil. To mark the Brazilian government's commitment to the Games, the four presidential candidates recorded testimonials that were presented at the PASO meeting in Mexico City, stating that, if elected, they would maintain the commitment to hold the Games in Rio de Janeiro. Thus, when President Luiz Inácio Lula da Silva took over the presidency in January 2003, he went ahead with the preparations for the event, together with the COB and Rio de Janeiro state and city governments. One of the positive points of Rio de Janeiro's bid was the suggestion to host the Parapan American Games just after the Pan, using the same structure and organization, something that had not happened in previous editions of the games. So, with victory in the candidacy, the country took on the responsibility of organizing two continental events.

Thus, having on the one hand a city planning conception dating back to 1993 and 1994, when the Rio de Janeiro City Strategic Plan (Vainer, 2013, p. 59) was elaborated, and on the other hand the understanding that sports mega-events are drivers of urban change, public authorities, among them the Brazilian government, took steps to create conditions to ensure that these sporting events would take place in the city (Brasil, 2006a).

Throughout the preparation period, the 2007 Pan and Parapan Games were regarded with skepticism and distrust by various segments of the Brazilian population. Few would have bet that the country would be able to hold such an important event.

Brazil had no tradition of organizing sporting events of this size, the urban services needed to host such events were almost everywhere of poor quality, and public works were performed at above market prices and rarely completed on time. In addition, the country suffered from a lack of planning capacity and excessive bureaucracy. The Games, however, were a commitment assumed by Brazil and also, in the view of many, an opportunity to promote changes in the city of Rio de Janeiro.

In terms of sports results and population support, the COB and the Brazilian Government considered the Games a success. Soon after the Pan, an opinion poll conducted by IBOPE (a Brazilian survey agency) revealed a favourable view of the event among the Brazilian population over 16 years of age: 81% considered the Games “well organized” and 73% that the resources to promote them were “well applied” (IBOPE, 2007, p. 56 and 92). These evaluations were not shared by other segments of Brazilian society, which pointed to problems of planning and organization, lack of popular participation in the decision-making process and, after the Games, under-utilized sports facilities. The main criticism focused on the urban works that were included in the city plan for the 2007 Pan but were not carried out, the high costs of the event, and corruption and suspicion of misappropriation of public money in the contracts for the works and services related to the Games. The final report published by the Ministry of Sport showed a total cost of R\$3.09 billion of which R\$1.60 billion (52.3%) was funded by the Brazilian government (Brasil, 2008a, p. 81). (NB: R\$4 = €1)

In spite of criticisms, the realization of these events created a favourable environment with international sports organizations for the Rio de Janeiro bid to host the 2016 Olympics. The Brazilian government's understanding that the 2007 Pan and Parapan brought positive results also reinforced the arguments in favour of Federal Government support to the Brazilian Football Confederation's (CBF) bid for the 2014 FIFA World Cup. In this respect, since November 2006 a task group of the Federal Government established by President Lula was in charge of elaborating a strategic plan and defining actions, within the competence of the Federal Government, in order to comply with the requirements established by FIFA so that Brazil could apply for the 2014 World Cup (Brasil, 2006b).

After the Pan and Parapan experience, there was greater agreement at the Federal Government level that, if well planned and executed, the Olympics and the World Cup could generate benefits for Brazil, raising the country's image to the world, attracting foreign investment, furthering economic development, and promoting social and urban changes. In analysing the strategic agenda of the Brazilian Presidency, it is observed that since the 2007 Pan and Parapan, sport came to be one of the central factors in social and economic development for the government (Brasil, 2008b, 2010, 2016).

The decision to bid for the 2016 Olympics was taken at the Assembly of COB in September 2006, supported by the technical evaluation of Event Management Services (EKS), an international consulting firm hired by the COB to issue an expert report on the proposal of Rio de Janeiro. For EKS, the experience of organizing the Pan and Parapan, and the sports facilities built for these events, would give to Rio de Janeiro an excellent starting point for the bid. At Federal level, the Ministry of Sport was given the task of carrying out such an attempt and of coordinating the Brazilian government's actions, since it had been the main player in the Pan and Parapan Games.

On October 2007, Joseph Blatter announced Brazil as the host country of the 2014 FIFA World Cup. With the right to host the event, the Brazilian government put into practice its plan to make the event a catalyst for change in various policy areas.

As preparations for the World Cup were taking place, the Brazilian government was involved with the Rio de Janeiro bid for the 2016 Olympics. Studies conducted by Brazilian and foreign institutions helped in the decision of the Federal Government over the model to be adopted for the Olympics in Brazil. In view of the reports examined, the Brazilian government chose to follow the example of Barcelona.

In this respect, since the early years of his presidential mandate, Luiz Inácio Lula da Silva, a football *afficionado*, took sport as an ally in his external policy. In 2004, at his request, the CBF took the national football squad to Port-au-Prince, in Haiti, to play a friendly match with the Haiti national team. The match was organized by the United Nations with the aim of promoting peace and reconciliation. At the time, Brazilian troops were in Haiti as part of an international peace force after a violent revolt that led to a change in the country's government. This connection of Lula (as he is called in Brazil) with sport, and especially football, became known among journalists and academics as "ball diplomacy". Lula attended the match and, according to media reports, asked the Brazilian players, among them Ronaldo, "not to score too many goals" (British Broadcasting Corporation, 2004).

In the years that preceded the election of the host city for the 2016 Olympics, the Brazilian government engaged in many activities abroad using sport as an instrument for external policy. In 2008, a new sector within the Brazilian Ministry of Foreign Affairs was created to coordinate government actions in this area: the General Coordination for Cooperation and Interchange on Sport (CGCE). A plan was prepared for Brazilian diplomats to make contacts with IOC members, National Olympic Committee and International Sport Federation presidents, government authorities and sport personalities who could influence the voting for the 2016 Olympics. The president himself had meetings with several heads of state, attempting to gain their support for the Rio de Janeiro candidacy. He also attended the Opening Ceremony of the Beijing Olympics in 2008 and visited the London Olympic Park in April 2009 (Resende, 2010, pp. 35–36).

On 2nd October 2009, the Brazilian president delivered a speech at the 121st IOC Session held in Copenhagen as part of Rio de Janeiro's candidacy presentation for the 2016 Olympics and just a few hours before the voting process. His speech was considered by the Brazilian media, politicians and sport leaders as decisive for Rio's victory over Madrid, Tokyo and Chicago. The international media also highlighted Lula's role in the election of Rio as host of the 2016 Olympics. On 3rd October 2009, *The Telegraph*, an English newspaper, depicted Lula as "the driving force behind the bid for the past three years with his strong personal and vocal commitment".

Throughout the preparation for these events, large sectors of Brazilian society resisted and even opposed the demands of the IOC and did not welcome the enormous amount of public funds to be put into its realization. One of the most critical problems identified in the accomplishment of these events was the long time spent by the government in signing contracts with private companies, especially in the area of construction and services. Brazilian legislation was very strict on these matters, with a number of required steps and deadlines that slowed down the process of contracting. In order to speed up the hiring of private companies, the Brazilian government

proposed a new model for public contracting. The implementation of such a measure required a change in federal legislation, and only after intense debate in the National Congress was the new model approved (Brasil, 2011a). Initially planned to improve works and services related to the 2014 World Cup and the 2016 Olympics, the new regime was later extended to other areas of public administration. The Brazilian government considered this model of contracting a legacy of sports mega-events to the public management and sports of the country. For the critics of the events and the political opposition, it was a way of favouring big private companies, particularly those involved with the construction of sport facilities and urban works.

There were also governance problems, mainly in the communication and distribution of responsibilities among the three levels of government (Federal, State and Municipal), that gained relevance in the years 2011 and 2012. During this period, the Brazilian government conceived a governance model that would bring together the three levels of government, private partners and civil society. Under the executive coordination of the Ministry of Sport, the governing committees of the World Cup and the Rio 2016 Olympics and Paralympics were created. The two committees were organized in thematic chambers that brought together all sectors of federal, state and municipal governments involved in the events, having the co-responsibility of following up and executing, in each instance, the governmental commitments and projects foreseen in the matrix of responsibility of the events.

In 2011, a public consortium known as the Olympic Public Authority (APO) was formed. The purpose of the institution was to coordinate governmental actions for the planning and delivery of the works and services necessary for the Games (Brasil, 2011b). One year later, the Brazilian government created the Management Committee for the Rio 2016 Olympic and Paralympic Games (CGOlimpíadas) to define the guidelines and actions of the Federal Government in relation to these events (Brasil, 2012).

The Executive Group for the 2016 Olympic and Paralympic Games (GEOlimpíadas) was also created by the Brazilian government (Brasil, 2012). The Group was responsible for approving and coordinating the activities developed by federal administration bodies or financed with funds from the Federal Government relating to the Games, and for monitoring the implementation of the actions defined by the CGOlimpíadas.

The Ministry of Sports considered this model of governance an innovation and an important legacy for public management, intended and implemented for greater alignment, speed and economy in the execution of the processes, in order to obtain greater effectiveness in the delivery of the events. In practice, however, these measures to improve the interaction between the different levels of government did not work as expected, and problems persisted until the events were over. The same happened in relation to the interaction between the public and the private sector.

In 2013, the Confederations Cup took place in 6 large Brazilian cities. The competition to host the matches began in 2009 and ended only in 2011, when FIFA announced the venues of the tournament. The fierce dispute among Brazilian cities highlighted the importance that local leaders and governments attached to such events. The Brazilian government participated in different ways, from providing financial support for the construction of sports venues to security, telecommunications, transportation, business and tourism infrastructure. The Brazilian Agency for the Promotion of Exports and Investments (Apex-Brasil), for example, brought over international busi-

ness executives around the tournament, with the aim of contributing to domestic job creation and income generation. This Agency acted to promote Brazilian products and services abroad and to attract foreign investment to strategic sectors of the Brazilian economy. FIFA and the Brazilian government celebrated the stadium attendance (over 50,000 people per game, on average) and the financial success of the event (Brasil, 2013).

The Confederations Cup, however, did not proceed without problems. The competition period was marked by popular demonstrations in the main cities of the country. Among the concerns of protesters were: the reduction of fares and improvement of public transport, the improvement of public safety, the fight against corruption, and greater investments in education and health. In addition, demonstrators criticized high spending on the World Cup and the Rio 2016 Olympics. Numerous clashes between police and demonstrators took place near the stadiums. The media gave visibility to the events, and the images travelled throughout the country and the world, showing the dissatisfaction of a significant part of the Brazilian population with the holding and handling of these events.

The Brazilian government, though criticizing the episodes of violence and damage to public and private property, considered the demonstrations as expressions of the democracy recently installed in the country. In response to the criticisms of World Cup and Olympics expenditures, the Executive Secretary of the Ministry of Sport stated that the legacy being built by all public and private entities involved in the planning of these events rightly contemplates the aspirations of the Brazilian population, as expressed by the demonstrators (Fernandes, 2013, p. 22).

Regarding the major sports events held in Brazil, however, there was no participation of the population in the decision-making process at any stage: bid, organization, accomplishment, or management of the legacy. In fact, the organizing committees of sports events held in Brazil have often used the results of opinion polls to justify and legitimize their actions and decisions. This procedure falls far short of what is desired for events that substantially affect people's lives and involve, as in the case of Brazil, huge public investments.

The period following the Confederations Cup was one of uncertainty over the completion of stadiums and other works planned for the 2014 World Cup. The preparations for this event required major participation from the Brazilian government, especially in terms of financial support. In the construction and renovation of the stadiums, R\$8.38 billion was spent, of which R\$3.81 billion was financed by the National Bank for Economic and Social Development (BNDES), R\$3.95 billion in local government investments, and R\$611 million in private investments. Investments for the event totalled R\$27.1 billion. This amount includes construction for urban mobility, ports, airports, security, telecommunications, tourism infrastructure and complementary facilities for the event (Brasil, 2014a).

The Football World Cup involved twelve Brazilian cities. Eighteen cities applied to host the matches, with FIFA experiencing difficulty in making their choice due to the great dispute between the candidates. To meet the pressures of the states and municipalities, and to recognise the Brazilian government's intention to promote urban change and to expose the country's large cities to the world, twelve cities were chosen instead of eight, as originally required by FIFA.

The Brazilian government raised expectations that the Cup would bring a considerable financial return to the country, especially in tourism. The Brazilian Tourism Institute (EMBRATUR) set itself the goal of attracting 600,000 tourists to the World Cup. In October 2013, a campaign began to improve the country's image abroad, so that foreign tourists would not fear the protests, airport problems and abusive hotel prices.

For FIFA, the Cup was a financial and public success. The event had a total attendance at the stadiums of 3.42 million people, with an average of 53,500 spectators per game – the second largest totals in the history of the World Cup. (The largest was in the United States in 1994, with 3.58 million people.) In the Fan Fest, organized in the 12 host cities, 5.15 million people were present. In financial terms, the World Cup generated a total revenue of US\$4.8 million for FIFA and incurred total expenses of US\$2.2 million, thus leaving a profit of US\$2.6 million (Fédération Internationale de Football Association, 2014a, 2014b, 2015).

The Brazilian government considered the World Cup an absolute success. In the governmental view, the country won the Cup outside the football field, with investments in airports, ports, urban mobility and multipurpose arenas that remained for Brazilian society as legacies.

Dilma Rousseff, who was elected Brazilian president in 2010 to replaced Lula, stated that the success of the World Cup was a victory for the Brazilian people and government, and to highlight the greatness of the event she called it: “the Cup of Cups” (Brasil, 2014b). She said that it had been necessary to go through a delicate moment of preparation for the event, facing an atmosphere of mistrust and pessimism that the World Cup would not be successful. For the Brazilian government, this atmosphere of pessimism had been artificially created by sectors of the mainstream media with the support of Brazilian elites and political opponents who would be dissatisfied with a governmental success in the event.

In the years following the Football World Cup, attention was focused on the Olympic and Paralympic Games. The Bid proposal presented to the IOC by the Rio 2016 Bid Committee provided for various infrastructure and social projects for the city of Rio de Janeiro, which would receive financial support from the Federal Government (Comitê de Candidatura Rio 2016, 2009). The urban and environmental legacies, considered an inseparable unit by the Brazilian government, were related to improvements in public transportation, safety, air quality, and water pollution, among others. As a consequence, many infrastructural works were carried out in Rio de Janeiro, many of them in areas of low-income communities.

The displacement and resettlement of urban populations resulting from works for the 2016 Olympics, but also for the 2014 Football World Cup, was one of the critical aspects of the arrival of sports mega-events in Brazil (Reppold Filho, 2008, 2013). Within a model of sporting events such as Olympism, that values citizenship and human rights, local populations should not be displaced to regions that present even worse conditions than those in which they already live. A fundamental aspect should be to guarantee resettlement with infrastructure in appropriate conditions, with access to schools, health, transportation, sports and leisure. Advance notice is also important, and time must be given for people to accept and to organize their changes. In poor areas, many people do not own their homes and compensation be-

comes difficult. There are many records of violations arising from urban works and sports infrastructure for the Olympic Games and the Football World Cup in Brazil (Rolnik, 2016).

On the positive side, the sports legacy was characterized by the expansion of sports practice and physical activity for the Brazilian population. In addition, investments in financing sport projects and building sports facilities were intended to favour the performance of Brazilian athletes in future international competitions. The social legacy referred also to social inclusion and the well-being of the low-income population, especially through educational sports. The main focus was on young people.

After winning the bid for the 2016 Games, the Brazilian government prepared a strategic plan for high-performance sports. In 2009, a survey was conducted on the difficulties faced by Brazilian sport (Brasil, 2009a, 2009b). The results pointed to:

- a) disarticulation of the bodies that constitute the national sports system (Federal, State, Municipality, Olympic and Paralympic Committees, Sport National Federations and sport clubs),
- b) devaluation of the clubs that acted in the formation of athletes,
- c) deficiencies in grassroots sport projects, particularly in schools,
- d) underutilization of financial resources available for sport,
- e) low quality and shortage of sports equipment and facilities.

In 2010, the Ministry of Sport organized the 3rd National Conference on Sport. This meeting, which brought together representatives of all national sports bodies, approved a recommendation for the Brazilian government: Brazil should be among the ten most successful countries in the Olympics and among the top five in the Paralympics. The idea was to make the country a sports power.

As well as an increase in the number of medals won in the Olympics and Paralympics, the notion of sports power also involved:

- a) to win more medals and rank more athletes in the first eight positions in world and continental competitions,
- b) to have more people and types of sports being practiced among the population,
- c) to improve the level of coaches, referees and multidisciplinary teams,
- d) to professionalize the management of sports organizations,
- e) to develop the national sport base, and
- f) to build new sport centres and training facilities, and to renew existing provision.

In the face of this challenge, the plan for high performance sport was organized on three pillars:

- 1) supporting the Olympic and Paralympic sports,
- 2) building the National Training Centres Network, and
- 3) expanding sport practice in the country.

To support Olympic and Paralympic sports, the Brazilian government put into practice two main projects: the *Bolsa Atleta* (Athlete Grant) and the *Brasil Medalhas 2016* (Brazil 2016 Medals). Although the *Bolsa Atleta* had been running since 2005, focusing on direct financial support for athletes, the program was restructured and expanded by the Ministry of Sport. By 2015, there were about 6,100 athletes receiving this financial support, distributed in different categories of grants, from base to elite sport. In the *Atleta Pódium* (Athlete Podium), the top grant category, for athletes of individual sports with chances of getting medals, 261 athletes were supported.

In 2012, to achieve the goals set for Brazilian athletes at the 2016 Olympics and Paralympics, the Brazilian government launched the Brasil Medalhas 2016. This Plan established an investment of R\$1 billion in sport (R\$390 million for Training Centres and R\$610 million to support athletes). This support covered all the aspects that contribute to the athlete's performance, from the costing of its coaches and multidisciplinary teams, to the acquisition of sports equipment, training in Brazil and abroad, and participation in international competitions.

In order to build a National Training Centres Network, the government set a plan to integrate the sport training facilities with the work of national sports organizations. In gymnastics, for example, 16 training centres were structured in 13 states. For wrestling, equipment was distributed across the country. Judo received a Judo Training Center and equipment for projects in all Brazilian states. Sport clubs received funds to invest in infrastructure and the preparation of athletes.

In relation to extending sports practice for the population, the Initiation Sport Centres (CIE) were created in 2014, consisting of multisport gyms for the practice of up to 13 Olympic and six Paralympic sports (285 units were contracted in 263 cities). The concept of the CIE was to expand the public sport provision, encouraging the practice of sports in areas of social vulnerability. The purpose announced by the Brazilian government was that such facilities would enable the democratization of access to sport to children and young people who could learn and practice, increasing their repertoire in new sports. Those who excelled would migrate their training to the Regional Training Centres and the best of those to the National Training Centres. There was also the approval of contracts for the construction and coverage of 9,817 sports courts and facilities in 3,807 cities, totalling R\$3.8 billion in investments. By June 2017, many of these sport facilities were still in planning or under construction.

The Brazilian candidature for the 2016 Olympics also provided for an Olympic Education program with national impact, as did previous Games hosts (see Moun-takis, 2016). This, however, did not happen as planned. This fact can be characterized as a major negative point in the government's actions. In 2014, the Organizing Committee of the Rio 2016 Olympic and Paralympic Games started the Rio 2016 Education Program, entitled 'Transforma'. It was only in July 2015, about a year before the Olympic and Paralympic Games, that the Organizing Committee signed an agreement with the Ministry of Education so that the program could be taken to the primary and secondary schools of the country's public education networks. However, the agreement was expected to close in December 2016 – so the program was planned to last only one year and a half. By the time of the Olympic Games, in August 2016, the project had reached only the Federal Capital District and 3 of the 26 Brazilian states – Rio de Janeiro, São Paulo and Minas Gerais (Tepedino, 2016). It cannot be expected that an Olympic education program of such short duration, and limited to such a few states, could have a significant impact on the Brazilian population of children and young people.

FINAL REMARKS

The Brazilian government considered sports mega-events as opportunities for the great changes that it intended for the country, seeing their legacies as a central point in its general strategy of economic, social and political development.

Based on this understanding, the Brazilian government implemented a development plan that, under the concept of the nationalization of the benefits of major sporting events, provided for the dissemination of investments in the construction and modernization of urban infrastructure beyond Rio de Janeiro and the 12 cities that hosted the FIFA Football World Cup. The vision was that the planned benefits for the large Brazilian cities involved directly with these sport events should branch out to the surrounding areas and cities, creating a dynamic effect of the local and regional economy and promoting social benefits for the entire population.

The Brazilian government also used sports mega-events as instruments for foreign policy and public diplomacy. The intention was to improve the country's reputation and international image, increase Brazilian influence in the world and create business opportunities for its companies. Sport events were opportunities to show the world a modern, democratic, multicultural and peaceful nation, with a dynamic economy.

In relation to sports, the vision was to take Brazil to the level of a sports power. The proposal consisted of building and modernizing sports facilities and equipment, supporting the development of high-performance sports, expanding infrastructure and fostering projects for sports and physical activity throughout the country, especially for the populations of low income.

The closing of the Paralympic Games in Rio de Janeiro and the economic and political crisis that affected the country in the months leading up to the Olympic Games, which culminated in the impeachment of President Dilma Roussef, also represents the end of the so-called "decade of sports mega-events" and a cycle of Brazilian sports policy. Attention now turns to the legacy that sports mega-events have left for the country.

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A physical activity barriers questionnaire for youth with visual impairments

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ABSTRACT

Background. In the current paper we examined the psychometric properties of the Physical Activity Barriers Questionnaire for children with Visual Impairments (PABQ-VI). We examined evidence for the ability of the PABQ-VI to produce scores considered to be valid and exhibit internal reliability.

Methods. Forty one children living in the USA who were attending a residential sports camp participated in our research. Psychometric properties of the PABQ-VI were investigated using Pearson product-moment coefficients, Cronbach's alpha and split-half reliability tests. Convergent validity was established by exploring correlations between the PABQ-VI, physical activity (PA) levels and participant's self-efficacy for overcoming barriers.

Results. Participants demonstrated low PA levels. Both PA participation and barrier PA self-efficacy scores were correlated with the PABQ-VI. The most physically active participants perceived fewer barriers and had stronger efficacy compared to participants who were less physically active.

Conclusions. Overall, the PABQ-VI demonstrated preliminary evidence of convergent validity. Future researchers may consider reducing participant burden by reducing the scale length through eliminating the most poorly performing items and examining the three-factor structure using factor analysis.

KEYWORDS

exercise; disability; adapted sport; blind

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INTRODUCTION

Children and adolescents with visual impairments (VI) tend to be sedentary and engage in low levels of physical activity (PA) in absolute levels and relatively when compared to comparably aged peers (Augestad & Jiang, 2015; Greguol, Gobbi, & Carraro, 2014; Haegele & Porretta, 2015; Lieberman, Byrne, Mattern, Watt, & Fernandez-Vivo, 2010). The reasons for low PA range from limited opportunities to be active, especially when young (Greguol, Gobbi, & Carraro, 2014; Perkins, Columna, Lieberman, & Bailey, 2013), which can promote developmental delays in motor skill acquisition. Additionally a lack of fitness, poor and inefficient gait patterns, and psychosocial variables (e.g., lack of interest, few friends) contribute to limited PA (Lieberman, Byrne, Mattern, Watt, & Fernandez-Vivo, 2010; Wagner, Haibach, & Lieberman, 2013).

However, researchers have indicated that youth with VI can achieve healthy levels of fitness and adequate motor skills when they engage in PA (Perkins, Columna, Lieberman, & Bailey, 2013). In order for educators and parents to provide quality PA opportunities it is helpful to understand the most common PA barriers that limit youth with VI from participating in PA. Identifying these barriers early in life is critical because childhood PA experiences influence later life PA participation (Telama, Yang, Leskinen, Kankaanpää, Hirvensalo, Tammelin, Viikari, & Raitakari, 2014).

In a recent literature review on PA and school-aged children with VI, Haegele and Porretta (2015) urged researchers to conduct theory-driven PA interventions that address barriers over multiple domains. However, research that can guide PA interventions is constrained by a lack of scales that can be used to identify PA barriers among youth with VI. Current measures such as the Exercise Benefits and Barriers Scale (Sechrist, Walker, & Pender, 1987) and the Perceived Barriers to Exercise Scale (Salmon, Owen, Crawford, Bauman, & Sallis, 2003) do not address barriers unique to people with VI. For example, barriers relating to policy, accessibility, a lack of sight, and fear of stigmatization are missing from the above noted scales (Kissow, 2015; Shields, Synnot, & Barr, 2012). Although two PA barrier scales have recently been developed for people with VI both scales were developed specifically for adults and fail to address barriers specific to children and adolescents (Jaarsma, Dekker, Koopmans, Dijkstra, & Geertzen, 2014; Lee, Zhu, Ackley-Holbrook, Brower, & McMurray, 2014).

Children spend a large proportion of time at school or with peers, and therefore perceive barriers that adults with VI do not encounter. Similarly, we know that parental support heavily influences the PA levels of children with VI (Greguol, Gobbi, & Carraro, 2014; Perkins, Columna, Lieberman, & Bailey, 2013; Stuart, Lieberman, & Hand, 2006). Hence, parent-linked barriers such as over-protection and beliefs that children can't participate in PA contribute to the barriers experienced by youth with VI. For these reasons, questionnaires developed for adults are not ideal for research involving youth with VI.

To facilitate future research on PA barriers of youth with VI, the Physical Activity Barriers Questionnaire for Children with Visual Impairments (PABQ-VI) was developed (Armstrong, Lieberman, Guerrero, & Martin, in review). While the PABQ-VI demonstrated initial adequate validity and reliability, a small sample size was a weakness and additional research examining validity and reliability is needed. The PABQ-VI is based in social cognitive theory (SCT) and initial research (Armstrong, Lieberman, Guerrero, & Martin, in review) indicates it can produce scores that provide

evidence of validity and reliability. In the current study we extended prior work on the PABQ-VI (Armstrong, Lieberman, Guerrero, & Martin, in review) and provided additional evidence of its ability to produce scores deemed valid and reliable.

The PABQ-VI is based on Bandura's SCT which asserts that a person's behavior, their environment and personal factors all exert reciprocal influences on each other (Bandura, 2004; Ramirez, Kulinna, & Cothran, 2012). SCT recognizes that health behaviors are influenced by an individual's outcome expectations, goals and perceived barriers, in addition to their self-efficacy (SE; Bandura, 2004). Researchers have found that SE directly predicts PA and related SCT constructs such as perceived barriers (Ayotte, Margrett, & Hicks-Patrick, 2010). In other words, if a person has low SE, they are likely to perceive many barriers to PA, exhibit low outcome expectations, have difficulty establishing PA related goals and ultimately avoid PA participation (Allison & Keller, 2004; Ayotte, Margrett, & Hicks-Patrick, 2010).

In the current study we continue to examine validity (i.e., convergent) by examining if the PABQ-VI is positively linked to PA and self-efficacy. We also employed a larger sample to achieve these purposes relative to the initial validation sample (Armstrong, Lieberman, Guerrero, & Martin, in review).

METHODS

Participants

Participants were a convenience sample of 41 youth with VI (18 F, 23 M), aged from 8 to 18 years ($M = 12.98$), who attended a sports camp in America in 2015 (see Table 1). The B1–B4 classification system (United States Association of Blind Athletes, 2016) was used to classify level of vision, because this was the system used to enroll children in the American camp. B1 classification refers to no functional vision and B4 refers to visual acuity from 20/200 up to 20/70 in the better eye with correction, or a visual field of greater than 20 degrees. Gender breakdown via classification was as follows: B1 (6 F, 3 M), B2 (5 F, 5 M), B3 (5 F, 11 M), B4 (2 F, 4 M).

Instrumentation

Physical Activity. The Physical Activity Questionnaire for Children and Adolescents (PAQ-C/-A) (Kowalski, Crocker, & Donen, 2004) was used to assess participant's PA levels. This questionnaire has been used previously among youth with VI and shown evidence it can produce scores considered valid and reliable (Greguol, Gobbi, & Carraro, 2014).

PABQ-VI. The Physical Activity Barrier Questionnaire-Visually Impaired (Armstrong, Lieberman, Guerrero, & Martin, in review) was used with minor changes made to the wording of four items (items 4, 23, 32, 34) to better suit an American audience. For example, the term *play-time* was replaced with *recess* in item 23. An open-ended question was included at the end of the PABQ-VI, allowing children to report additional barriers to PA. The anchors for the 5-point likert scale used in this study were as follows, 1 = strongly disagree and 5 = strongly agree.

PASES. The Physical Activity Self-Efficacy Scale contains eight items and participants responded by circling 'yes' 'unsure' or 'no'. For example, item 1 from the PASES was "I can be physically active most days after school".

Test administration and data analysis

Upon receiving ethical approval, trained camp counselors, who were paired one-on-one with campers throughout the week, dictated the PABQ-VI to their campers using identical scripts. Large print copies were provided to participants who wished to read along and braille versions were also available. Data analysis was completed using IBM SPSS version 21. No estimation or adjustments were required for missing items.

RESULTS

Descriptive statistics can be found in Table 1a and Table 1b. An independent-samples t-test was run to see if there were any differences in PABQ-VI, PAQ or PASES scores for level of vision, gender or age. Homogeneity of variances was confirmed for all comparisons based on Levene's Test for Equality of Variance ($p > 0.05$), except for the comparison of male vs female PASES scores. Effect-sizes (r) were also calculated.

Table 1a Participant Demographics and Measurement Scores

| Characteristic | n ($M \pm SD$) ^a | Range | VAR ^b |
|-----------------|---------------------------------|--------|------------------|
| Gender | | | |
| Male | 23 | | |
| Female | 18 | | |
| Level of vision | | | |
| B1 | 9 | | |
| B2 | 10 | | |
| B3 | 16 | | |
| B4 | 6 | | |
| Age | 12.98 \pm 2.286 | 10.00 | 5.22 |
| PAQ Score | 2.26 \pm 0.583 | 2.34 | 0.34 |
| PABQ-VI Score | 154.15 \pm 25.67 | 103.00 | 659.18 |
| PASES Score | 1.50 \pm 0.435 | 1.50 | 0.19 |

^a Mean \pm Standard Deviation

^b Variance

Table 1b Ms, SDs for all variables

| Vision Level | PABQ-VI | PASES | PAQ |
|--------------|--------------|-------------|-------------|
| B1 | 167.8 (19.1) | 1.75 (0.25) | 2.42 (0.48) |
| B2 | 150.2 (28.1) | 1.46 (0.35) | 1.83 (0.58) |
| B3 | 156.9 (24.6) | 1.43 (0.50) | 2.53 (0.43) |
| B4 | 132.8 (22.6) | 1.17 (0.46) | 2.04 (0.71) |

For the PAQ assessing PA levels, significant differences existed between groups B1 and B2 as well as B2 and B3. Children with B1 vision were more active ($M = 2.42$, $SD = 0.477$) than children with B2 vision ($M = 1.83$, $SD = 0.58$); $t(17) = 2.40$, $p = 0.028$; effect-size $r = 0.5$, and children with B3 vision were also more active ($M = 2.53$, $SD = 0.425$) than those with B2 vision ($M = 1.83$, $SD = 0.58$); $t(24) = -3.56$, $p = 0.002$; effect-size $r = 0.57$.

For PABQ-VI scores, significant differences were identified for level of vision, between groups B1 and B4, and groups B3 and B4 only. Children in the B1 group ($M = 167.78$, $SD = 19.13$) had significantly higher PABQ-VI scores (fewer barriers) compared to those with B4 vision ($M = 132.83$, $SD = 22.59$); $t(13) = -3.230$, $p = 0.007$; effect-size $r = 0.64$. Similarly, children with B3 vision scored higher on the PABQ-VI ($M = 156.94$, $SD = 24.61$) than those with B4 vision ($M = 132.83$, $SD = 22.59$); $t(20) = 2.09$, $p = 0.05$; effect-size $r = 0.45$. Between-group differences were also found for gender, with males reporting significantly fewer barriers (higher PABQ-VI scores) ($M = 163.70$, $SD = 22.46$) than females ($M = 141.90$, $SD = 24.84$); $t(39) = 2.94$, $p = 0.006$; effect-size $r = 0.42$.

For PASES, significant differences were found for level of vision, between groups B1 and B4 only. Children in the B1 group scored higher on the PASES ($M = 1.75$, $SD = 0.251$) compared to children in the B4 group ($M = 1.17$, $SD = 0.460$); $t(13) = 3.20$, $p = 0.007$; effect-size $r = 0.62$. Boys also scored significantly higher on the PASES ($M = 1.65$, $SD = 0.344$) compared to girls ($M = 1.31$, $SD = 0.47$); $t(30) = 2.56$, $p = 0.016$; effect-size $r = 0.38$. Homogeneity of variance could not be assumed for this gender comparison, according to Levene's Test for Equality of Variances ($p = 0.037$), so separate variances were used.

Similar to the initial PABQ-VI validation study, the frequency distribution of likert-scale responses from the PABQ-VI was skewed in the positive direction and the median response across all items was 4, corresponding to the label 'I agree'.

Convergent validity

PABQ-VI scores were correlated with PA levels ($r = 0.44$, $p < 0.01$, effect-size $r^2 = 0.2$) and the PASES ($r = 0.66$, $p < 0.01$; effect-size $r^2 = 0.44$), meaning that participants who were active and had high levels of PA self-efficacy perceived fewer PA barriers. Active participants also demonstrated higher PA self-efficacy ($r = 0.32$, $p < 0.05$; effect-size $r^2 = 0.1$). These correlations provide some evidence of convergent validity.

Item-total correlations for the PABQ-VI subscales

Item-scale correlations for the PABQ-VI sub-scales are provided in Table 2. Personal scale items correlated most strongly with their intended subscale with a few cross-loadings. Similarly, all environmental barrier items correlated most strongly with the environmental subscale, with the exception of item 31. Ten social barrier items correlated most strongly with the social subscale as expected, although the eight remaining social items correlated more strongly the remaining subscales or no subscale at all. In total, eight items (items 3, 11, 12, 14, 19, 25, 28, 31) did not correlate significantly with the PABQ-VI as a whole and five of these were reverse-scored items.

Table 2 Item-total correlations for PABQ-VI subscales

| Item | | PER* | SOC* | ENV* | Total* |
|-------------------|--|----------------|----------------|----------------|----------------|
| Personal Barriers | | | | | |
| 1 | I believe physical activity is important. | 0.660** | 0.364* | 0.372* | 0.503** |
| 2 | I feel motivated to do physical activity. | 0.618** | 0.364* | 0.400** | 0.502** |
| 3 | I think I have enough time after homework and chores to do physical activity. | 0.471** | 0.110 | 0.122 | 0.234 |
| 4 | I know how to do physical activity if I want to. | 0.459** | 0.278 | 0.401** | 0.419** |
| 5 | I believe I can do physical activity even though I have a visual impairment. | 0.535** | 0.352* | 0.337* | 0.447** |
| 6 | Sport and physical activities are fun because I'm good at them. | 0.475** | 0.350* | 0.316* | 0.421** |
| 7 | I feel confident to try new sports and physical activities. | 0.549** | 0.501** | 0.534** | 0.598** |
| 8 | I like how my body looks and feels when I do physical activity. | 0.675** | 0.328* | 0.418** | 0.510** |
| 9 | I'm scared to get hurt when I do physical activity. | 0.512** | 0.505** | 0.346* | 0.512** |
| 10 | Physical activity and sports are fun. | 0.627** | 0.314* | 0.405** | 0.485** |
| 11 | Physical activity makes me very tired because I have a visual impairment. | 0.417** | 0.121 | 0.254 | 0.277 |
| 12 | My vision impairment does not keep me from doing physical activity. | 0.537** | 0.111 | 0.243 | 0.302 |
| Social Barriers | | | | | |
| 13 | My parents have time to do physical activity with me. | 0.301 | 0.659** | 0.306 | 0.504** |
| 14 | My parents show me how to do physical activity. | 0.091 | 0.502** | 0.097 | 0.289 |
| 15 | My parents encourage me to do physical activity. | 0.343* | 0.532** | 0.248 | 0.436** |
| 16 | My parents can afford for me to do sport and physical activity. | 0.249 | 0.429** | 0.499** | 0.465** |
| 17 | My parents expect me to do physical activity. | 0.568** | 0.710** | 0.626** | 0.734** |
| 18 | My parents believe that physical activity is just as important as school. | 0.259 | 0.463** | 0.297 | 0.401** |
| 19 | My parents worry about my safety when I do physical activity. | 0.073 | 0.155 | -0.080 | 0.057 |
| 20 | Physical activity is important to my parents. | 0.358* | 0.648** | 0.427** | 0.565** |
| 21 | My parents have time to take me to sport even if my brothers or sisters also play sport. | 0.234 | 0.391* | 0.392* | 0.401** |
| 22 | My parents have a way to get me to places to do sport or physical activity. | 0.452** | 0.334* | 0.409** | 0.445** |
| 23 | My classmates include me in games and physical activities during play time. | 0.379* | 0.690** | 0.551** | 0.640** |

| | | | | | |
|------------------------|---|----------------|----------------|----------------|----------------|
| 24 | I know other children who will do physical activity with me. | 0.145 | 0.513** | 0.346* | 0.410** |
| 25 | Other kids have made fun of me during sports or physical activity. | 0.351* | 0.291 | 0.141 | 0.288 |
| 26 | My teachers expect me to do physical activity just like everyone else. | 0.273 | 0.566** | 0.574** | 0.564** |
| 27 | My PE teacher encourages me to do physical activity. | 0.348* | 0.623** | 0.665** | 0.648** |
| 28 | My teacher worries about my safety when I do physical activity. | 0.154 | 0.381* | 0.061 | 0.239 |
| 29 | My PE teacher makes changes to games and activities so I can participate. | 0.273 | 0.453** | 0.423** | 0.452** |
| 30 | My PE teacher includes me in games and physical activities. | 0.304 | 0.534** | 0.579** | 0.560** |
| Environmental Barriers | | | | | |
| 31 | People in my community don't expect that I can do physical activity. | 0.069 | 0.183 | 0.165 | 0.169 |
| 32 | I know about opportunities to do physical activity outside of school. | 0.698** | 0.536** | 0.746** | 0.742** |
| 33 | There are sport programs or physical activities available in my community. | 0.541** | 0.376* | 0.696** | 0.606** |
| 34 | There are sighted guides who can help me do physical activity in my community. | 0.237 | 0.390* | 0.509** | 0.449** |
| 35 | There are sports or activities that I can join which are close to home. | 0.527** | 0.490** | 0.792** | 0.692** |
| 36 | There are places in my community that are safe for me to do physical activity. | 0.526** | 0.718** | 0.790** | 0.792** |
| 37 | Sports clubs in my community allow me to join even though I have a visual impairment. | 0.522** | 0.567** | 0.828** | 0.739** |
| 38 | I have sports equipment at home that I can use to be physically active. | 0.405** | 0.546** | 0.789** | 0.680** |
| 39 | There are spaces at home that are safe for me to do physical activity. | 0.411** | 0.663** | 0.753** | 0.719** |
| 40 | I have to participate in PE class because it is a school rule. | 0.214 | 0.368* | 0.432** | 0.401** |
| 41 | My school have physical activity equipment for people with visual impairment. | 0.276 | 0.203 | 0.511** | 0.377* |
| 42 | My school has sport teams and physical activity clubs that I can join if I want to. | 0.448** | 0.544** | 0.667** | 0.642** |

Note: Items that did not correlate significantly with any subscale are highlighted in grey; Significant correlations are in boldface, except in cases where cross-loading has occurred and the difference between correlations is greater than 0.20; ** Correlation is significant at the 0.01 level (2-Tailed); * Correlation is significant at the 0.05 level (2-Tailed). PER = Personal barriers, SOC = Social barriers, ENV = Environmental barriers, Total = Total PABQ-VI score.

Internal consistency reliability

The PABQ-VI demonstrated good internal consistency with a Cronbach's alpha coefficient of 0.92 and split half reliability of 0.87. When analyzed as separate scales, the environmental subscale was most internally consistent ($\alpha = 0.86$, split-half reliability = 0.83), followed by the social ($\alpha = 0.81$, split-half reliability = 0.67) and personal subscales ($\alpha = 0.77$, split-half reliability = 0.78). Mean inter-item correlations were reasonable (0.54, 0.50 and 0.63) for the personal, social and environmental subscales, respectively.

DISCUSSION

As noted by Hubley and Zumbo (2011) validation is a continuous process that involves lots of different types of evidence to illustrate if scores produced within a given context by a particular sample are supportive of validity and reliability. Further, they emphasize that validity concerns the interpretation and consequences of the test scores and is not a fixed or static property of the measure itself (Hubley & Zumbo, 2011). Hence the current sample and context in which the present findings are based is important for the reader to bear in mind. Future researchers using the PABQ-VI should always remember that the current scale assesses a theoretical construct (PA barriers) and is designed to produce scores relevant to children with VI.

Findings from the current study mostly align with the findings from the initial research study (Armstrong, Lieberman, Guerrero, & Martin, in review) as PABQ-VI responses were positively skewed in the current study, increasing from 'strongly disagree' to 'strongly agree', with the median response being 'I agree'. The tendency for participants in both studies to respond agreeably with PABQ-VI items might reflect that in both studies participants were enrolled in VI-specific sports camps whose goal it was to engage camp participants in PA. Nonetheless, the PABQ-VI was able to yield a consistent distribution of responses across both samples.

In the current study the highest ranked questions were items 1, 4 and 5 (all personal barriers). This finding mirrored the same finding from the initial validation study (Armstrong, Lieberman, Guerrero, & Martin, in review). The finding suggests that both Irish and American children recognize PA as important (item 1); believe they can be active regardless of their VI (item 5) and are aware of ways to do PA (item 4). Item 5 (I believe I can do PA even though I have a VI) was the absolute highest scoring item, with 71.4% of participants in Study 1 and 82.9% of participants in Study 2 responding with 'strongly agree'. This consensus across both studies may reflect that children with VI do not consider their VI as a major barrier to PA, but perceive other factors as most limiting (Greguol, Gobbi, & Carraro, 2014; Perkins, Columna, Lieberman, & Bailey, 2013).

In support of the latter idea, findings from the current study and initial validation study indicate that both social and environmental factors such as a lack of sighted guides (item 34), parents' concerns for safety (item 19), PE teachers' ability/willingness to adapt activities (item 29) and a lack of specialized PA equipment at school (item 41) are important. These findings are supported by current barrier research that has identified parent, peer and teacher-related barriers as well as policy and environmental barriers as pertinent to children with VI (Greguol, Gobbi, & Carraro, 2014; Stuart, Lieberman, & Hand, 2006). Collectively, our findings provide preliminary evidence of validity in support of the PABQ-VI.

Convergent validity

Our sample demonstrated low levels of PA. Participants in the current study fell below age and gender norms for the PAQ-C/-A (Voss, Ogunleye, & Sandercock, 2013). Despite a tendency toward physical inactivity, children who engaged in more PA perceived fewer PA barriers, which emulates findings from research on people with disabilities including VI (Jaarsma, Dekker, Koopmans, Dijkstra, & Geertzen, 2014) and provides validity evidence.

The PASES was correlated significantly with PABQ-VI scores with a small to moderate effect-size of $= 0.44$, providing evidence of convergent validity.

Differences for gender and level of vision

The PABQ-VI was also able to discriminate between participants based on level of vision and gender. In the initial validation study, participants with low vision were more active and reported fewer PA barriers than those who were blind and that finding was consistent with work by Stuart and colleagues (Stuart, Lieberman, & Hand, 2006) who found that PA barriers differed according to level of vision and, Holbrook et al. who observed that blind participants were less active than those with low vision (Holbrook, Caputo, Perry, Fuller, & Morgan, 2009).

A similar relationship between level of vision and PA was found in the current study with the exception of B1 and B2 classifications. A possible explanation for this might be that the difference in level of vision between B1 and B2 classifications might be insufficient to cause the group with lower vision to be any more limited than those with some vision.

We also found differences in PASES scores for level of vision and gender. The finding that B1 participants had higher PASES and fewer PA barriers than B4 participants was unexpected, but serves as a reminder that a person's perception of barriers and SE for overcoming barriers may be influenced by more than just the severity of VI. In fact, children who are blind have been known to achieve healthy levels of PA when provided with the opportunities to do so (Blessing, McCrimmon, Stovall, & Williford, 1993).

In terms of gender, boys had higher SE and fewer PA barriers compared to girls, but no differences were found for PA level. Aslan, Calik and Kitis (2012) found that boys with low vision were significantly more active than girls with low vision, but this was not true for participants who were blind. Most authors have not identified a gender bias for PA engagement among children with VI, which is a phenomenon that exists among sighted peers (Greguol, Gobbi, & Carraro, 2014). It is possible that the absence of a gender bias reflects the global lack of opportunities for children with VI to participate in PA, regardless of gender (Shapiro, Moffett, Lieberman, & Dummer, 2005). The significantly higher SE and fewer barriers reported by boys is consistent with findings by Shapiro and colleagues (2005) who found boys to have higher perceived competence for PA compared to girls.

Item scale correlations and the proposed three-factor structure

In terms of item-scale correlations, the PABQ-VI had 10 items that failed to correlate with their intended subscale in the initial validation study. In the current study only 2 items failed to correlate with any of the subscales, including the overall PABQ-VI. These were item 19, "My parents worry about my safety when I do PA", and item 31,

“People in my community don’t expect that I can do PA”. Interestingly, both of these reverse-scored items (19 and 31) did not correlate significantly in the initial developmental study (Armstrong, Lieberman, Guerrero, & Martin, in review) either.

Overall, the majority of items throughout the PABQ-VI correlated with their intended subscale, however a few items cross-loaded (Table 2). Cross-loading is not ideal because it shows that these items are unable to discriminate as intended. However, viewed with a social-cognitive lens, PA barriers that are considered personal and environmental should be expected to interact to influence PA behavior, rather than operating exclusively (Ramirez, Kulinna, & Cothran, 2012).

For example, the item “Physical activity and sports are fun” (item 10), was developed to address the barrier ‘lack of enjoyment of PA’. Although ‘enjoyment’ is a feeling generated from within a person, enjoyment can certainly be contingent on social (e.g., friends) or environmental (a nice well-kept soccer pitch) factors.

In order to demonstrate relevance and utility of the PABQ-VI for children with VI, it is essential to include items across multiple domains to reflect the variety of barriers experienced by this population. However, the decision to interpret PABQ-VI results as a single scale or as three subscales depends on the user’s goals and the context. For example, analyzing data as three separate subscales might be useful when comparing findings across different groups. In contrast, a single barrier score might be appropriate to track general changes in perceived barriers before and after an intervention. The inclusion of an open question at the end of the PABQ-VI allows researchers to identify additional barriers that could be useful to inform PA program development.

The small sample size prevented a factor analysis to examine the proposed three-factor structure of the PABQ-VI. However, given the adequate internal consistency evidence for the three subscales in the current and initial study it is not recommended that any items are deleted from the PABQ-VI at this time.

Limitations

The most obvious limitation to our study was the low sample size. Future researchers should aim for larger samples that allow for more sophisticated analyses and to reliably reduce scale length by losing the most poorly performing items. A greater diversity of participants would be beneficial in the future to test the generalizability of results. The PAQ-C/PAQ-A is a subjective self-report scale so objective measures of PA (e.g., pedometers) are needed to more fully investigate the relationship between PA participation and barriers. Finally, test-retest reliability was not investigated in the current study and data on test-retest would be helpful. Researchers who wish to apply the questionnaire in its preliminary form should be aware of these limitations, interpret results with caution and seek to address these concerns in future studies.

Conclusions and future directions

Despite the aforementioned weaknesses, we showed that the 42-item PABQ-VI has strong potential to identify PA barriers among children with VI across multiple domains. We conclude that the PABQ-VI demonstrates initial evidence of internal consistency and validity when correlated with PA and SE. Furthermore, the frequency distribution of PABQ-VI responses and the ability of the PABQ-VI to discriminate between population sub-groups support the evidence of validity.

In support of a unified validity theory, Hubley and Zumbo (2011, p. 220) argue that validity is “the degree to which all of the accumulated evidence supports the intended interpretation of test scores for the proposed purpose”. Future efforts to validate the PABQ-VI for this purpose will focus on recruiting sufficient participant numbers to investigate the three-factor structure as well as performing item by item analyses and test re-test reliability.

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Anthropometric and somatotype differences between C1 paddlers who were and were not selected for the Czech national team

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ABSTRACT

The objective of this study was to determine the anthropometric and somatotype differences between elite single-canoeists (C1) included in the white-water slalom Czech national team (NT) ($n = 5$) and others ($n = 12$) who did not qualify for the national team (DNQ) leading up to the Olympic Games in Rio de Janeiro, 2016. All paddlers were measured using a battery of 40 anthropometric parameters in one day, 4 weeks before competing in the Czech national selection races. The NT racers had a significantly ($p < 0.05$) greater circumference of the forearm (27.8 ± 0.6 vs. 26.8 ± 1.4) and upper arm (35.60 ± 1.5 vs. 33.5 ± 1.7) for the dominant paddling arm, as well as a greater chest circumference (98.3 ± 2.4 vs. 93.9 ± 2.3). Additionally, the sum of triceps, scapular, calf, and supraspinal skinfolds were significantly less in NT. There were no significant differences in height ($p = 0.14$), body mass ($p = 0.18$) or circumferences of the lower extremities ($p = 0.09$ – 0.32). Somatotype was statistically similar ($p = 0.06$ – 0.13), but practically different (NT = 1.4–5.6–2.3; DNQ = 1.6–4.6–3.1) such as body fat percentage (NT = 7.5 ± 2.3 ; DNQ = 9.1 ± 1.6). Based on the results of this study we can recommend that single-canoeists seeking to achieve elite performance should participate in training that focuses on maximizing the musculature of the upper limbs and chest while maintaining minimal body fat. The current data also shows that experience likely plays a role in national team selection, as NT were an average of 5.5 years older than DNQ.

KEY WORDS

Olympic games; canoe; white water; slalom; high performance athletes

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INTRODUCTION

White-water slalom is a canoeing event in which one must navigate through gates placed on river rapids as quickly as possible. Although the concept of the sport remains the same, white-water slalom competitions have undergone radical development over the past 20 years. For example, the duration of a typical race has shortened from over 200 seconds (s) to approximately 90–110s and the slaloms are becoming faster and more technical. Therefore, it is likely that success in the modern white-water slalom may largely depend on an athlete's strength levels, specifically rapid and explosive strength in the upper body, that is needed to navigate the canoe through hairpin turns within the rapids (Bílý, 2012). As the sport has evolved and the importance of strength and power output increases, it is probable that changes to the somatotypes and key anthropometric parameters of competitors have occurred over the years.

It is well known that somatotype and some anthropometric parameters may indicate whether an athlete would be suitable to participate at the highest level in canoe sprint. Specifically, certain anthropometric variables such as upper body anthropometric variables correlate with paddling performance (Fry & Morton, 1991; Van Someren & Palmer, 2003; Akca & Muniroglu, 2008) and can be used during talent identification as well as providing areas to focus on during training (Gutnik et al., 2015). However, other studies carried out on canoe sprint have failed to find significant relationships between anthropometric parameters and performance on the race track (Dokumaci & Çakir-Atabek, 2015; Van Someren & Howatson, 2008). Therefore, data regarding the relationship between anthropometric measures and performance in canoe sprint has not been completely clarified scientifically. Furthermore, the body of literature is even smaller in white-water slalom, a canoeing event that includes a greater technical aspect and that may not be determined by physical factors to the same extent as in canoe sprint.

Ridge, Broad, Kerr, & Ackland (2007) measured anthropometric variables in 12 kayak racers and 19 canoe racers who took part in the 2000 Olympic games in Sydney, but the authors did not distinguish between the single and double canoe categories, and the somatotype was provided for canoeists and kayakers together. Within that study, the only significant difference between canoeists who placed in the top 10 in the 2000 Olympics and the other competitors was the value of the ectomorphic component of the somatotype (Ridge et al., 2007). In comparison with the 2000 Olympic canoe sprint racers (Ackland, Orng, Kerr, & Ridge, 2003) white-water competitors were smaller (185 ± 6.2 vs. 177 ± 8.0 cm), lighter (84.8 ± 6.2 vs. 73.1 ± 5.9 cm), and had different somatotype ($1.6-5.7-2.2$ vs. $1.7-5.4-2.5$). Vedat (2012) proceeded in the same inconsistent manner, studying the anthropomorphic parameters of the Turkish national kayak and canoe white-water slalom team and presenting the results for all men's kayak and canoe categories together. These categories, however, differ in the demands they place on athletes' strength, and it is thus not appropriate to combine data from the various categories together (Bílý, 2002), as previous researchers have shown that the anthropometric parameters and somatotype are different between kayakers and canoeists (Hagner-Derengowska et al., 2014). In the study by Bílý, Süss, & Buchtel (2011), the categories were properly separated, but the number of anthropometric parameters tracked was very low and the authors used bioelectrical impedance to measure the athletes. Although this method is commonly used, the readings can be

affected by hydration status (Lukaski, Bolonchuk, Hall, & Siders, 1986), consumption of a meal (Slinde & Rossander-Hulthén, 2011), and exercise (Abu Khaled, McCutcheon, Reddy, Pearman, Hunter, & Weinsier, 1988; Dehghan & Merchant, 2008). On the contrary, there are advantages of using skinfold measurements (SKF), which do not require large pieces of equipment, is financially affordable, and is accessible all around the world. The SKF method requires only the skill and experience of the examiner (Riegerová & Ulbrichová, 1993) and the caliper of the right type. Therefore, it is widely recommended (Máček & Máčková, 2011; Garves et al., 2006; Riegerová, Přidalová, & Ulbrichová, 2006) and may be useful to provide more anthropometric measures using a quick and cost-effective method.

Analysis of the literature has shown that there is still a lack of information explaining the anthropometric and somatotype differences between elite white-water paddlers and the wider group of performance paddlers, especially in the single-canoe category (C1). Therefore, the objective of this study was to determine the anthropometric and somatotype differences between 5 elite C1 paddlers who qualified for the Czech national team (NT) and other high performance Czech C1 racers who did not qualify (DNQ).

Findings can help all performance athletes with both short and long term ambitions for the inclusion to the National Team, because they can better understand their own limits or reserves, or they can better target their goals. Our findings can also help in the field of the talent identification and development.

METHODS

A total of 17 male C1 slalom paddlers were measured using a battery of 40 anthropometric parameters before competing in selection races for the Czech national team (the 3 best C1 competitors and 2 alternates were nominated) and for the 2016 Olympic Games in Rio de Janeiro (1 C1 paddler was nominated). Only paddlers competing in the highest Czech competition series – Czech Cup ($n = 38\text{--}42$) with Performance Class I ($n = 20$) could participate in our study. The entire base sample was addressed. Three competitors could not participate because of illness or staying abroad. Selection races are a part of the Czech Cup series every year. All participants read and signed a consent form before participating in the study, which was approved (no. 052/2016) by the ethics committee at the Faculty of Physical Education and Sport in Charles University.

The measurements took place over a single day, 4 weeks before the nomination races for the Czech national team prior to the 2016 Olympic Games in Rio de Janeiro. To eliminate inter-rater variability, all measurements were conducted by a single experienced examiner from the Faculty's Biomedical laboratory. All unilateral measurements were performed on the right side of the body with the exception of the forearm and biceps, which were conducted on the dominant arm in terms of paddling strength (Bílý et al., 2010). Body mass, 7 direct lengths, 7 segmental girths, 7 breadth measurements, 1 depth measurement and 3 calculated ratios were determined according to Norton & Olds (1996), similar to the measurements conducted by Ridge et al. (2007), Ackland et al. (2003), and Bloomfield, Ackland, & Elliot (2003). To determine somatotype, 4 skinfold sites were measured (triceps, scapula, calf and supraspinale) using Harpenden calipers with a precision of 0.1 cm (pressure on skinfold 10.0 g mm²).

The somatotype was calculated using the method of Carter & Heath (1990) using the software programme Somatotype 1.2.5 (available from: <http://goulding.ws/somatotype>). Another 10 skinfold sites were measured (cheek, chin, chest I, triceps, back, abdomen, chest II, hip, thigh, calf) to calculate body fat percentage according to prediction equation by Pařízková (1977) in Riegerová, Přidalová, & Ulbrichová (2006), using Best calipers with a precision of 0.1 cm (pressure on skinfold 28g/mm²).

Independent student's T-tests were conducted in MS Excel 2010 and statistical significance was set at $p < 0.05$ as in the morphological study of 2000 Olympic white-water athletes by Ridge et al. (2007). To assess data normality, the method of comparing the arithmetic mean and median was used (Netolická, 2008).

RESULTS

All data were normally distributed. Descriptive statistics for absolute and relative anthropometric parameters are presented in Table 1. Somatotypes are presented in Figure 1.

Table 1 Statistics for absolute and relative size of anthropometric parameters

| | Competitors included in the national team of the Czech Republic (n = 5) | | Other competitors of 1st and master class that did not qualify for the national team (n = 12) | | Statistical significance of differencec |
|-------------------------------------|---|-------------|---|-------------|---|
| | Mean and SD | Range | Mean and SD | Range | P |
| Age (years) | 26.4 ± 3.9 | 21.2–32.0 | 18.9 ± 3.6 | 16.0–30.0 | 0.007 |
| Body weight (kg) | 76.2 ± 4.4 | 69.2–81.4 | 73.8 ± 4.5 | 65.1–80.7 | 0.18 |
| Body height (cm) | 179.2 ± 1.5 | 176.6–181.1 | 180.9 ± 4.6 | 175.6–191.7 | 0.14 |
| BMI (kg.m ⁻²) | 23.9 ± 1.8 | 21.1–25.9 | 22.6 ± 1.6 | 18.7–24.8 | 0.13 |
| Sitting height (cm) | 93.7 ± 1.5 | 91.8–95.8 | 92.9 ± 2.9 | 87.1–99.7 | 0.23 |
| Sitting height/body height (%) | 52.3 ± 1.0 | 50.5–53.6 | 51.3 ± 0.9 | 49.4–52.9 | 0.08 |
| Arm span (cm) | 187 ± 4.5 | 183.5–195.0 | 186.1 ± 3.4 | 181.0–193.0 | 0.36 |
| Arm span/body height (%) | 104.4 ± 2.0 | 101.9–107.7 | 102.9 ± 1.9 | 99.8–105.8 | 0.11 |
| Arm length (cm) | 33.0 ± 1.6 | 30.5–35.2 | 32.1 ± 1.5 | 29.5–34.2 | 0.18 |
| Forearm length (cm) | 30.0 ± 2.3 | 24.5–30.2 | 26.1 ± 1.2 | 24.5–28.5 | 0.28 |
| Thigh length (cm) | 42.2 ± 3.1 | 37.0–45.5 | 42.6 ± 2.1 | 40.0–47.0 | 0.41 |
| Leg length (cm) | 38.5 ± 2.8 | 35.0–42.5 | 38.2 ± 2.2 | 34.2–42.5 | 0.43 |
| Shoulder breadth (cm) | 39.3 ± 0.8 | 38.0–40.3 | 39.9 ± 1.1 | 38.5–42.0 | 0.14 |
| Anterior-Posterior chest depth (cm) | 20.0 ± 1.2 | 18.2–21.4 | 20.0 ± 1.9 | 17.8–24.0 | 0.45 |
| Humerus breadth (cm) | 7.4 ± 0.3 | 6.8–7.8 | 7.1 ± 0.4 | 6.1–7.7 | 0.12 |
| Femur breadth (cm) | 10.0 ± 0.5 | 9.60–10.7 | 10.0 ± 0.5 | 9.1–10.8 | 0.37 |
| Flexed dominant arm girth (cm) | 35.6 ± 1.5 | 33.1–37.6 | 33.5 ± 1.7 | 30.5–36.0 | 0.020 |
| Flexed dominant forearm girth (cm) | 27.8 ± 0.6 | 27.2–28.6 | 26.8 ± 1.4 | 25.0–29.8 | 0.040 |
| Chest girth (cm) | 98.3 ± 2.4 | 94.0–101.0 | 93.9 ± 4.7 | 85.0–102.0 | 0.016 |

| | | | | | |
|---------------------------------------|------------|-----------|------------|-----------|--------------|
| Waist girth (cm) | 79.2 ± 1.8 | 77.0–82.0 | 77.5 ± 3.5 | 70.0–83.2 | 0.11 |
| Hip girth (cm) | 92.1 ± 2.4 | 88.5–94.7 | 92.8 ± 2.3 | 87.0–95.7 | 0.32 |
| Thigh girth (cm) | 50.3 ± 1.5 | 47.5–52.0 | 48.6 ± 2.9 | 44.5–53.5 | 0.09 |
| Calf girth (cm) | 35.0 ± 1.1 | 33.5–36.2 | 34.7 ± 2.1 | 31.5–38.2 | 0.15 |
| Sum of 4 skinfolds ^a (mm) | 20.6 ± 3.6 | 17.5–27.5 | 24.8 ± 2.0 | 19.5–28.0 | 0.030 |
| Endomorphy | 1.40 ± 0.4 | 1.0–2.0 | 1.6 ± 0.2 | 1.2–1.9 | 0.13 |
| Mesomorphy | 5.6 ± 1 | 4.1–7.0 | 4.6 ± 1.0 | 3.1–6.9 | 0.06 |
| Ectomorphy | 2.3 ± 0.8 | 1.4–3.5 | 3.1 ± 0.9 | 1.9–5.4 | 0.06 |
| Sum of 10 skinfolds ^b (mm) | 49.2 ± 9.9 | 39.0–68.0 | 54.3 ± 5.6 | 43.0–65.0 | 0.18 |
| Body fat (%) | 7.5 ± 2.3 | 6–12.2 | 9.1 ± 1.6 | 4.8–11.8 | 0.13 |

^a Sum of 4 skinfolds by Carter and Heath (1990): triceps, scapula, calf and supraspinale. Measurement conducted to calculate somatotype.

^b Sum of 10 skinfolds by Pařízková (1977): cheek, chin, chest I, triceps, back, abdomen, chest II, hip, thigh, calf. Measurement conducted to establish % body fat.

^c The statistical significance of the difference between the groups of racers on or not on the national team was determined based on the results in nomination races that took place 4 weeks after the anthropometric measurements.

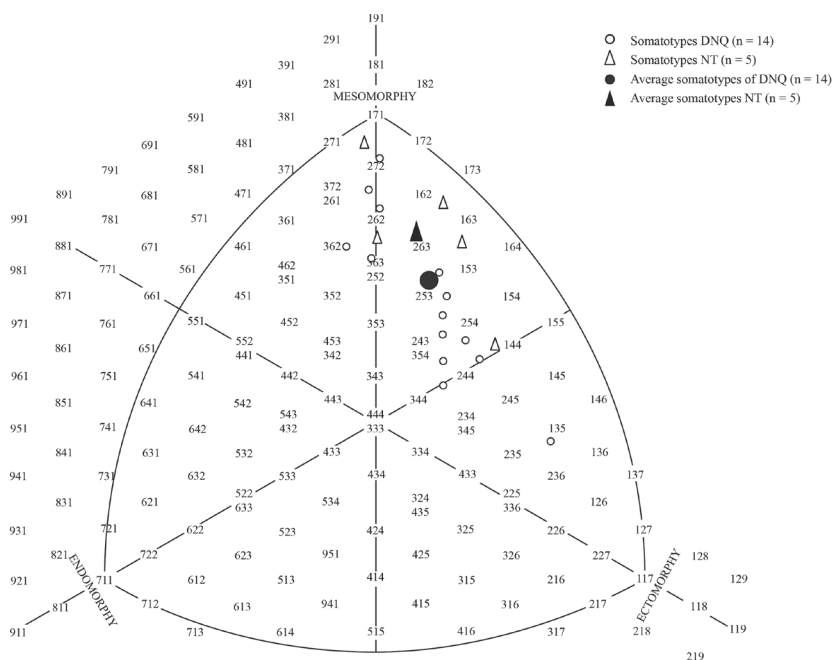


Figure 1 Somatograph of the NT a DNQ competitors

List of abbreviations

- C1 Single-canoe, type of boat
 NT Athletes who were chosen for the Czech national team
 DNQ Athletes who did not qualify for the national team
 SKF Skinfold measurements
 BMI Body mass index

DISCUSSION

NT racers had significantly greater arm and chest girths compared to DNQ racers. Additionally, the sum of 4 skinfolds was significantly less in NT, but body fat percentage using a 10-site body composition equation, total body mass, and limb lengths were not statistically different between NT and DNQ. The lack of differences in lower body circumference measurements and total body mass indicate that upper body musculature play a significant role in elite C1 paddle performance.

The NT paddlers had a greater circumference of the forearm (27.8 ± 0.6 vs. 26.8 ± 1.4 cm), upper arm (35.60 ± 1.5 vs. 33.5 ± 1.7 cm) and chest (98.3 ± 2.4 vs. 93.9 ± 2.3 cm) compared to DNQ. With no differences in total body mass or lower limb circumference, the differences in upper body girth likely contributed to, albeit an insignificant, increased mesomorphic component in NT compared to DNQ ($1.4\text{--}5.6\text{--}2.3$ vs. $1.6\text{--}4.6\text{--}3.1$). It is evident from the somatograph that both the elite and sub-elite racers can be characterised as ectomorphic mesomorphs, which is in agreement with the conclusions of Bílý et al. (2011) and Ridge et al. (2007). It is probable that the NT athletes had more muscle mass in the upper limbs and chest than DNQ, while muscle mass of the lower limbs remains minimal. From a coaching standpoint, an ectomorphic mesomorph somatotype is desirable for C1 paddlers because it allows to the paddler to remain relatively low in body weight while also increasing muscle mass in the upper body to exert more force against the water, enabling quicker acceleration and deceleration of the boat throughout the slalom. Therefore, exaggerating this somatotype by placing a larger focus on upper body resistance training may prove to be beneficial for C1 paddlers.

It is important to note that while the NT racers displayed larger upper body girths than the DNQ racers, this may be partly credited to the fact that the NT paddlers were older than the DNQ racers (26.4 ± 3.9 vs. 18.9 ± 3.6 years). This difference is the result of a number of junior athletes (17 to 18 years old) being among the top twenty Czech racers in the C1 category. This presents a certain limitation to this study, since, although the younger competitors compete at the national level, their bodies may still be developing and their somatotype may not be definitive (Sigmund et al., 2016). We also concur with the conclusions of Ridge et al. (2007) that NT canoeists were older than DNQ. As older athletes tend to be ranked higher than younger athletes, it is likely that experience plays a large role in performance.

Neither the sum of 10 skinfolds (NT = 49.2 ± 9.87 ; DNQ = 54.3 ± 5.60 mm; $p = 0.18$) nor body fat percentage (NT = $7.5 \pm 2.3\%$; DNQ = $9.1 \pm 1.6\%$; $p = 0.13$) displayed a difference between groups. Akca & Muniroglu (2008) reported greater body fat percentages (13.7%) than those in the present study (7.5–9.1%), but noted that body composition was negatively correlated with 500m flat-water sprint times. Also, they used a different anthropometry method for the determination of body fat percentage – the Siri equation application of Durnin & Womersley (1974). Although a direct comparison should not be made between white-water slalom and flat-water sprint, the course distance and physiological requirements of the sport are partly similar. Therefore, it can be recommended that white-water canoe athletes should aim to reduce the amount of body fat, which is supported by the data for NT paddlers in the present study.

Overall the NT racers were similar to the Olympic white-water slalom participants from Sydney 2000 (Ridge et al., 2007) in terms of age (28.1 ± 5.2 years), somatotype (1.7–5.2–2.5), arm span (183.8 ± 7.9 cm) and sitting height (93.0 ± 3.9 cm). We also found similarities to the study of Vedat (2012), in which 10 male white-water athletes from the Turkish National Canoe Team had a mean height of 176.2 ± 5.7 cm, mean body weight of 74.5 ± 10.7 kg and mean values of the somatotype components of 2.2–5.0–2.3. Additionally, the white-water slalom racers of the present study were shorter (~ 180 vs. 184.3 cm), lighter (~ 75 vs. 85.2 kg), and less mesomorphic (~ 1.5 – 5.0 – 2.5 vs. 1.6 – 5.7 – 2.2) than canoe sprinters. Such differences can be attributed to the need for quick acceleration, deceleration, and directional changes in white-water slalom compared to canoe sprint, which may warrant a smaller, lighter body (Ackland, Ong, Kerr, & Ridge, 2003).

Previous studies (Ridge et al., 2007; Vedat, 2012; Bílý, Süß, & Buchtel, 2011) agree with our data, in that white-water slalom racers have an average height of about 170–180 cm and a body mass of 70–80 kg. It has been suggested that a short stature is an identifiable feature of slalom paddlers, as they are among the shortest of all athletes (Norton & Olds, 1996), which is similar to the mean of a reference population of non-athletes (Riegerová, Kapuš, Gába, & Ščotka, 2010). A short stature may be of considerable advantage to the slalom paddler, who is reliant on maintaining a low centre of gravity to increase stability in the constantly changing white-water environment (Ridge et al., 2007). In addition, previous studies have shown that a greater body mass is likely a limiting factor for performance (Ridge et al., 2007; Vedat, 2012; Bílý, Süß, & Buchtel, 2011). Combined, a tall stature and heavy body mass present a problem, as the capacity of contemporary boats is quite small. Another disadvantage for larger athletes is the increased surface area between the boat and the water caused by the boat riding lower in the water, which makes it more difficult to achieve and maintain momentum continuously (Grasgruber & Cacek, 2008). Only 3 paddlers in the present study exceeded 80 kg (80.4 – 81.4 kg) and it is likely that weight reduction occurred prior to competition, as the races took place 4 weeks later. Thus, greater body weight, and the frequently associated greater height, is likely a limiting anthropometric factor for elite and sub-elite performance.

Lastly, there are some limitations in the present study. First, the relatively small sample size (NT = 5, DNQ = 12) may cause concern, but the purpose of the study was to compare the top elite paddlers in the Czech Republic to other elite paddlers. Therefore, the nature of the research questions required the NT sample size to be low, representing the “elite of the elite” in the country. Future research conducted simultaneously in various countries may provide larger sample sizes and may unveil more significant differences, as many *p*-values in the present study ranged from 0.06–0.18. Second, as previously mentioned, the number of elite paddlers under the age of 20 is quite large in the Czech Republic. As a result, differences in somatotype may be partly credited to maturation and not solely to training. Finally, the present study utilized a battery of 40 anthropometric variables, but no physiological or performance measures. Therefore, future research should aim to determine whether the anthropometric parameters separating NT and DNQ paddlers also associate with physical performance in elite C1 paddlers.

CONCLUSIONS

Single canoeists who qualified for the Czech national team (NT) had greater chest, upper arm, and forearm circumferences than DNQ even though they all had very similar weight and height. These differences support a statistically similar, but practically different, somatotype (NT = 1.4–5.6–2.3; DNQ = 1.6–4.6–3.1). NT C1 paddlers had lower body fat percentage by 1.6%. The NT group did not differ from the DNQ group in terms of height, sitting height, weight, arm span, or lower body circumference measurements. Therefore, the results of this study indicate that single canoeists aspiring to reach elite levels should practise strength training with an emphasis on the upper limbs and chest muscles, seek to attain a minimum level of body fat, and minimise hypertrophy of the muscles in the lower limbs.

In line with other studies (Ridge et al., 2007; Vedat, 2012; Bílý, Süß, & Buchtel, 2011) we can suggest that greater body weight, and the frequently associated greater height, is likely a limiting anthropometric factor for elite and sub-elite performance. Only 3 paddlers in the present study exceeded 80 kg (80.4–81.4 kg) and it is likely that weight reduction occurred prior to competition, as the races took place 4 weeks later. Only 1 paddler had more than 190 cm. This can help in talent identification.

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Three models of failed athletic contests

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ABSTRACT

Arvi Pakaslahti's model of failed athletic contests (the Two Ideals Model) and Mika Hämäläinen's most recent model of failed athletic contests (the Four Items Model) are the two most sophisticated models of failed athletic contests in the philosophy of sport literature. In this paper, I argue that the Two Ideals Model is a more plausible model of failed athletic contests than the Four Items Model. However, I also argue that the Two Ideals Model is an incomplete model of failed athletic contests. I suggest that instead of accepting the Two Ideals Model, it would be better to endorse what I call 'the Three Ideals Model'.

KEYWORDS

injustice; athletic skill; athletic superiority; official result; official final ranking

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INTRODUCTION

Sometimes a sports contest or its official result(s) may seem fundamentally flawed or defective. In such cases, a sports contest may be called a *failed athletic contest*. The two most sophisticated models of failed athletic contests in the philosophy of sport literature are Arvi Pakaslahti's (2016) model and Mika Hämäläinen's (2016) most recent model of failed athletic contests.¹ For the sake of simplicity and clarity, I will call Pakaslahti's model *the Two Ideals Model* and Hämäläinen's most recent model *the Four Items Model*.²

The main purpose of this paper is to show that the Four Items Model is not a plausible model of failed athletic contests. I begin by describing the Two Ideals Model and the Four Items Model. Then I argue that the Four Items Model faces three problems which the Two Ideals Model does not face. I conclude that the Two Ideals Model is a more plausible model of failed athletic contests than the Four Items Model. However, I also argue that the Two Ideals Model is an incomplete model of failed athletic contests. I suggest that instead of accepting the Two Ideals Model, it would be better to endorse what I call *the Three Ideals Model*.

Descriptions of the Two Ideals Model and the Four Items Model

Let's first have a look at the Two Ideals Model. Pakaslahti writes:

It could be argued that one of the built-in ideals or central goals of each sports contest is that it provides or produces an official result which reflects well the athletic excellence shown by different athletes or teams in that contest. [...] To put it slightly differently, it could be argued that one of the built-in ideals of each sports contest is that it provides an official result which reflects accurately the betterness (i.e. the athletic superiority) of different athletes or teams in that contest. I call this ideal *the Athletic Superiority Ideal*. [...] Another built-in ideal of sports contests is, I believe, that a contest provides or produces an official result which is *just* or *fair*. To put it differently, it seems reasonable to hold that one of the built-in ideals of each sports contest is that it does not lead to injustice in terms of its official result. I call this ideal *the Just Results Ideal* (Pakaslahti, 2016, pp. 281–282).

Thus, the Two Ideals Model is concerned with *realizations of two ideals*. The Two Ideals Model also claims that a sports contest was a failed athletic contest if it failed in terms of one or both of the ideals the model includes (see Pakaslahti, 2016, pp. 281–283). A good example of a failed athletic contest which failed in terms of the Athletic Superiority Ideal but which did not fail in terms of the Just Results Ideal is

¹ On Hämäläinen's (2014; 2015) earlier models of failed athletic contests, see Hämäläinen (2016) and Pakaslahti (2016). On Nicholas Dixon's (2003) model of failed athletic contests, see Hämäläinen (2014; 2015) and Pakaslahti (2016).

² Pakaslahti (2016) does not give a name to his model of failed athletic contests. Hämäläinen (2016, p. 12) calls his model of failed athletic contests 'the four criteria account' and 'the four-criterion account'. According to Hämäläinen (2016), the four items which his model consists of are also criteria of betterness or athletic superiority of athletes or teams. I believe that this view is implausible, but I cannot discuss it in this paper. Instead, I will describe Hämäläinen's model in a way that enables me to ignore his view of the criteria of betterness.

a professional boxing fight in which one of the boxers was better than the other boxer (i.e. in which one of the boxers showed more athletic excellence than the other boxer),³ but in which the better boxer was deservedly disqualified in the ninth round due to several rule violations he committed in the ninth round and some of the earlier rounds (see Pakaslahti, 2016, pp. 284–285). A good example of a failed athletic contest which failed in terms of the Just Results Ideal but which did not fail in terms of the Athletic Superiority Ideal is a football match in which one of the teams was better than the other team (i.e. in which one of the teams showed more athletic excellence than the other team), and which the better team officially won due to a serious refereeing error (see Pakaslahti, 2016, pp. 285, 287–288).

It should be noticed, however, that according to the Two Ideals Model, in order for a sports contest not to fail in terms of the Athletic Superiority Ideal, it is enough that its official result reflects the betterness of the athletes or teams accurately *in an ordinal sense*. For example, if in a football match one of the teams was much better than the other team and officially won the match 1–0, the official result of the match does not reflect the betterness of the teams accurately *in a cardinal sense* (i.e. does not reflect accurately which team was better *and* how much better it was), but does reflect their betterness accurately in an ordinal sense (i.e. reflects accurately which team was better). Thus, the match did not fail in terms of the Athletic Superiority Ideal (Pakaslahti, 2016, p. 282). In a similar fashion, even if the team that officially won the match 1–0 would have deserved to officially win the match by a wider margin, the match did not fail in terms of the Just Results Ideal because the team that deserved to officially win the match in fact officially won the match (Pakaslahti, 2016, pp. 283, 291).

The Four Items Model, on the other hand, consists of four different kinds of items or elements. These items are *display of athletic skills*, *official results*, *written-rules-based results* and *ethos-rules-based results* (see Hämäläinen, 2016).⁴

Hämäläinen (2015, pp. 18–19; 2016, pp. 9–10) defines athletic skills as those actions or action elements that a sport community values. For example, the football community values, among other things, accurate passes, possessing the ball and powerful shots (see Hämäläinen, 2015, p. 19). On the other hand, in Hämäläinen's (2014) first study of failed athletic contests, Hämäläinen did not define athletic skills as actions or action elements that a sport community values. Instead, Hämäläinen (2014, pp. 290–291) accepted the view that athletic skill consists of physical prowess and relevant mental attributes. However, Hämäläinen (2016, p. 9) claims that in his first study of failed athletic contests he referred with athletic skills to those action elements that a sport community values. Thus, I assume that Hämäläinen does not see much of a difference between these two descriptions of athletic skill. For example, it could be asked why the football community values accurate passes? Hämäläinen might answer that the football community values accurate passes because accurate passes are demonstrations of physical prowess.

³ Pakaslahti (2016, pp. 289–290) thinks that the correct criterion of betterness in sports contests is athletic excellence, with which Pakaslahti (2016, p. 290) refers to those abilities and skills that a sports contest has been designed or is supposed to test.

⁴ Of these four items, the first two are included also in Hämäläinen's (2014; 2015) earlier models of failed athletic contests.

Of all of the items of the Four Items Model, official results are the most straightforward ones. Official results are simply those results which sports officials and organisations assign or award to contests, athletes and teams. It should be noticed, however, that Hämäläinen talks about official results of athletes and teams, whereas Pakaslahti talks about official results of contests. For example, if a football match between Team T and Team U officially ended 1–0, Hämäläinen would say that Team T's official result is 1 and Team U's official result is 0 (and that Team T's official result is better than Team U's official result), whereas Pakaslahti would say that the official result of the match is 1–0 (see Hämäläinen, 2016; Pakaslahti, 2016).

It should also be noticed that Hämäläinen talks about written-rules-based results and ethos-rules-based results of athletes and teams rather than of contests (see Hämäläinen, 2016). The written-rules-based result of an athlete or team refers to what the official result of an athlete or team in a sports contest should be or should have been from the point of view of the written rules of the sport (see Hämäläinen, 2016, pp. 8–9). Consider a football match between Team V and Team W, which included one refereeing error. The refereeing error took place in the final seconds of the match when the referee incorrectly awarded a goal to Team V. The match officially ended 1–0, but it would have officially ended 0–0 if it had not included the refereeing error. Thus, from the point of view of the written rules of football, Team V's official result should have been 0, whereas Team W's official result is what it should be from the point of view of the written rules of football. This means that both teams' written-rules-based results are 0. In other words, the written-rules-based results of Team V and Team W are equally good (or equally bad).

The ethos-rules-based result of an athlete or team refers to what the official result of an athlete or team in a sports contest should be or should have been from the point of view of the ethos rules of the sport (see Hämäläinen, 2016, pp. 8–9). Consider a football match between Team X and Team Y. The match did not include any refereeing error. In the final seconds of the match, the referee correctly awarded a goal to Team X. However, Team X scored the goal in a way that violated the ethos of football. The match did not include other violations of the ethos of football. The match officially ended 1–0, but it would have officially ended 0–0 if it had not included the violation of the ethos of football. Thus, from the point of view of the ethos rules of football, Team X's official result should have been 0, whereas Team Y's official result is what it should be from the point of view of the ethos rules of football. This means that both teams' ethos-rules-based results are 0. In other words, the ethos-rules-based results of Team X and Team Y are equally good (or equally bad).

The Four Items Model is concerned with whether the official result of each of the athletes or teams reflects accurately in an ordinal sense how much athletic skill he/she/it displayed. The Four Items Model is also concerned with whether the official result of each of the athletes or teams reflects accurately in an ordinal sense how good his/her/its written-rules-based result and ethos-rules-based result are.⁵ Let's have a look

⁵ Hämäläinen puts this differently, as according to Hämäläinen (2016), the Four Items Model tests whether there is a conflict between any of the four different kinds of items. For example, consider a sports contest in which Team E achieved a better written-rules-based result than Team F but in which they achieved equally good ethos-rules-based results. We could say that

at a football match, in which Team G achieved a better official result than Team H. If it is also the case that Team G displayed superior athletic skill to Team H (i.e. that Team G displayed more athletic skill than Team H), their official results reflect accurately in an ordinal sense how much athletic skill they displayed. If, on the other hand, Team G did not display superior athletic skill to Team H (i.e. Team G displayed less athletic skill than Team H or Team G displayed as much athletic skill as Team H), their official results do not reflect accurately in an ordinal sense how much athletic skill they displayed. In that case, according to the Four Items Model, the match was a failed athletic contest. Similarly, if Team G did not achieve a better written-rules-based result than Team H and/or did not achieve a better ethos-rules-based result than Team H, their official results do not reflect accurately in an ordinal sense how good their written-rules-based results are and/or do not reflect accurately in an ordinal sense how good their ethos-rules-based results are. The Four Items Model claims that in such cases the match was a failed athletic contest (see Hämäläinen, 2016).

Three problems of the Four Items Model

Pakaslahti constructed an example of a football match in which the ethos of football was violated by two players, and which ended up being a failed athletic contest according to the Two Ideals Model. Pakaslahti used this example for rejecting Hämäläinen's (2014; 2015) earlier models of failed athletic contests, as they cannot consider the match a failed athletic contest (see Pakaslahti, 2016, pp. 285, 288–289).⁶ However, Pakaslahti's example can also be used for rejecting the Four Items Model.

The match took place between Team A and Team B. The match was free of refereeing errors and cheating,⁷ and neither team was luckier than the other team (see Pakaslahti, 2016, pp. 285, 289). Pakaslahti (2016, p. 289) claims that Team A was the better team in the match. The rationale is that Team A created legally (i.e. in a way that is permitted by the written rules of football) and fairly (i.e. in a way that is not unfair) more good scoring chances than Team B and shot the ball better than Team B (Team A's shots were more powerful and much less inaccurate than Team B's shots), whereas in all other respects their performances were equally good (see Pakaslahti, 2016, p. 285). However, Team A also created one good scoring chance *unfairly* (but legally) and scored from it:

the written-rules-based results of that contest are in conflict with the ethos-rules-based results of that contest (see Hämäläinen, 2016, p. 12). However, this conflict implies that the written-rules-based results and/or the ethos-rules-based results are in conflict with the official results. If Team E achieved a better official result than Team F, the official results are in conflict with the ethos-rules-based results, whereas if the teams achieved equally good official results, the official results are in conflict with the written-rules-based results. And if Team F achieved a better official result than Team E, the official results are in conflict both with the written-rules-based results and the ethos-rules-based results.

⁶ Hämäläinen (2016) responded to Pakaslahti's criticism by developing his second model of failed athletic contests into the Four Items Model. Pakaslahti (2016, pp. 289–290) also provided another argument against Hämäläinen's earlier models of failed athletic contests, which Hämäläinen (2016, p. 10), however, rejected.

⁷ Cheating is understood here so that a necessary condition of cheating in a sports contest is that one breaks a written rule.

In the final moments of the match, Team B is on the attack and in possession of the ball, when a player (Player P) of Team A sprains his ankle and falls to the ground in pain. A player of Team B kicks the ball out of play, so the injured player can be treated, even though this deprives Team B of the advantage. When play is restarted a player (Player Q) of Team A takes the throw-in but does not return the ball to Team B. Instead, he intentionally throws the ball to one of the attackers (Player R) of Team A, who is unmarked and in a very good position to break through the defence of Team B. Player R also does not return the ball to Team B. Instead, he breaks through, runs with the ball, feints the goalkeeper and scores. The match ends 1–0 (Pakaslahti, 2016, p. 289).

Although Team A was the better team in the match, it seems that Team A did not deserve to officially win the match because it scored its goal unfairly. The way in which Team A scored was unfair because the goal it scored was based on a violation of an important convention (or ethos rule) of football. This violation led to an unjust official result (see Pakaslahti, 2016, p. 289). It seems to me clear that the official result of the match is so unjust that the match should be considered a failed athletic contest. Thus, the right answer to the question whether the match was a failed athletic contest seems to be ‘yes’. The Two Ideals Model clearly gives this answer. But can the Four Items Model conclude that the match was a failed athletic contest?

Team A achieved a better official result, as Team A’s official result is 1 and Team B’s official result is 0. It seems also clear that according to the Four Items Model, Team A displayed superior athletic skill, because the football community values the creation of good scoring chances and because how much the football community values a shot is determined partly by how accurate and/or powerful it was. Team A also achieved a better written-rules-based result. Since the official results of both teams are what they should be from the point of view of the written rules of football, Team A’s written-rules-based result is 1 and Team B’s written-rules-based result is 0.

We can now see that if it is the case that Team A did *not* achieve a better ethos-rules-based result, the match was a failed athletic contest according to the Four Items Model, and that if it is the case that Team A achieved a better ethos-rules-based result, the match was not a failed athletic contest according to the Four Items Model. Hämäläinen (2016, pp. 9, 12) claims that Team A’s ethos-rules-based result is 0. Saying that Team A’s ethos-rules-based result is 0 means that Team A’s official result should have been 0 from the point of view of the ethos rules of football. Thus, Hämäläinen assumes that Team A would not have been awarded a goal (i.e. Team A would not have officially scored) in the final moments of the match if Player Q and Player R had not violated the ethos of football. This assumption implies that Team A’s ethos-rules-based result is *not* better than Team B’s ethos-rules-based result, which means that either both teams’ ethos-rules-based results are equally good (i.e. neither team would not have been awarded a goal in the final moments of the match if Player Q and Player R had not violated the ethos of football) or Team B’s ethos-rules-based result is better (i.e. Team A would not have been awarded a goal in the final moments of the match but Team B would have been awarded a goal in the final moments of the match if Player Q and Player R had not violated the ethos of football).

The problem is that it could not be confirmed that Team A would not have been awarded a goal in the final moments of the match if Player Q and Player R had not vio-

lated the ethos of football. Perhaps Team A would have officially won the match even if Player Q and Player R had not violated the ethos of football. It is possible (although very unlikely) that if Player Q had thrown the ball to one of the players of Team B, Team B would have lost the possession of the ball a few seconds later and Player R (or some other player of Team A) would have broken through and scored (without violating the ethos of football). But no one could ever discover whether or not that would have happened. Thus, the epistemic problem is that it would be impossible to discover what the ethos-rules-based result of Team A is. This implies that from the point of view of the Four Items Model, it is not clear that the match was a failed athletic contest. In other words, the Four Items Model leaves it open whether the match was a failed athletic contest. But since the official result of the match is clearly very unjust, it seems to me clear that the match was a failed athletic contest.

If it could be discovered what the ethos-rules-based results of Team A and Team B are and it were discovered that they are 1 and 0, it might make sense to say that the actual official result of the match, 1–0, is not unjust. In other words, if it could be discovered that the match would have officially ended 1–0 *even if* Player Q and Player R had not violated the ethos of football in the final moments of the match, it might make sense to say that the actual official result of the match is not unjust. But it is clear that no one could ever discover the ethos-rules-based results of Team A and Team B. Thus, the *possibility* that Team A would not have officially won the match if Player Q and Player R had not violated the ethos of football and the *impossibility* of discovering whether Team A would have officially won the match if Player Q and Player R had not violated the ethos of football allow us to conclude that the actual official result of the match is unjust.

So the first problem of the Four Items Model is related to the achievement of a better ethos-rules-based result. The second problem of the Four Items Model concerns the achievement of a better written-rules-based result. This problem can be illustrated with the following football match between Team C and Team D. In this match no player violated the ethos of football. However, the match included one refereeing error. The error took place on the 75th minute when one of the players of Team C shot the ball towards Team D's goal. The shot was quite powerful and the ball crossed the goal line partly before the goalkeeper managed to save the shot. However, the referee and assistant referee believed that the ball crossed the goal line completely. Thus, the referee awarded a goal to Team C. The match officially ended 1–0. Team C created six or seven good scoring chances in the match, whereas Team D had only two or three good chances to score a goal. On the other hand, despite having many good scoring chances in the match, Team C had just one shot on target (i.e. the shot on the 75th minute). However, Team D did not have any shot on target. Moreover, some of Team C's shots which missed the target were powerful and narrowly wide, whereas none of Team D's shots was powerful and all of them missed the target by three or four metres.

It seems to me clear that the official result of the match is so unjust that the match should be considered a failed athletic contest. Thus, the right answer to the question whether the match was a failed athletic contest seems to be 'yes'. The Two Ideals Model clearly gives this answer. The Four Items Model, however, cannot conclude that the match was a failed athletic contest. The Four Items Model says that the match was a failed athletic contest if it is the case that Team C did *not* achieve a better written-

rules-based result than Team D. But it is possible that Team C's written-rules-based result is better than Team D's written-rules-based result, as it is possible that Team C would have been *correctly* awarded a goal *later* in the match (e.g. on the 79th or 87th minute) if it had not been incorrectly awarded a goal on the 75th minute. However, it could never be discovered whether or not that would have happened, because no one could find out how the match would have developed if Team C had not been incorrectly awarded a goal on the 75th minute. Thus, the epistemic problem is that it would be impossible to discover what the written-rules-based result of Team C is. This implies that the Four Items Model leaves it open whether the match was a failed athletic contest. In other words, the Four Items Model cannot claim that the match was a failed athletic contest. It can only claim that the match was a failed athletic contest *if* Team C's written-rules-based result is not better than Team D's written-rules-based result. But since the official result of the match is clearly very unjust, it seems to me clear that the match was a failed athletic contest.

If it could be discovered what the written-rules-based results of Team C and Team D are and it would be discovered that they are 1 and 0, it might make sense to say that the actual official result of the match, 1–0, is not unjust. In other words, if it could be discovered that the match would have officially ended 1–0 *even if* the refereeing error had not occurred, it might make sense to say that the actual official result of the match is not unjust. But it is clear that no one could ever discover the written-rules-based results of Team C and Team D. Thus, the *possibility* that Team C would not have officially won the match if the refereeing error had not occurred and the *impossibility* of discovering whether Team C would have officially won the match if the refereeing error had not occurred allow us to conclude that the actual official result of the match is unjust.

The third problem of the Four Items Model is terminological. This problem may be less serious than the previous problems, but I think it is worth discussing. It can be illustrated with a professional boxing fight between Boxer O and Boxer P, which took place in the heavyweight division. Boxer O is a big heavyweight who is famous for his very long reach and extremely powerful punches. Boxer P, on the other hand, is a very small heavyweight who used to fight in the cruiserweight division. He also has a short reach for the heavyweight division. Boxer P is, however, a very technical boxer and is famous for his footwork, head movement and hand speed. By utilizing his huge reach advantage, Boxer O ended up landing slightly more punches in the fight. Boxer O also landed the hardest punches of the fight, but he was unable to knock down Boxer P or truly hurt him. Boxer P, on the other hand, demonstrated superior footwork, head movement and hand speed. Due to his much faster hands and much better footwork and head movement, Boxer P was able to make the fight very close. The fight was, however, very easy to score, as Boxer O landed much more punches in seven rounds and Boxer P landed much more punches in five rounds. Moreover, in those rounds in which Boxer O landed more punches, he also landed the hardest punches of the fight, whereas in those rounds in which Boxer P landed more punches, Boxer O did not land any hard punches. All three judges scored the fight 115–113 for Boxer O.

On the basis of the description of the fight and the fighters, it makes sense to say that Boxer P demonstrated superior athletic skill, as he was only narrowly beaten by an extremely powerful boxer who had huge size and reach advantages. However, since Boxer O landed more punches in the majority of the rounds and the fight as a whole,

and since Boxer O also landed the most powerful punches of the fight in the rounds in which he landed more punches than Boxer P, it seems to me clear that Boxer O showed more athletic excellence, or demonstrated superior athletic abilities, *as a heavyweight boxer*.

It is also clear that the boxing community values punches which land (except when they are not in accordance with the written or ethos rules of boxing). Moreover, the boxing community values such punches even more when they are powerful. These considerations suggest that understanding the term ‘athletic skill’ as Hämäläinen does implies the conclusion that Boxer O demonstrated superior athletic skill. However, it seems to me that with athletic skill Hämäläinen refers to a property that he should have called ‘athletic excellence’ or ‘athletic ability’. Thus, I believe that Hämäläinen uses a wrong term when he uses the term ‘athletic skill’. I think that instead of using the term ‘athletic skill’, Hämäläinen should have used the term ‘athletic excellence’ or the term ‘athletic ability’.

CONCLUSION

I have shown that the Four Items Model faces three problems which the Two Ideals Model does not face. Certainly, the third problem of the Four Items Model is trivial in the sense that it is merely terminological and could be fixed easily by replacing the term ‘athletic skill’ with a better term. The other two problems, on the other hand, are more fundamental, because they are related to some of the concepts (rather than to some of the terms) the Four Items Model includes.

Since I cannot think of the Four Items Model having any advantage over the Two Ideals Model, I conclude that the Two Ideals Model is a more plausible model of failed athletic contests. However, even if the Two Ideals Model is a more plausible model of failed athletic contests, it seems to me that it is an incomplete model of failed athletic contests.⁸ I believe that instead of accepting the Two Ideals Model, it would be better to endorse a model which includes the Athletic Superiority Ideal, the Just Results Ideal and *the Official Rankings Ideal*. I call this model ‘the Three Ideals Model’. According to the Three Ideals Model, all these three ideals should be considered built-in ideals of each sports contest. Related to this, the Three Ideals Model also claims that a sports contest was a failed athletic contest if it failed in terms of any of these ideals.

The Official Rankings Ideal is that a sports contest ends up providing official final rankings. For example, consider a ski jumping contest in which fifty ski jumpers were scheduled to compete, but which was cancelled after twenty jumps due to dangerous weather conditions. Since the contest did not end up providing official final rankings, it failed in terms of the Official Rankings Ideal and was thus a failed athletic contest according to the Three Ideals Model. Consider also a professional boxing fight, in which an accidental headbutt in the second round opened a huge cut above the right eye of the boxer who was headbutted, and in which the referee stopped the fight on the ring doctor’s recommendation after the third round and ruled the fight a no-contest. The referee ruled the fight a no-contest because the written rules of the fight

⁸ Pakaslahti (2016, p. 290) in fact notes that his account of failed athletic contests may be incomplete.

required him to make such a ruling. A no-contest as an official result of a professional boxing fight indicates that no one officially won the fight, that no one officially lost the fight, and that the fight was also not officially a draw. Thus, if a professional boxing fight ended up being officially a no-contest, it implies that neither boxer achieved a better official final ranking and that the fighters also did not achieve equally good official final rankings. In other words, if a professional boxing fight ended up being officially a no-contest, it implies that the fight did not end up providing official final rankings. This means that in the previous example, the fight failed in terms of the Official Rankings Ideal and was thus a failed athletic contest according to the Three Ideals Model.⁹

But why should the Official Rankings Ideal be considered one of the built-in ideals of each sports contest? Sigmund Loland writes:

After the last round, a boxer's points are counted and compared with those of his opponent to rank the two boxers accordingly. After all marathon runners have crossed the finishing line, we rank them according to time taken for the complete distance. [...] it is possible to formulate a general goal that characterizes sport competitions as such: the goal of sport competitions is to measure, compare and rank two or more competitors according to athletic performance. This goal seems to be common to all sports [...] It defines sport's characteristic social structure, and I shall therefore call it the structural goal of sport competitions (Loland, 2002, pp. 9–10).

So, if ranking competitors (and teams) is part of the goal that characterizes sports contests and defines sport's characteristic social structure, it makes sense to consider the Official Rankings Ideal one of the built-in ideals of each sports contest. It should be noticed, however, that measuring and comparing are merely means for ranking competitors. Loland (2002, p. 9) in fact notes that 'measuring and comparing performances leads to a final ranking of competitors according to performance'. Thus, although it makes sense to say that measuring, comparing and ranking competitors define sport's characteristic social structure, I believe that measuring and comparing competitors are not part of the structural goal of sports contests; it seems to me that the structural goal of sports contests is to rank competitors rather than to measure, compare and rank competitors.

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⁹ It should be noted that in the fight of the previous example any other official result than a no-contest would have been a very unjust official result. For example, if the referee would have mistakenly believed that the cut had been caused by a punch and he would have therefore awarded a technical knockout victory to the boxer who accidentally headbutted the other boxer, the official result would have been very unjust. Thus, the fight did not end up failing in terms of the Just Results Ideal but would have failed in terms of the Just Results Ideal if it had not been ruled a no-contest (in which case it would not have failed in terms of the Official Rankings Ideal).

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